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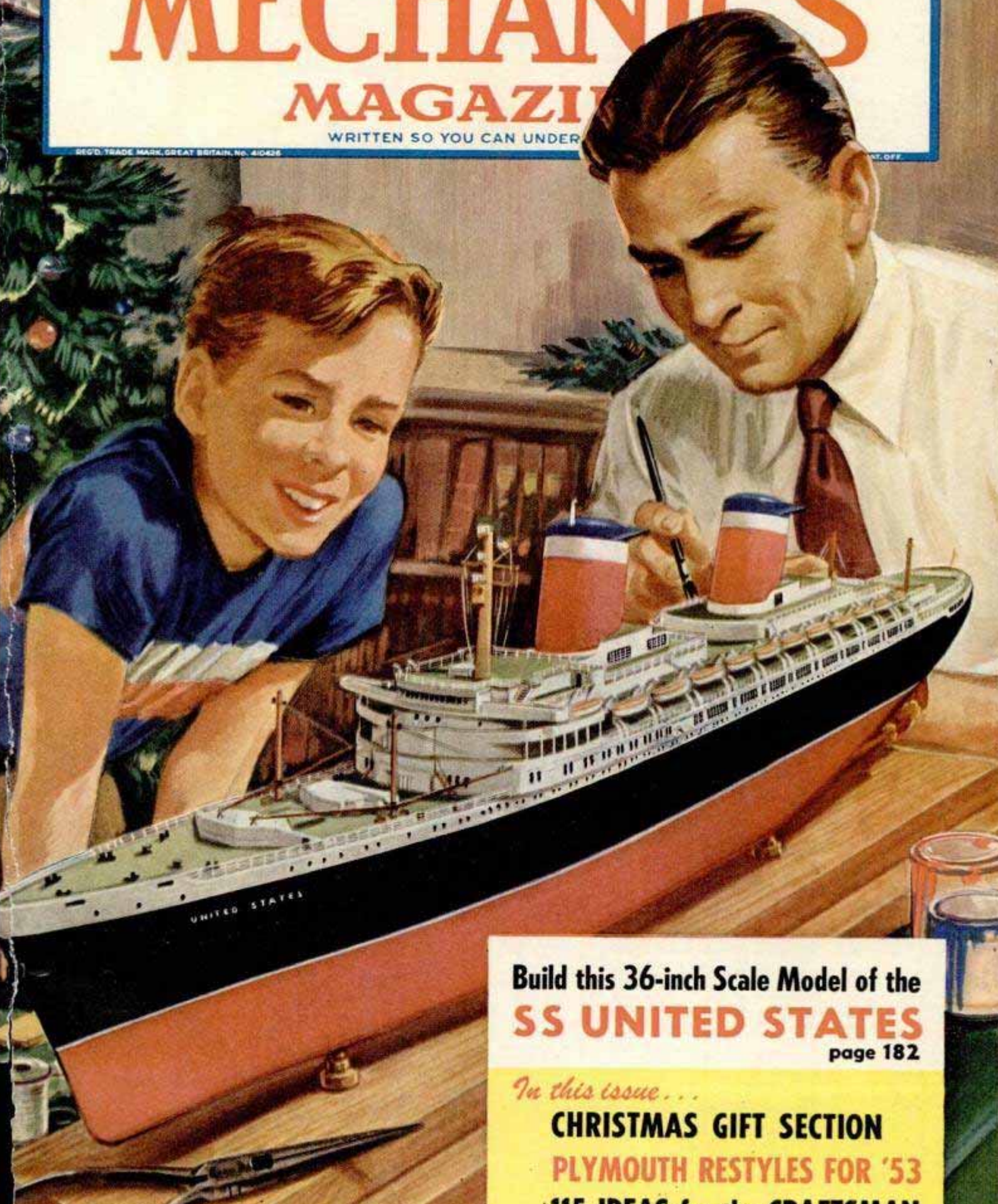
POPULAR MECHANICS

MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND

REG'D. TRADE MARK, GREAT BRITAIN, NO. 410426

PRINTED IN U.S.A.



Build this 36-inch Scale Model of the
SS UNITED STATES

page 182

In this issue...

CHRISTMAS GIFT SECTION

PLYMOUTH RESTYLES FOR '53

45 IDEAS FOR THE CRATCHMAN

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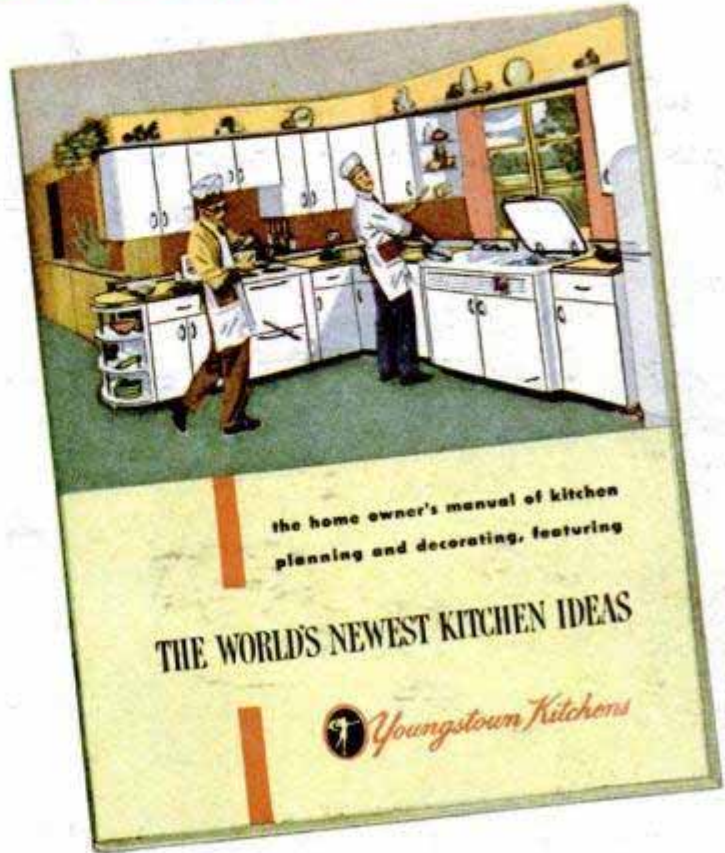


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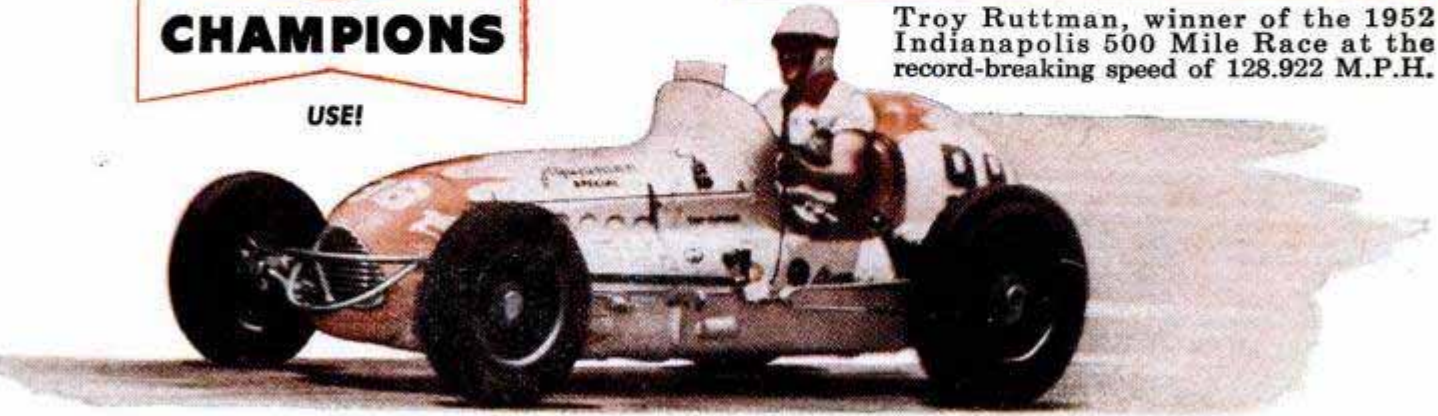
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USE!



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Popular Mechanics Magazine

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H. H. WINDSOR, Founder

H. H. WINDSOR, JR., Editor and Publisher



this month's cover

CHRISTMAS is a time for many things—the sparkling gaiety of a special tree and the deep, rich tones of church chimes ringing out the age-old hymns. Best of all, perhaps, Christmas is a time when members of a family draw quietly together again, when a good, warm feeling goes with every family activity. Our cover shows a scene that soon will be duplicated in thousands of American homes, in one way or another. Dad and son are working as a team on a special project, one they can't seem to find time for during the rest of the year. It could be almost any project, but in this case it's something extra special—a 36-inch model of that new queen of the seas, the *SS United States*. On page 182 is the first of a series of articles on building this beautiful model. The series includes complete plans for the ship, from the keel to the crown of the supersmokestacks. It's a project well worthy of any father-son team. Why not launch it during the holiday season?

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DECEMBER 1952

Number 6

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Above: Mr. Wizard in a demonstration of oxygen and combustion. Center: With helpers, Willy and Betsy, watching bottle fountain and action of carbon dioxide in bubbles. Willy and Betsy in a test that proves sound isn't so easy to locate. Hundreds of pictures like these in Mr. Wizard's book.

Some of 150 Projects and Experiments Explained and Pictured for Boys and Girls to Do at Home

- | | |
|--|--|
| Why salt melts ice. | How to make . . . |
| Experiments with vacuum. | Static electricity |
| What is air, oxygen, atmospheric pressure? | Water boil with an ice cube |
| What makes an airplane fly? | Your own telephone with tin cans |
| What is gravity? | Music boxes |
| Why does hot air rise? | Compasses |
| What is steam? | Your own telegraph set |
| Why does corn pop? | Water boil in a paper box |
| What are molecules? | Fire extinguishers |
| What is carbon dioxide? | How to carry sound in your finger tips |
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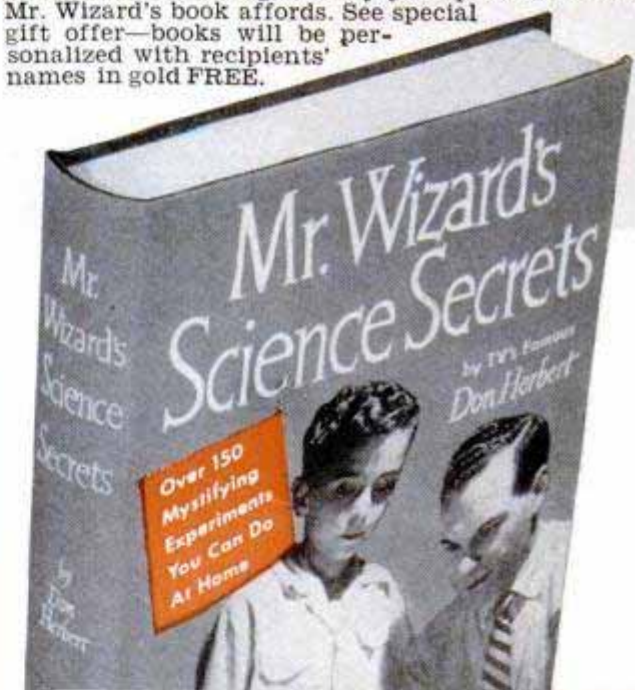
Mr. Wizard answers most of the questions children ask. They're all in his book. His answers and demonstrations are so fascinating that youngsters actually have fun learning the facts they should know and they never tire of learning. Parents and teachers will find the book a helpful treasure.

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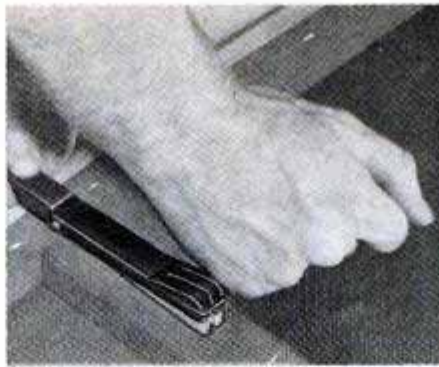
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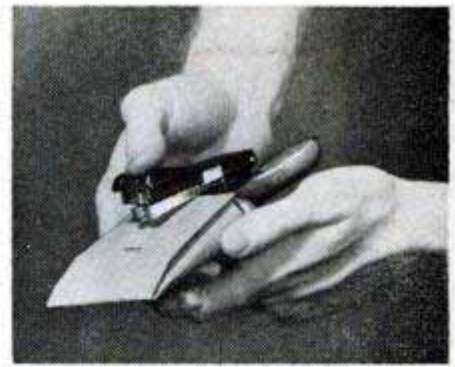
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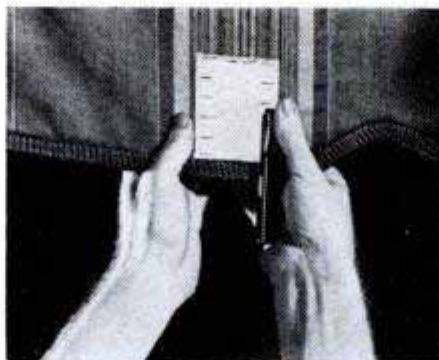
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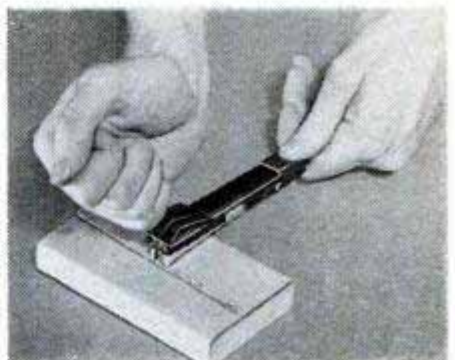
PUT WRAPS on your paint brushes between jobs. *Bostitch B-8* has removable base for getting into tight places.



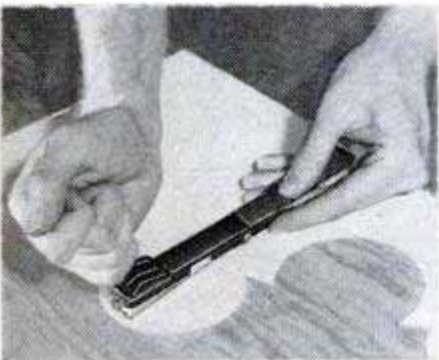
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THE EDITORS



Letter to the Editor:

In Floyd Clymer's test of the '52 Lincoln (PM, Oct. 1952) he mentioned that the hand brake was at the right side and hard to apply. The hand brake may be hard to apply, but it is not on the right side!

Rod Smith,
Butte, Mont.

Correct, sir, the brake is on the left!—
Editor.

Wooden Lungs for Polio Victims

During a visit to Hillsboro, Ore., Gov. Earl Warren of California and his daughter Nina, a recovered polio patient, examined with interest one of the hundreds of



"wooden lungs" built from *Popular Mechanics* plans. More than 1200 civic and fraternal groups in the United States and abroad requested the plans, which were furnished free, after an article describing the construction appeared in the magazine's January 1952 issue. The lung was designed for emergency use in the treatment of infantile paralysis. It was designated as the "project of the year" by the United States Junior Chamber of Commerce, with 678 local bodies building lungs for their communities. Other organizations actively participating were Lions clubs, American Legion posts, Boy Scout troops, lumber merchants' association, the National Association of Letter Carriers and police and fire departments. Typical of many projects was that of the Hillsboro Junior Chamber of Commerce. After its directors voted to build the lung and received the plans, a workshop was set up in the garage of member Theodore F. Oberlander, project chairman. For the next two months 21

(Continued to page 8)

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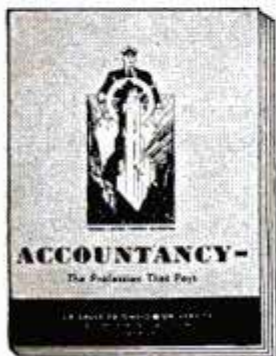
And knowing these facts, ask yourself if there can be any further question about the practicability of this training for you—ask rather if the real question is not about the size of your own ambition and the quality of your determination.

For Accountancy is no magic wand for the lazy or the fearful or the quitter—it offers success only to the alert adult who has the courage to face the facts and the will to carry on till the job is done.

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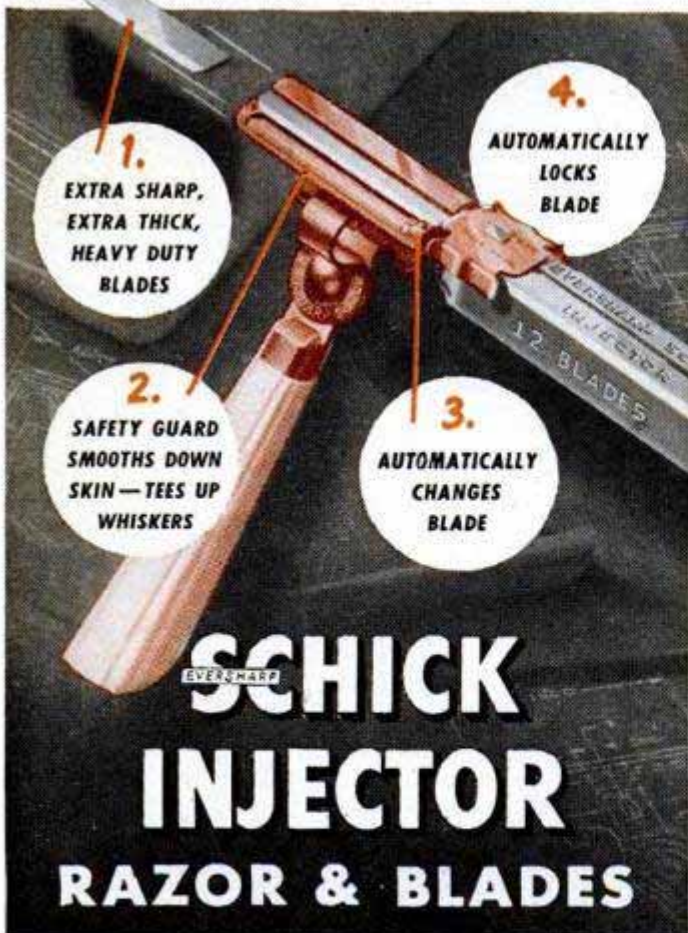
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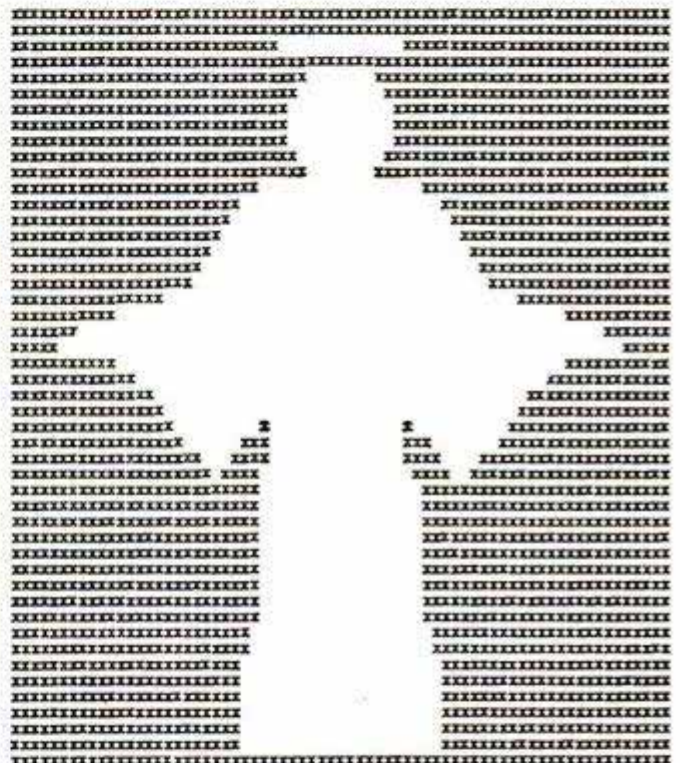
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(Continued from page 6)

of the members, almost all of them inexperienced craftsmen, put in a total of 327 hours building the lung. The entire cost of materials was \$187.55. On completion the lung was presented to Washington County and it is now constantly available for its lifesaving role at the county hospital.

Letter to the Editor:

Right up to the last minute of the day before Christmas the thousands of Associated Press Teletype machines all over the country pound out their news dispatches for newspapers and radio and television commentators. But with the start of Christmas Day the news releases dwindle and finally the machines stop their clicking.



Then a bell rings, the machines start to chatter again and this time strange messages that never get into any newspaper start coming across the wires.

Usually the message is in the form of an intricate drawing, carefully tapped out with the letter X. As soon as one operator finishes, another starts.

These messages are Christmas greetings from one operator to another. There are huge Santa Clauses, stars, sacred silhouettes, Christmas trees and dozens of others, all bearing messages of good will.

Considering the limited equipment which the operators must use, most of the X-drawings are works of art. Actually, many days of planning, and careful counting of spaces go into the messages.

All of them follow the same motif; most contain messages of cheer found on an

(Continued to page 10)

ARE THESE MISTAKES HOLDING YOU BACK?

If you're not getting ahead as fast as you'd like, check these possible reasons. Find out why you're not a success and what you can do about it.

- YES NO
- Do you put things off?** To get anywhere you have to make a start.
 - Do you really want to succeed?** Isn't there something you want enough to work for it? Marriage, a new home, money for your family—all depend on your advancement.
 - Are you unwilling to give up temporary pleasures?** Some people think more of a good time now than of promotion and higher pay later on.
 - Are you too lazy to plan ahead?** You've got to manage your life, plan for success and stick to it.
 - Are you afraid of responsibility?** In a bigger job you'll have to make decisions, act, be somebody.
 - Are you short on courage?** It takes grit and determination to set a course and stick to it.
 - Is your education limited?** The good jobs go to men who know—men with sound training in their field. I. C. S. offers you that training.
 - Do you think you can't afford specialized training?** College may be too expensive, but home study lets you earn while you learn, at 1/10 the cost.
 - Do you hesitate to find out where to get training?** If you shy off from taking the first step, you'll never achieve success.

One out of three who read this page and check their shortcomings will do something about it. Two will stay in the rut. One will plan for self-improvement and stay with it till he gets there. Are you the one?

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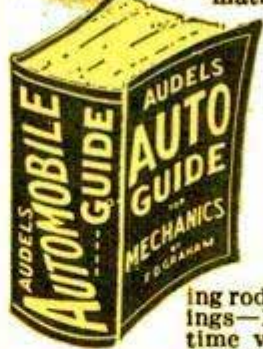


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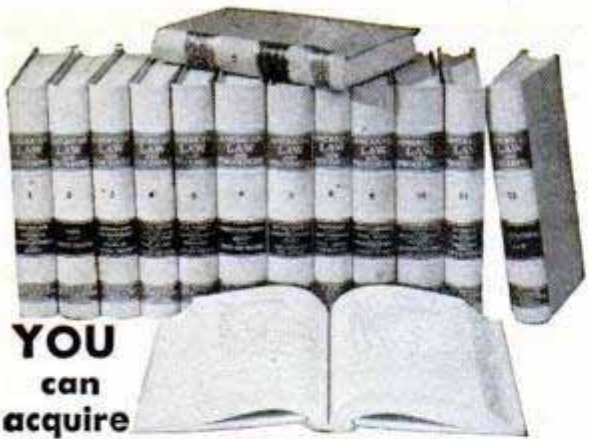
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☞ South America and South Africa probably were once joined by a broad land bridge, Dr. Kenneth Caster of the University of Cincinnati told members of the International Geologic Congress, citing similarities in certain geologic features.



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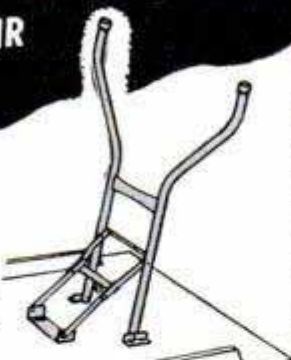
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(Continued from page 10)

transmission. A mechanic in the local Chevrolet garage told me that on Sept. 19, 1952, three Chevrolets with V8 engines and one straight 6 Chevy with a new automatic transmission stopped at the garage for repairs. The straight 6 had broken a connecting rod. The four were on their way back to Flint, Mich., from Denver, Colo., where they had tested the cars on Pikes Peak and other rugged terrain.

Below are the facts that I could find out about the four cars:

1. The new transmission had the letters on the indicator quadrant arranged in a different manner and there was an extra position marked S. . . .

2. The V8 engines "looked like baby Cadillac engines."

3. The tail pipe on the V8s had been changed to the right side.

4. Some of the mechanics had rides in the V8s and according to them the V8s had plenty of pickup. One Chevrolet engineer got the V8 up to 100 m.p.h. on the speedometer. This was accomplished on a curving and hilly stretch of highway.

All the above facts are true so far as I know. I did not see the cars myself, but the mechanics are reliable.

Harold Cooney,
(Student in mechanical engineering, State University of Iowa, Iowa City, Iowa.)

According to our reports, the V8 won't be ready for the 1953 Chevrolet line. — The Editor.

Letter to the Editor:

Regarding the "Owners Report on the '52 Lincoln" (PM, Oct. 1952) and referring to the center-fill gas tank, it does not take much ingenuity to place the cap so it will hold the license plate down while the gas is being put in the tank. Now, the location of the battery: The proper place for a heavy unit like the battery is as low as practicable considering the road clearance of the car. Why impair the stability of the car by placing this weight as much as three feet from the road as is done in some cars? I enjoy articles by Floyd Clymer.

Frank M. Hogan,
Blaine, Wash.

Letter to the Editor:

I wish to inform you that I received the beautiful scroll on which *Popular Mechanics* placed Nikola Tesla. I wish to thank you personally as well as in the name of the State Committee for the Commemoration of the Tenth Anniversary of Tesla's death and the 100th Anniversary of Tesla's birth,

(Continued to page 20)

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(Continued from page 18)

also in the name of the Nikola Tesla Institute of which I am the president.

The citation will be placed in the Nikola Tesla Museum in Belgrade which is now in the process of organization. I am sure that as Tesla's admirers it will interest you to know that all of his papers are now here in the Tesla Museum and that they contain a priceless record of the historic development of the electrical era. As soon as all his papers are sorted this will be material for years of study and research.

Sava N. Kosanovic,
Minister of State,
Belgrade, Yugoslavia



Publisher Visits Aberdeen

Secretary of the Army Frank C. Pace, Jr., (right) greets H. H. Windsor, Jr., publisher of *Popular Mechanics* at first public demonstration of the Army's new 11-inch mobile gun which will fire atomic shells. In the demonstration at Aberdeen Proving Ground one of the 85-ton guns fired a conventional shell which exploded in view of the spectators on the reviewing stand.

Letter to the Editor:

Here's a curiosity that may interest you: A Swiss manufacturer replaces the gasoline engine of a Willys Jeep with a 6-cylinder, 35-horsepower diesel engine. Total cost of the Jeep with diesel is \$2750; with standard gasoline engine \$2500. Both prices apply in Switzerland.

Peter Wildermuth,
Ruti, Switzerland

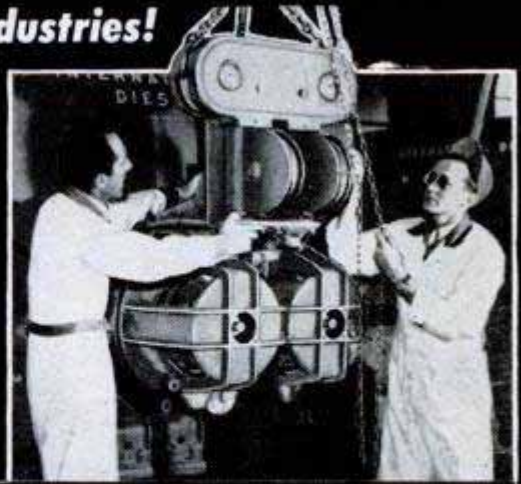
☐ A new kind of bullet to replace the traditional tracer bullet has been invented by Peter P. Alexander of Beverly, Mass. He has discovered that bullets made of an alloy of lead and zirconium burst into flame on impact with the target.

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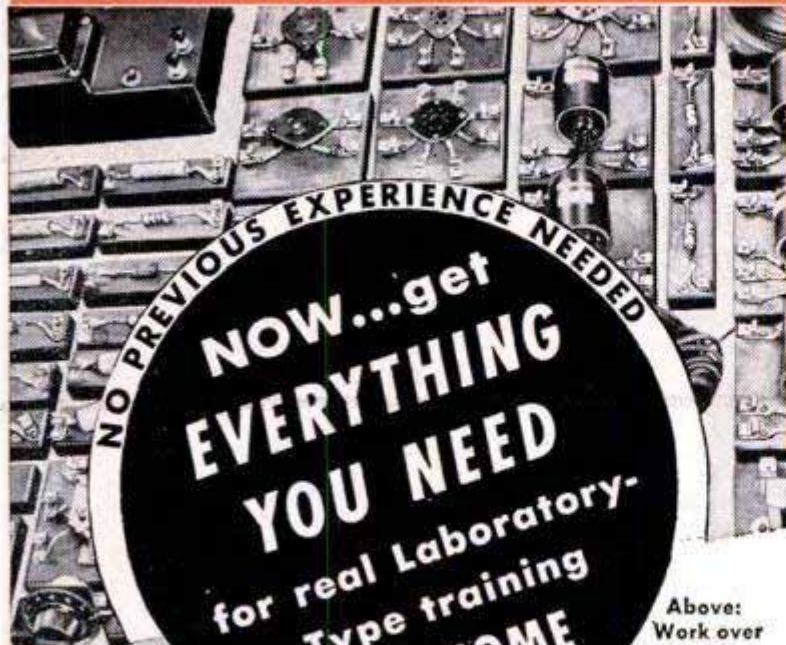
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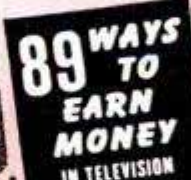
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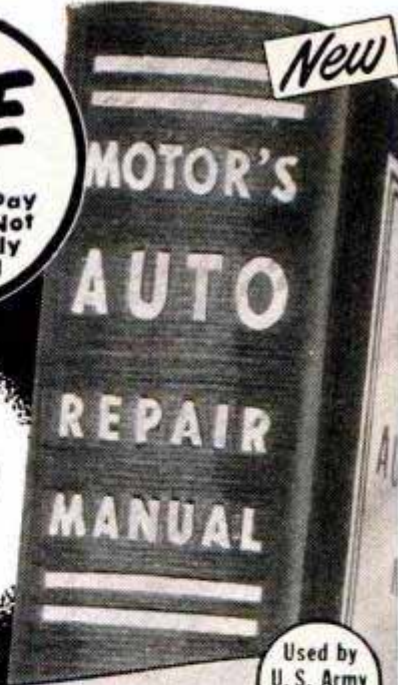
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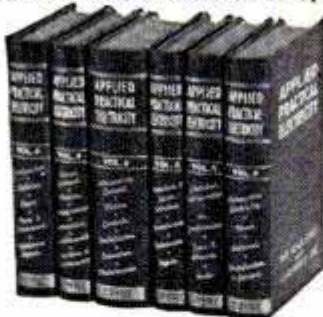
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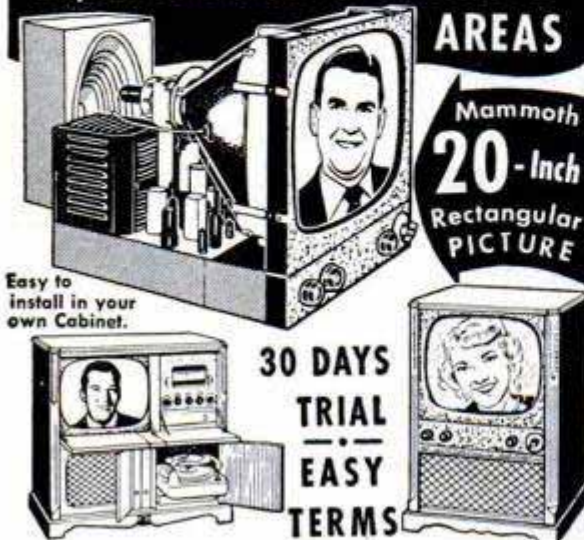
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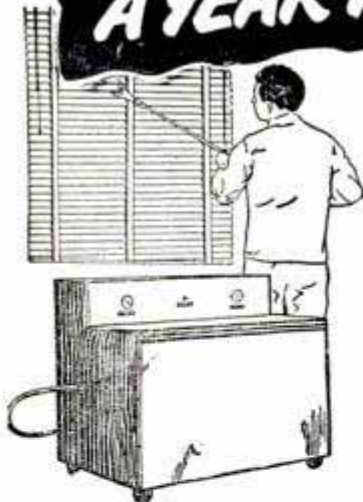
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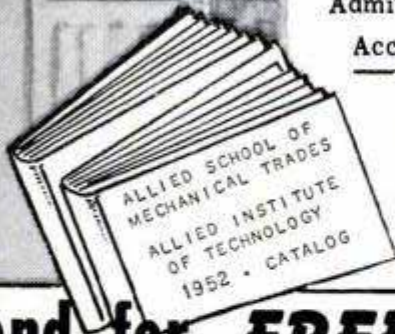
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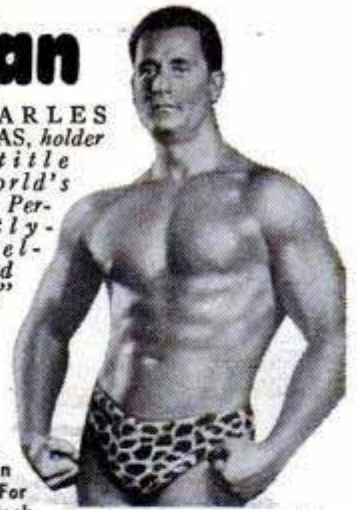
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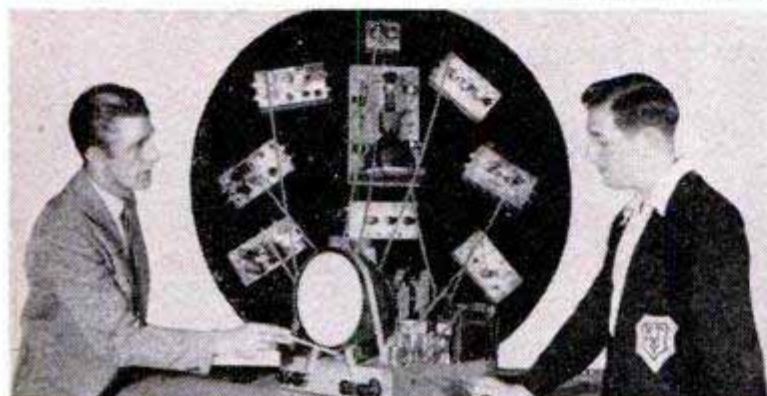
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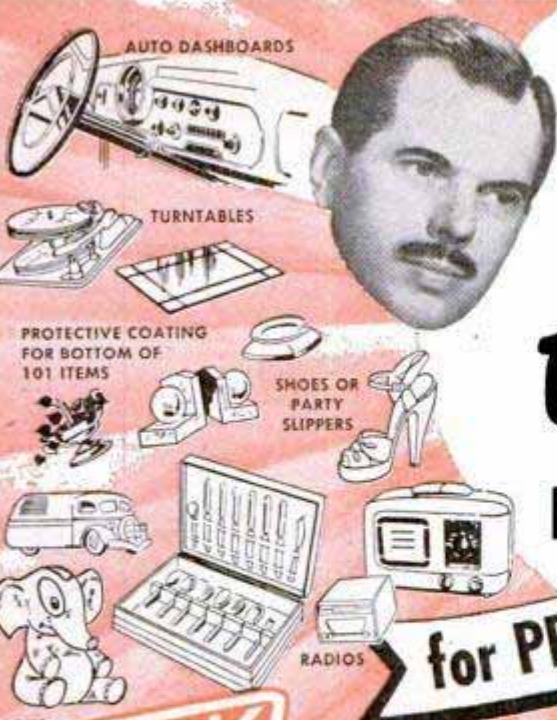
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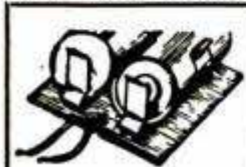
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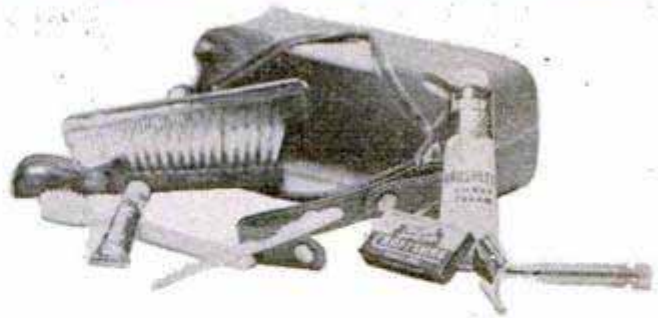


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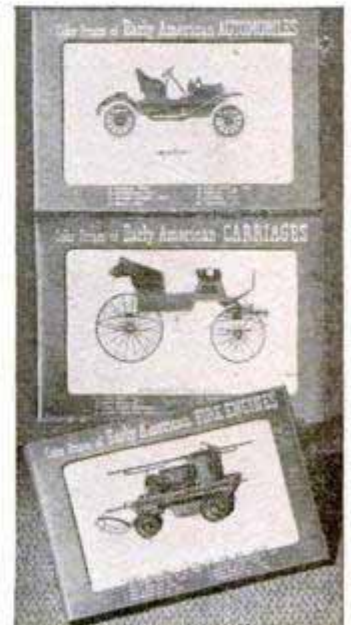
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POPULAR MECHANICS

DECEMBER
1952

WRITTEN SO YOU CAN UNDERSTAND IT
VOL. 98 NO. 6

The Magic of SILENT SOUND

By *Thomas E. Stimson, Jr.*

FANTASTIC, almost incredible, things are being done with sound waves pitched so high, or so low, that we can't hear them.

With ultrasound we can look inside castings and forging and examine them for flaws as easily as if they were made of ice. The same high-frequency vibrations are used by physicians to treat patients. Sometimes an arthritic patient finds much of his disability vanishes after a 10-minute treatment that he didn't even feel or hear.

Infrasound, an uncanny form of energy only recently investigated, can perform many heavy tasks. Prof. F. J. Converse of California Institute of Technology is using infrasonic energy to compact loose beach

sands into roads that can support heavy truck traffic.

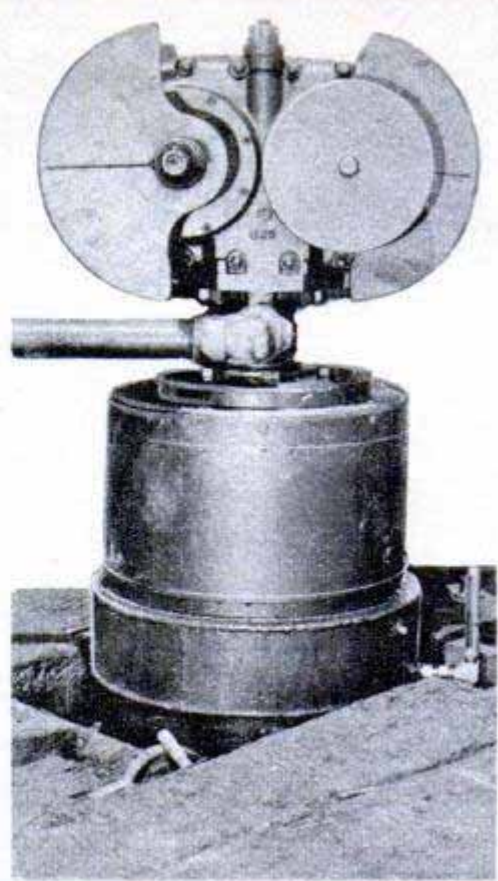
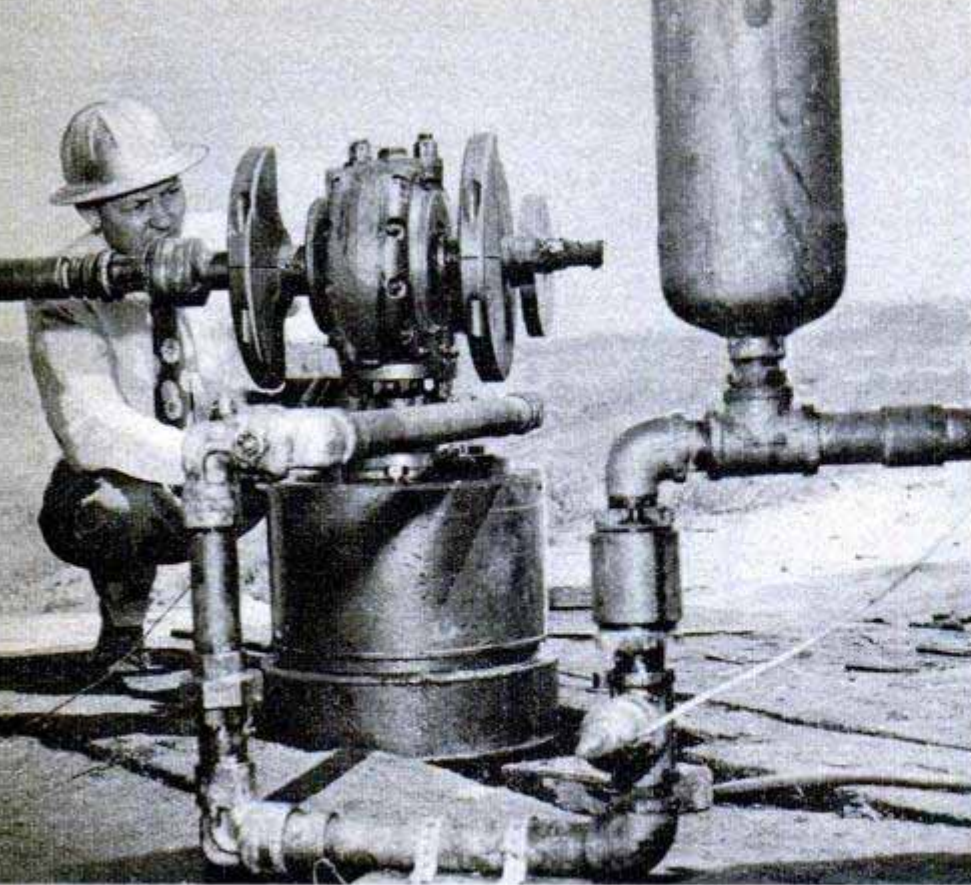
Our ears detect sound waves that vibrate from about 20 to some 20,000 cycles per second. Vibrations above that band are ultrasonic; those below are infrasonic.

Recently at Ventura, Calif., petroleum engineers watched a thing that seemed positively supernatural—a drilling rig that was "making hole" a mile beneath them without any of the usual commotion.

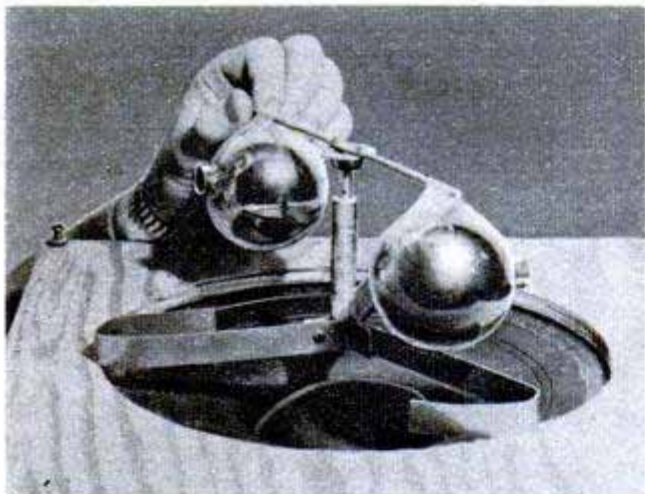
No big machinery was in motion. The

Patient's arm is being treated with ultrasonic therapy. Crystal in the transducer head vibrates at one megacycle per second





Left, infrasonic vibrations cause this pump to bring oil from deep wells. Wave generator, center, consists of two weights, shown more clearly at right, geared to exert vertical thrust as they are rotated by an engine

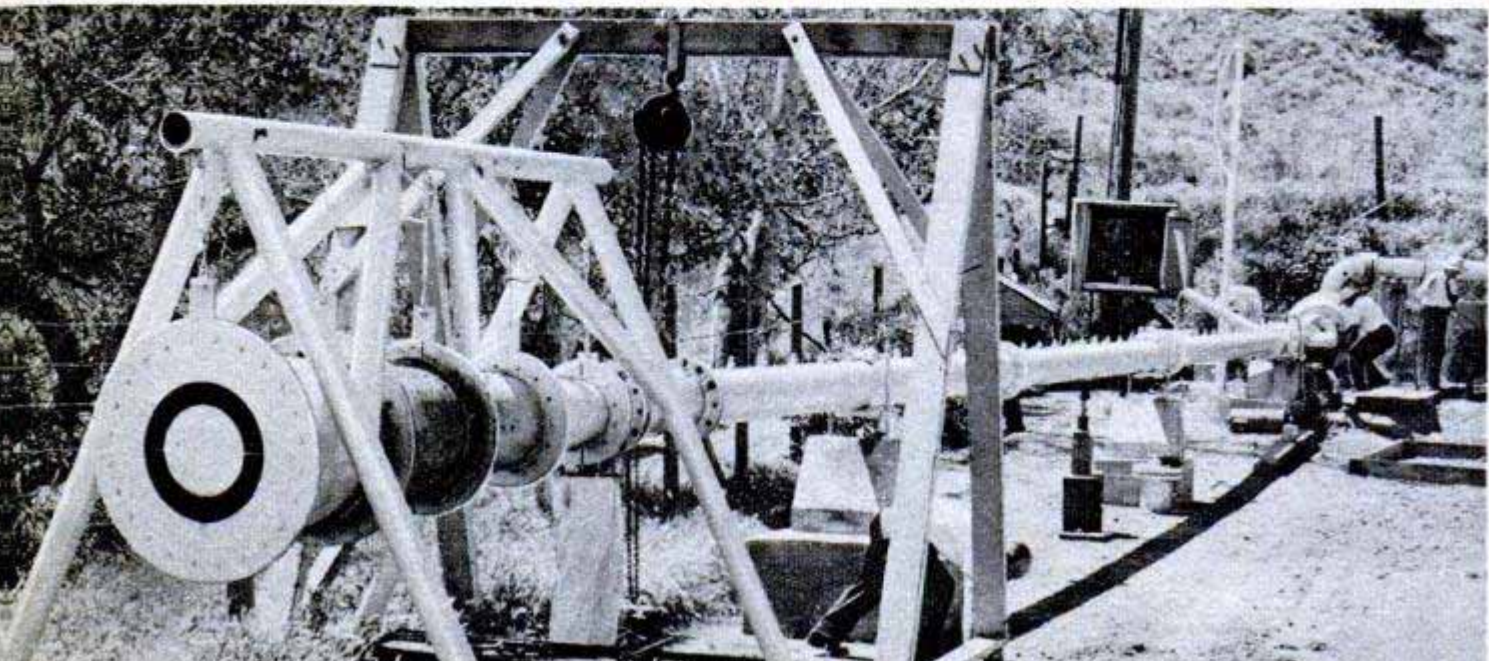


rotary table was standing still and yet the drill pipe was dropping steadily into the hole. The only noise that could be heard was the clank of the mud pump as it circulated a stream of mud down into the well and forced up to the surface the debris of the drilling process.

What the engineers were watching was a sonic drill that may revolutionize the science of drilling for oil.

The apparatus uses infrasonic energy to fatigue and break up the formation ahead of the drilling bit. Sound waves do the work cheaper, produce straighter holes and eliminate most of the tedious "round trips"

Above, when loudspeaker below these balls produces intense sound, jets of air issue from openings in balls, making the pivoted arm rotate. Below, 1400-horsepower siren is at the opposite end of a long wave-guide tube



necessary to replace a worn or damaged bit.

One of the amazing things about the drill is the tiny amount of power required to drive it. All the energy it needs comes from the movement of the mud that is circulated down into the well. And yet the acoustic drill smashes its way through solid granite, a heartbreaking rock for most drillers, as rapidly and easily as an ordinary rotary bit cuts through soft shale.

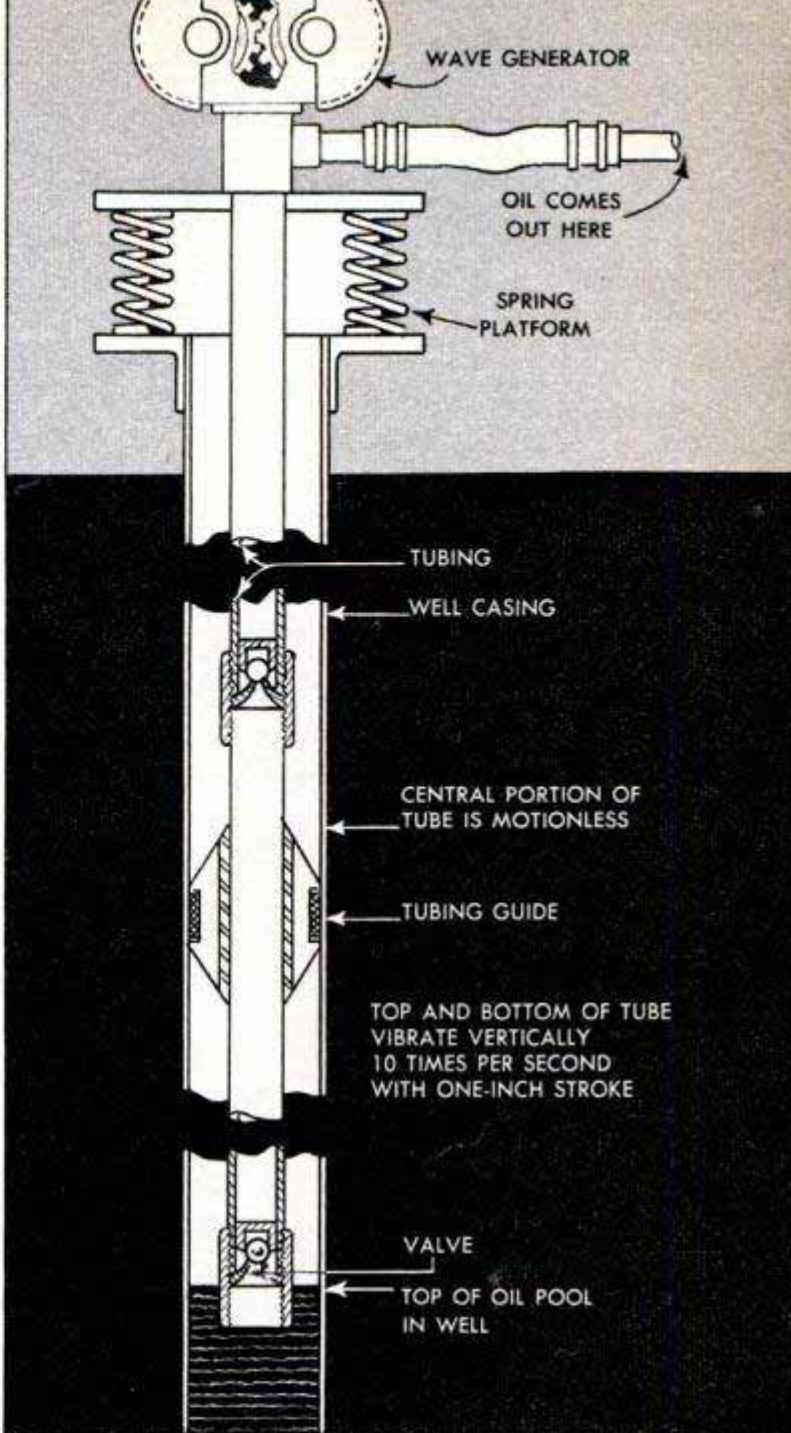
Not all of the bugs have been worked out of the drill to date, but already it appears that extreme depths that have been unattainable for sheer mechanical reasons will soon be easy to reach.

On the same day that the engineers watched sound waves drilling a well, they inspected an acoustic pump, a simple device that imparts infrasonic energy to the tubing of an oil well. Presto! The oil flows out of the well almost with gusher force.

The sonic pump consists merely of a pair of weights arranged something like out-of-balance flywheels. They rotate in opposite directions and in phase with each other so that both exert vertical thrust at the same time. Attached to the top of a string of oil-well tubing that hangs free in the well, this generator puts elastic wave energy into the tube. The resulting resonant action produces rapid elongations and contractions of each end of the tube.

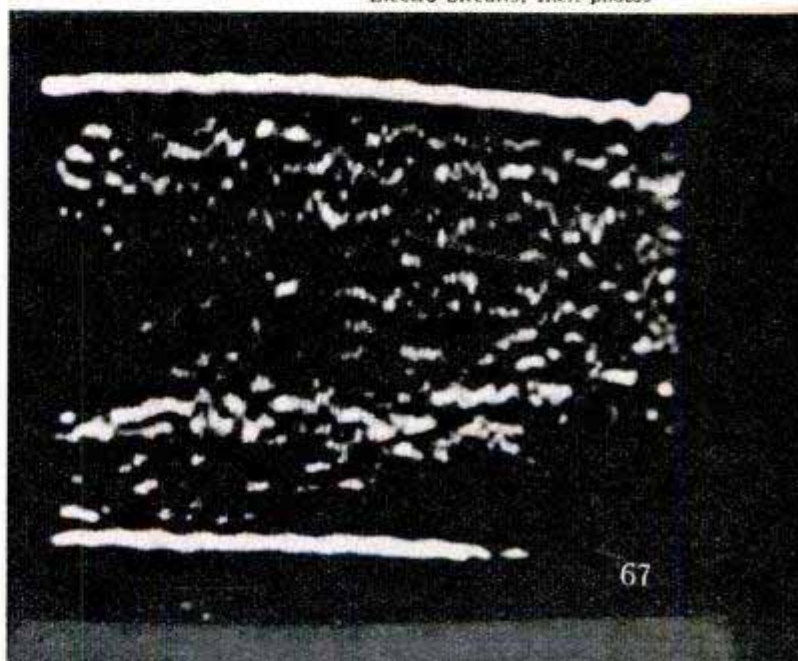
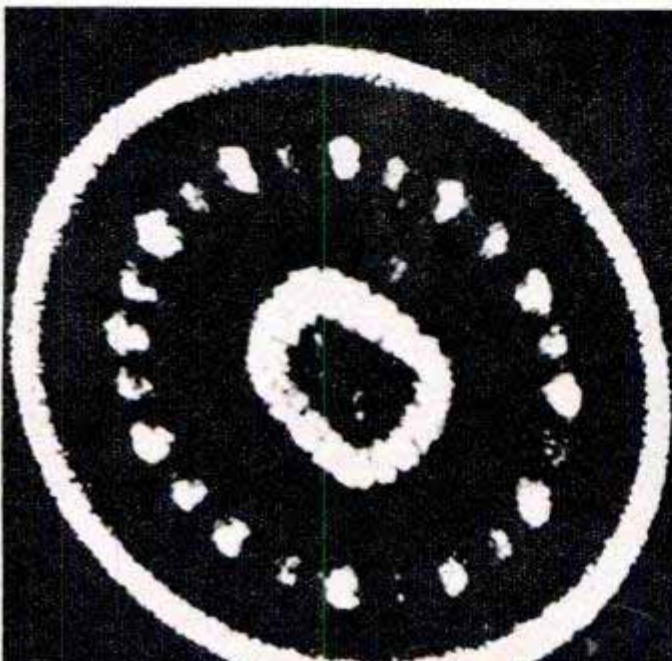
In effect, the bottom of the tube reaches down into the oil, traps some of the oil above the first of a series of check valves, lifts the oil, then reaches down for another gulp. Each stroke is only a little more than an inch long but the end of the tube makes 10 strokes per second. The net result is a pump that lifts hundreds of barrels of oil a day.

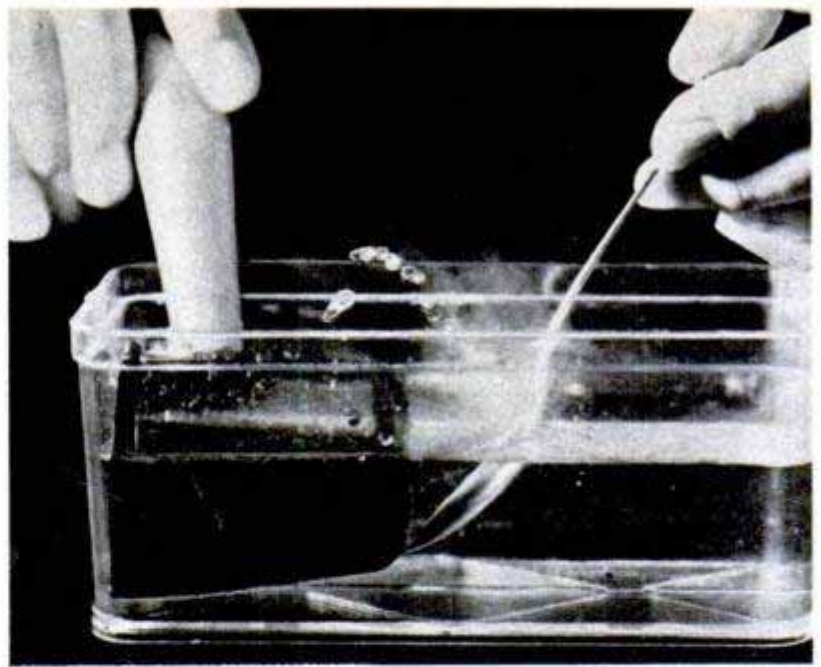
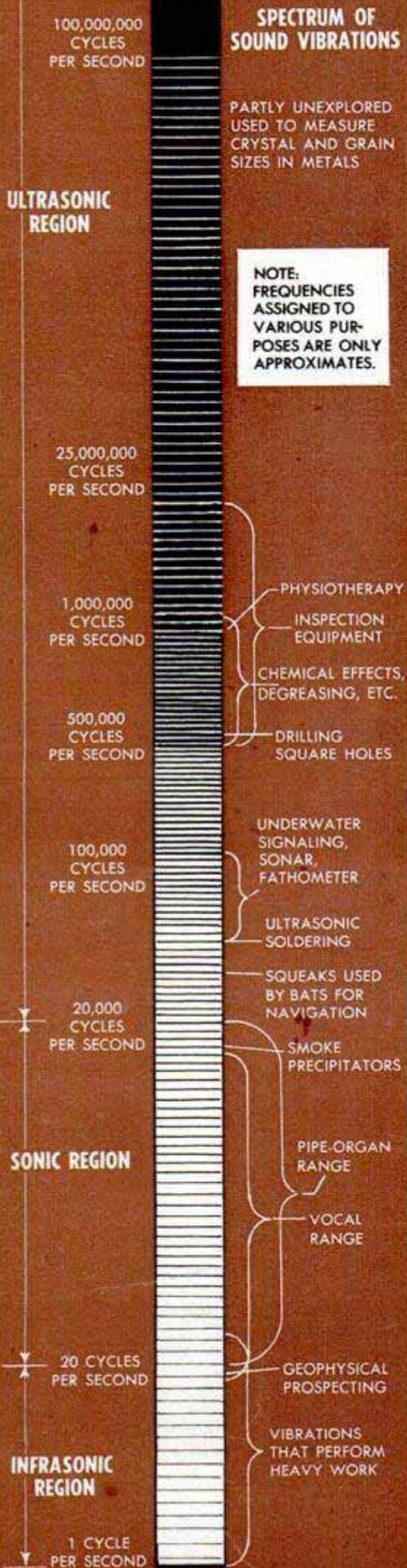
It's a pump that works by sound because, by definition, sound waves are "periodic disturbances in an elastic medium." All such vibrations, no matter whether they occur at the rate of one per second or



As tube in sonic pump vibrates, its open end dips in and out of the oil, lifting it an inch per vibration

Below left, ultrasonic photo of steel-bar exterior. Right, interior of forged aluminum bar "seen" sonically
Electro Circuits, Inc., photos





Electro Circuits, Inc., photo

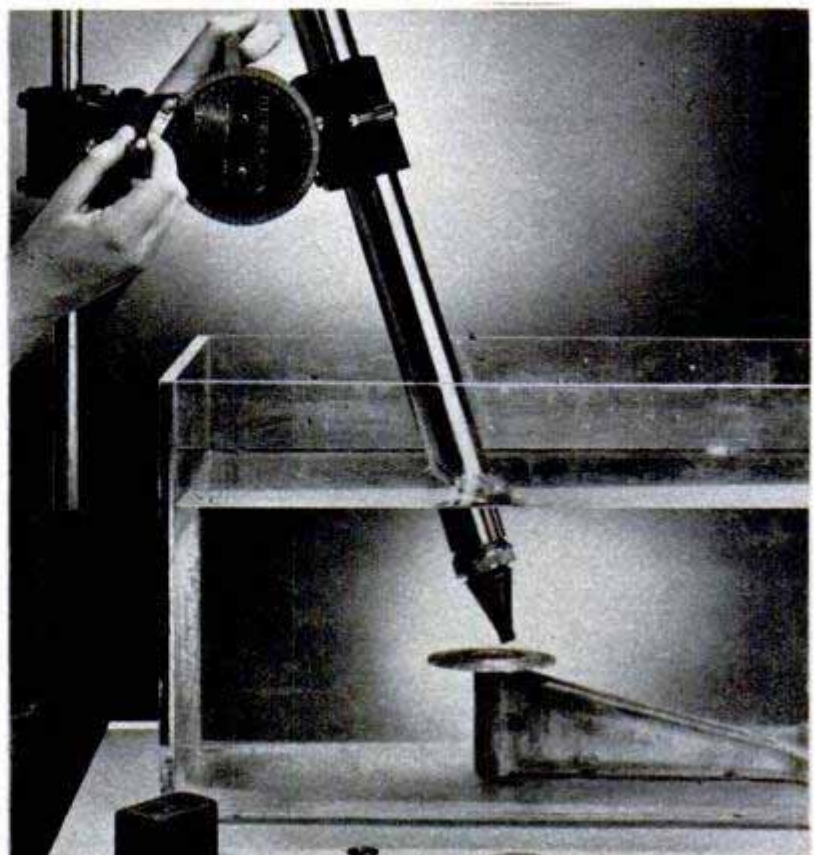
Transducer in water at left emits one megacycle per second. Energy bounces from bowl of spoon, causing column of water to jump up

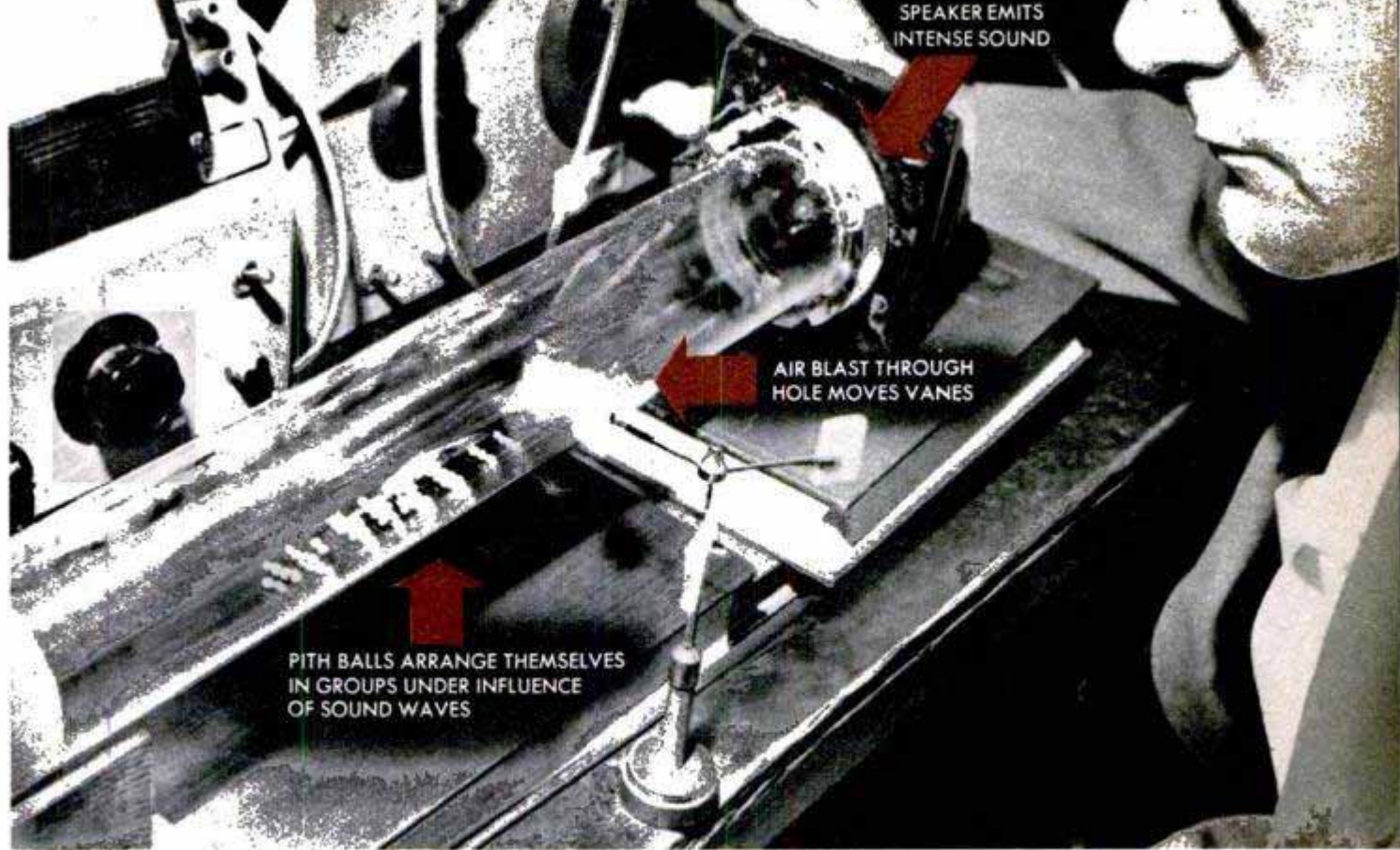
millions of times per second, follow the same acoustic principles.

The "Soundrive Pump" and the "Soundrill" stem from research by Albert G. Bodine of Los Angeles, a pioneer investigator of infrasonic energy. Important as they appear to be, they are mere peanuts compared to another use that Bodine foresees in the near future for infrasound.

These low-frequency waves hold the promise of doubling the amount of oil that can be extracted from the ground. By conventional methods no more than 25 to 35 percent of the oil is obtained from any petroleum deposit. All the rest remains locked or clogged up in the rocklike sands. Today it appears that infrasonic energy can be used to vibrate the formations, or heat them up, to release once again as much oil as we have

Below, interiors of metal pieces are checked ultrasonically with transducer at end of tube. The inspection must be done underwater





Intense sound causes pith balls to assemble in clumps and forces jet of air from hole in sealed plastic tube

been getting. In a sense, oil would be melted out of the rock.

"The sonic pump in its present form vibrates the surrounding rock to some extent and unclogs it, enabling more oil to flow," Bodine says. "Now we are designing new pumps that will transmit some of their energy into the formation at the same time they do the pumping job. Experiments with cores of oil sands indicate we can

about double the total production of oil from any deposit."

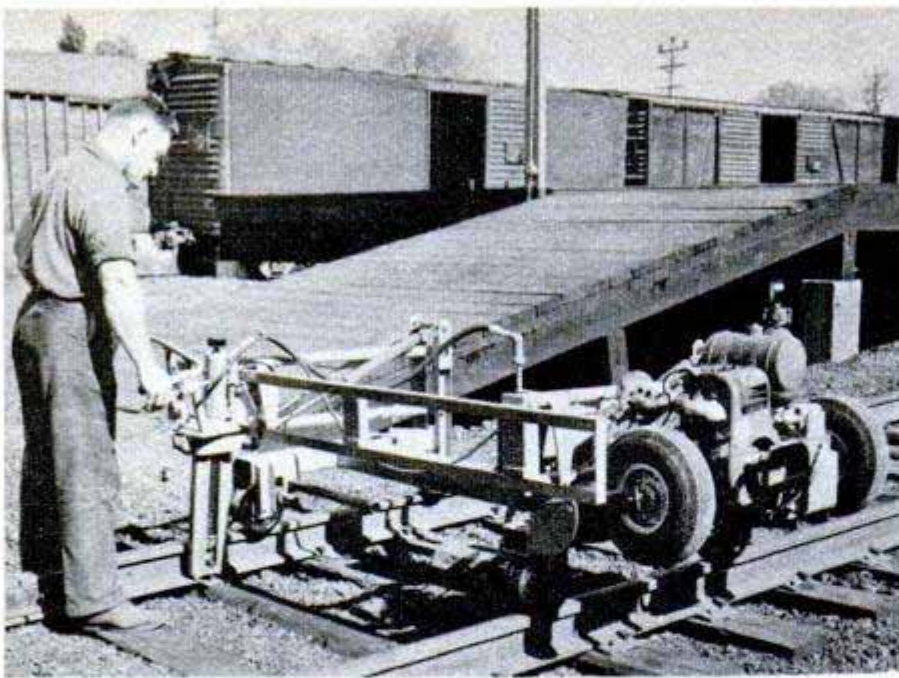
Among other activities, Bodine is making a basic study of the entire science of high-amplitude sound in cooperation with Drs. R. W. Leonard and I. Rudnick of UCLA for the Office of Naval Research.

One of their tools is one of the world's most powerful sirens, located in a remote

(Continued to page 248)

Simple shapes with flat surfaces are checked out of water. Coating of oil on surface transmits ultrasonic waves



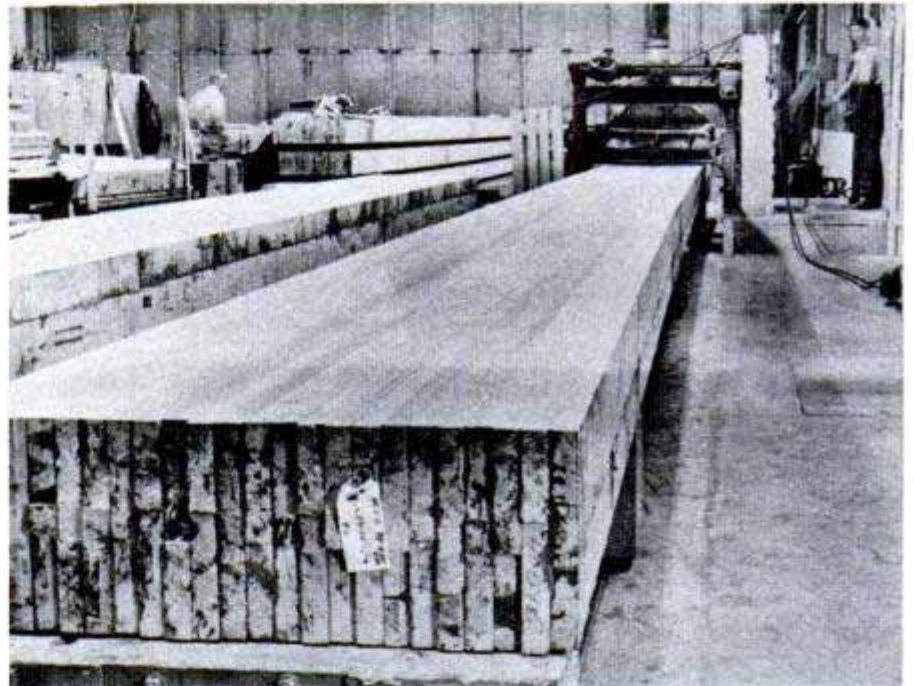


Hydraulic Spike Yanker

Railroad maintenance is aided by a unit that pulls spikes from ties at a speed of 8 to 12 a minute by a gasoline-powered hydraulic machine. The pulling mechanism, mounted on counterbalanced arms, is quickly swung from one rail to the other. One man operates the machine and, despite its 685 pounds, can lift it on and off the rails alone, as the unit is equipped with two set-off wheels and lift pipes.

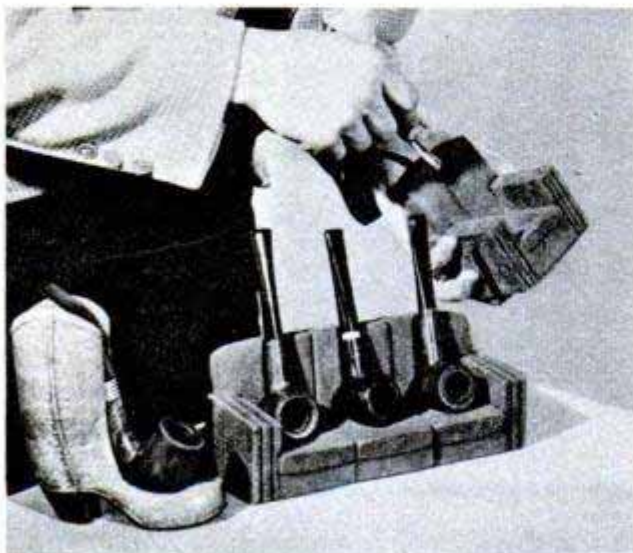
"Railroad" Planer Smooths Large Laminated-Wood Trusses

Huge beams and trusses made of laminated wood ride four-wheeled flatcars through a big planer that trims and smooths the rough surfaces. The "railroad" planer speeds the finishing operation considerably, replacing hand sanders. The largest beam handled by the planer, built for a dredge, measured 90 feet long, 12 inches thick and tapered in width from 52 to 36 inches.



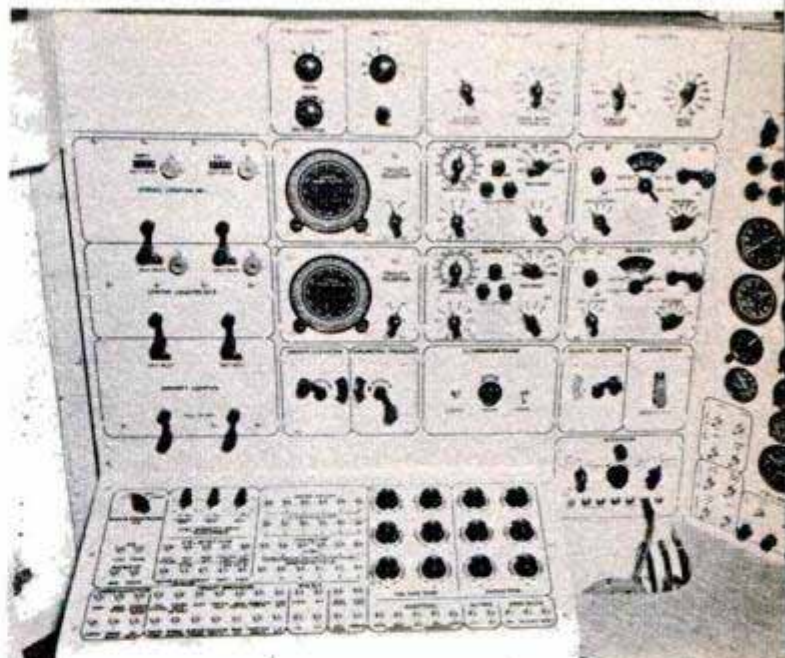
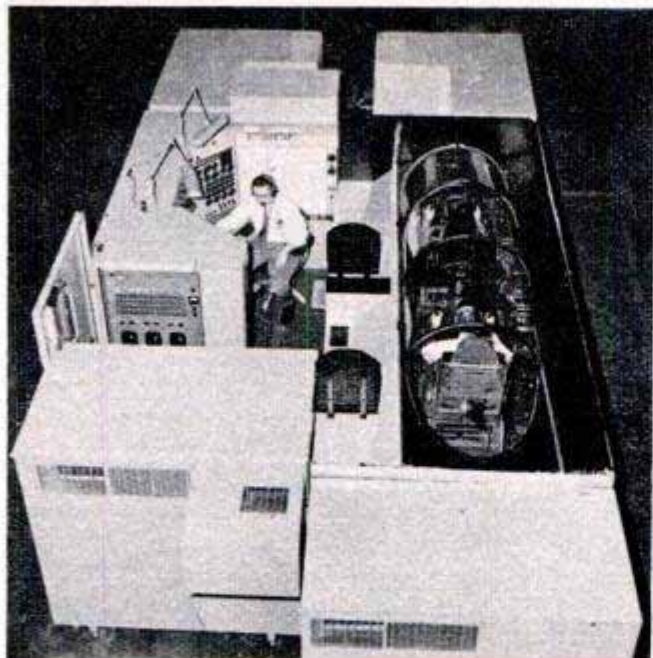
□ Nearly 1,000,000,000 pounds of carbon black are added to rubber each year to improve tires.

Diminutive "Overstuffed" Furniture Pieces Make Novel Pipe Racks



Miniature pieces of "overstuffed" furniture made from scrap lumber are grooved to serve as decorative racks for pipes. Built by industrial-arts students at the University of Idaho, the smoker's accessories are painted with colorful enamel. While the enamel is still wet, flock of the same color is blown on to give the appearance of mohair. Other designs include a cowboy-boot pipe rack.

If you do not find the information you need in the index on pages 12, 14 and 16, sources of further information are available without charge from *Popular Mechanics*. Write to the Bureau of Information, 200 East Ontario St., Chicago 11



Jet-Bomber Pilots Learn Job on the Ground

Crewmen for the Air Force's fastest jet bomber will be schooled for the job in an electronic simulator that provides 1001 required training steps. The Link-built trainer, with a single motor-generator power supply and miniature electronic units, weighs and costs only a fraction of an actual B-47 airplane. It duplicates both normal and emergency engine, flight and communications operations, as well as assisted take off (ATO) and procedures for refueling in the air. A buzzer warns the

pilot of an impending stall, for example, but movement of the controls and built-in buffeting provide identical conditions of the in-flight stall. Sitting before a myriad of lights, switches, push buttons and instruments, an instructor sets up and controls each flight, introducing problems and conditions as the occasion demands. His console is directly opposite the trainer unit, which is an inch-for-inch duplication of the jet aircraft's cockpit with exact placement of the controls and equipment.

Antique "Flaming" Organ Displayed by London Museum

Gas flames regulate pitch of an unusual organ owned by the London Science Museum. Over 77 years old, the Pyrophone produces notes with glass tubes, inside of which are controlled gas flames. Invented by physicist Frederick Kastner, the instrument was played at a recent meeting of the Royal Society of Arts. The music it produces was described as "celestially beautiful."



Government Hires Large Percentage of Scientists

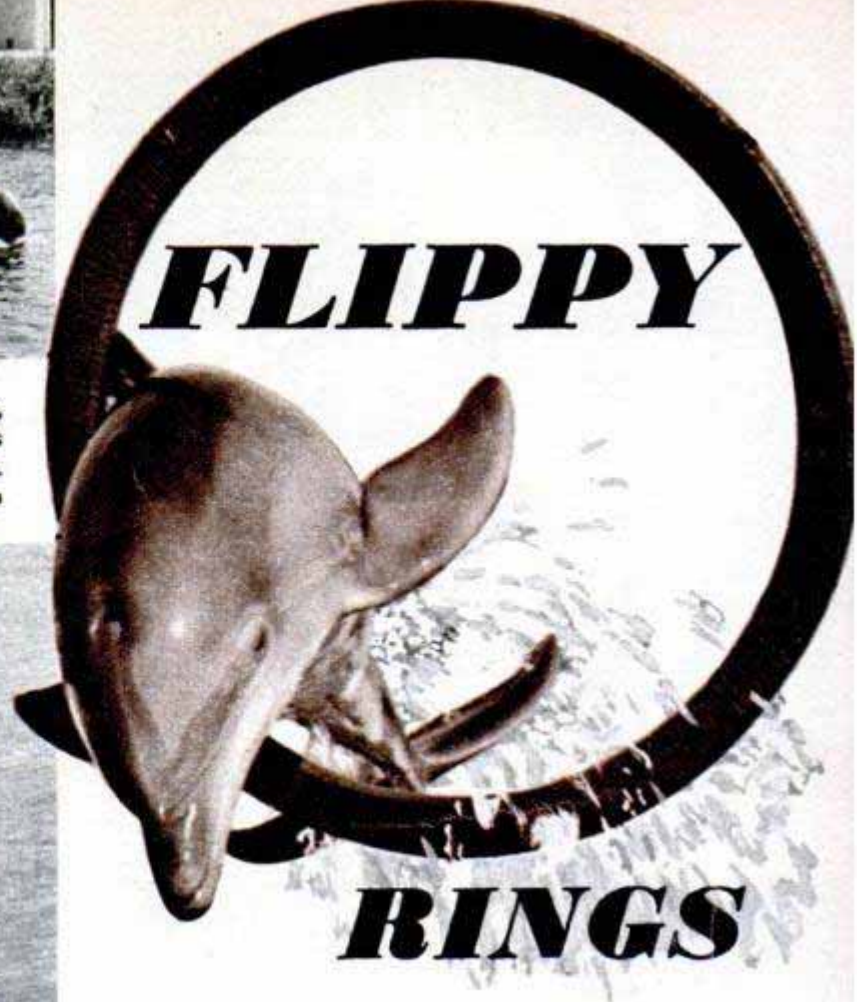
Scientists directly employed by the federal government in technical work number 90,980—over 15 percent of the nation's total supply. Slightly over half—46,673—are engineers. Physical scientists are next with a total of 16,308; biologists number 14,793. Medicine and dentistry account for 6100 employees and all other groups of scientists add up to 7106.



Equipped with a special harness and a towline, Flippy serves as the motive power for a mermaid's surfboard ride. Below, dog takes a ride, too. Right, the porpoise leaps through a small hoop



Below, the agile porpoise soars up out of the water to hurdle a fish net. Trainer taught him to leap over the net for a reward of fish, then jump over a rope and finally sail through the paper hoop



Keepers of the deep-sea zoo at Marineland, Fla., have a salty picnic with their performers. Porpoises, they say, are practically people

VISITORS TO the big Marine Studios on the white Florida beach some 20 miles south of St. Augustine thought they were seeing things recently. In a small estuary behind the big tanks, a girl and a dog bounded over the wavelets on a surfboard at the end of a towline. On the pulling end of the line was a seven-foot porpoise named Flippy. With great heaves of his ponderous body, he arched clear of the water, tugging the surfboard and occupants at a lively clip.

Every evening in a "private" pool behind the Marineland tanks this same finny phenomenon goes through a repertoire of stunts and tricks no porpoise in history has ever done before. At voice or hand commands from a trainer, Flippy leaps through a paper hoop, flings his seven-foot, 350-pound body into the air, grabs a ball hanging on a string and rings a bell with it. He can hoist a flag the same way. He'll leap up to catch a ball or stick tossed to him and bring it back to the trainer. Another Flippy stunt is to sit halfway out of



In huge tanks of Marineland, denizens of the deep live in natural surroundings while the visitors — and scientists — watch them

At gesture from his trainer, Flippy heaves himself six feet into air to grab rubber ball and ring the bell

THE BELL

By
Richard F. Dempewolf

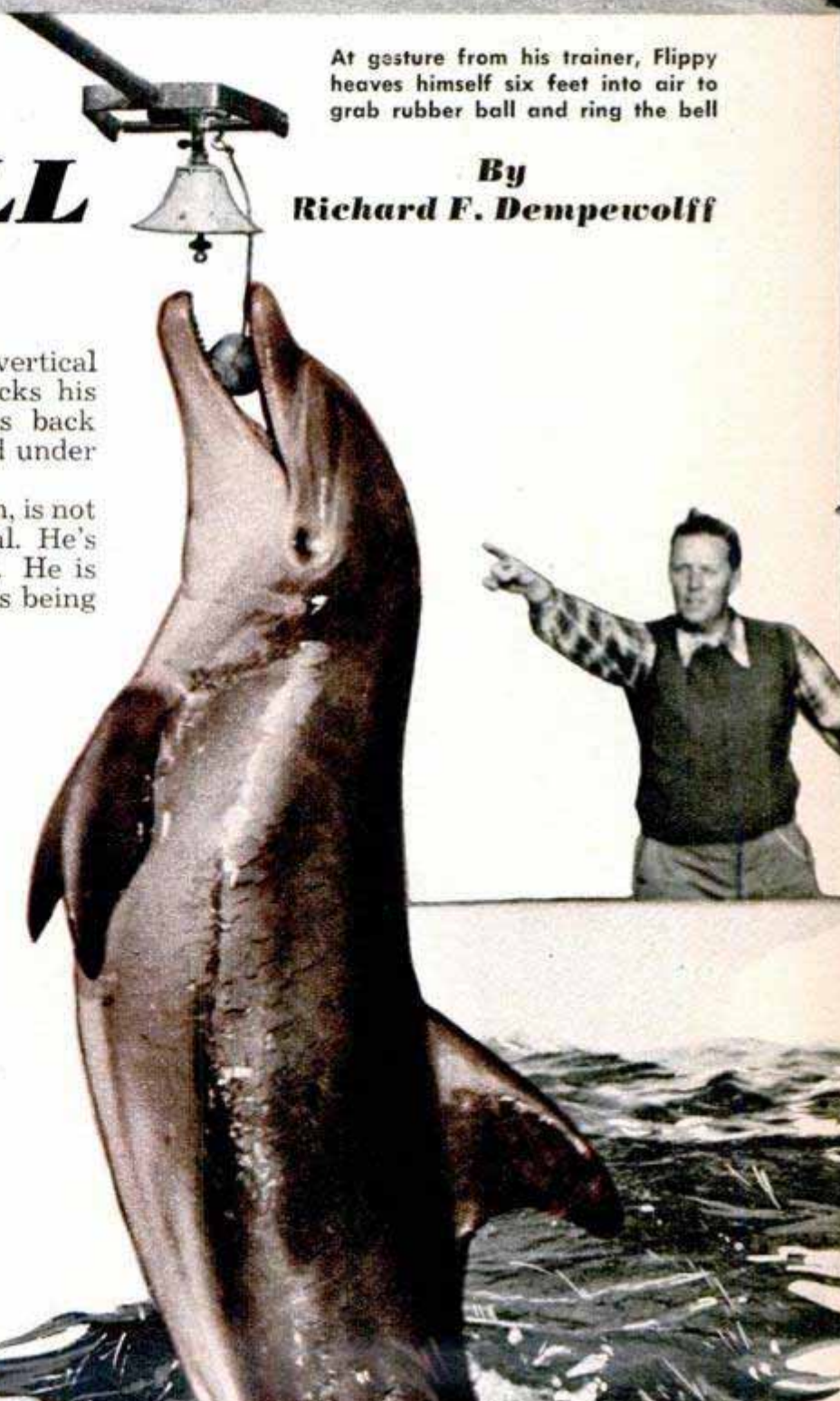
water and swim back a few feet in vertical position every time the trainer flicks his hand. He'll also do figure-S turns back and forth through a small hoop held under the water.

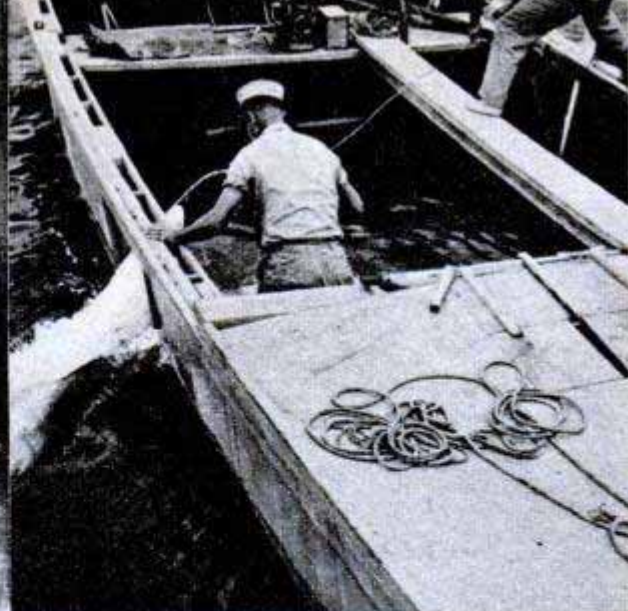
Flippy, who is a bottlenose dolphin, is not just a trick animal like a trained seal. He's not even on exhibit at Marineland. He is one of a host of marine experiments being conducted at the world's most remarkable deep-sea zoo, where scientists peer through portholes to watch the private lives of marine denizens. Flippy is proving that porpoises have a brain development so advanced that it may compare with that of the dog and the chimpanzee.

Learning the secrets of the deep and its denizens at Marineland has called for pioneers with plenty of ingenuity and determination.

Actually, Marineland was conceived in an African jungle by a trustee of the American Museum of Natural History and a Hollywood cameraman, Douglas Burden. Burden was herding tigers, elephants, monkeys and other jungle beasts into a stockade for the filming of the movie *Chang*.

It set Burden wondering why the same thing couldn't be done





Shark, caught in the deep sea, is hauled into live well of the barge. Left, upon arrival at oceanarium, diver must walk the shark around tank to restore its "breathing"



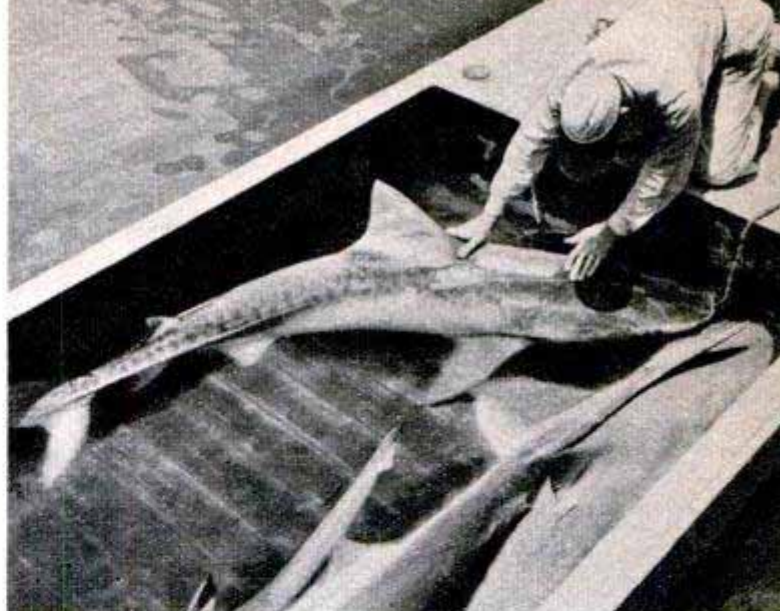


One snap of this character's jaws could sever an arm. Collectors remove dangerous "hooks" from his mouth

with denizens of the deep. He visualized an enclosed chunk of ocean where briny creatures of all kinds would live, love and fight together just as they would in the open sea. The baby ocean would be surrounded by steel and concrete walls, perforated by crystal portholes, so the sea creatures could be observed and photographed underwater. Back home, Burden and Ilya Tolstoy, grandson of the famous writer, put their heads together, drew plans and set out to sell their idea. From a dozen magnates and wealthy sportsmen they raised the money. At last, in 1938, a huge, white, fortresslike structure rose out of the coquina sand. Within four years Marineland boasted a population of 26 human and 15,000 finny citizens.

Inside the multitiered shell surrounding

Collector stands ready to drop tail snare over a curious porpoise. Tongs snap shut, tightening rope



Attendants push sharks around barge's well so water will pass through the gills to prevent suffocation

the sea corral, a visitor walks into a jade-green world. He is in the enclosed outer perimeter of two giant steel and concrete tanks. A rectangular one, 100 feet long, 45 feet wide and 18 feet deep connects by flume with a circular "minisea" 75 feet in diameter and 12 feet deep. In the honeycomb of passageways surrounding the tanks, 200 heavy-glass portholes pierce the inner walls at every conceivable level. Through them glows the cool green of sea water and past them move the ghostly forms of sea giants.

Myriad schools of bright-colored tropical fish scoot around the sand bottom, hiding from big predators in the hollows of a seven-ton coral reef. Sea fans and plumes wave gently as marine creatures brush them. In the circular tank, undulating

Visitor holds out a mullet from the feeding platform and porpoise leaps six feet out of water to snatch it



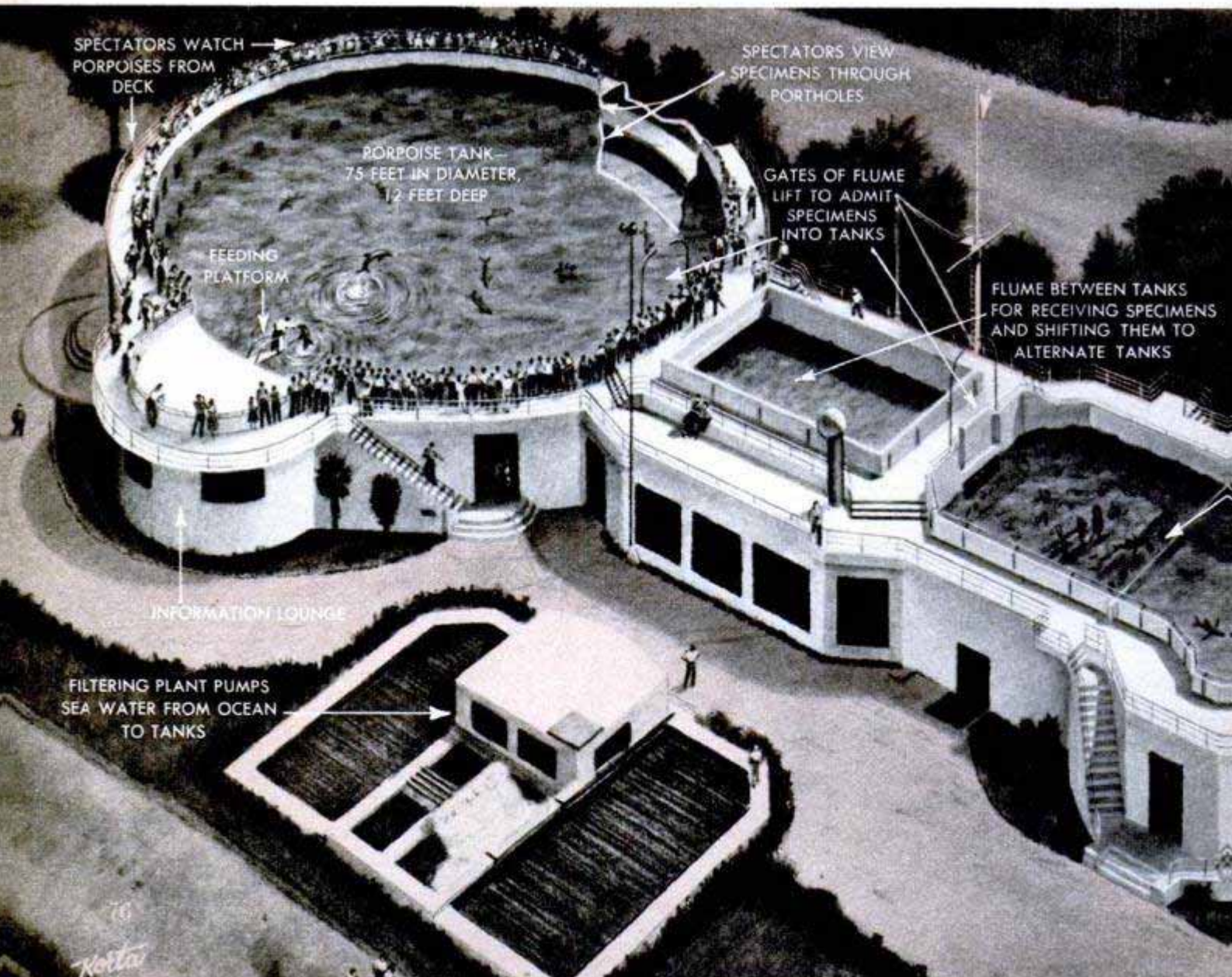


Webbed sling is worked under the body of a porpoise that's just been caught, and odd animal is hoisted into big tank with a crane. Drawing below shows complete layout of Marineland

500-pound porpoises send little fish scooting for cover. Big manta rays skirt the ribs of an old shipwreck as they flap slowly along the bottom. From a jagged, eight-ton rock ledge, a monstrous moray eel pokes his ugly head.

It's one thing to have a gigantic fish bowl full of deep-sea goliaths, and another to keep your monsters in good shape. Divers stalk, slow-motion, along the coquina bottom several times a day, scattering pieces of fresh mullet. Each porpoise alone gobbles 20 pounds of fish each day. But in spite of being well-fed, big fellows sometimes eat the little fellows. "Once we put a tiger shark in with the porpoises," one of the men reveals. "The big dolphins ganged up on him and took turns ramming him in the gills with their snouts. In no time the shark was dead."

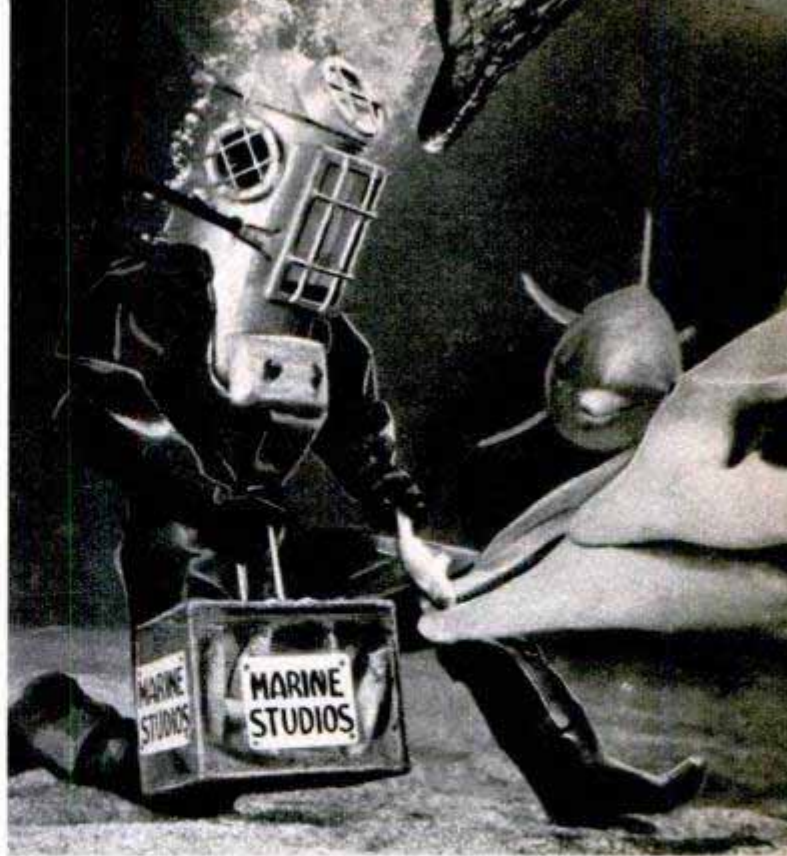
All this, plus mortality from natural causes, means the highly specialized fishing crew employed by the studios is kept busy corralling replacements and finding new rare



specimens. To do their job, these pioneers have had to develop ingenious devices and stunts. Their fleet consists of a dinghy, a 32-foot barge and a 28-foot skiff. The barge has the 14-foot "live well" in its center for carrying specimens to the studios. The men haul specimens aboard simply by pulling them into the well through a big door in the side of the barge.

One of the niftiest devices used by the collectors is the odd tail snare or lasso for catching the spotted porpoise without injuring him. This 10-foot fast-swimming character with a built-in grin is mighty elusive. His weak spot is a sense of curiosity that leads him to investigate any boat in sight.

The snare is a long pole with a rig like a pair of open ice tongs on the end of it. It holds a loop of rope. While Mr. Porpoise frolics beside the boat, a collector drops the snare right above the animal's wide, horizontal tail fin. Presto! The tongs snap shut, flipping the loop of rope around the tail, and Mr. Porpoise is in trouble. The rope hinders his driving mechanism which, unlike that of most ocean dwellers, propels him with an up-and-down motion. Soon he's tired enough to be hauled alongside.



The 50,000 finny citizens of Marineland are fed several times daily by divers carrying baskets of fish



WINDOWS AT ANGLE GIVE UNDERSIDE VIEW

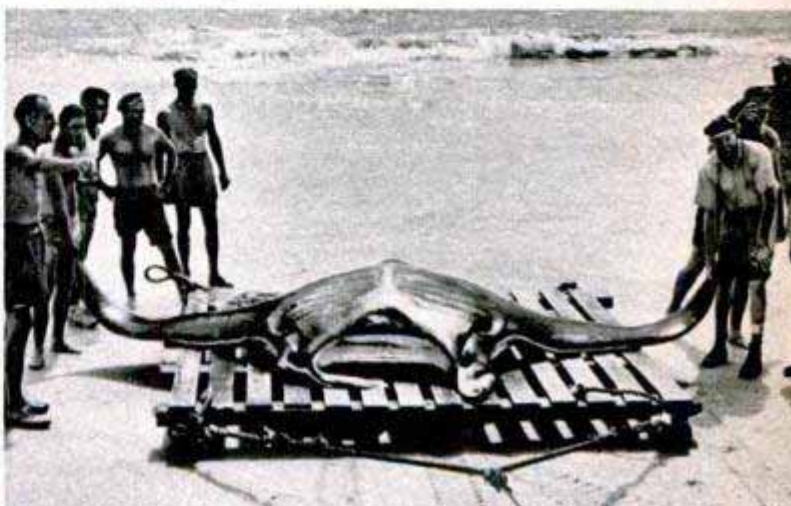
SPECIMEN TANK -
45 FEET WIDE, 100 FEET LONG,
12 TO 18 FEET DEEP

Big 10 and 12-foot sharks at Marineland are another matter. For them the crew has designed special steel hooks, 10 inches long and $\frac{1}{4}$ inch thick, which they fasten with chains to a heavy line several hundred feet long. Hooks are spaced every five fathoms. The line is baited with chunks of fish or horsemeat, anchored at each end, marked with buoys and tossed over the side. Later the lines are hauled up and 15 to 25 monsters, weak from their struggles, are dragged into the live well of the barge.

Until recently, crews doped these big fellows before tinkering with them. A big hypodermic syringe with a needle almost half the size of a soda straw was attached to the end of a special harpoon. As the shark was pulled alongside, a harpooner

(Continued to page 234)

Ugly 1500-pound manta ray was trapped in a net and towed fishing barge around the ocean for six hours



Pop-Out Samplers Accurately Check Airplane's Rate of Icing

Automatic ice-gathering devices are being used to test icing conditions on the Air Force's F-89 all-weather interceptor. Believed to be the first ever developed, they each contain four sections measuring $\frac{1}{8}$ to 3 inches in diameter and pop out from the plane's nose when the radar operator pulls a switch on a special control panel. They revolve for a half minute, receiving an even coating of ice, then retract into special refrigerated chambers. After the flight, the cylinders are removed and the amount and thickness of the ice coat are carefully measured.

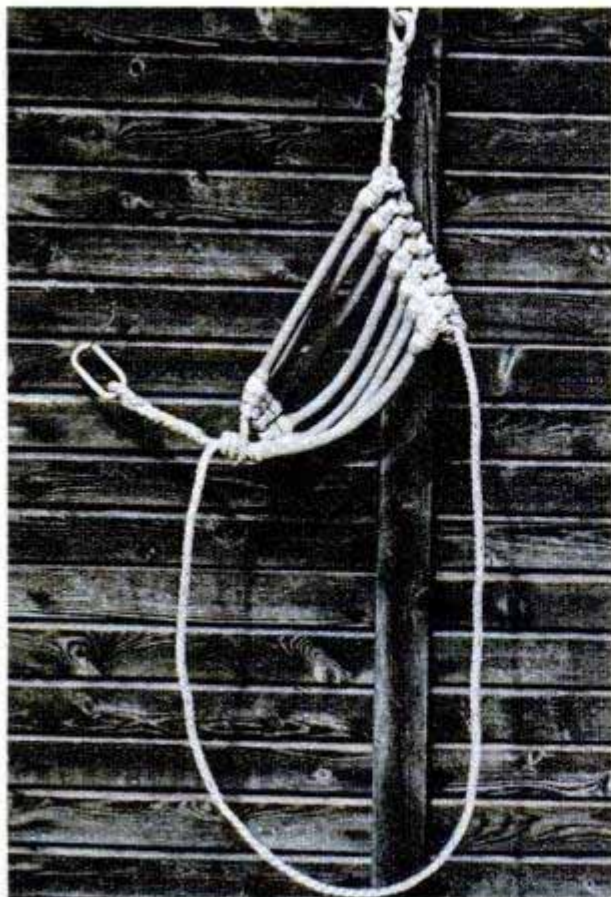


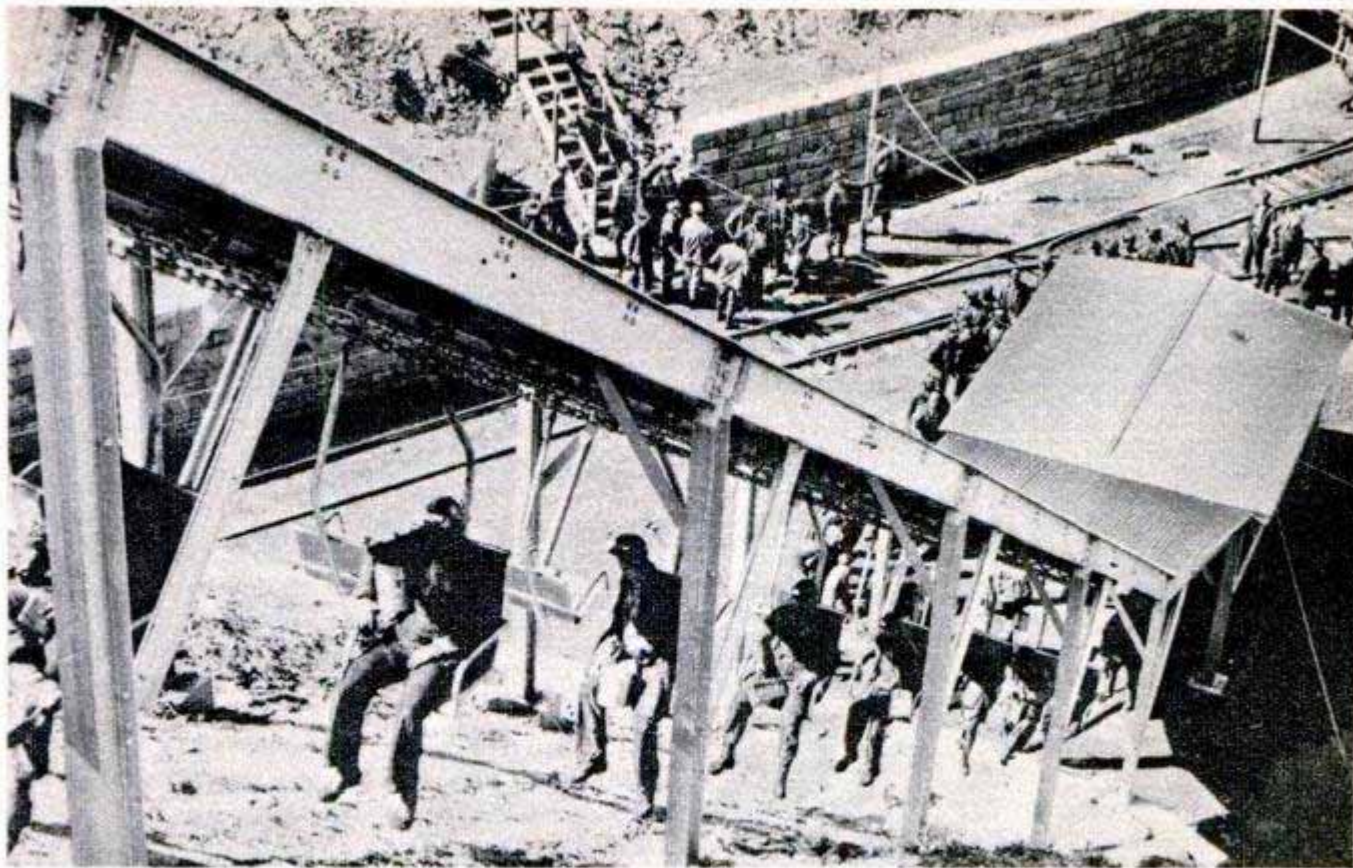
Shock-Absorber Rope Prevents Fatal Falls by Workers

Steeplejacks, steelworkers and others who work at dangerous heights can protect themselves from fatal falls by a safety device invented in France. It consists of a shock-absorbing rope which takes up the force of a free fall without injury to the worker. Eight rubber tubes are the absorb-

ing mechanism. As tension is exerted, each tube is stretched successively. In tests in France, free falls of as much as 10 feet have been stopped within 3 feet without injury to the worker. The shock-absorbing section is in a bag worn by the worker or placed where the rope is anchored.

Left, rope has 10 rubber strips to absorb shock. Right, packed in a bag, the rope is anchored above worker





Coal Miners Carried by Ski Hoist on Way Homeward

Coal miners at a shaft near Gary, W. Va., are literally "given a lift" at the end of a hard day's work. They are transported in

style to the mine's exit level by means of a chain-belt seating device similar to those used by skiing enthusiasts.

Hydraulic Lift Parks Airplanes in Small Carrier-Deck Areas

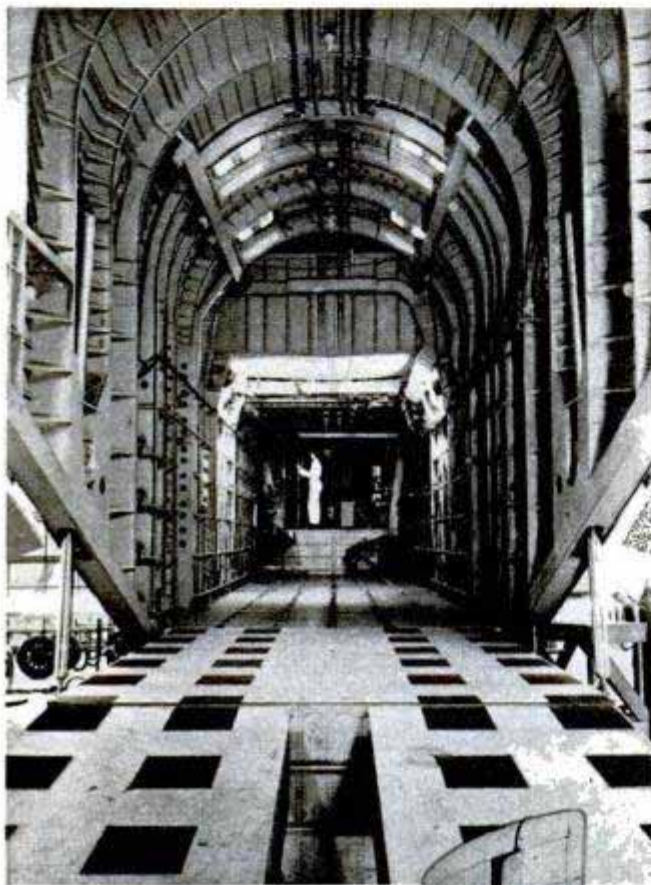
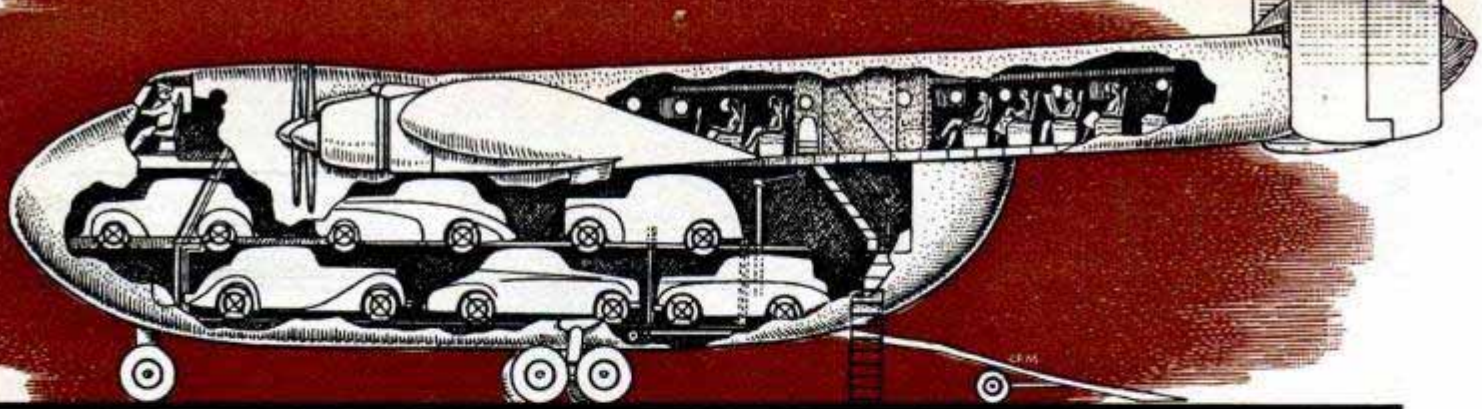
Initial tests are being made aboard a carrier of a new hydraulic lift to maneuver planes into small parking areas. The motor-driven English device enables one man to move a six-ton airplane about with ease. The lifting end is put under either the tail wheel or nose wheel, which it locks in a circular pallet and raises. The aircraft is towed or pushed on its main landing wheels. Push buttons on the handle control lifting and lowering operations.



Accelerated Drying Method for Painted and Varnished Products

Almost instantaneous drying of many paints, inks and varnishes is accomplished with a process using sulphur-dichloride vapor. Conventional industrial drying methods take hours, but the new method does the job in from two to twenty seconds. The vapor reacts with pigmented oils as coated materials are passed through an enclosed drying chamber on an endless belt. After

treatment in the chamber, materials are dust and tack free and can be handled, stacked, packaged or given a second coat. Recently developed by Illinois Institute of Technology researchers, the process has high industrial value because it speeds up production and cuts down storage space. It can be used in the manufacture of linoleum, furniture, appliances and license plates.



Top, cross-section view of ferry, showing location of cars and passengers. Above, interior of 55-ton airplane

Even large busses, below, can enter through freighter's wide, outward-opening doors under craft's high tail

Car-and-Motorist Air Ferry For Cross-Channel Service

Up to 8 automobiles and 42 passengers will be carried on a triple-decker freighter airplane scheduled to begin flights in England next year. It will enable tourists to fly with their cars on ferry trips between the British Isles and Europe. The aircraft's two lower decks will house cars and other vehicles, with the passenger cabin and crew compartment occupying the third level. The cars will be loaded through two large doors at the rear of the four-engine, 55-ton aircraft, after being pulled singly up the ramp by a winch. An elevator will lift the first vehicles to the second deck where they will be slid forward on rails into position. All the cars will be locked in place for the flight. The complete loading operation for freight and passengers will take 20 to 25 minutes. There will be enough space for motorcycles and bicycles to be stowed along one side of the lower deck. The aircraft, a modification of the Blackburn Universal Freighter, already in operation, will cruise at about 180 miles an hour.

Blackburn and General Aircraft, Ltd., photos

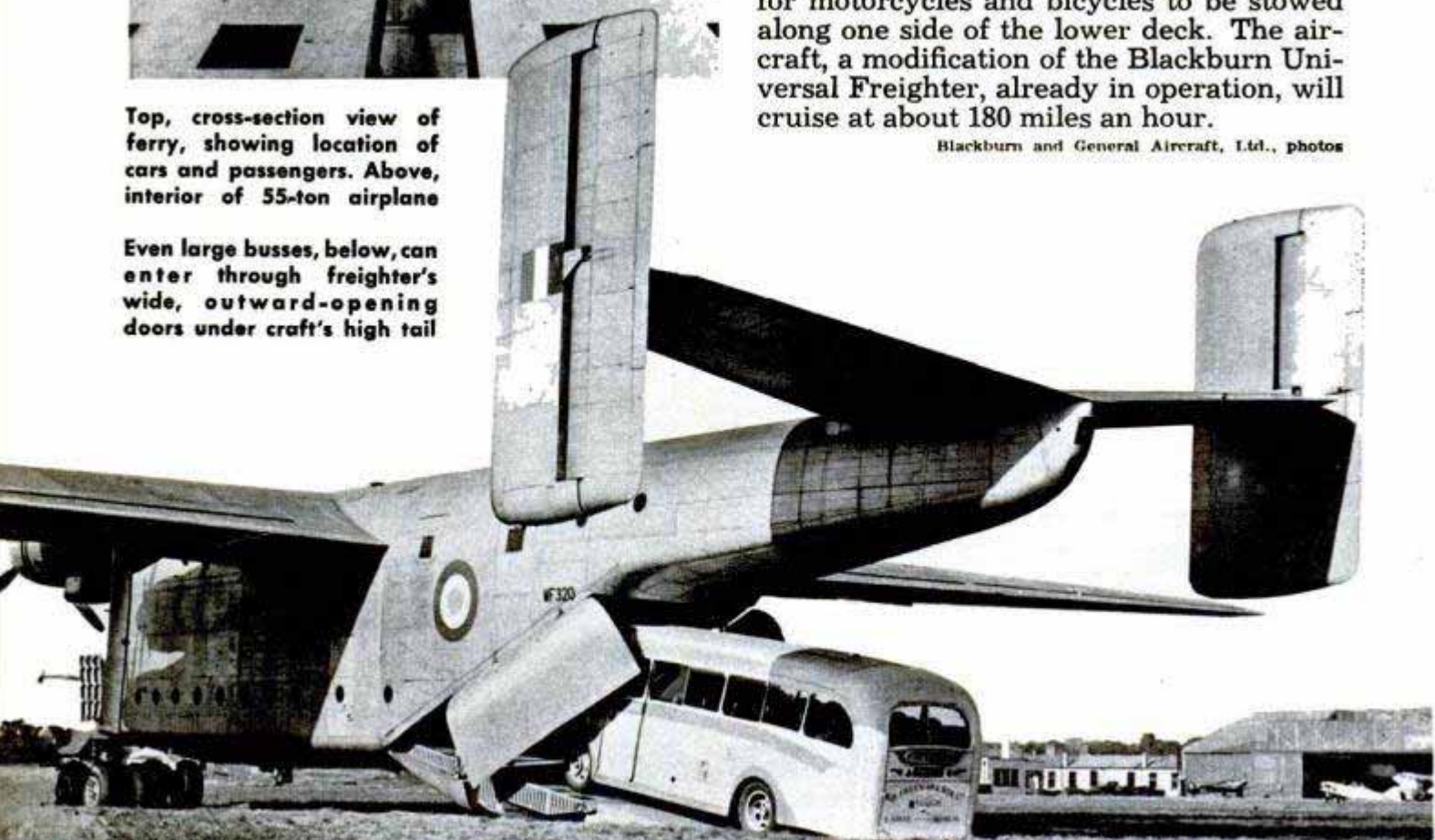




Photo from Knott's Berry Farm

It's a big decision—how to spend that nickel. A few confectioners still specialize in real old-time candies

They Make Candy by the Ton

By
Clifford B. Hicks

HIGH ATOP a huge factory in Chicago is the fairy-tale kingdom of a man with a unique and appealing profession. So appealing, in fact, that if he were only known to the nation's small fry he'd outdazzle all manner of cowboys, puppets and spacemen.

This is America's largest sweet-tooth factory—a full 17 acres of luscious sights, smells and tastes—and here Otto Windt plies a unique trade in the high little office: he's actually paid to taste candy, day in and day out.

Windt is a tall, energetic and thin man (surprisingly thin, considering his work) who serves as the factory's chief candy technician. His pleasant duties are twofold: He sees that every batch of sweetness emerging from the tantalizing depths of the

Candymakers "swing the batch" by looping it over arms of a mechanical puller, which gives right texture





Candy is tumbled in big drums to give it an outer coating, to color it or to polish it to a high luster. Process is called panning. These are candy eggs with a long "shelf life," already in production for Easter

factory is taste-tested; and he dreams up luscious new candies to tempt the palates of 125,000,000 candy-eating Americans. Five days a week Windt is surrounded by the tempting, vagrant odors of maple sugar, melted butter, roasted nuts, pungent spices, sharp cinnamon and rich chocolate. He tastes hundreds of types of candy during the week.

Candy-technician Windt practices an art that is surprisingly modern, yet the history of candy itself goes back to antiquity. You can bet your bottom bonbon that the cave-

man soothed his sweet fang with honey swiped from Pleistocene bees. The Romans, in their day, cooked up a concoction of honey, poppy seeds and nuts, thereby innocently inventing the forerunner of the modern nougat. In the 14th century, Venetians started toting back from the Orient a strange substance which we now call sugar. But modern candies didn't really get their start until the 19th century when pharmacists discovered the trick of coating pills with sugar.

Today candy is literally a billion-dollar

On hot, leather-topped table, candymaker works out effective design. "Rope" will be pulled, cut into pieces





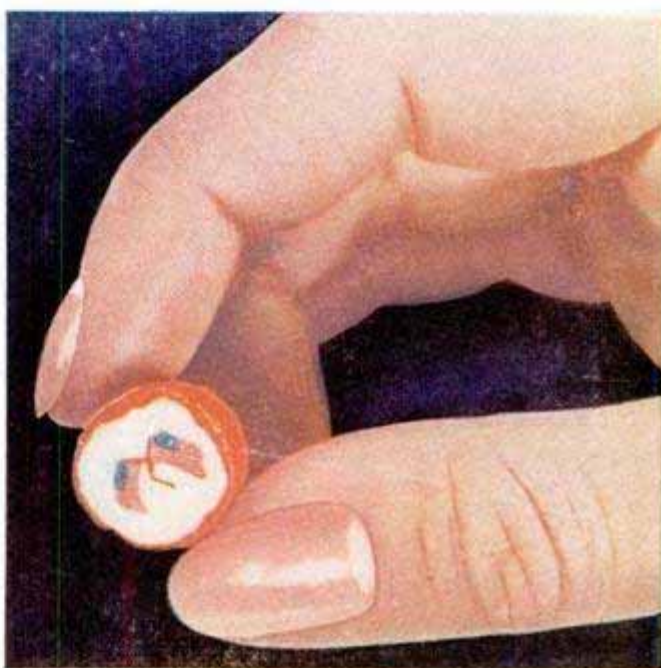
"Sugarheads" work on cut-rock—the kind with the picture in the middle. Soft, thin layers of red, white and blue candy are assembled into an intricate mass



Design is stretched out, then mounted in a big pillow of white candy. The trick is to "draw" the picture lengthwise so it will appear in cross section of candy



Final step is wrapping the entire mass in a thin red blanket. The resulting "log" is slowly pulled from one end to form "rope" about the size of man's finger



When rope is chopped into pieces, design appears in miniature in the center. In this case, candy-eater will find 13 stripes, suggestion of stars on each flag

business. In this country, it's estimated, the candy-eaters stow away an average of 20½ pounds apiece each year, a grand total of about 2,500,000,000 pounds!

To satisfy the tremendous demand, our confectioners produce some 2000 different kinds of candy. Yet the old-timers in the business will tell you there hasn't been a really new species of sweetness for a good many years. The old-fashioned licorice whips, buttons, "mothballs" and jawbreakers are the forebears of today's candies. Here and there you can still purchase the old-timers. Knott's Berry Farm at Buena Park, Calif., goes to fantastic lengths to stock old-fashioned candies for its little—and big—customers.

Perhaps the outstanding example of an old candy with a new appearance is the remarkable confection turned out by Charles Slagle at his Candy Butcher Shop in San

Francisco. Hanging from racks in the shop are all kinds of sausages, ham, bacon, cold cuts and other meats. Actually these meats are old-fashioned marzipan candy, pressed into shape in molds and beautifully painted with vegetable coloring.

Slagle's brother, Robert, is a competitor in the fancy-candy business in San Francisco. His specialty is candy fish—realistic rainbow trout, packed in a fisherman's creel.

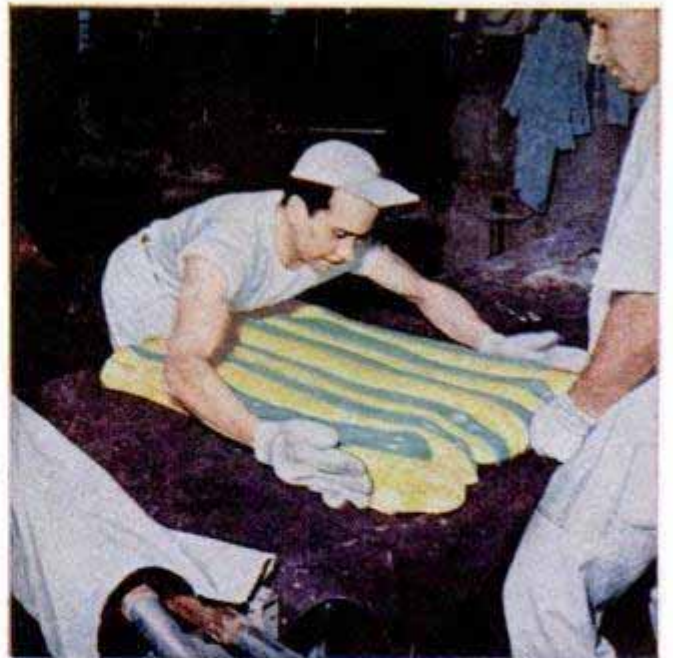
Otto Windt, the man with the enviable job, plies his unique trade for one of the world's largest candymakers, E. J. Brach & Sons. As chief candy technician he dreams up new candy combinations and directs the laboratory of control, which sees that every bite of candy leaving the factory measures up to rigid standards.

The laboratory's 20 technicians check every manufacturing operation in the building frequently. No one in the factory



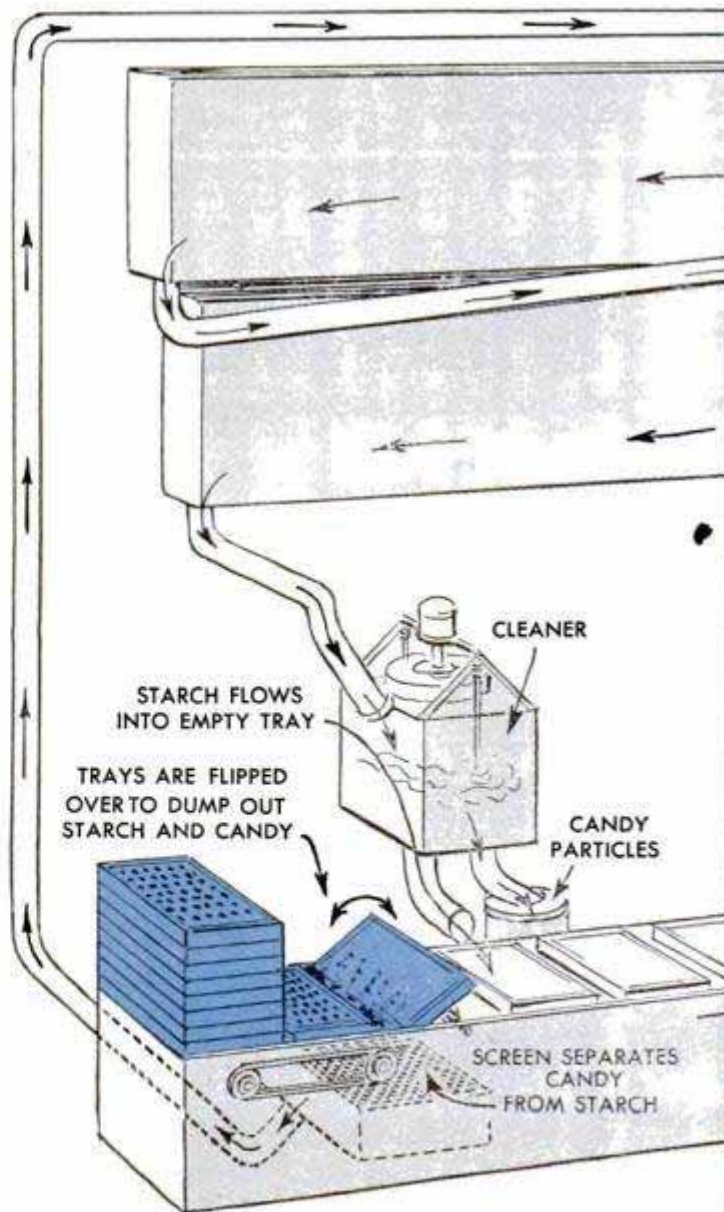
Tons of different candies are churned in this mechanical bin, then packaged as party mixes. Below, wrong picture for a candy story? No, those cold cuts all are marzipan candy, hand-painted to resemble meats

Photo from Slagle's Candy Butcher Shop



Alternate-colored strips are assembled on a table. Possible designs for candy "pillows" are endless

Big "mogul," below, revolutionized candymaking. Cycle starts as starch flows to empty trays, ends when candy tumbles from trays, which go on for a new load



knows when an inspector will appear at a particular candy line, scoop up a sample and take it with him to the laboratory for examination. Every peanut coming into the plant is X-rayed and any goober that shows the slightest variation is discarded.

But a mechanical taster just hasn't been invented, so the final exacting test of the candy is left to the sensitive palate of the technician, who wraps his lips around luscious chunks of fudge, nougat and caramel day in and day out. It's no strange sight to see this same taste-tester stop by the retail candy store in the factory to buy a couple of pounds of assorted gumdrops for his week-end pleasure. That, perhaps, demonstrates the unique appeal of candy: no one ever gets tired of it.

In performing the second part of his job—dreaming up new candy combinations for Brach's—Windt shops for confections all over the world.

The candy business, despite its hauntingly pleasant end product, is among the most fiercely competitive industries in existence. Candymakers have a sharp eye and sensitive tongue for detecting new

candies that seem to strike the public fancy anywhere in the world. Occasionally a promising treasure is found in the product of a small confectioner. Such an item may be picked up and analyzed; then, perhaps, a new big-volume candy will be born.

Though there's been little that's genuinely new in end products, there's been a real transformation in the candy industry in the past 50 years. Brach's itself is a fine illustration of that change.

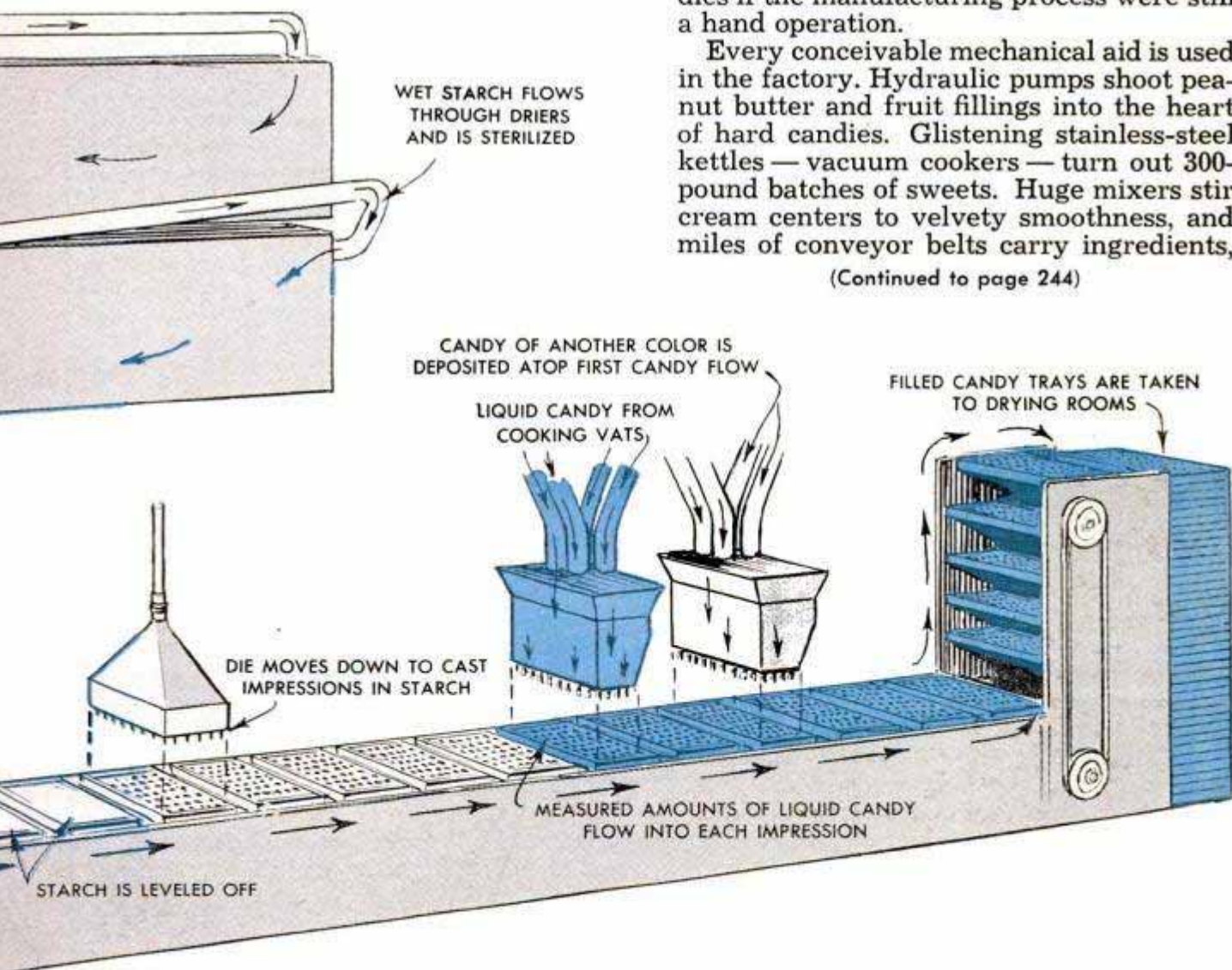
Back in 1904 Emil J. Brach and his sons, Edwin and Frank, started their "Palace of Sweets" with a cooking vat, a couple of pouring tables and a few starch boards. Just about everything was done by hand, and it was a sweet day when they turned out 100 pounds of candy.

Today Brach's may ship out a million pounds of candy in 24 hours. Some of the figures are significant: It takes 20,650 acres in cane and beets to produce the company's sugar intake; 20,250 acres of corn to make the corn syrup; the full production of 2750 dairy cows to meet milk requirements.

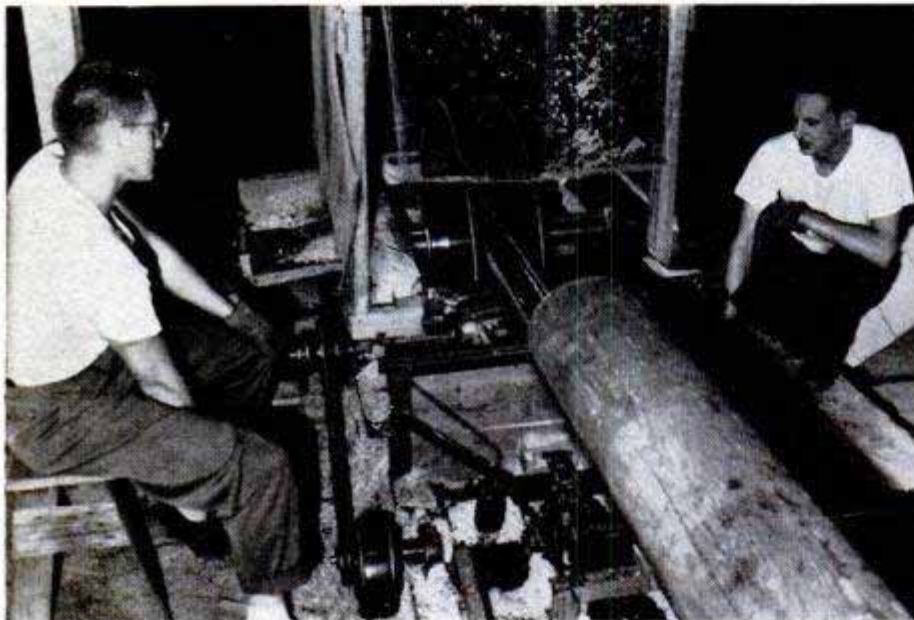
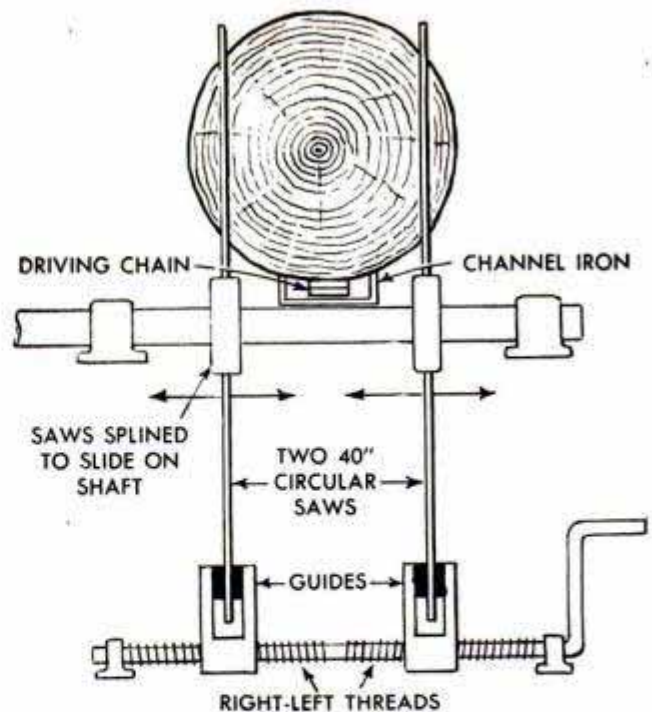
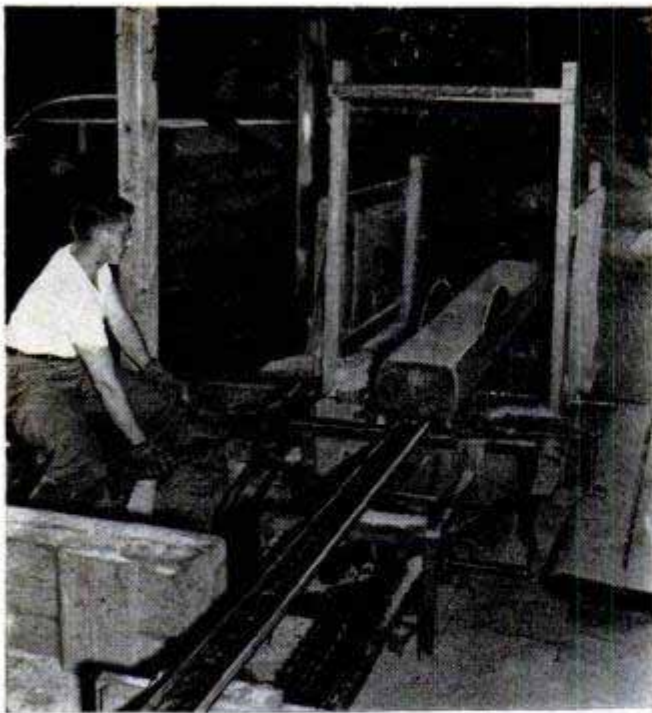
Obviously this landslide of ingredients couldn't be converted into tantalizing candies if the manufacturing process were still a hand operation.

Every conceivable mechanical aid is used in the factory. Hydraulic pumps shoot peanut butter and fruit fillings into the heart of hard candies. Glistening stainless-steel kettles—vacuum cookers—turn out 300-pound batches of sweets. Huge mixers stir cream centers to velvety smoothness, and miles of conveyor belts carry ingredients,

(Continued to page 244)



THE MOGUL—ASSEMBLY LINE FOR CANDY



Auto transmission on reduction gear enables Macpherson (above, left) to reverse conveyor chain after the first cut and bring log through from other direction. Cores average eight to ten feet

Parallel saws (above) rest on guides anchored to a threaded shaft. Turning of crank adjusts width of cut. Conveyor chain is mounted in channel iron at exact midpoint between circular blades

Preparing to "square off" log, Macpherson (left) operates the conveyor-chain controls while Wolff turns crank to adjust the blades for proper cutting width. Mesh protects eyes from sawdust

Junior-Size Sawmill Turns Firewood Into Lumber

INGENUITY has paid off handsomely for John Macpherson and Milt Wolff of Portland, Ore., who literally built a sawmill in the basement of an apartment house! The two young men became interested in the peeler cores of local plywood mills, where huge lathes peel veneer layers from the best fir logs available. A peeler core, about one foot in diameter, can't be lathed further and in the past has been sold as fuel. The young men realized that the lumber in the cores was excellent and would immediately be purchased by finishing mills if the logs were squared into timbers. They designed a complete junior-size sawmill and built it in the basement of an apartment building. After testing it, they moved the mill to the outskirts of Portland and went into business. The entire mill cost less than \$1000, and in the

first month of its operation, running only evenings and week ends, it grossed \$1350. The head rig of the mill consists of two 40-inch circular saws splined to the same shaft. A powered link chain passes between the blades. A small log simply is rolled into place between the saws, the two blades are adjusted for the width of the cut, and the chain pulls the log through the mill. The log then is given a quarter turn, the drive chain reversed, and a second pass made. Result: A squared timber. Without help, the two men produce more than 1000 board feet of lumber per hour, averaging a net of \$7.00 per hour apiece.

U. S. telephone service has doubled during the last 10 years and almost a million people are waiting for new installations, according to company officials.



Detroit Listening Post

By Siler Freeman

THE RUSH of new models slows somewhat this month with only three scheduled—Pontiac, Ford and Mercury. All three will come out during the first half of December.

Pontiac will be of the utmost interest. Because General Motors' styling policy overlaps in several divisions, the 1953 Pontiac will provide the first clue as to what the new Chevrolet will look like.

The battle between the two rivals, Ford and Chevrolet, will be charged with unusual vigor next year—a year experts say will provide the first real competition since 1940. Ford's changes will not be extensive. They will be "identification" changes mainly. Mercury's too will not go beyond that.

The industry is buzzing about the revival of the sports-car market. Kaiser-Frazer's announcement of a plastic-bodied sports roadster was followed by Nash's that it has decided to build its ultralight car, heretofore labeled only as the NXI.

As stated in this column previously, George W. Mason, president of Nash, has never abandoned the idea of a small, economical yet smart-looking car to supplement his Rambler line. But it has undergone major changes since it was first shown to test public reaction.

The new Nash small car will have an 85-inch wheelbase rather than 80. It will seat three instead of two and will be powered by a 42-horsepower engine instead of an 18 or 36. It will be built in England, as originally planned. Left by the wayside is the \$1000 price tag for which Mason was shooting. No price has been given, but no doubt it will be almost double that when it hits the American market.

K-F's plastic roadster will be in the \$2000-to-\$2500 class. It will weigh 200 to 300 pounds less than the Henry J.

Studebaker, leading independent, is keeping very quiet about its 1953 models. But that doesn't mean inactivity at South Bend. Reports are that it will again set a style trend, as it did postwar. Its new car is said to have a foreign look, principally like the British Jaguar. It will be a little hard to get into, but will have plenty of room inside.

Stepping up engine horsepower and compression ratios isn't posing a fuel problem yet. The national average is now 90 octane on premium gasoline, with 93 to 94 in the Midwest. Oil-industry experts say the power race will have to pause for a while after this year. They do not see much of a step-up in octane ratings immediately because of the huge expense involved.

Compression ratios for the first time will go above 8 to 1 in the 1953 models. Unless engineers can build "mechanical" octanes into their power plants, the 10-to-1 ratios envisioned for ordinary cars will still be a few years away.

Lead, of course, has eased up in price, but that alone is not enough to bring 100-octane fuel. However, it has insured continuance of present supplies of premium gasoline.

One long-term mechanical change to be noted in the 1953 models is the use of 12-volt batteries. Cadillac, Oldsmobile and Buick will have them and Chrysler will be forced to adopt them for its air-conditioning systems. Use of the 12-volt battery saves copper and is more efficient. It is expected to spread throughout the car and truck field within the next year.

Dodge amazed the experts by holding the price line after a complete retooling for its 1953 body and engine. Often in the industry, slight ornamentation changes have brought forth requests that OPS boost price ceilings. Dodge's move is encouraging.

More than ordinary interest will be centered on the new Chevrolet and Buick lines, due in January. Both have changed their automatic transmissions to an important extent. The two GM divisions are using the torque-conversion principle and have found their customers slightly querulous for various reasons. The improvements will be watched carefully when they get in the hands of the public.

Buick will have another sports car in addition to its Skylark at the big GM show in New York next month. So will Cadillac and Olds. Although no announcement has been made of plans for production other than for the Skylark, orders will be written at the Waldorf display.

29% USE PREMIUM GAS EXCLUSIVELY

69% HAVE CONVENTIONAL TRANSMISSIONS

THE POPULAR MECHANICS MOTOR SURVEY
AS CONDUCTED BY FLOYD CLYMER

- 1- I am the owner of a 1952 Henry J. Corsair 4 Corsair 6 Vagabond 4 6
- 2- It is equipped with: Conventional transmission Speedometer with overdrive
- 3- I have owned it approximately 3 months. I use premium (high test) gasoline Regular Reasonably so
- 4- Do you obtain the gasoline economy you expected? Yes No m.p.g. - country driving: 26
- 5- Average gasoline mileage: 1500-2000 miles. I do do not add oil between oil changes.
- 6- I change oil every 22 months. I do do not add oil between oil changes.
- 7- Roadability and handling qualities are: Excellent Good Unsatisfactory
- 8- Maneuverability in traffic seems to be: Excellent Good Unsatisfactory
- 9- Acceleration is: Exceptional Very Good Average Poor No
- 10- In your Henry J, do you have the feeling of driving a "small" car? Yes No

ONLY 9% GET LESS THAN THEY EXPECTED

JUST AVERAGE, POLL SHOWS

11- Here are my main reasons for purchasing a new Henry J: I wanted to get a new car at what a good second hand car would cost - inexpensive upkeep *except for rear

- 12- My comments on the features:
 - Visibility, front and rear: Like Dislike Acceptable
 - Riding qualities in general: Like Dislike Acceptable
 - The 100-inch wheelbase: Like Dislike Acceptable
 - The body styling in general: Like Dislike Acceptable
 - Curb clearance for opening of doors: Adequate Too High Too Low
- 13- Specifically, what do you dislike about your new Henry J? Should be at least 6 in. more leg space in rear seat. Also should have larger rear window. Not enough room in rear seat. When base should be about 110.
- 14- Would you buy another Henry J? Yes Possibly No
- 15- Has the fact that the Kaiser-Frazer factory pays retail prices to your dealer for warranty repair work or service benefited you? Yes Partially No
- 16- Have you found Kaiser-Frazer dealer service better or worse than service from dealers in other makes you have previously owned? Better Worse About the same
- 17- How do you rate your Henry J, generally? Excellent Good Average Poor

ONLY 14% ADD OIL BETWEEN CHANGES

SLIGHTLY BELOW AVERAGE

48% EXCELLENT 39% GOOD

LOUDEST GRIPES--
1. REAR SIDE WINDOW CAN'T BE OPENED
2. REAR WINDOW TOO SMALL

89% WANT NO MORE HORSEPOWER

GENERAL INFORMATION

- 18- What type of engine would you prefer in your next new car? In-line V-type
- Number of cylinders: 4 6 8 Valves: Side Overhead
- 19- Are you satisfied with the horsepower rating of your Henry J (68 or 80 h.p.)? Yes No
- Approximately what H.P. rating would you like in your next new car? 90-100
- 20- What specific improvements would you like in your next car? larger rear window
- 21- Based on your present experience, which transmission would you prefer: Conventional Automatic (What kind? about 110" wheelbase - more space between front and back seats)

This questionnaire will be tabulated fairly, and your name will be held in strict confidence; we request that you attend to each question listed. Thank you.
Please mail promptly to:

FLOYD CLYMER,
1268 SO. ALVARADO ST.
LOS ANGELES 6, CALIF.

My name: [Redacted]
Address: [Redacted]
City & State: Chicago, Ill.
Occupation: printer

(Please write other personal comments)
This is my second Henry J. - I especially like the fold-forward backseat. It makes a good bed for the kids (we have a mattress for it) whenever we travel. With the 3 features I disliked about it corrected, the Henry J, to me, would be the perfect family car.

CLYMER TESTS THE KAISER

Floyd Clymer tested the Henry J in February 1951. This month, he puts its big brother through the paces. Read what Clymer found out about the Kaiser, beginning on page 91

The



Slightly longer than last year's, the 1953 Corsair has a restyled interior, an almost unchanged exterior

OWNERS REPORT on the HENRY J

The true test of a car begins when the owner takes the wheel. *Popular Mechanics* sent questionnaires to 1000 Henry J owners. Here's what they say about their cars

By Floyd Clymer

UNDoubtedly one of the most-discussed cars on the American market is Kaiser's lightweight (2350-pound) Henry J. An amazing number of Henry J owners are enthusiastic boosters and a large percentage have high praise for the car, while the percentage of dissatisfied owners is quite small; in fact, only 3 percent said they would not buy another Henry J; 31

percent might buy another Henry J and 66 percent said they will do so.

Most owners are well pleased, such as a Southbridge, Mass., automobile serviceman who wrote: "I work on all makes and models of cars day in and day out; I have driven everything from a Model A Ford to Lincolns and Cadillacs. Some of the big cars may give a little better ride and go a

Despite the slanted rear deck and small lid, there is considerable luggage space in the small Henry J

Most owners use regular gas, are satisfied with gas mileage. Sloping back window makes rear vision poor



Percentages From PM Poll

Owners of Corsair models.....	56%
Vagabond models.....	44%
Owners of 4-cylinder models.....	51%
6-cylinder models.....	49%
Conventional-transmission cars.....	69%
Overdrive-equipped cars.....	31%
Use regular gasoline.....	71%
premium gasoline.....	29%
Get gas mileage expected or more.....	56%
reasonably near expected mileage.....	35%
less than expected.....	9%
Average gasoline mileage in country*	
4-cylinder.....	27.8 m.p.g.
6-cylinder.....	26.1 m.p.g.
*Owners of overdrive-equipped models report approximately 2 m.p.g. higher gas mileage (country driving only)	
Average gasoline mileage in city	
4-cylinder.....	24.3 m.p.g.
6-cylinder.....	23.3 m.p.g.
Average mileage before oil change.....	1332
Owners who do not add oil between changes.....	86%
Roadability excellent.....	63%
good.....	36%
unsatisfactory.....	1%
Maneuverability excellent.....	82%
good.....	18%
unsatisfactory.....	0%
Acceleration exceptional.....	24%
very good.....	53%
average.....	22%
poor.....	1%
Owners who note no feeling of driving a small car.....	78%

OWNERS' RATING OF HENRY J

Excellent.....	48%
Good.....	39%
Average.....	12%
Poor.....	1%

Below, with a 17½-foot turning radius, the 100-inch-wheelbase Henry J is easy to maneuver in tight spots. Chalk lines emphasize how sharply front wheels turn



GENERAL INFORMATION

Owners preferring the following on next car:	
In-line engine.....	74%
V-type engine.....	26%
Six cylinders.....	64%
Four cylinders*.....	19%
Eight cylinders.....	17%
Side valves.....	55%
Overhead valves.....	45%
No increase in horsepower desired.....	89%
Conventional transmission with overdrive.....	50%
Conventional transmission only.....	30%
Automatic transmission.....	20%
(*37% of the owners of 4-cylinder models would prefer a similar engine in their next cars.)	
Will buy another Henry J.....	66%
Might buy another Henry J.....	31%
Will not buy another Henry J.....	3%
Dealer service about the same as that of other makes.....	55%
better.....	30%
worse.....	15%
Chief purchase reasons (in order of popularity):	
1. Economy of operation	
2. Original price	
3. Styling features	
4. Driving ease (roadability and handling)	
Improvements desired in next car (in order of preference):	
1. Increased vision to rear	
2. Better body workmanship	
3. Rear side windows which crank up and down	
4. Increased seating and/or riding comfort	
Most frequent objections:	
1. Rear side windows do not crank up and down	
2. Inadequate rear vision (small rear window)	
3. Body fitting, poor assembly or workmanship	
4. Inadequate leg or seating room in rear	
5. Undue vibration or noise from engine or drive mechanism	
6. Car too small, short or lightweight	

little faster, but the Henry J, in my estimation, will stand up to most of them in durability and performance."

The replies from Henry J owners include some brickbats, too. "Specifically, what do you dislike about your new car?" is a question always included in our surveys, and here is a random sampling of Henry J dislikes:

"After the usual parking-lot adventures, the bumpers are wrinkled like an accordion."—Cleveland physician.

"The rear windows won't roll down."—This complaint was common among the owners. (I agree.)

"Frequent breaking of door glass."—South Carolina naval-base employee.

"The 'grasshopper' rear end."—Philomath, Ore., newspaper worker.

"No dome light or armrests."—Greenville, Tenn., electric-lift operator. (The 1953 car has a dome light in all models.)

"Should have a lock on the driver's door."—Astoria, L. I., housewife. (I agree.)

"Clutch and brake pedals should be a

(Continued to page 230)

CLYMER TESTS THE KAISER

THE CAR I TESTED was the 1952 Kaiser Manhattan four-door sedan with Dual-Range Hydra-Matic Drive, powered with the 115-horsepower, six-cylinder, 7.3 to 1 high-compression engine which Kaiser calls Supersonic.

The test was for 1090 miles in southern California, Arizona and Nevada over desert, mountains and back roads. I could not make the engine overheat. The only trouble I had was a vapor lock that occurred twice in the heat of the desert. Some cold water poured on the gas line and fuel pump took care of it. The exhaust manifold is too close to the fuel pump, which causes this trouble. (Engineers should climb high mountains like Pikes Peak some time, as the same trouble occurs on many cars climbing long, steep grades at high altitudes. This suggestion applies not only to Kaiser engineers but to all engineers.)

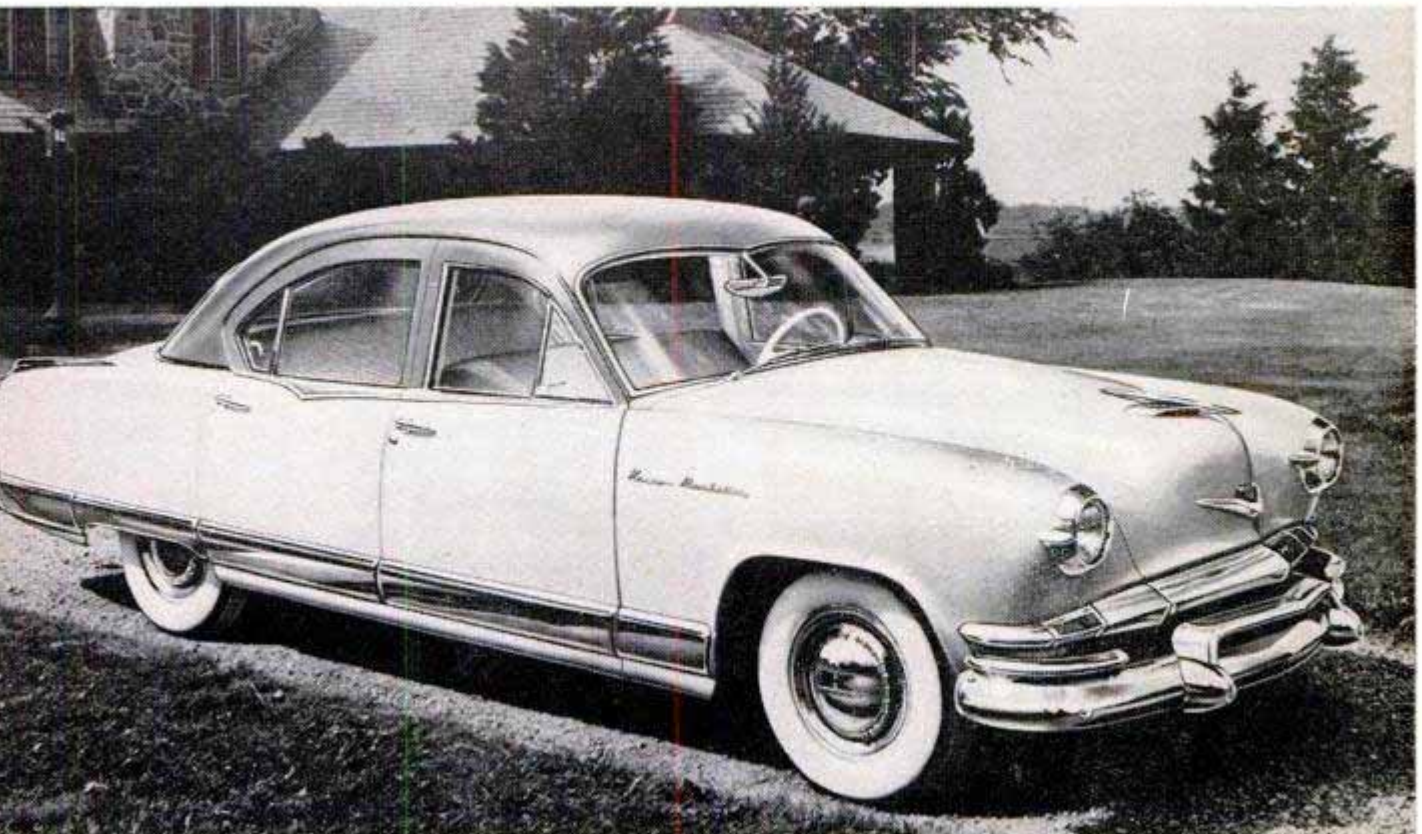
The new Kaiser is one of the finest handling cars I've ever driven and roadability is excellent. I once said that earlier Kaiser cars had a nearly perfect combination of balance and weight distribution and now I find the 1952 model is even better than previous ones. The car is very stable at high speeds and on curves.

The self-centering, easy operating brakes are excellent and stand abuse. Vision is as

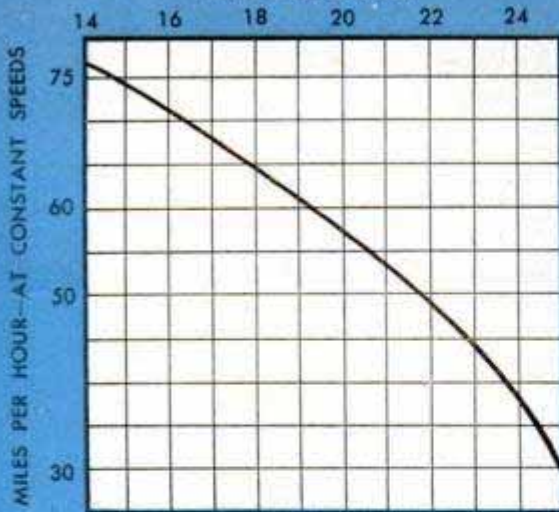


Clymer says that though it's no road locomotive, the Kaiser has good power in low gears for steep grades

Announced too late for testing, the 1953 model is little changed outside. Horsepower has been boosted to 120 compared with 115 in the '52 model. The new Kaiser retains sleek continental lines and good visibility



**ECONOMY TEST — 1952 Kaiser Manhattan
Dual-Range Hydra-Matic Drive
MILES PER GALLON**



At constant 30 m.p.h.....	24.9 m.p.g.
At constant 50 m.p.h.....	21.8 m.p.g.
At constant 60 m.p.h.....	19.2 m.p.g.
At constant 75 m.p.h.....	14.5 m.p.g.

CROSS-COUNTRY MILEAGE

Los Angeles to San Diego (coast route, considerable traffic).....	17.2 m.p.g.
San Diego to Phoenix, Ariz.....	19.8 m.p.g.
Phoenix to Los Angeles, via Las Vegas, Nev.....	21.9 m.p.g.

Premium gasoline of various brands was used to Phoenix.
Regular gasoline used on return trip. Satisfactory but some pinging.

¼ mile from zero	Drive range 3 only.....	22.30 sec.
	Drive and Low ranges.....	21.90 sec.
½ mile from zero	Drive range 3 only.....	34.80 sec.
	Drive and Low ranges.....	33.90 sec.
0 to 30 m.p.h.	Low range only.....	5.80 sec.
0 to 60 m.p.h.	Drive range 3 only.....	18.90 sec.
	Drive and Low ranges.....	17.10 sec.

Top speed by speedometer..... 95-98 m.p.h.
Actual top speed about 7% less (speedometer variation)

good as if not better than any other American car. Steering is easy but there is some road shock transmitted from wheels to the steering wheel. Some large persons will find the steering wheel too low. The ratio is quite good and five turns of the steering wheel from lock to lock is satisfactory. The ride is smooth; the front end is stiffer and has less tendency to "bottom" when hitting hard bumps at high speed than previous models. Wheelbase is 118½ inches, which makes for a good-sized car.

The driving position is most comfortable and I found it an excellent car for long-distance driving. Roominess is an outstanding feature of Kaiser cars. Body lines are low and rakish.

The Kaiser engine is smoother than in earlier models and, while slightly underpowered by present horsepower standards, it gives a satisfactory and economical performance. Top speed is good — 95 to 98 miles per hour by speedometer (which, like most others, is fast by about 7 percent). The car has good power in lower gears for steep grades.

The engine gives good economy for its moderate size (226.2-cubic-inch displacement) and my tests produced excellent mileage (see Economy Chart).

The Hydra-Matic transmission needs no comment and its operation on Kaiser cars is the same as on General Motors makes. Borg-Warner transmissions, with or without overdrive, are also available on all Kaiser and Henry J models.

The body is built by Kaiser and is wide and roomy, yet there is no feeling of bulk or awkwardness in handling the car. I can't quite make up my mind what Kaiser's "Anatomic" design is or what it means, but I do know it gives a comfortable ride regardless of the name. It is easy to get in and out through the large doors. Door handles are of the pull type, operate easily and are attractive. Doors open and close nicely.

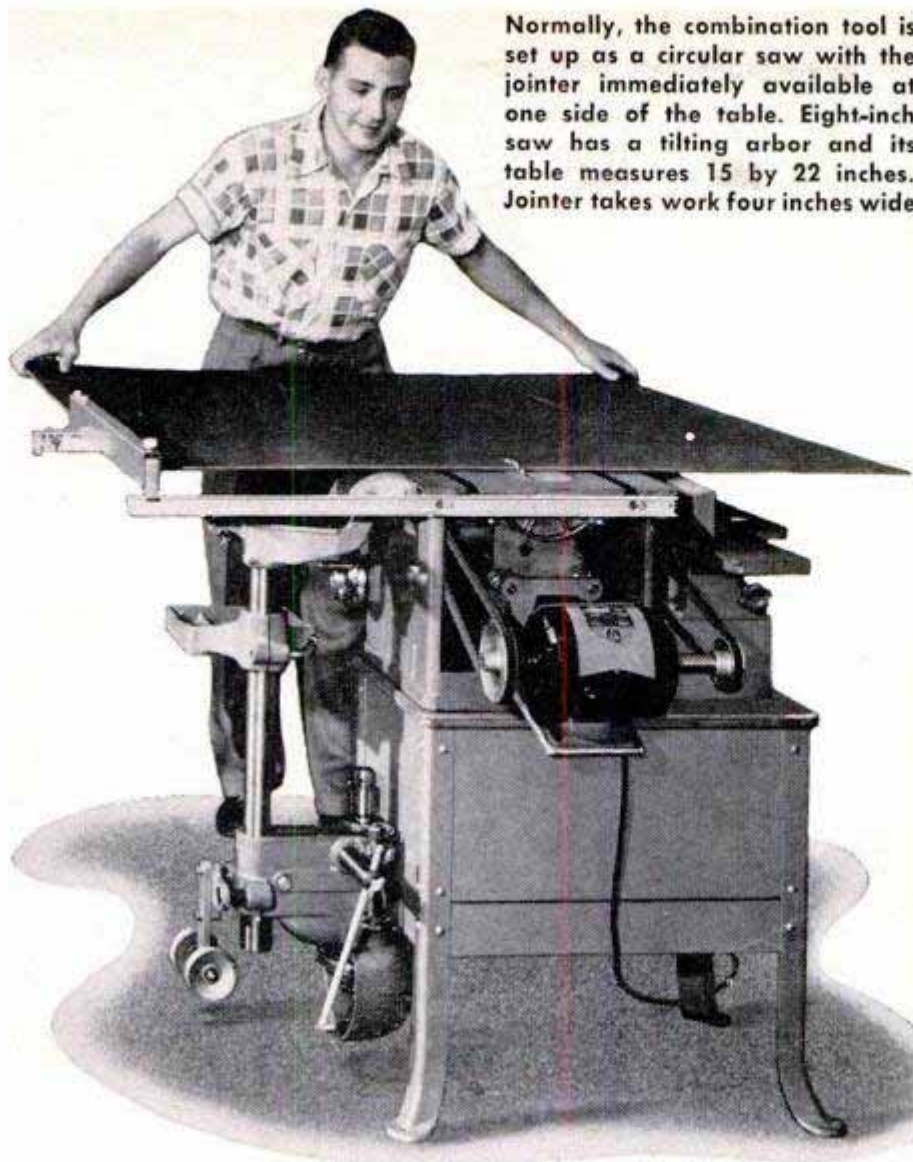
The foam-rubber cushions and seats are excellent. Seats are wide (approximately 64 inches in front, 63 inches in the rear) and afford a comfortable and roomy ride for three passengers in front or rear.

The instrument panel has a vinyl-covered crash pad which has some value in a crash. The instruments are well located. Brake pedal and

(Continued to page 224)

Child is visible when only 7½ feet from bumper, several feet closer than on most other cars



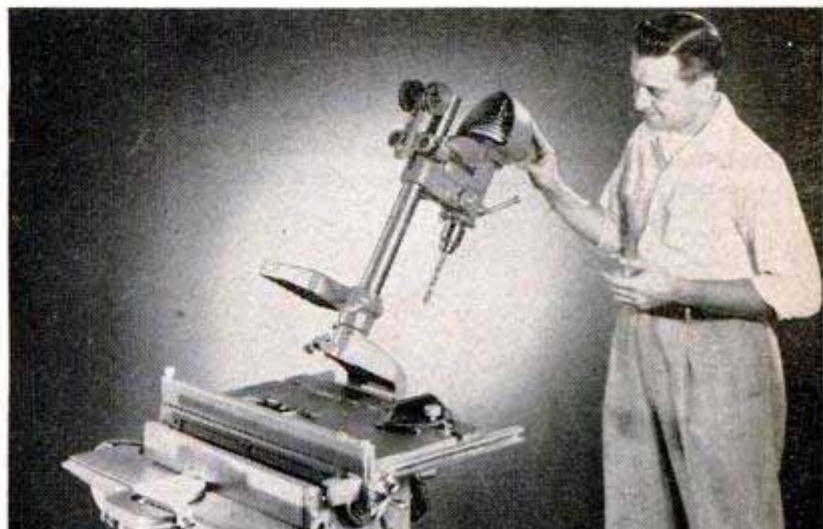
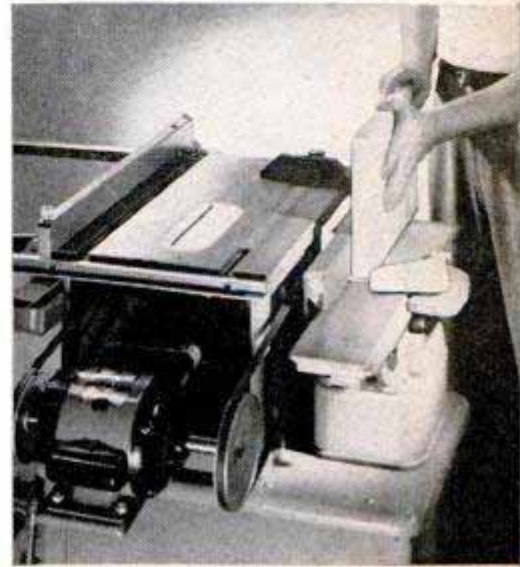


Normally, the combination tool is set up as a circular saw with the jointer immediately available at one side of the table. Eight-inch saw has a tilting arbor and its table measures 15 by 22 inches. Jointer takes work four inches wide

All-in-One Power Workshop Combines Four Basic Tools

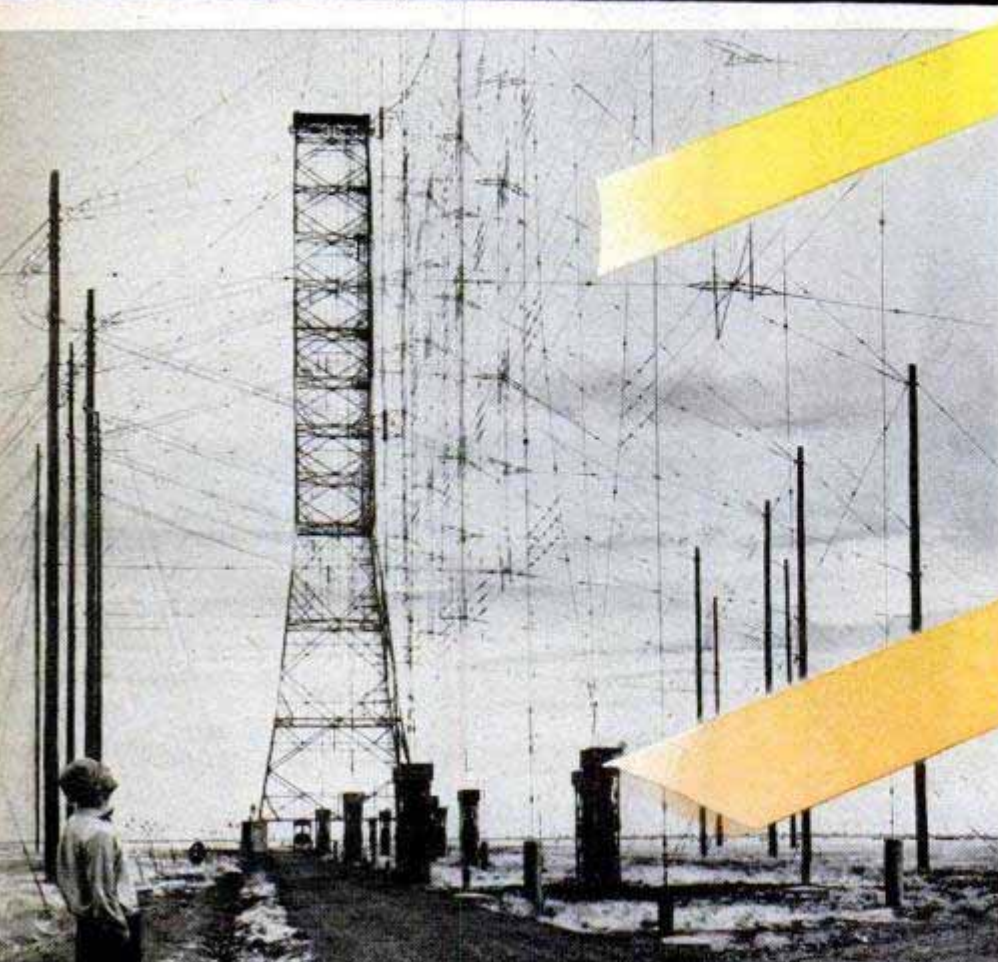
FOUR BASIC TOOLS—the ones most often used by home craftsmen—are combined in a single power workshop measuring only three feet square. Built into the unit, manufactured by Delta, are a tilting-arbor circular saw, a jointer, a drill press and a disk sander. A special feature of the new combination tool is that it can be broken down into four individual tools, each mounted on its own stand and powered by its own motor. This enables the owner to set up a full-scale workshop when additional space is available. In normal operating position the power shop is set up as a circular saw and a jointer. Work can be moved directly from one of these tools to the other. It takes less than one minute to change the tool for operation of the drill press, and about 30 seconds for operation of the sander. With the attachment of a molding head and 27 cutters, the saw can be used to turn out all conventional shapes of molding. The jointer handles work up to four inches wide.

Top right, compound mitering—cutting two angles at once—is easy with saw's tilting arbor. Center above, jointer cuts a square edge for good joint, also can be used to cut bevel edge and rabbet. Right, sander puts finished edges on curved surfaces. Below, it takes less than a minute to swing drill press into place

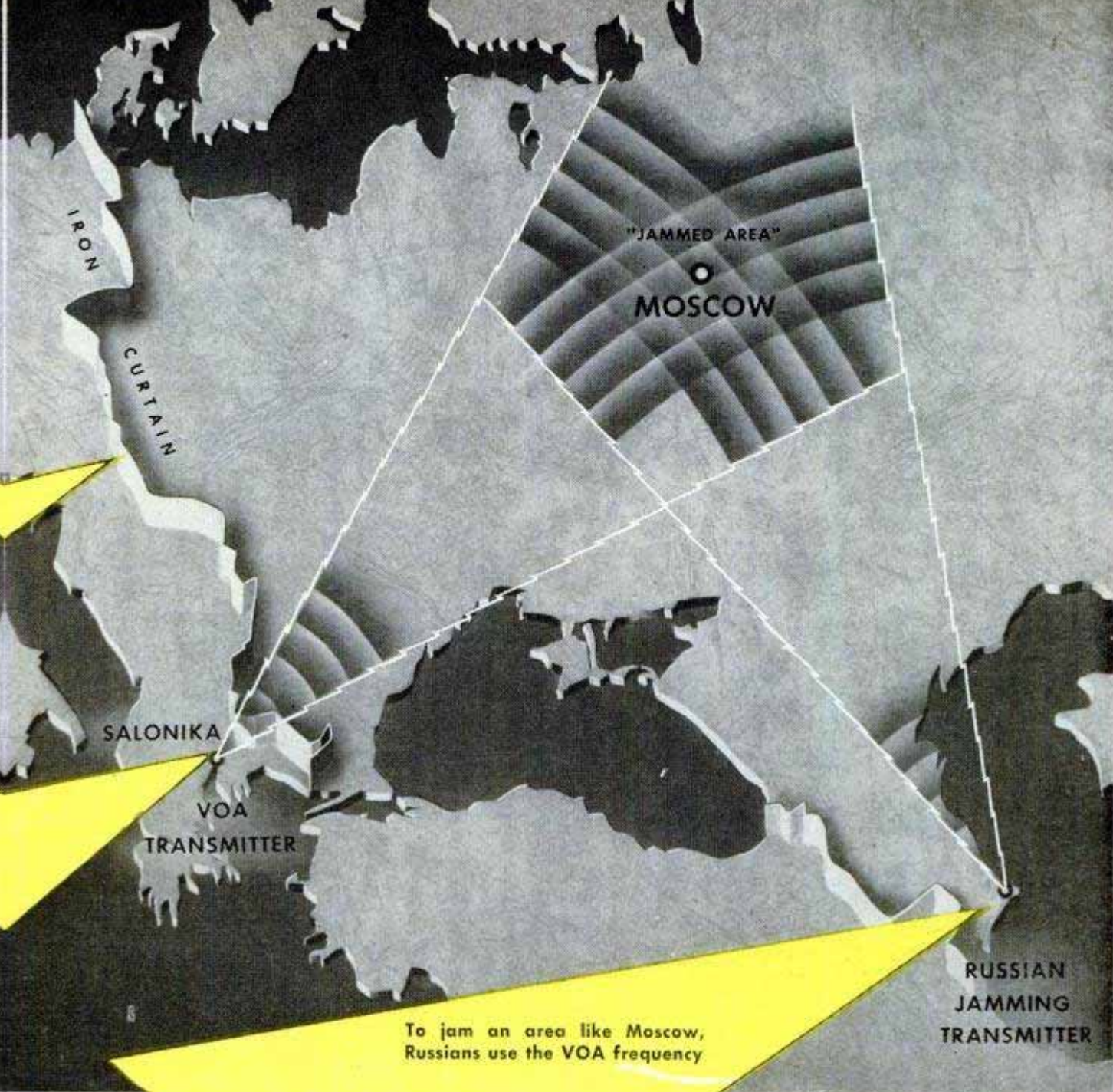




Plastic balloons carrying leaflets penetrate Iron Curtain in spots where radios are jammed. The word "svoboda" is Czech for "freedom"



Curtain antenna on West Coast is one of several Voice of America installations in the U.S.A. which beam programs to specific targets



WITH SEAGOING RADIO STATIONS, SKYSCRAPING SPIDERWEBS AND SQUARE BALLOONS . . .

We're Blasting Holes in the Iron Curtain

MARINERS, hugging the coastal route between Panama and Vera Cruz a few months ago, saw something out on the gray Caribbean that looked as though a chunk of the Navy's lighter-than-air base at Lakehurst, N. J., had torn loose and gone to sea. High above a strange ship, and attached to it by a heavy cable, a big blimp soared like a fat bird on a leash.

The craft's deck bristled with a startling array of 30-foot antennas. Some resembled giant fishing rods. Others looked like upside-down steel towers with pointed ends anchored to the deck. Amidships, a massive steel landing platform for the blimp reared above the deck line.

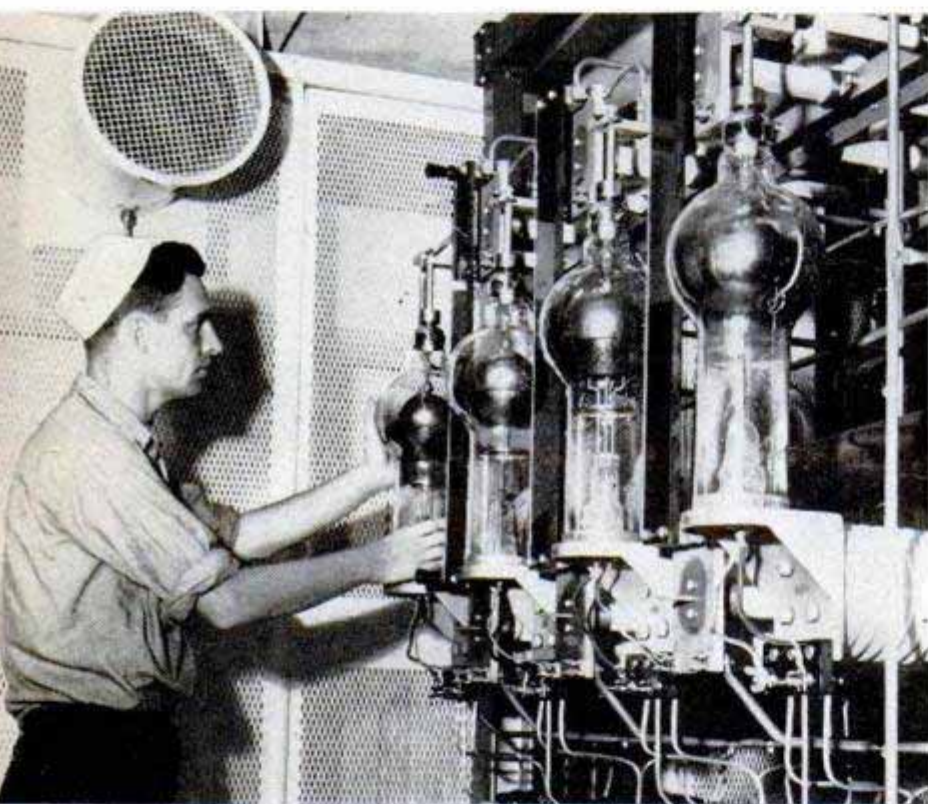
It was the *Courier*, Voice of America's new roving radio transmitter, testing the



Coast Guard cutter *Courier* is the Voice of America's seagoing radio broadcasting station with giant 150,000-watt transmitter



On board *Courier*, turntable for recordings stays level even when the ship rolls



Huge condenser tubes in ship's transmitter room are shock-mounted

Engineer in main control room on *Courier* faces water-cooled tubes



carrying power of her electronic voice. Converted from a 5800-ton Navy A-K, she's one of a hatful of new tricks—including such things as vast webs of steel for blasting radio messages around the world; great flights of message-carrying pillow-shaped plastic balloons for hurdling communist boundaries; matchbox-sized radio sets for Red-dominated listeners—all helping to pull the drawstring on the Iron Curtain.

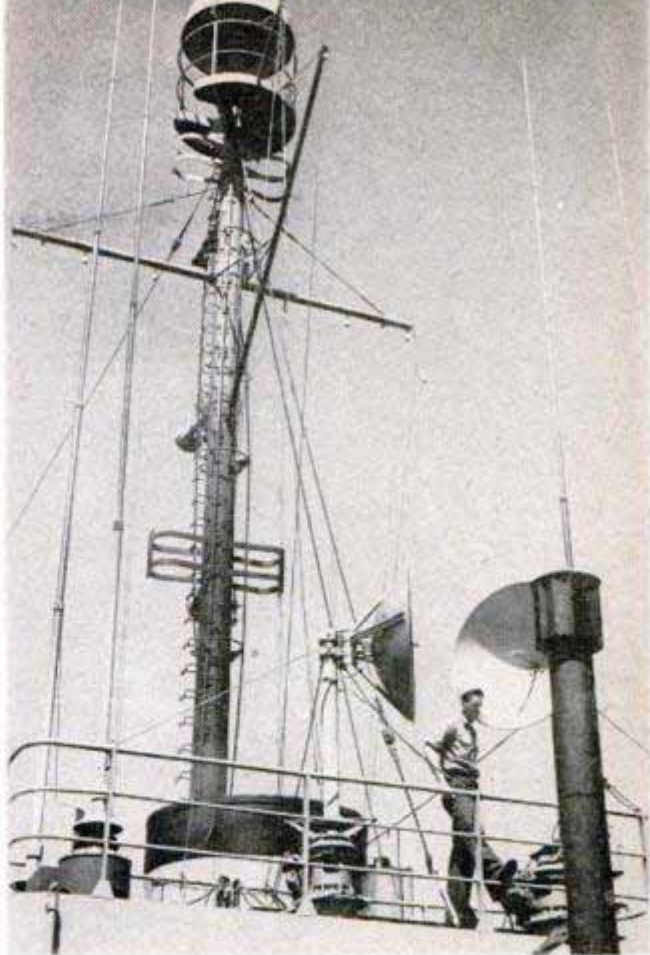
Manned by the Coast Guard for the State Department, the *Courier* is the first "combat" ship for Operation Vagabond—a proposed fleet of wandering supertransmitters that will roam the seas and lob verbal broadsides into Red-dominated countries from convenient harbors. Already, she has begun to play the biggest game of international radio tag in history. If necessary, she could operate under way, originate special programs from aboard and beam them out on a "skyhook" antenna that she flies from her helium-filled captive balloon. But most of the time, Capt. Oscar C. B. Wev, her skipper, will slip her in and out of undisclosed friendly European ports. She'll pick up Voice programs from the States and beam them on assigned frequencies deep into Soviet and satellite countries. Whenever Russian monitors locate her frequency and try to jam her off the air, she can simply haul down her

skyhook, up anchor, and set up business in a new location.

How well she works was revealed during her Caribbean shakedown. For six weeks her crew of 80 coastguardsmen, including nine radio officers and three Voice engineers, blasted the air waves with both relayed programs and special Latin broadcasts originating in the ship's own compact studio in the wheelhouse. Disk recordings were played on the special seagoing turntable, suspended so that the platter is always level, like a compass, no matter how the ship tosses on the seas.

"We broadcast to 10,000,000 listeners in Mexico," says Paul Tabailoux, one of the Voice supervisors on board, "and 160,000 in Panama City. But our mail shows we were picked up as far off as Scotland, Spain, Hawaii, New Zealand, England and France."

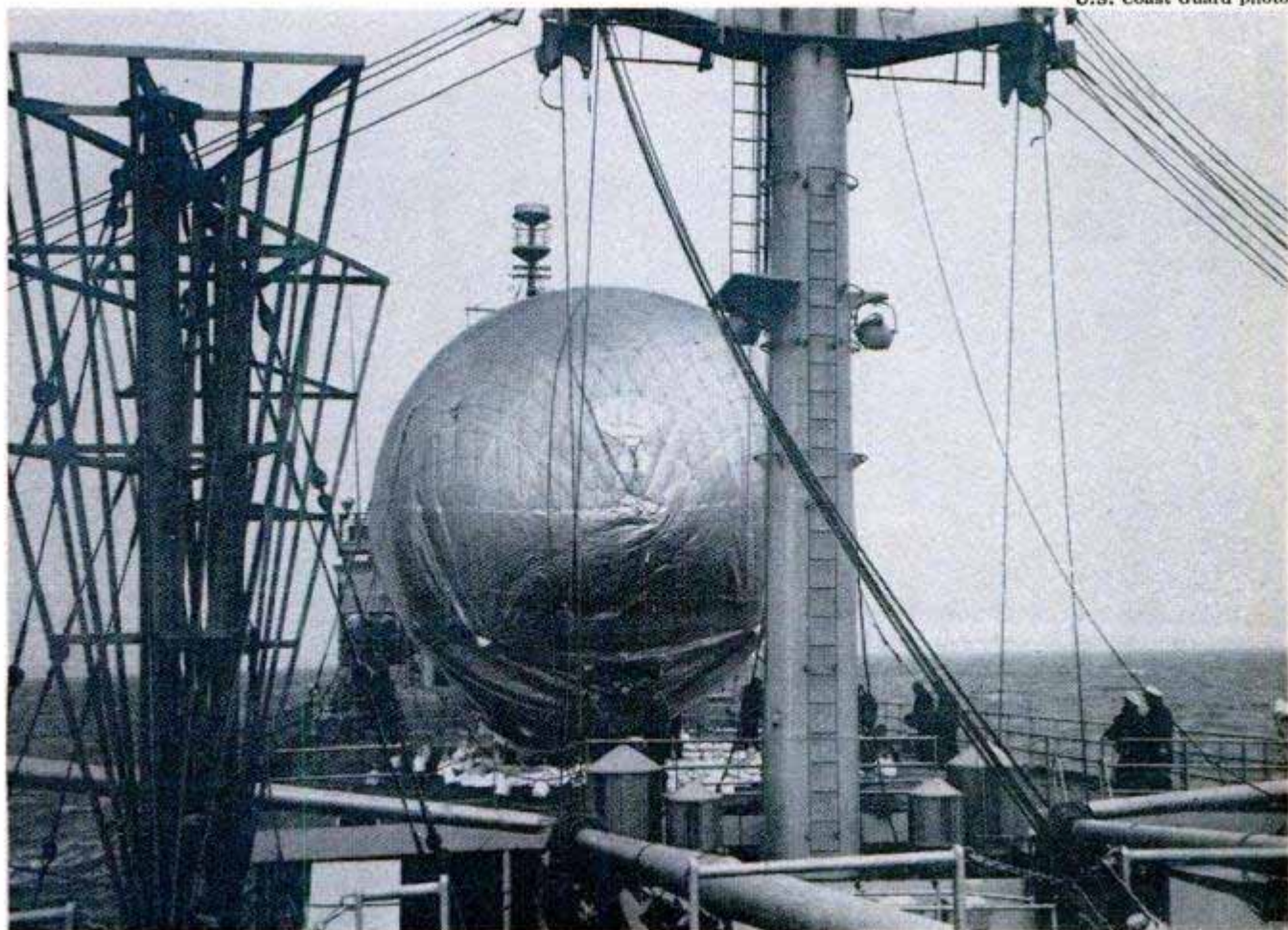
Packed into the *Courier's* 338-foot hull are a generating plant and radio station more powerful than many a big shore-based transmitter. Deep in an after hold, engineers roam through an air-conditioned electronic maze of switches, dials and glowing tubes. A 150,000-watt medium-wave transmitter will beam radio signals out across 1000 miles of space. In another long corridor banked by gleaming dial panels, operators stand on a cork runway to control two 35,000-watt short-wave transmitters capable of lobbing an anticommunist



Forest of antennas towers above *Courier* deck. Tall mast houses radar; long rods are receiving antenna

Below, captive balloon supports Voice of America antenna. Here it is shown fully inflated on flight deck of *Courier*. Balloon can soar 900 feet in air

U.S. Coast Guard photo



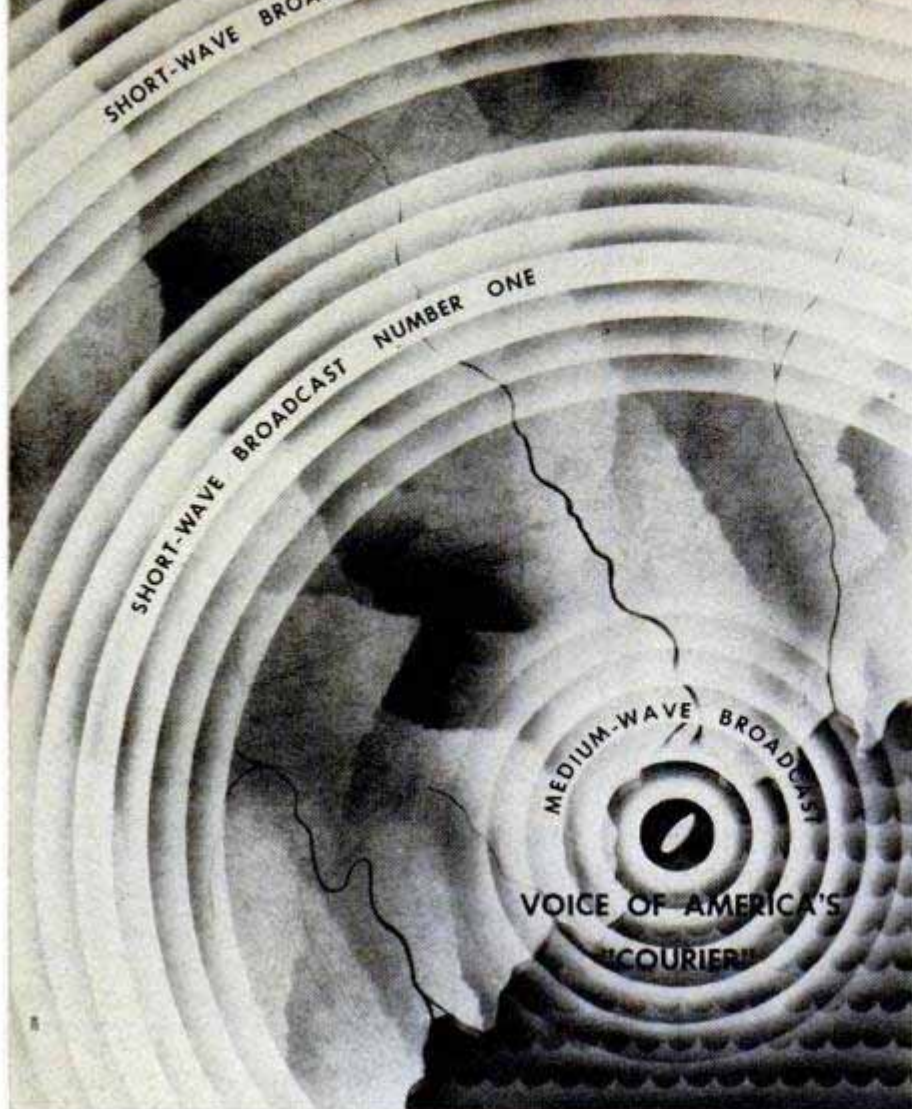
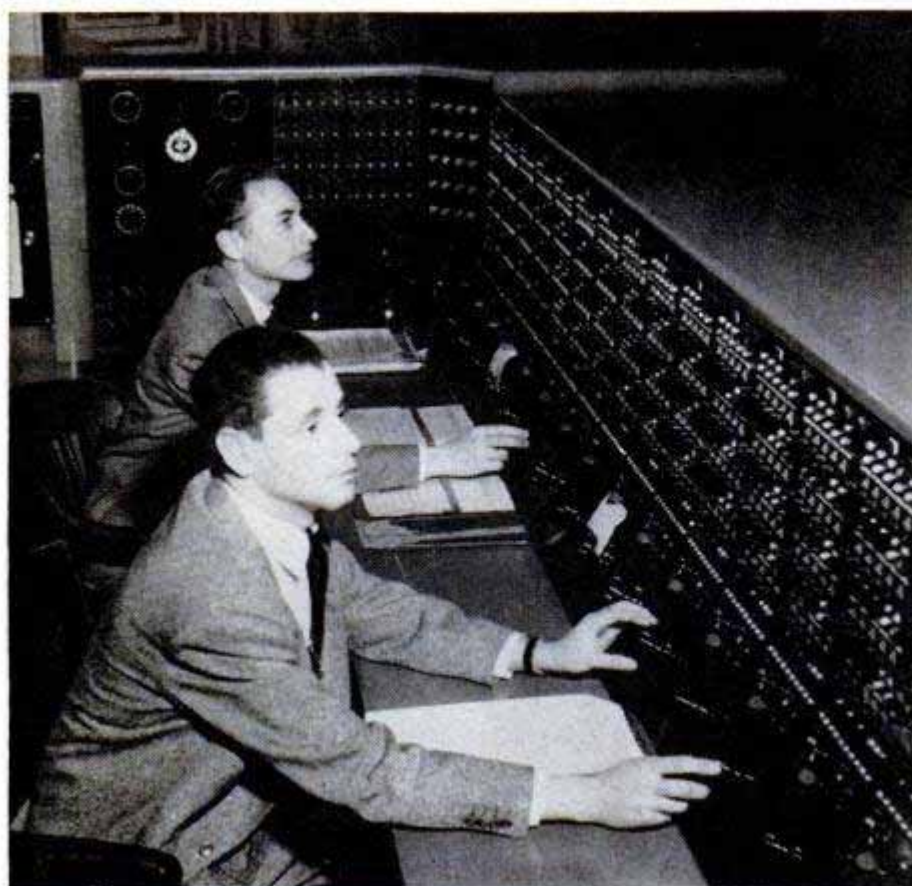


Diagram shows how Courier can transmit three broadcasts simultaneously

Voice of America's master control board handles 20 programs at one time and is the "gateway" for incoming and outgoing programs of the service



radio broadside clear around the world. Ship-to-shore and radioteletypewriter transmitters fill in the corners. Most of this delicate equipment sits on an eight-inch concrete platform measuring 20 by 40 feet, which is floated on cork slabs to absorb vibration from the ship's engines when she's under way.

In a 30-foot-high dungeon buried amidships, a battery of monster transformers hum in a low pitch. They are among the biggest ever to go to sea. Another hold houses three diesel generators capable of whamming 1,500,000 watts of power to the transmitters.

"With everything going, it would get seething hot down below and blister the paint," says Tabailoux. "So we have a special air-cooling system." The tubes are cooled by distilled water rushing through big porcelain water jackets around each tube base. The water takes heat from the tube and carries it to a heat exchanger, where fresh sea water cools it again. Then it returns to the tubes for another load of heat.

Oddest part of the ship is her 100-foot steel flight deck, sitting atop her well deck like a vast multi-legged table surrounded by a forest of antennas. The long whip-type rods are receiving antennas. Short wave goes out over the strange cornucopia-shaped steel towers. The skyhook, carried aloft by the blimp, is for medium-wave broadcasts.

Launching the skyhook at sea is a spectacular undertaking. Coastguardsmen, trained at Lakehurst, scramble around the flight deck like circus hands raising a big top, as they wrestle with the endless square yards of heavy

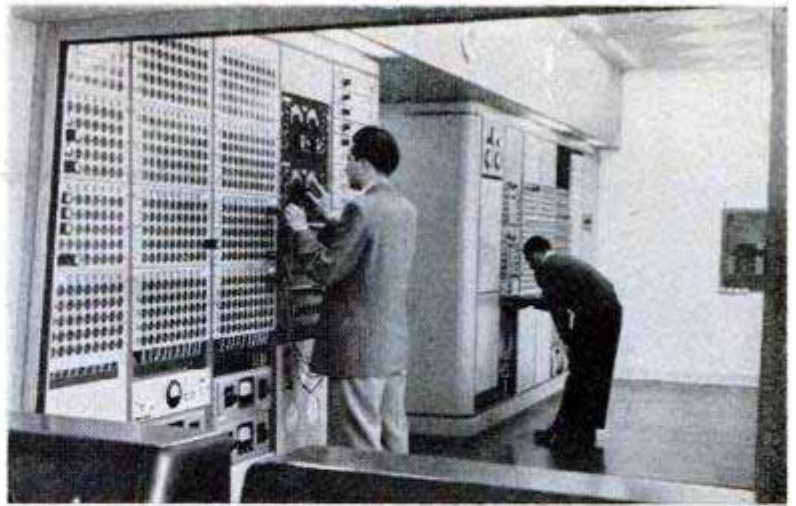
rubberized fabric. "The bag measures 69 feet long and 35 feet high, inflated," Tabailleux points out. "And there's only a 90-foot clearance between the masts."

The *Courier* carries six of the big bags, plus 600 bottles of helium to fill them. A big winch lofts the blimp and its antenna 900 feet in the air.

Tremendous insulators protect everything around the flight deck—for good reason. "During operations," Tabailleux explains, "the flight deck is so hot with frequency that men on it become charged. If you held a fluorescent lamp in your hands, it would light up."

Actually, the *Courier* is just one more verbal artillery piece in a battery that is blasting holes in the Iron Curtain with barrages of truth. In 1942, a tiny Voice of America squeaked its first news program from Station WLWO in Cincinnati to BBC, where it was fanned out to listeners in Germany and Italy. Today, a virtual storm of facts, figures and home truths bombards an estimated 353,290,000 potential listeners around the world in 46 languages. More than 50 program-hours a day on 70 frequencies pour out of New York studios to any of 38 short-wave transmitters located in the United States. Voice-controlled

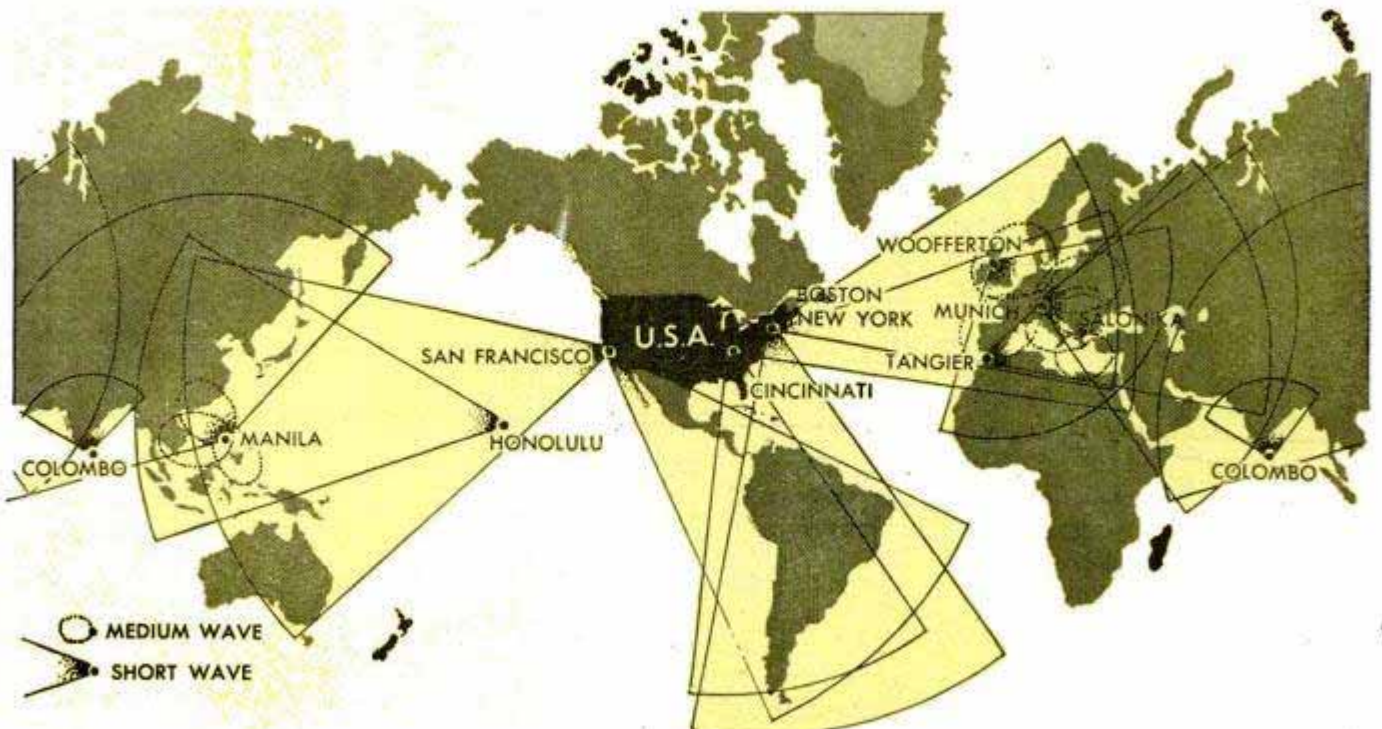
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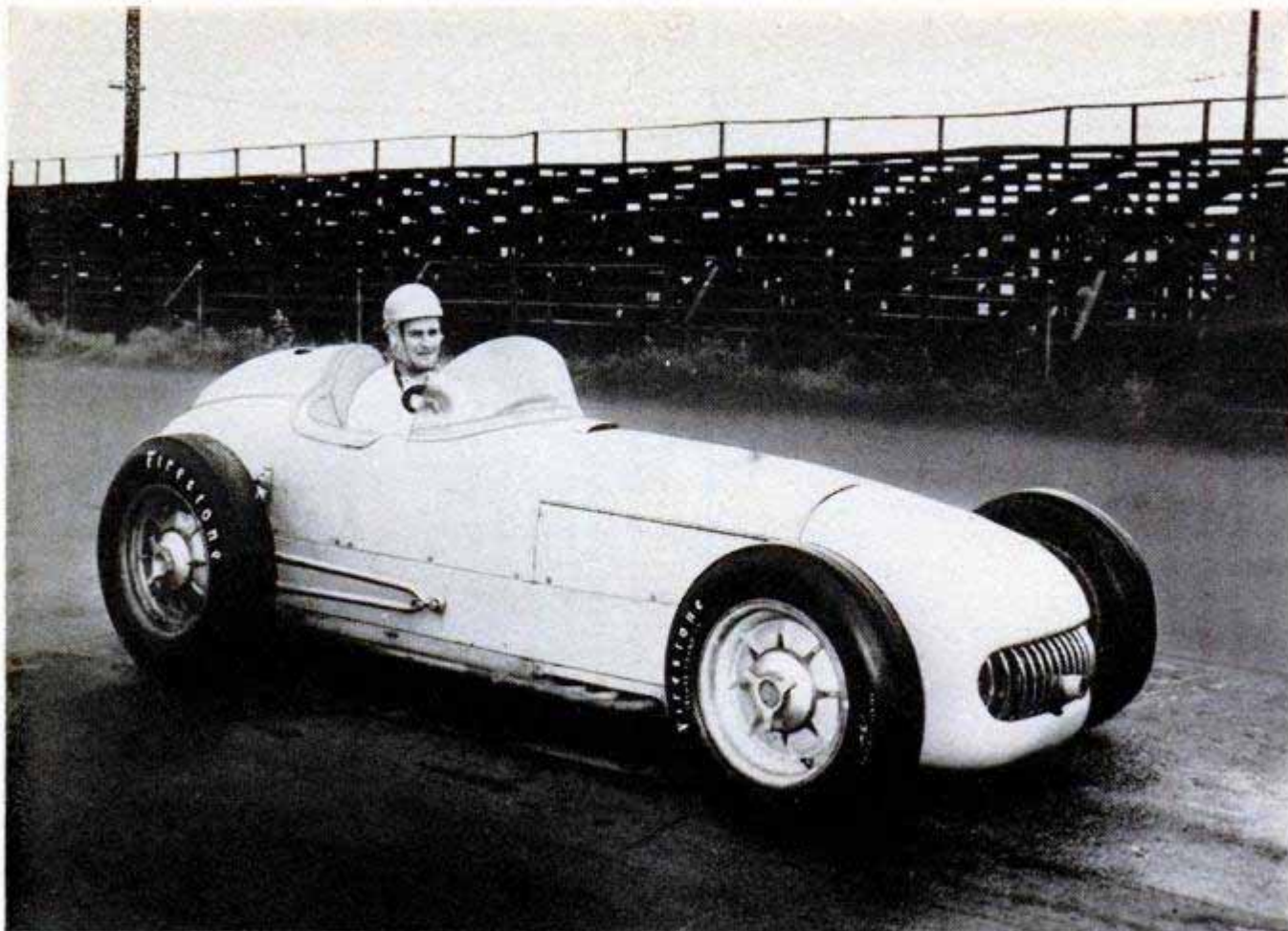


Radio Free Europe operates from this master control room in Munich. Below, RFE worker monitors an Iron Curtain broadcast



Map of the world shows how Voice of America transmitters literally blanket the world with radio coverage by bouncing signals from U.S. transmitters to networks of relay stations on both sides of the hemisphere





Driver Joe James covered 140 miles at an average of 135 miles per hour in the Chrysler-powered racing car

400-Horsepower Chrysler V8 Hits 170 M.P.H.

by David A. Wallace

President, Chrysler Division, Chrysler Corporation

BECAUSE of the extraordinary performance of a modified Chrysler V8 FirePower engine in recent tests conducted by the Firestone Tire and Rubber Company on the Indianapolis Motor Speedway, public interest has been aroused to a point where further details of the design of this power plant are in demand. Installed in a conventional racing chassis owned by Roger G. Wolcott of Indianapolis, this FirePower engine, in trials aggregating over 900 miles, drove the car farther and faster at sustained high speeds than ever before had been seen on this track, the scene of the 500-mile Memorial Day race.

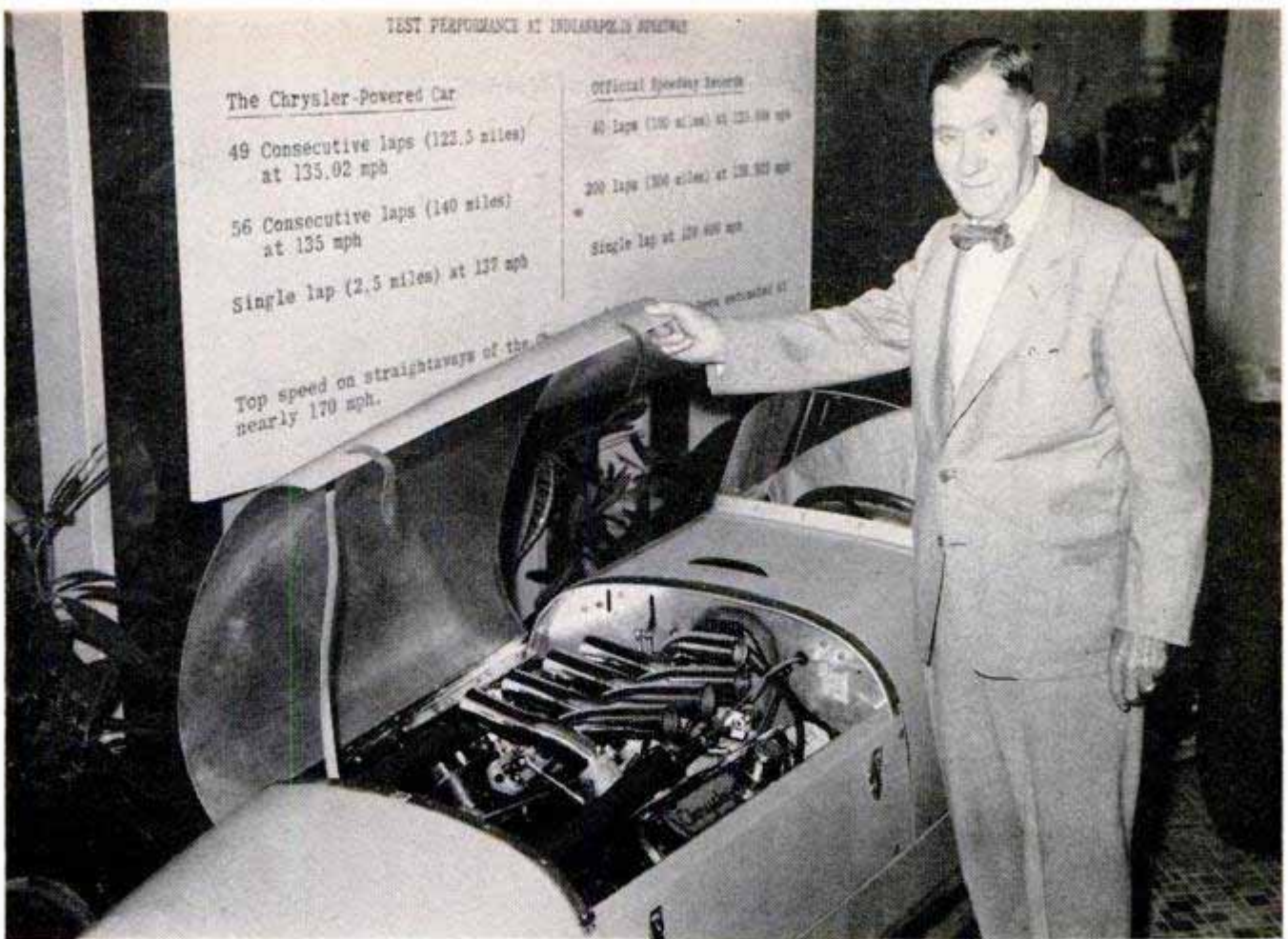
The car was clocked at a rate of 137 miles per hour for one lap, at 170 miles per hour on the straightaways and at 135.02 miles per hour for 100 miles, which beats the existing record of 133.068 miles per hour for this distance in the 500-mile race. And not a single thing was done to the engine, even to the changing of a spark plug, in all the grueling 900 miles of testing, the greater part at speeds bettering 133 miles per hour.

There was no change in the basic design

of the engine to accomplish these extraordinary feats of speed, stamina and reliability, except that it was necessary to use a dry sump to accommodate the low road clearance (three inches) of the racing car to avoid holding the oil on the sides of the crankcase when rounding the turns, as might be the case with a wet sump.

It is on the basis of this performance that I call this the "ultimate" engine. I believe it embodies the ultimate potentialities of the reciprocating type of engine for use in driving motor vehicles.

Normally, it is necessary when seeking to increase horsepower and torque in an automobile engine to make major design changes. These generally involve changing bore and stroke to produce even as little as 25 more horsepower. But the flexibility of the Chrysler FirePower engine is such that horsepower may be more than doubled without changes in weight, bore or stroke and with only minor changes in compression ratio, carburetion and fuel. It is possible to have an engine with an output of approximately 150 horsepower with



President Wallace, Chrysler Division, holds open the hood to uncover the engine he describes in this article

a compression ratio of 6 to 1 and then, by changes in compression, carburetion and fuel, to increase this progressively to over 400 horsepower, which was the output of the power plant used in the Indianapolis test car. Torque increases are commensurate with power increases in these steps.

The compression change requires only a slight increase in the length of the piston. The carburetion may be changed from a single carburetor, as in the stock FirePower, to a two or a four-barrel carburetor. Open or closed fuel injection will give the increased volumetric efficiency required by the higher horsepower.

In this "ultimate" engine, the increase in output from 150 to over 400 horsepower is accomplished without a supercharger and there are no changes necessary in bearings, rings or other important features. Hydraulic or solid tappets may be used, the solid type being adaptable to racing engines as their noisier operation is not a factor.

The hemispherical design of the combustion chamber is the basis for the extraordinary performance. The location of the spark plug in the center of the combustion chamber provides uniform burning of the fuel and all of the pressure when the charge is ignited is exerted directly on the piston.

There is no loss due to pockets or other uneven surfaces in the combustion cham-

ber. The hemispherical design makes it possible to obtain the highest rate of cooling or absorption of heat. This design also permits placing the valves on each side of the chamber which, in turn, means that maximum valve sizes may be used to obtain the horsepower desired. Various types of camshafts may be used to increase volumetric efficiency, but this a minor change that may be required only in engines with an output of above 250 horsepower.

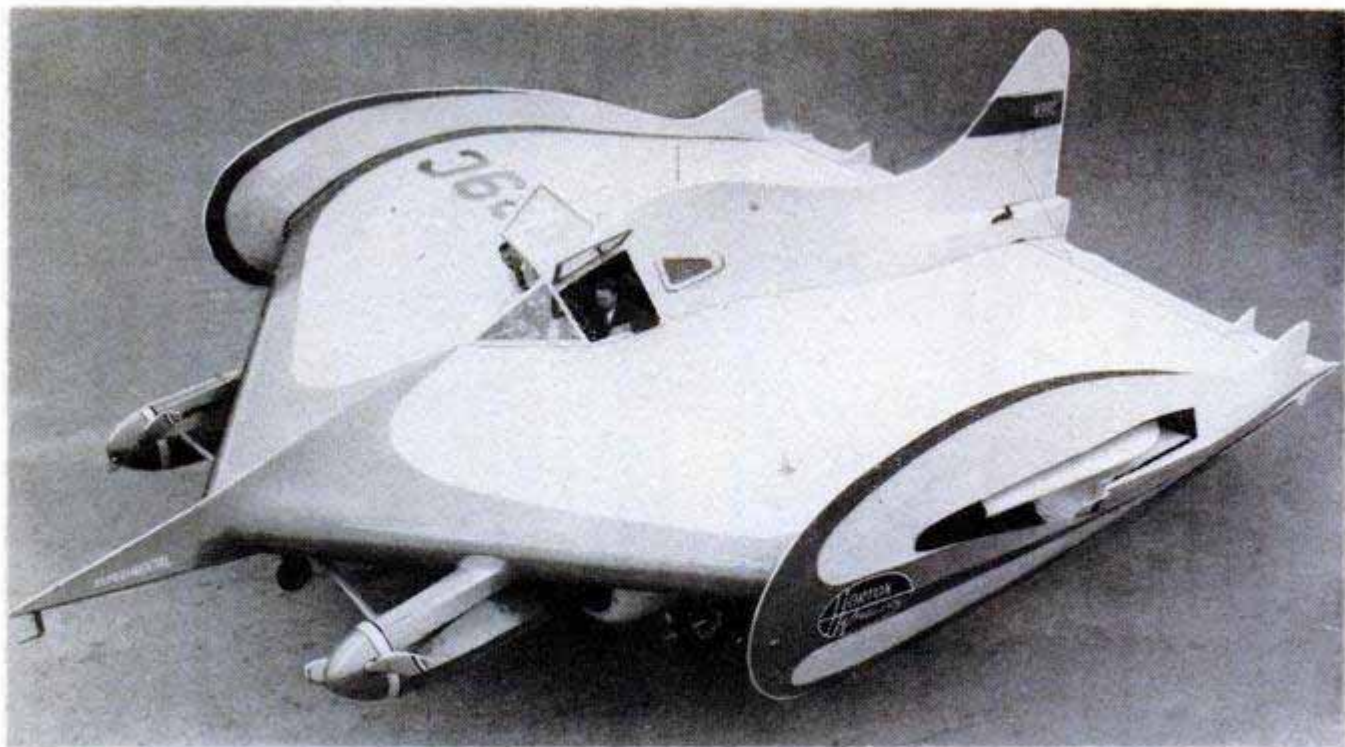
The adaptability of the FirePower engine was illustrated in a report by James C. Zeder, vice-president and director of engineering and research of Chrysler Corporation. Mr. Zeder listed six minor changes required to raise the horsepower from 180 to 310 (with premium fuel) for use in the Chrysler experimental K-310 sports car:

Valves and ports were enlarged; a two-runner intake manifold replaced the production type; four single carburetors

(Continued to page 286)

Indianapolis Speedway Performances

CHRYSLER-POWERED RACER	OFFICIAL SPEEDWAY RECORDS
49 laps (122.5 miles) at 135.02 miles per hour	40 laps (100 miles) at 133.008 miles per hour
56 laps (140 miles) at 135 miles per hour	200 laps (500 miles) at 128.922 miles per hour
Single lap (2.5 miles) at 137 miles per hour	Single lap (2.5 miles) at 139.600 miles per hour



Wings of the wedge-shaped plane disappear into the fuselage for parking. They are extended during flight

'Clipped' Plane Has Retractable Wings

SKIMMING ALONG the runways of the Orange County Airport, near Los Angeles, Calif., a strange "clipped wing" airplane has been undergoing high-speed taxi tests. The odd, wedge-shaped craft is the project of William E. Horton, a 36-year-old aircraft engineer. Although it's dubbed the Horton Wingless, the experimental plane has wings which retract into the fuselage.

His new idea, according to Horton, is to prevent high-pressure positive air surrounding the plane in flight from mixing with low-pressure air flowing over the upper portion of the fuselage. To accomplish this, Horton has built two "sealers"—

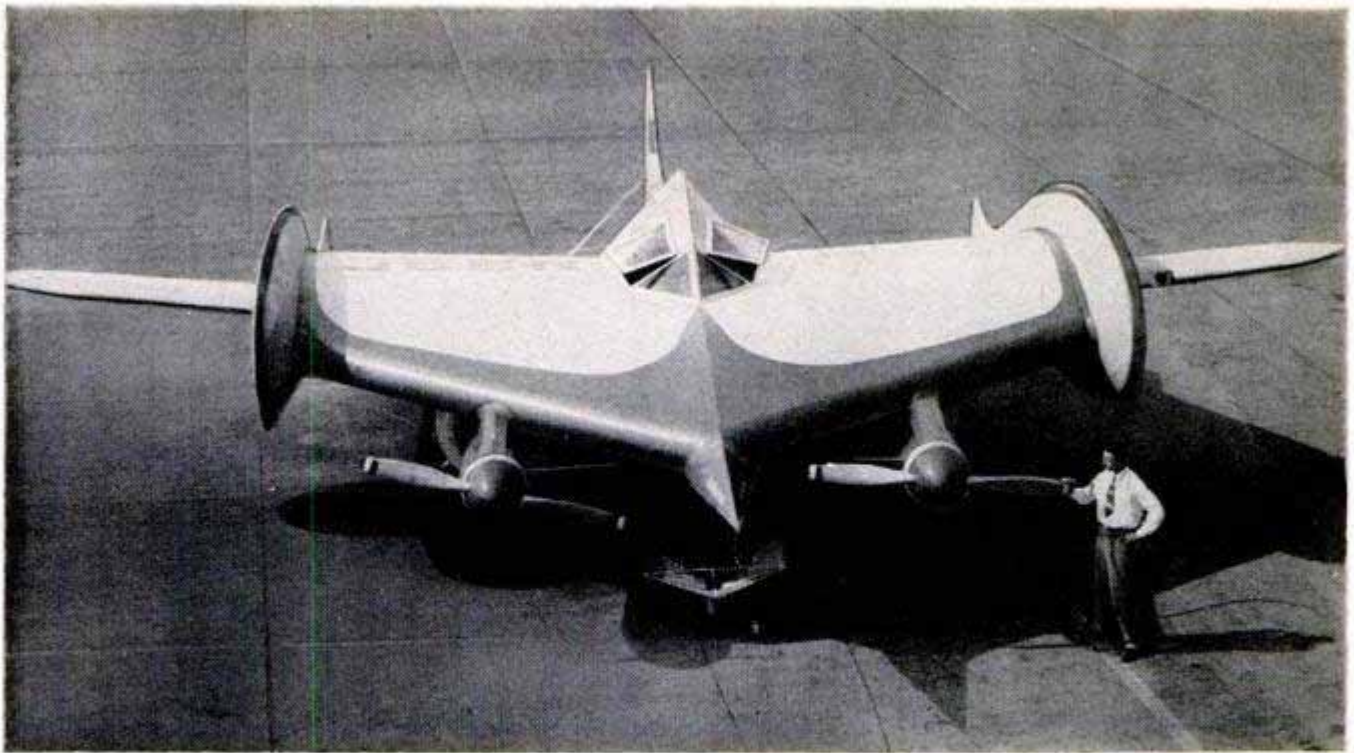
graceful streamlined fins—along the sides of the broad fuselage. Normal aircraft wings extend eight feet beyond the sealers and can be retracted for parking. The sealers, Horton says, produce multiple centers of pressure to give the plane much greater lift with 100 percent increase in pay load and range.

The plane is built around the engines, main spar and landing gear of a twin-engine Cessna monoplane. It is powered by two 225-horsepower engines and measures 26 feet from sealer to sealer and 40 feet from tip to tail.

After a series of taxi tests the plane will

During experimental taxi tests in preparation for flight tests, the Horton Wingless soars 20 feet into the air



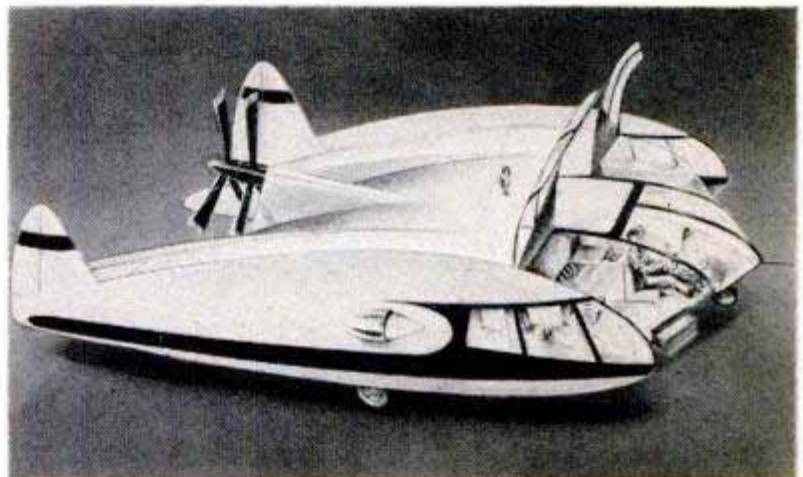


Odd plane, representing an investment of \$50,000, is built around the engines, main spar and landing gear of a conventional light monoplane. The inventor says the finlike "sealers" trap air to increase the lift

be put through its paces in experimental flights.

Horton has discussed the odd fuselage design with aerodynamicists. "They all tell me it won't fly," he says, and then describes the high-speed taxi test in which it soared 20 feet off the runway.

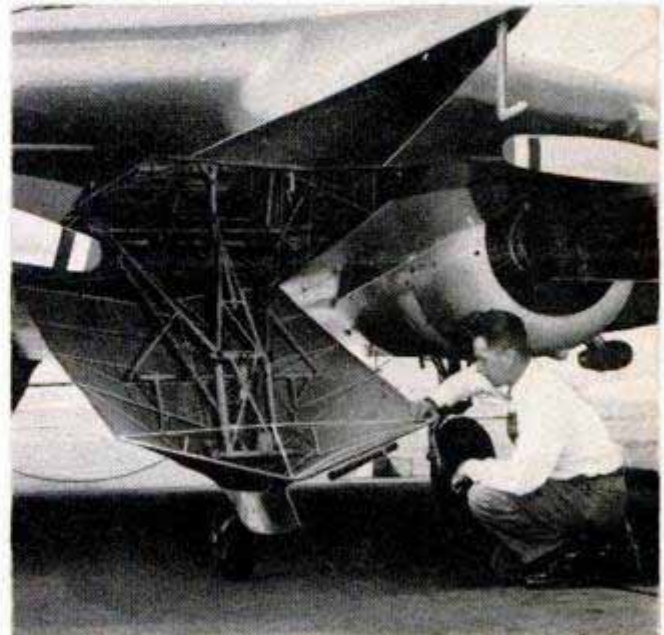
"The Horton Wingless takes off at 45 miles per hour with a power setting of 1800 revolutions per minute," the inventor reports. "The craft has very good landing and take-off characteristics and its performance during the taxi tests has been excellent." ★ ★ ★

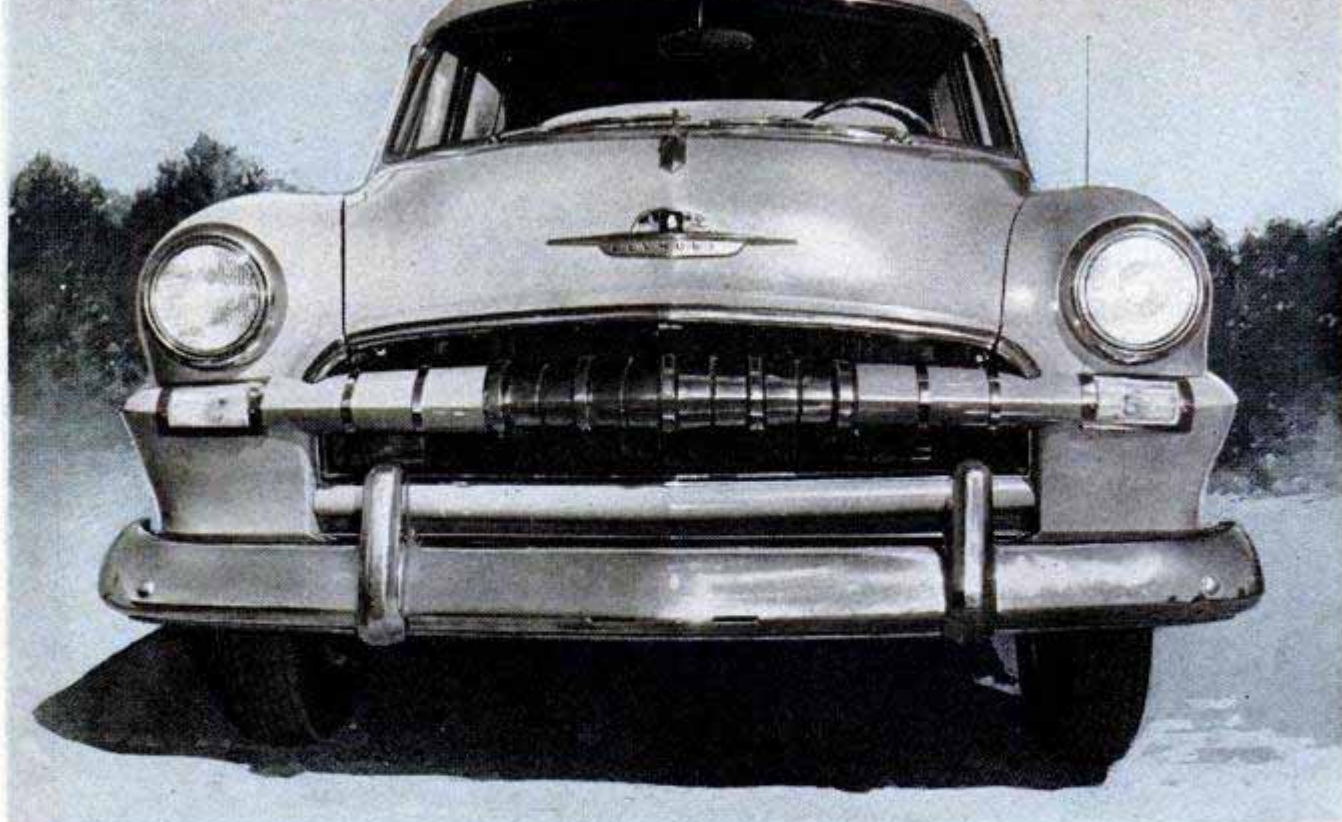


Inventor visualizes this kind of wingless plane for businessmen

Horton, seated in plane, is sure he has discovered a way of increasing a craft's efficiency with "sealers"

Taxi wheel makes the plane easy to steer and park on ground. Mechanism folds into fuselage in flight





Wider and lower, the new Plymouth no longer has the boxy look that many critics complained of last year

PLYMOUTH RESTYLES FOR '53

REMEMBER the old movie plot about the "plain Jane" secretary—the brainy, efficient gal who does three girls' work but gets nary a glance from the boss? Then about the middle of the picture she tosses away her horn-rims, gets a new hairdo, a new wardrobe, and presto! the boss not only gives her a glance, but marries her as the show ends!

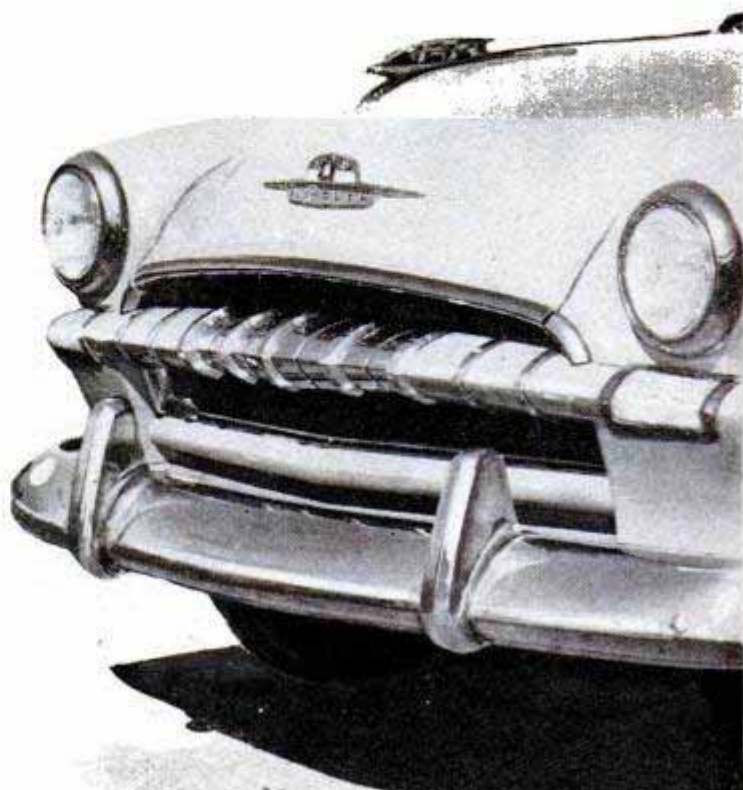
Well, that's the 1953 Plymouth story—with a few changes. This year, the dependable, solid Plymouth is busting out with a style that promises to make heads turn. Yet beneath the whistle-drawing lines is the engineering for which Plymouth is famous.

Completely new from bumper to bumper, the 1953 Plymouth body is lower, but not so low as to be uncomfortable. It is only about an inch lower over-all than last year, but skillful designing makes that inch seem like six. Chair-height seats have been retained, although they have had to be lowered slightly.

Engine-wise, there are few changes. It's the same basic power plant, but its compression ratio has been upped to 7.1 to 1 (last year's: 7.0 to 1) by slight changes in combustion-chamber volume. This, plus other small design changes, has increased power to 100 horsepower instead of last year's 97.

You won't hear any more complaints about Plymouth lacking stability on curves.

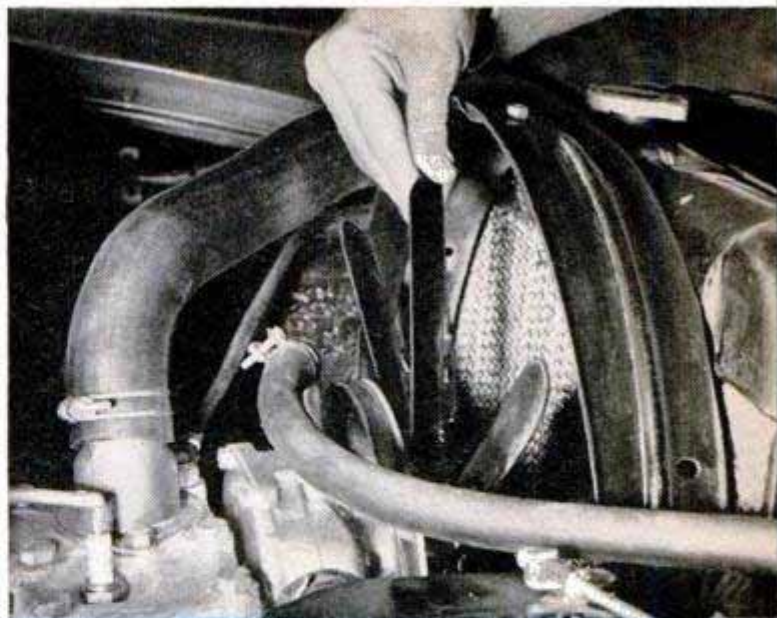
By a nonparallel control arm for the front-wheel suspension system, Plymouth has raised its roll center closer to its center of gravity, thus increasing stability. By moving the rear axle forward on the rear spring and increasing the rear-spring width to two inches, designers have virtually ended rear-wheel hop, even when accelerating on washboard roads or in sand. It is also claimed that the new axle location decreases the tendency of rear wheels to spin when starting on ice or snow.



This latter claim remains to be proved because at the time *Popular Mechanics* tried out the 1953 Plymouth, there wasn't a square inch of snow for miles—the temperature being in the top 80s. No acceleration or economy tests were made on the factory sample car (such tests will be made later by Floyd Clymer on assembly-line production models), but a road-handling test definitely did prove that the engineers weren't overstating the case for stability. Two severe S-turns (both as flat as a bowling alley) were easily navigated at between 55 and 60 without tire screech or fighting of the wheel. Fast driving (up to 60) over a blacktop "dipsy doodle" country road proved that the car won't pitch. On a washboard-gravel stretch, acceleration was steady and turns were made without wheel hop that wastes power and lowers traction.

The car is shorter than the 1952 regular models. It has a 114-inch wheelbase instead of last year's 118½. (There is no 111-inch Concord this year.) The shorter wheelbase plus better balance throughout the chassis make the car handle beautifully. Engineers at Plymouth say there is no one specific reason for the much-improved handling qualities—they are the result of many changes in suspension and steering elements.

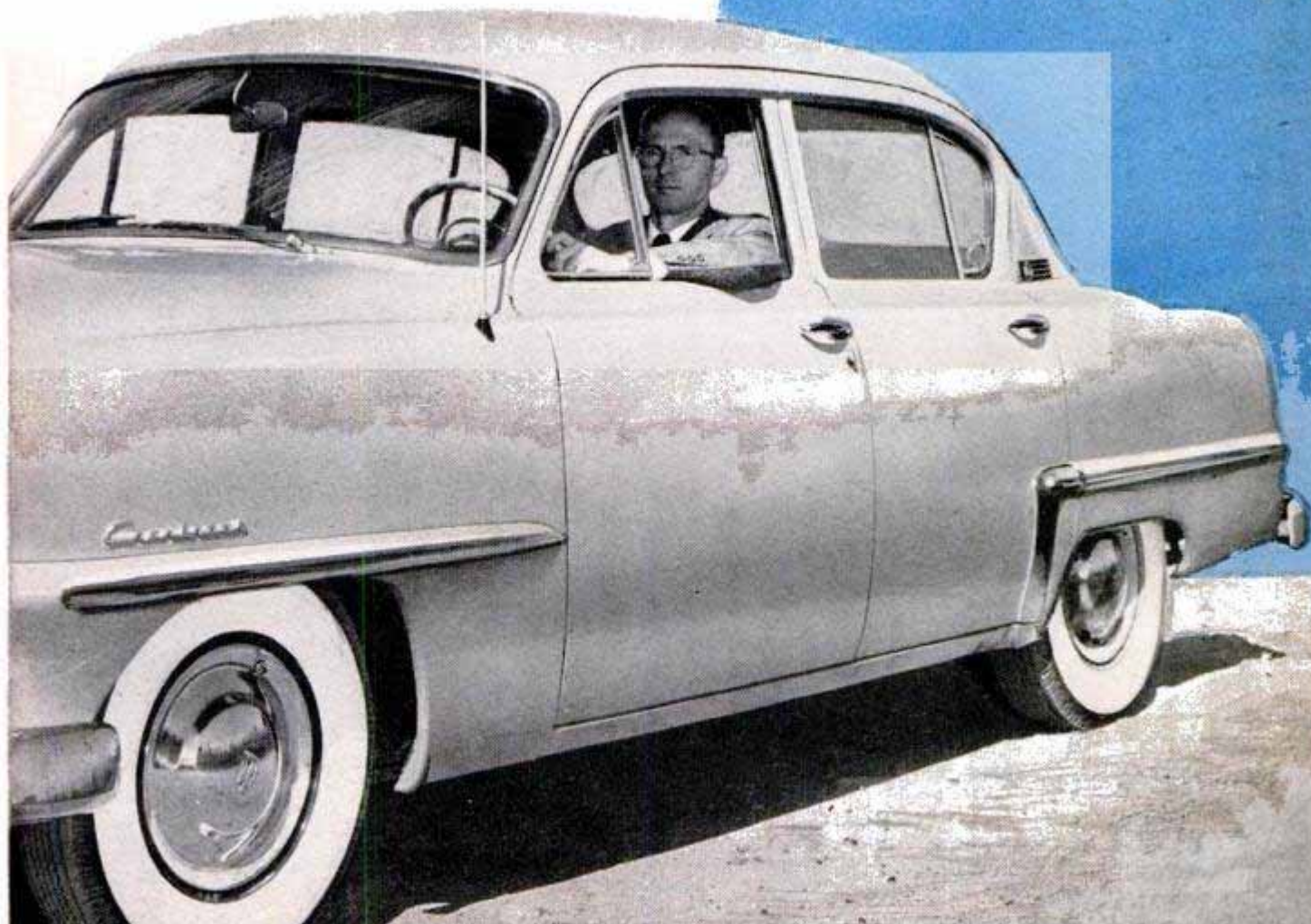
Now for the styling. It's clean and has little gingerbread or nonfunctional chrome. Incidentally, for those who like extra chrome, it's available at extra cost.



Lowering the hood line forced engineers to turn to a smaller six-bladed fan that is shrouded to prevent air recirculation. The new fan runs more slowly and therefore is quieter at high speeds

By
Arthur R. Railton

Even on a de luxe Cranbrook, decorations have been kept straightforward. The absence of the separate rear fenders makes the car appear longer although it has a slightly shorter wheelbase than 1952





Driver convenience has been improved by mounting the glove compartment in the center of the dashboard



There's more trunk room and the lid is wider. That is the gas filler cap you see on the left rear sill



Above, the rear door of the '53 Plymouth is much wider at the top so a back-seat passenger can see out without leaning forward—a real innovation

Below, superimposed on a photo of a 1953 Cranbrook is the dotted outline of the same model in the '52 line. New car appears much lower than it really is

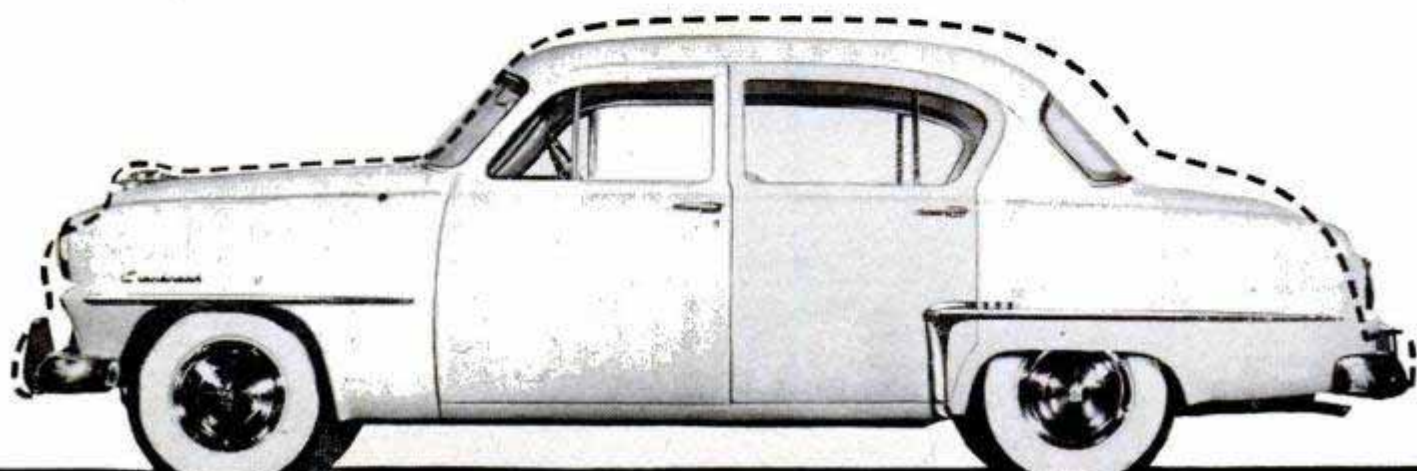
The body appears much lower than it really is because vertical lines have been softened or eliminated.

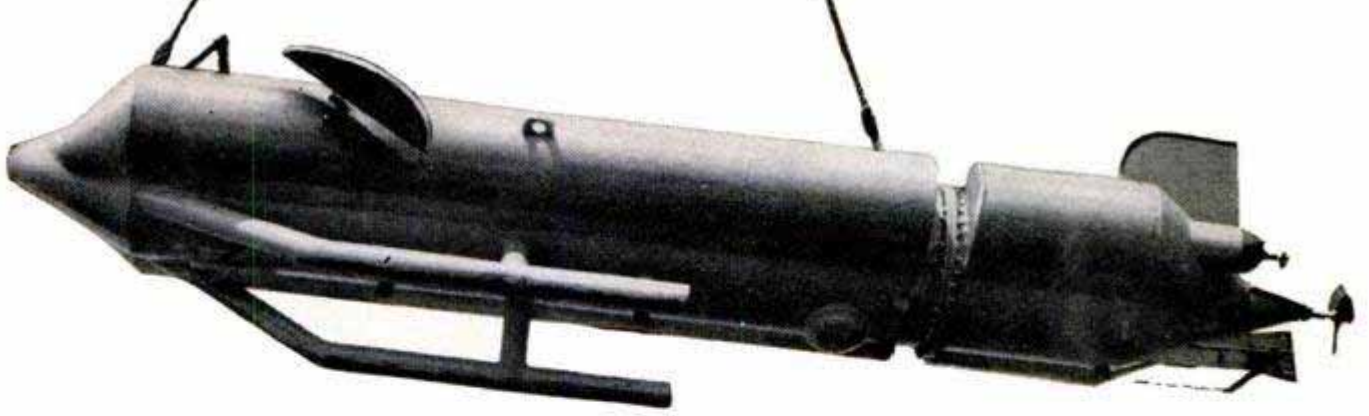
The curved, one-piece windshield is virtually distortion free. It has no sharp sweepback on the ends. Instead it has a nearly constant curve over its full width eliminating annoying side distortion.

Rear fenders are part of the body this year. The rear deck has been broadened and the trunk lid made larger. Statisticians claim there is almost 30 percent more room in the trunk, although it is doubtful that it will hold that much extra luggage.

Pushing the engine forward a distance of 2½ inches adds legroom inside the body and, by making a sharper jump-up in the frame at the rear axle, designers have provided more hiproom and cushion space in the back seat.

Here's a list of other improvements: The glove compartment is now in the center of the dash so the driver can reach it easily; gasoline filler pipe is on the rear sill to the left of the license plate; the dashboard has been curved forward slightly to add knee-room in the front seat; on two-door models, the driver's portion of the front seat is wide enough so that two persons can sit undisturbed as the other section tilts forward for entry of rear-seat passengers; trunk-lid hinges are mounted at the extreme outer ends where the hinge mountings can't gouge luggage or packages. ★ ★ ★

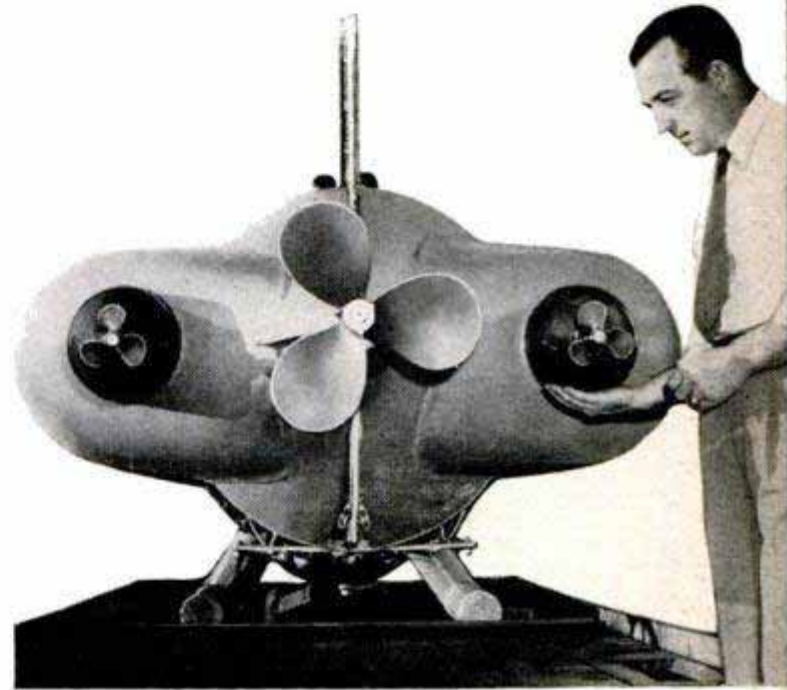




One-Man Sub Prowls Sea Bottom

OFF THE CALIFORNIA coast, a unique one-man submarine is being put through its paces. Designed for salvage work and exploration, the odd craft enables a diver to prowl the ocean bottom independent of surface facilities. Wearing full or partial diving gear, he controls the submarine from an open cockpit. If he wishes to park his vehicle on the sea floor, he can flood the tanks, connect a 30-minute air supply to his suit and walk away. While cruising, he is supplied with enough oxygen for several hours of submersion. On the surface, a 35-horsepower gasoline engine drives the boat at a speed of 15 knots. Underwater, a 24-volt battery system takes over for a speed of 3 knots. Twenty-two feet long, the submarine consists of a main cylinder, containing cockpit, engine, charging plant and battery motors, and smaller outboard blisters which carry fuel, compressed air and flooding tanks. Steel-tube runners beneath hold an emergency air supply. A compressed-air antishark gun mounts on front.

Steel-tube runners which support craft when it is resting on ocean bottom contain an emergency air supply compressed to a pressure of 800 pounds. Large central propeller (below), which is powered by gasoline engine, drives submarine on surface. Small outboard propellers are battery-driven for underwater travel



Sub operator rides in an open cockpit containing steering wheel, engine controls, air and water valves





This year's Chrysler emphasizes style and the Imperial sedan is an example of simple, uncluttered elegance

All-New Bodies Spark the 1953 Chrysler, DeSoto Lines; Lincoln Gives Its V8 Engine a 205-Horsepower Punch

NEW CARS, vintage of 1953, continue to make news. Among those showing this month are Chrysler, DeSoto and Lincoln. The first two offer completely new bodies, while Lincoln, after its recent body restyling, has put its energy into adding muscle to its V8 engine.

Exterior beauty is the Chrysler keynote with the whole line, from Windsor to Crown

Imperial, emphasizing style. Lower by 1½ inches, shorter by 4 inches, wider by 1¼ inches, the new cars have sleek and smooth lines. Despite exterior modifications, interior dimensions are virtually unchanged.

Chrysler features a 12-volt electrical system in its V8 models. Complete power steering and power braking are available. Compression ratios are the same—7 to 1

Sweptback rear fender is biggest change in the all-new Chrysler body. All models have wrap-around rear window





Lincoln restyled its front end for 1953, but top news is in its 205-horsepower engine. This is the Capri

for the six and 7.5 to 1 for the 180-horsepower V8.

All models have one-piece curved windshield and wrap-around rear window. Extra-cost items for the sports enthusiast are 60-spoke chrome-plated wire wheels. The gas filler cap has been moved to the rear below the trunk lid and new pull-type handles open the doors.

Wheelbases are as follows: 125½ inches for the Windsor 6 and the New Yorker V8; 133½ inches for the Imperial V8, and 145½ inches for the Crown Imperial V8.

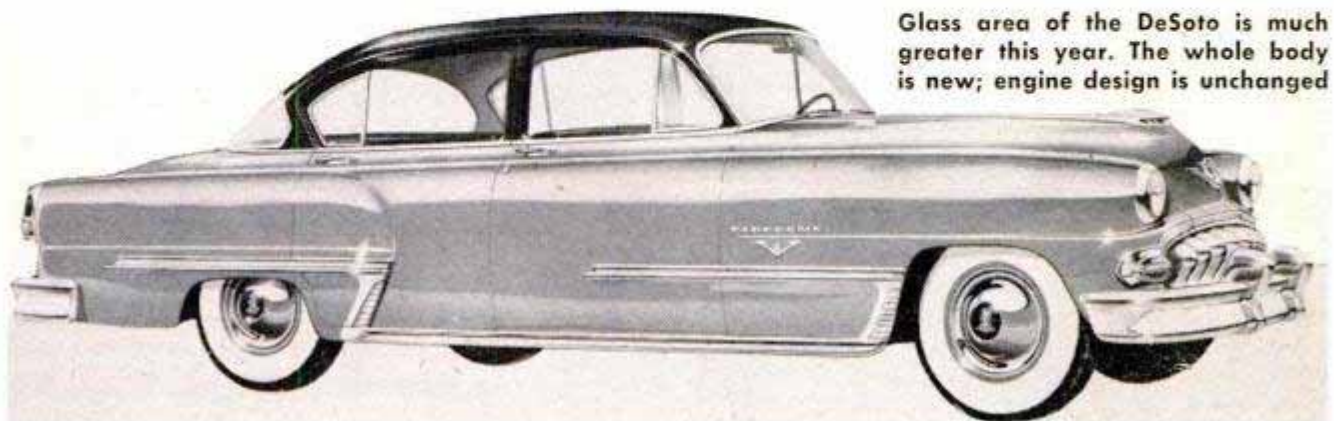
Also in the news this month is another member of the Chrysler family, the DeSoto. Its redesigned body bears a strong resemblance to its big brother. Continued is the 160-horsepower FireDome V8 as well as the older six. Both series are available with full power steering.

The wider and lower rear deck makes the car appear longer than its 125½-inch wheelbase would indicate. Over-all length is now 213⅞ inches, five inches longer than in

1952. It, too, has switched to a one-piece curved windshield. An interesting and practical feature is the reflection-free panel over the top of the dashboard.

Another debutante is the 1953 Lincoln with the 205-horsepower engine—the most powerful production engine in an American car today. The overhead-valve V8 was given added horsepower by improved carburetion and manifold plus an exhaust system that lessens back pressure. Also involved in the “soup up” is a mechanical spark control that supplements the regular vacuum advance. Top speed in excess of 112 miles per hour is claimed. Acceleration is improved, with the manufacturer stating that it will zoom from 0 to 80 miles per hour in less than 23 seconds.

In addition to power steering and power braking, Lincoln has a four-way motor-driven front seat that can be adjusted up and down like a barber chair as well as forward and backward. Two push buttons do the trick. ★ ★ ★



Glass area of the DeSoto is much greater this year. The whole body is new; engine design is unchanged

Miniature Switchboard Buzzes and Rings for Junior Operators



Vocational training for the small fry starts early in a household equipped with a toy switchboard which duplicates many features of a real instrument. The unit buzzes, rings and provides connections for as many as nine "calls." It was exhibited at a press preview of the Toy Guidance Exhibit in New York.

Air Patrols Check Ground Radar

Flying "detectives" of the Civil Aeronautics Administration are constantly checking the efficiency of ground-based electronic instruments that control traffic over 70,000 miles of federal airways. About 85 patrol planes are equipped with special instruments to pick up all signals given out by the radio-range stations and airports with instrument-landing systems. The new omnidirectional radio ranges must likewise be kept operating with courses true to within 2.5 deg. Finding electrical interference, which may come from a new barn, metal silo or bridge in the area, is often more difficult than remedying it.

Cross-Link Rollers Give Long Life to Automobile Tire Chains

Cross links can now be fastened on automobile tire chains with a roller assembly that allows the cross link to rotate and wear more evenly. There is also another advantage. The assembly is spring loaded so you can slip off a broken cross link and install a new one in a few minutes without tools. The turning action means better traction as well as longer wear because the links rotate in the opposite direction to the wheel when touching the pavement. Complete roller-equipped chain sets are available for passenger cars and light trucks. Heavy-duty roller assemblies are sold separately for large truck chains.



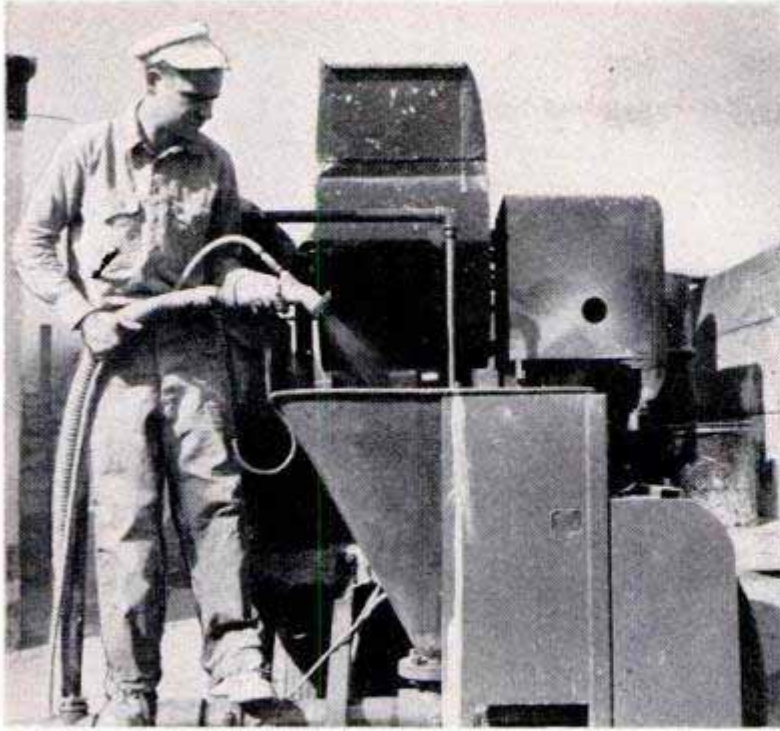
Wanted: 50,000 Engineers

They're not only wanted, they're desperately needed in American engineering projects, from new mines under the rim of the Arctic Circle to atomic-energy laboratories scattered across the country. Next month Carey H. Brown, Chairman of the Engineering Manpower Commission, takes a look at the broad field of engineering and its requirements. Supplementing his story are several aptitude tests—questions and answers with more than 60 illustrations—to help any reader determine whether he may have a mind particularly suited to engineering. Don't miss this story—the tests are fun as well as revealing. The civilian industry in the United States alone needs 30,000 engineering graduates a year—11,000 more than the estimated number of 1953 graduates of engineering schools.

Twenty Years Added To Average Lifespan

Medical progress in the last half century has contributed to an increase in life expectancy from 47.3 years to 67.6 years, according to officials of the American Medical Association. At the same time, the leading causes of death have changed. In 1900, pneumonia caused 12.9 percent of all deaths, tuberculosis 10.4 percent and heart disease 8.5 percent. Fifty years later, heart disease caused 32.6 percent of all deaths, cancer 13.6 percent (an increase from 3.6 percent), and cerebrovascular disorders 9.1 percent. Since 1900, the percentage of persons over 65 has doubled, partially due to the use of preventive medicine.

Machine Mixes and Sprays Base Coats of Plaster on Wall



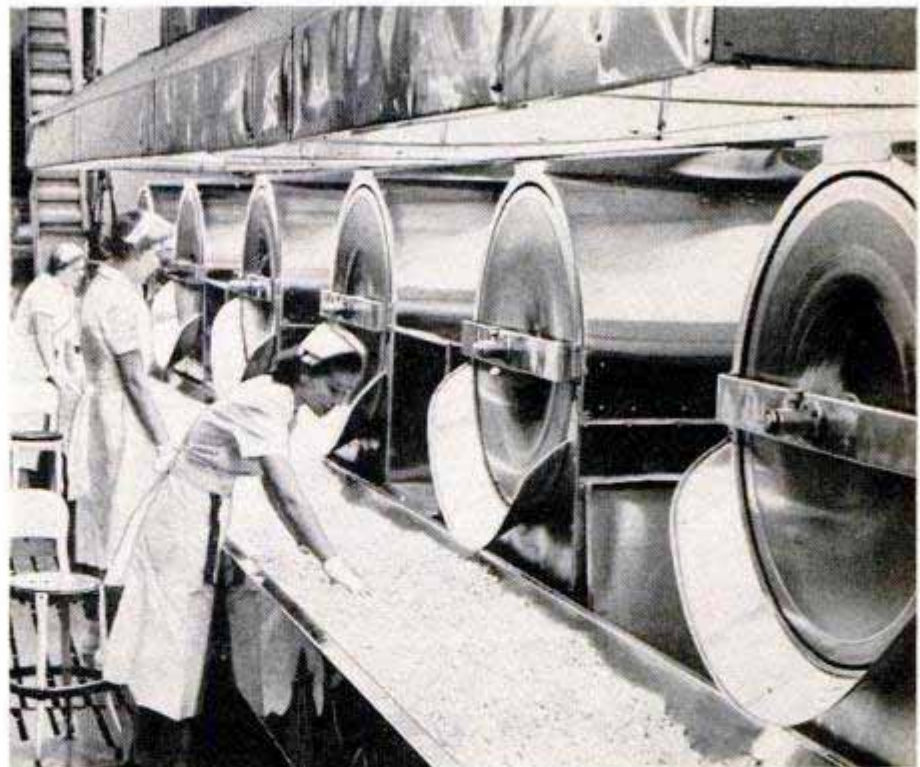
Left, workman prepares machine for a mix. Right, a stream of compressed air forces plaster against the wall

Plaster is sprayed on walls by an electric machine that enables one man to apply 60 cubic feet of base coat an hour, whereas with the hawk-and-trowel method he would average about 90 cubic feet a day.

Used only for the first two coats, the machine pumps plaster from a hopper to a nozzle where compressed air sprays the mixture on walls and ceilings. A switch at the nozzle controls the flow.

Popcorn Production Line Supplies Chain of Theaters

Enough popcorn to drown the sound in 140 movie houses is mass-produced at a single plant supplying a large chain of West Coast theaters. In a room where the temperature is maintained at 70 degrees and the air is changed at the rate of 500,000 cubic feet every minute, six big rotary poppers convert over 100,000 pounds of raw corn every month. Sorting, popping, culling, seasoning and sacking are all handled mechanically. The atomic-age version of the old-fashioned corn popper also mixes the seasoning of coconut oil and butter concentrate; applies it evenly to the corn; tosses out imperfect grains; transfers them to a stamping machine and produces poultry feed. When operating at full capacity, the poppers burn 1,500,000 British Thermal Units of gas every hour, enough to supply a small city.



Improved combat medicine and surgery have reduced the mortality rate among United Nations soldiers wounded in Korea to 23 per 1000 as compared with 45 per 1000 in World War II.



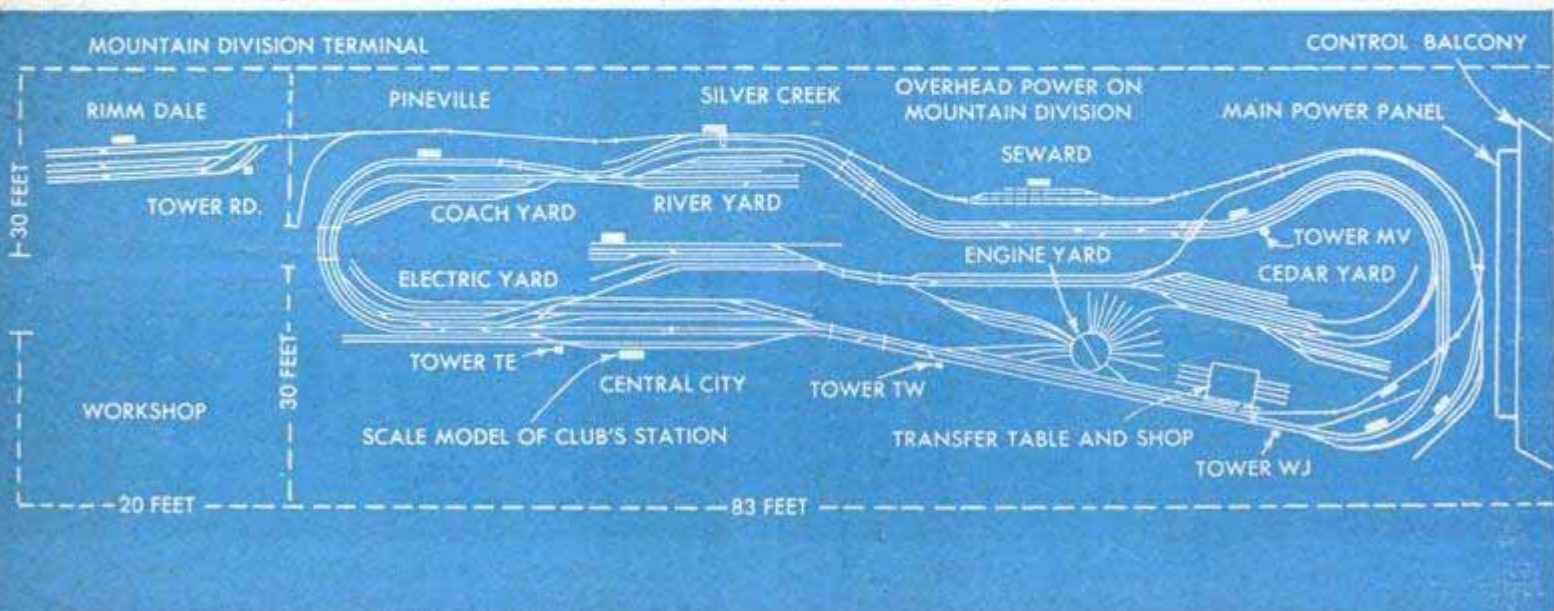
Children of all ages come to watch the modelers' two-hour public sessions

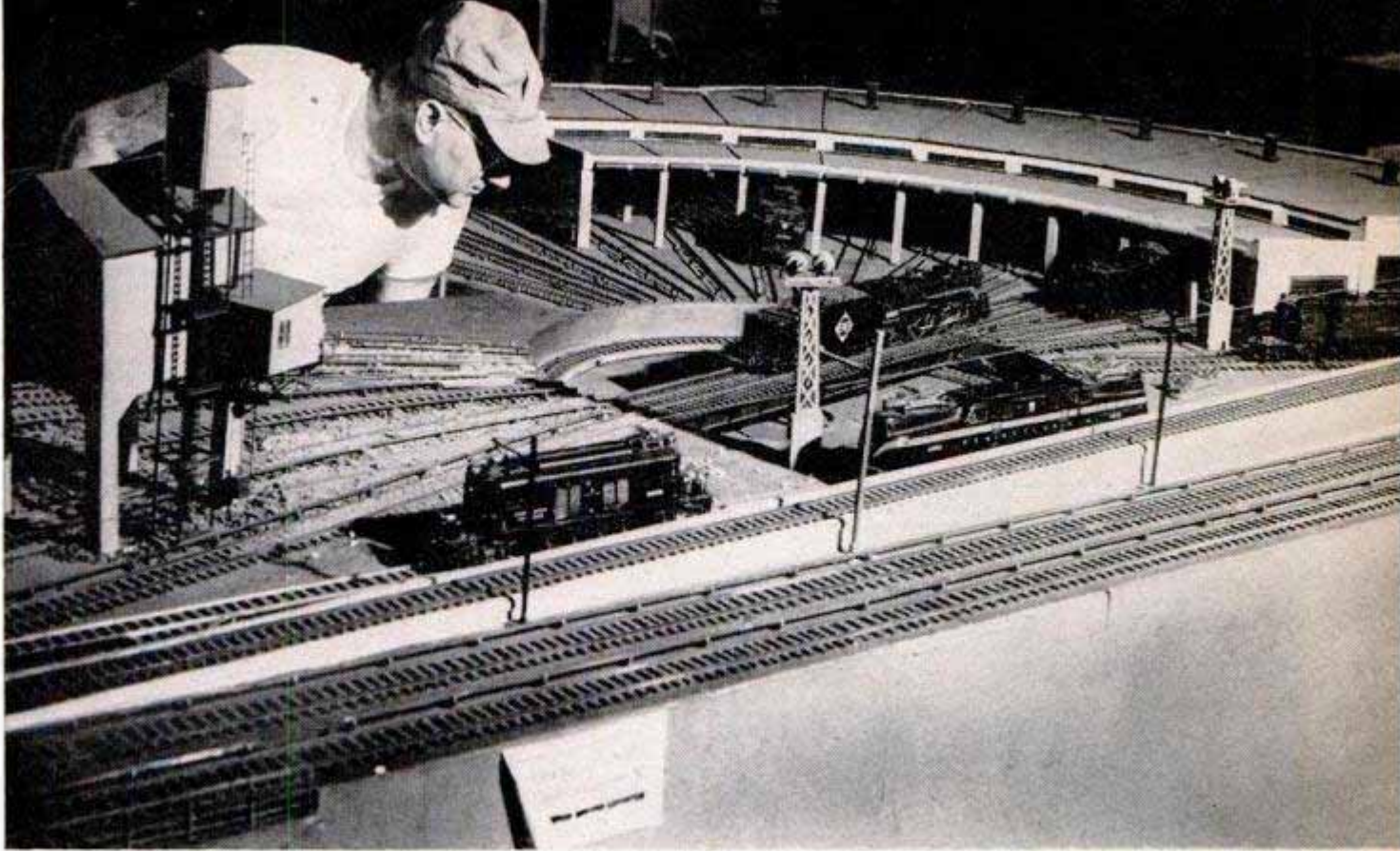
THURSDAY NIGHT IS RAILROAD NIGHT

in the old Pelham Manor, N.Y., railroad station where you'll find a gathering of indoor railroaders running their model trains on a layout almost a mile in length

by Daniel Rubin

Schematic diagram of the Eastern Lines. Lights along the way chart progress of trains over the system





All the members have specific assignments during operations. Here the roundhouse foreman is busy at his job

ALMOST 30 YEARS AGO in New Rochelle, N. Y., six men were having trouble with their wives. The same kind of trouble, for it seems that these men—Rollin Meyers, James See, George Barkley, A. Q. Smith, Robert Ward and E. P. Alexander—were busily engaged in building railroad pikes in their homes.

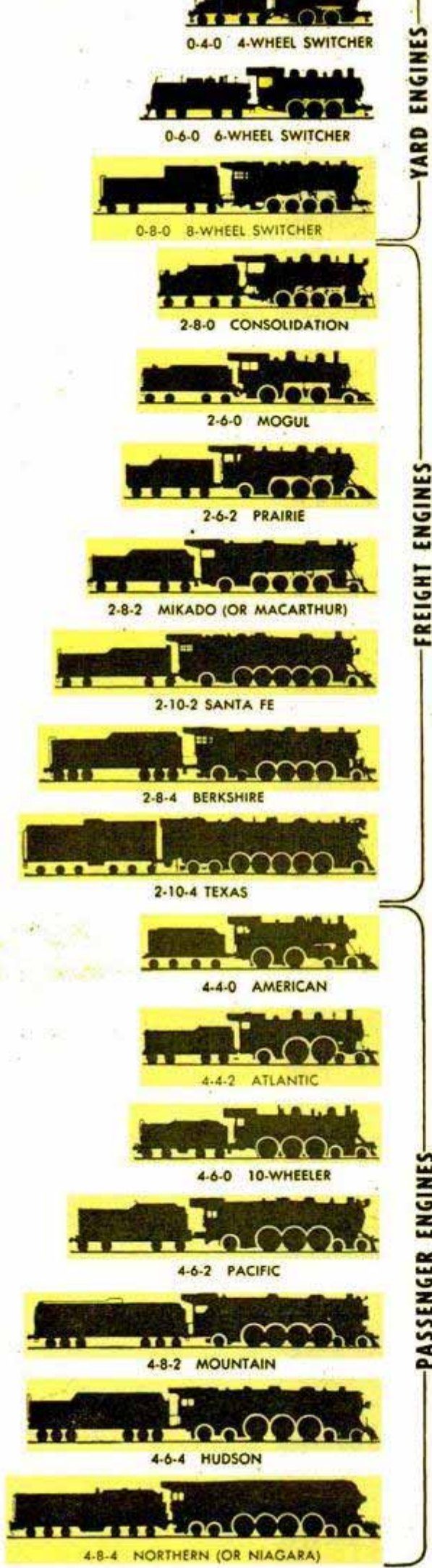
As these model railroads expanded to monopolize more and more of their attics and cellars, the wives began to object—strenuously and vocally. So began the Westchester Model Club. The men moved to Mr. Alexander's attic and in a short time, with all their equipment pooled together,

again ran out of space. They moved to a loft and from there, in 1934, to the present site—the old Pelham Manor, New York, New Haven & Hartford Railroad station. There are now over 3500 feet of O-gauge cold-rolled-steel track.

The rolling stock, all built to exact scale, consists of about 500 freight and 150 passenger cars and over 75 locomotives, among them the American, Atlantic, 10-wheelers, Pacific, Mountain, Hudson, Niagara, Consolidation, Mikado, Berkshire, Santa Fe, switchers, electric and diesels, although 80 percent of these had no commercial kits available and had to be built by hand.

It takes a sharp eye to tell this miniature, one of 75 locomotives on the line, from the full-size article





A machine shop equipped with a lathe, miller, drill press, shear and brake, is at one end of the station and is in constant use. The members are always building or repairing their equipment.

The line, with limited and express trains that make a scale speed of 70 miles per hour requires at least 20 men to operate it. The superintendent of operations supervises the entire system; the trainmaster checks operations and specifies all extra trains to be run and awards demerits for infractions of operating rules. There are also dispatchers, towermen, engineers, conductors, a yardmaster and a round-house foreman.

An interesting angle of the layout which makes it different from others is that it is run as a straight line rather than a circuit. The train will be put together in one yard, brought out on its line and run from one point to another, finally ending up in another yard. While the tracks, of necessity, are laid out in an oval, the trains are not run around and around.

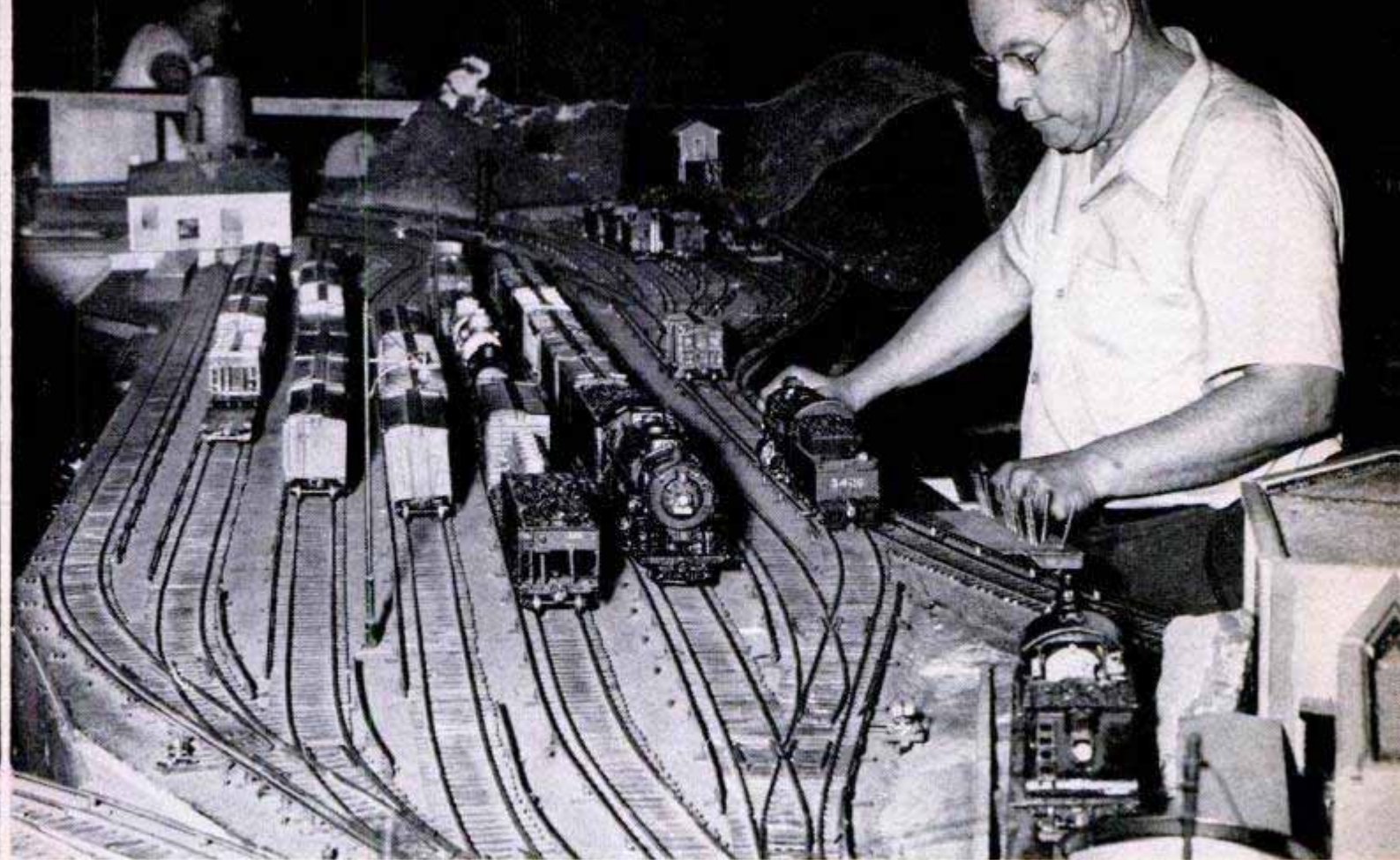
They also follow a strict timetable, keeping the dispatcher busy. A telephone system connects all towers with the dispatcher, whose job it is to keep trains rolling right on time, to contact the towerman to set the switches and color-light signals and to give the conductor orders for picking up and dropping cars.

The system has two running rails and an outside third rail for power pickup. The Mountain Division gets its current from overhead wires. The line, running on 22-volt direct current with about two amperes per engine, can handle up to five trains in each direction. Over 50,000 feet of wire are used for power, signals, switch controls and for lighting model houses, stations, platforms and telephones.

The landscaping of the line is unique in that its mountains, made of a mixture of plaster of paris and asbestos over 1/2-in. wire mesh, blend into hand-painted landscapes on the backdrop scenery. The station is made of broken stones and cement, giving a realistic touch. The grades on the main line do not exceed two percent and on Mountain Division, three percent.

All members own pieces of rolling stock and some have pikes at home, so the trains are either taken home or left in the lockers at the station.

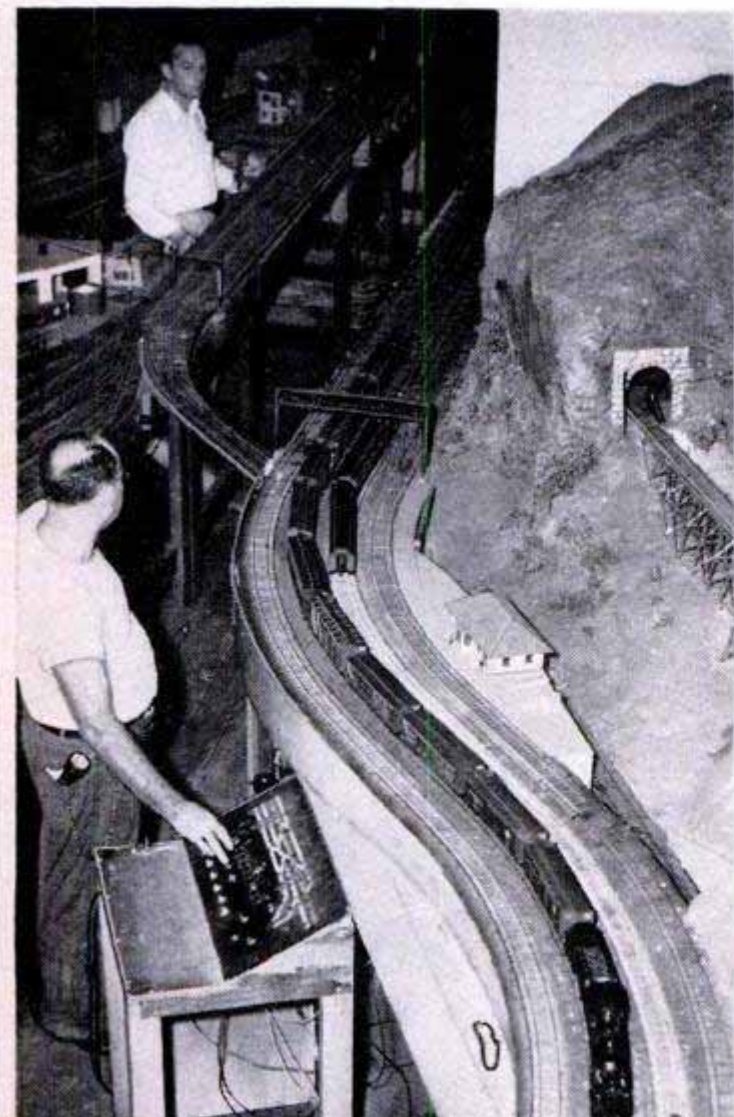
The club affords members a place to follow their hobby and stimulates interest in model railroading. ★ ★ ★



With a modern Gulliver supervising the operation, a model locomotive is run through a series of switches

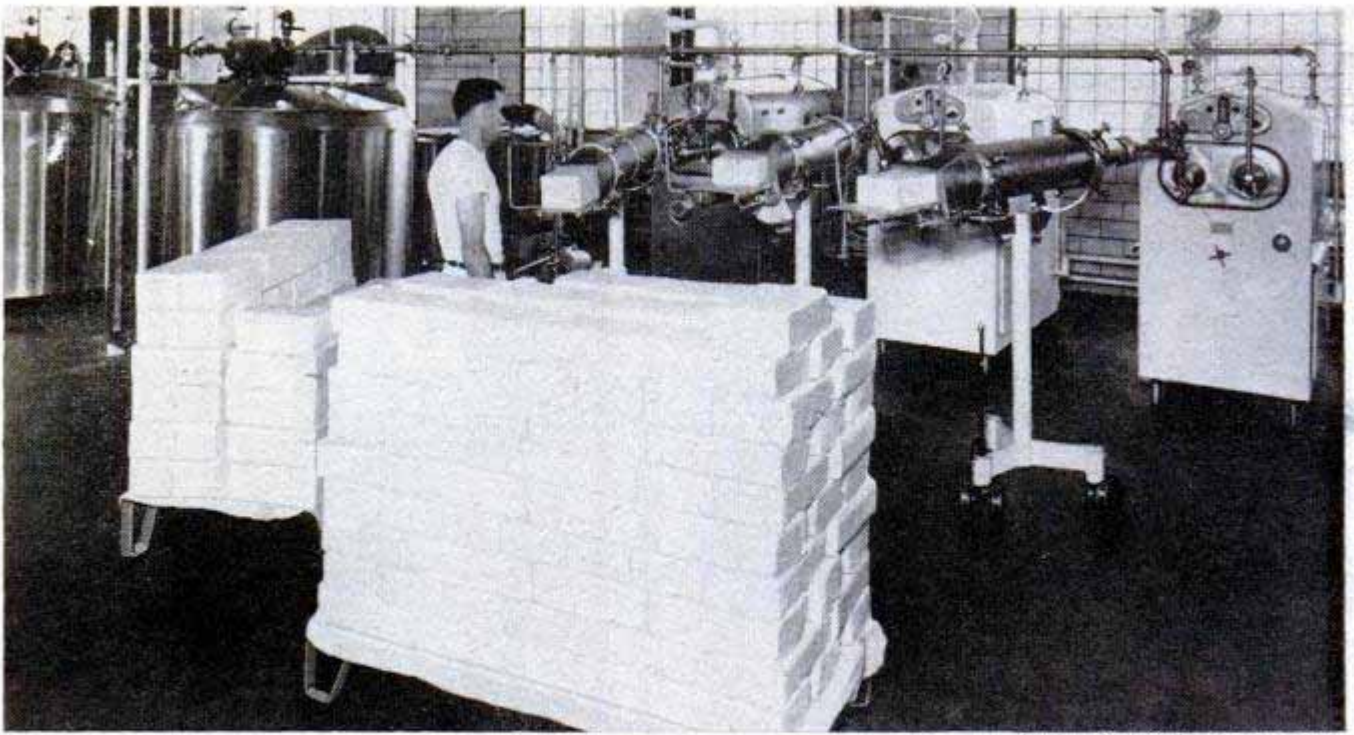
Part of the Mountain Division is shown at right, as a 10-car fast freight roars around a main-line curve.

Only part of the 700-odd pieces of rolling stock is kept in club's station. Most of it is stored at home



Inside the clubhouse building is its exact replica. Architect for the Pelham Manor station was Stanford White, designer of the original Madison Square Garden



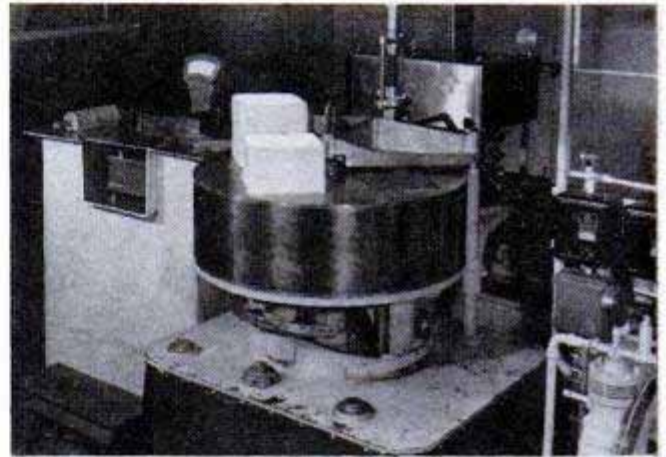


Cherry-Burrell Corporation photo

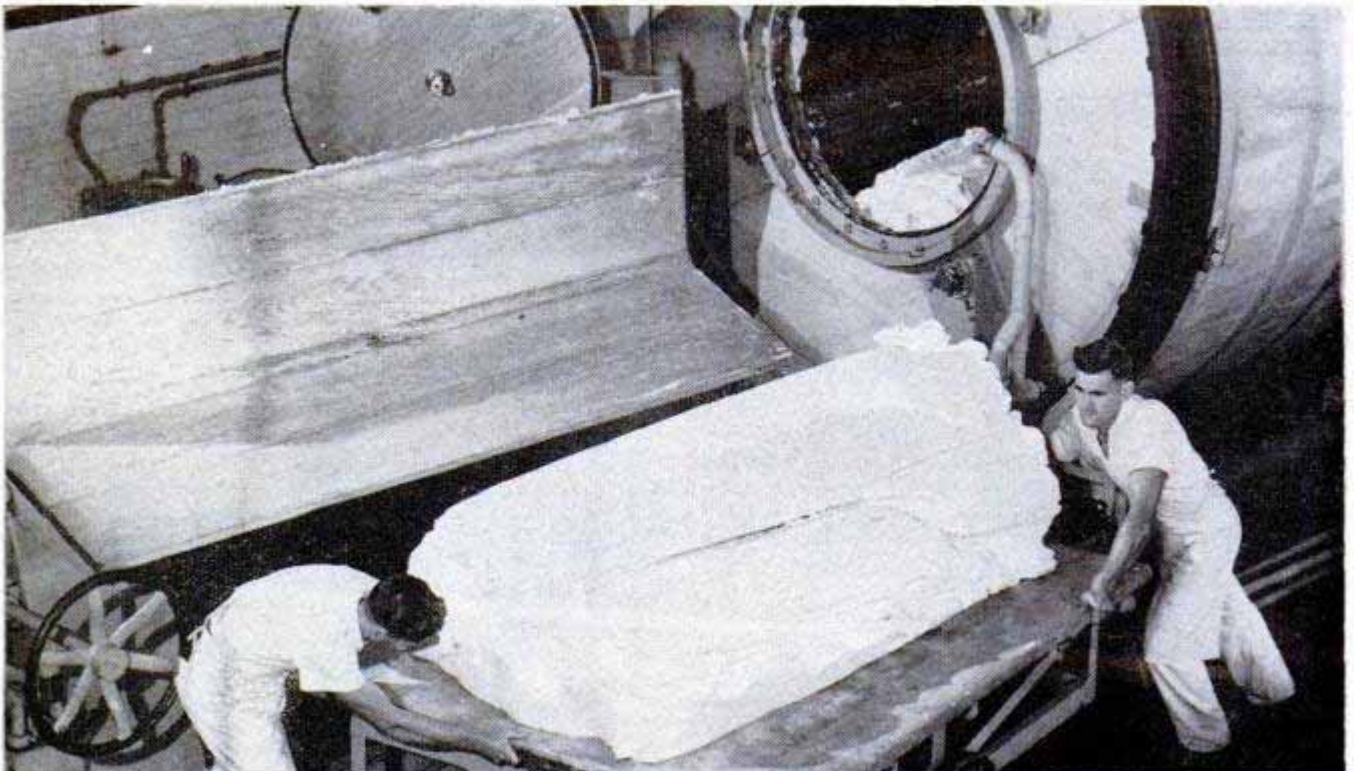
Continuous buttermaking machines turn out large blocks (above) or standard one-pound pats (below, right)

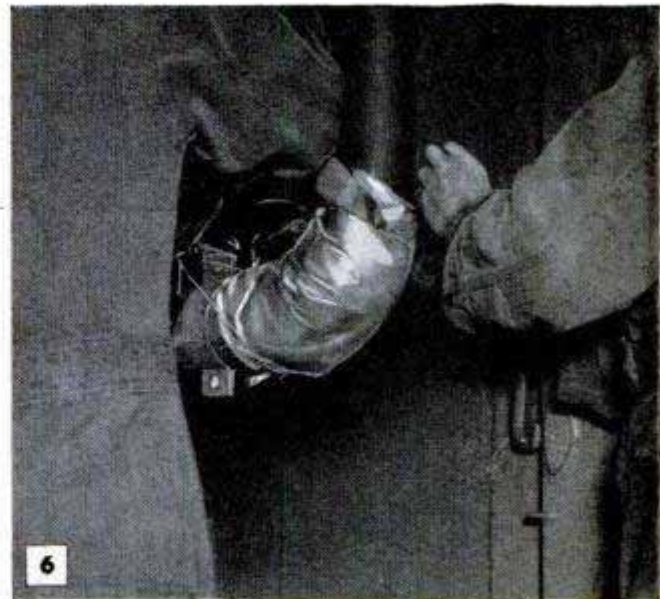
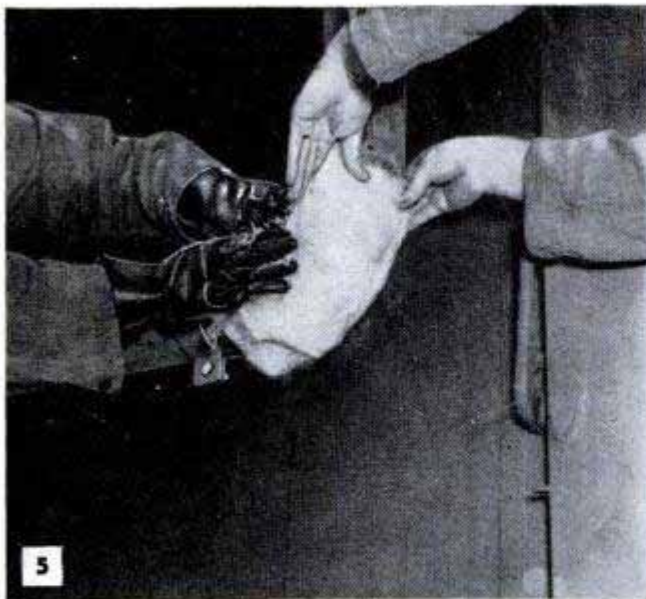
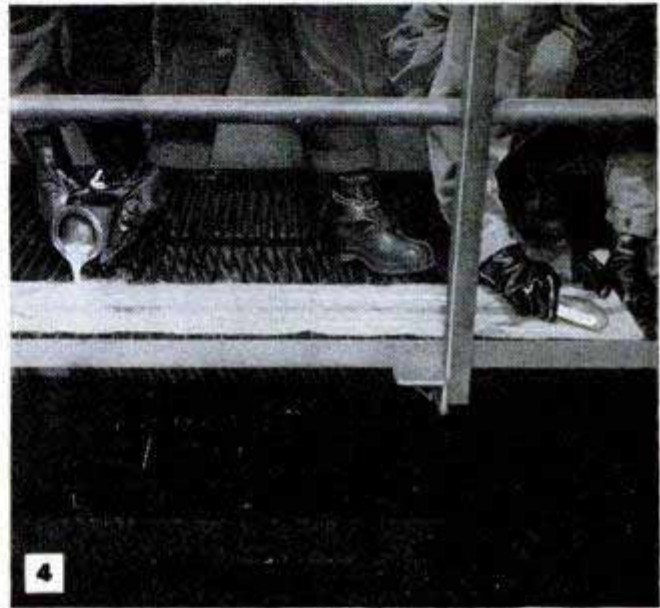
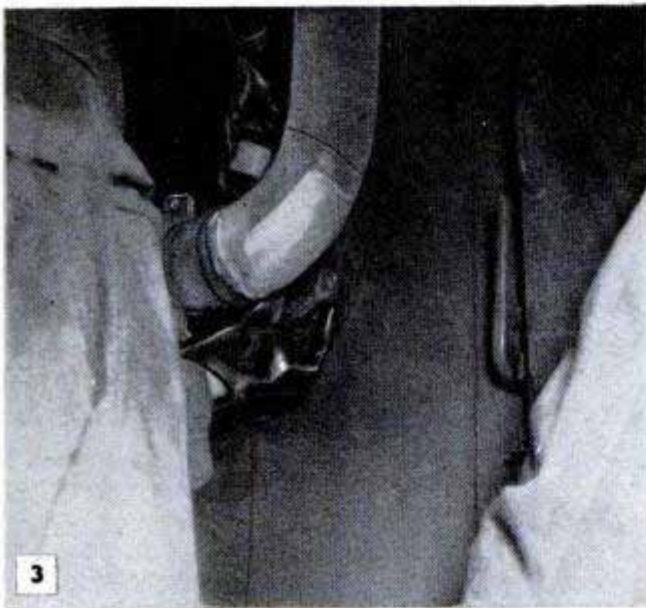
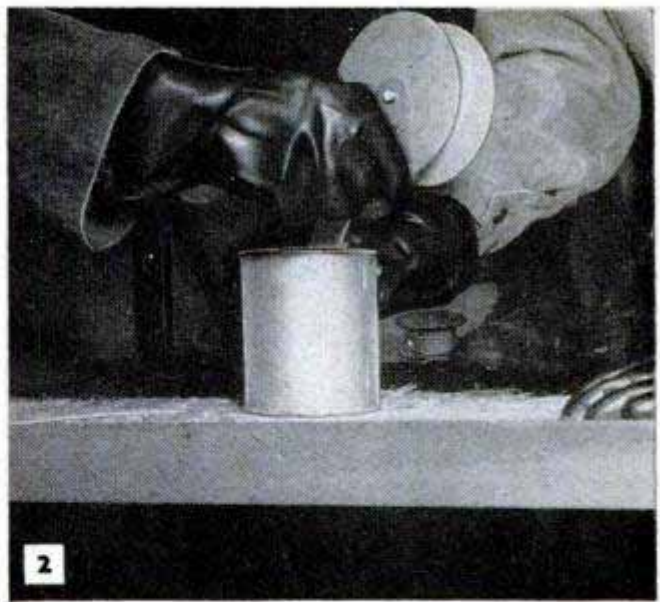
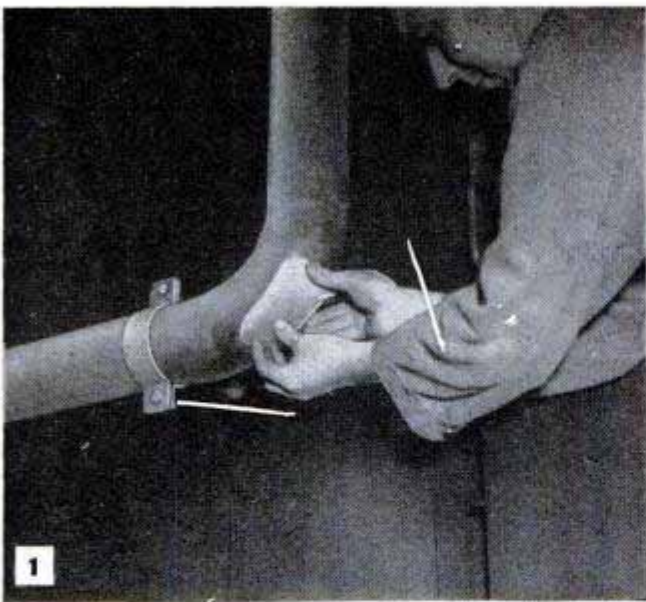
Buttermaking Minus Churns

UNTIL RECENTLY, buttermaking hadn't changed much since the days of Grandma's oaken churn. By the same, slow process, mammoth churns were agitated to separate the buttermilk and cause particles of butterfat to stick together. Now, in a new continuous process, cream is reduced to the necessary concentration of butterfat by centrifugal action, quickly heated and cooled to coalesce the particles, pasteurized, salted and turned into finished butter.



Workers remove huge slab of butter from standard churn. Up to three tons were produced in a single batch

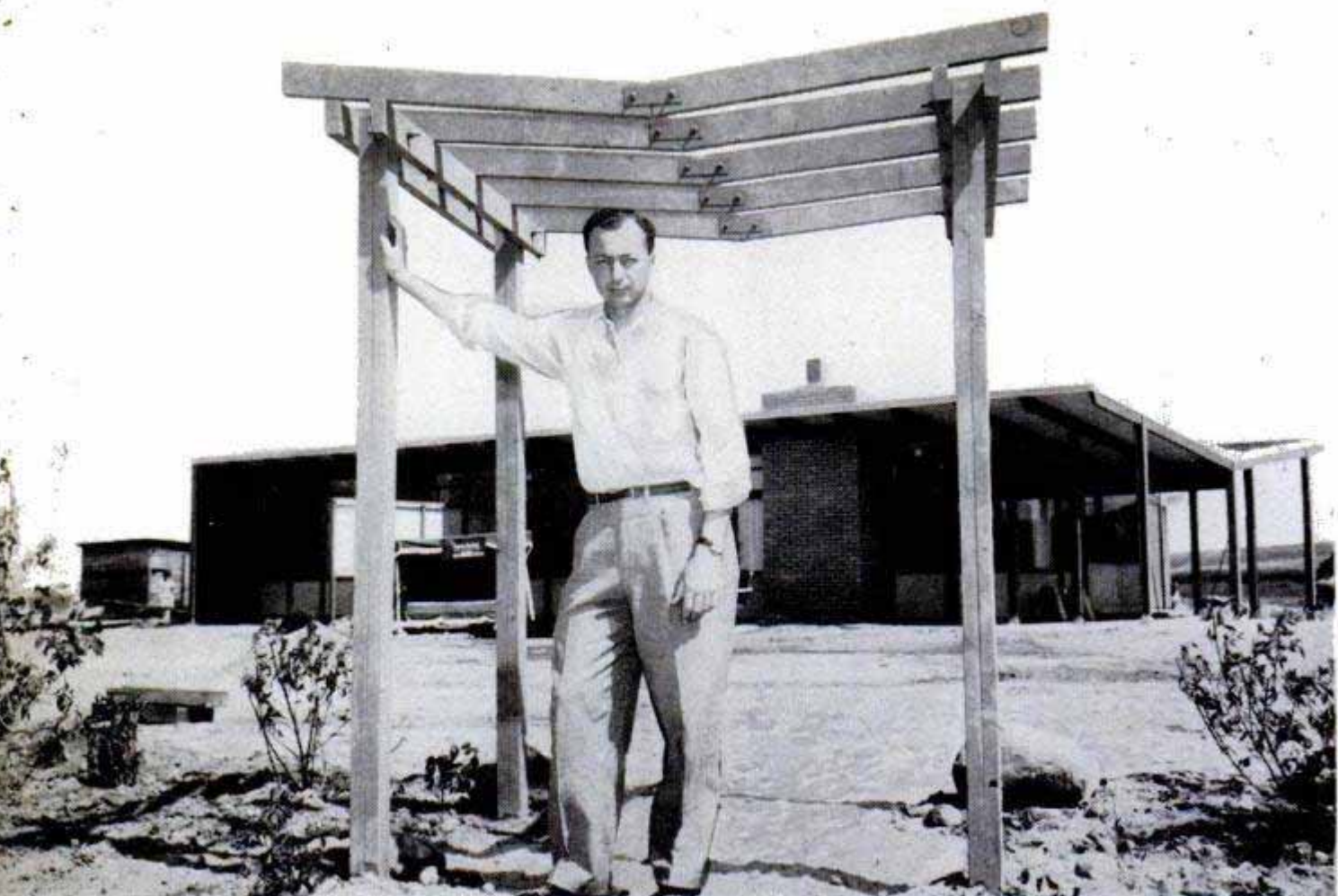




Navy Uses Plastic Patches to Repair Ship Pipe Lines

Quick emergency repairs of shipboard pipe lines are made with a new plastic patch developed by the U. S. Navy. Even completely severed ends of pipe can be joined tightly. A small patch (1) is put over the hole. Glass tape is then coated (2) with a liquid

plastic and wrapped tightly (3) around the pipe. A section of glass matting is then coated (4) with the remaining liquid plastic and applied (5) over the tape. Paper is wrapped around the patched area (6) to confine the liquid resin during the curing



Meet Don Dunn, lucky owner of the \$75,000 farm, complete with modern home, which was built in just 22 hours

THEY BUILT HIM A FARM IN A DAY

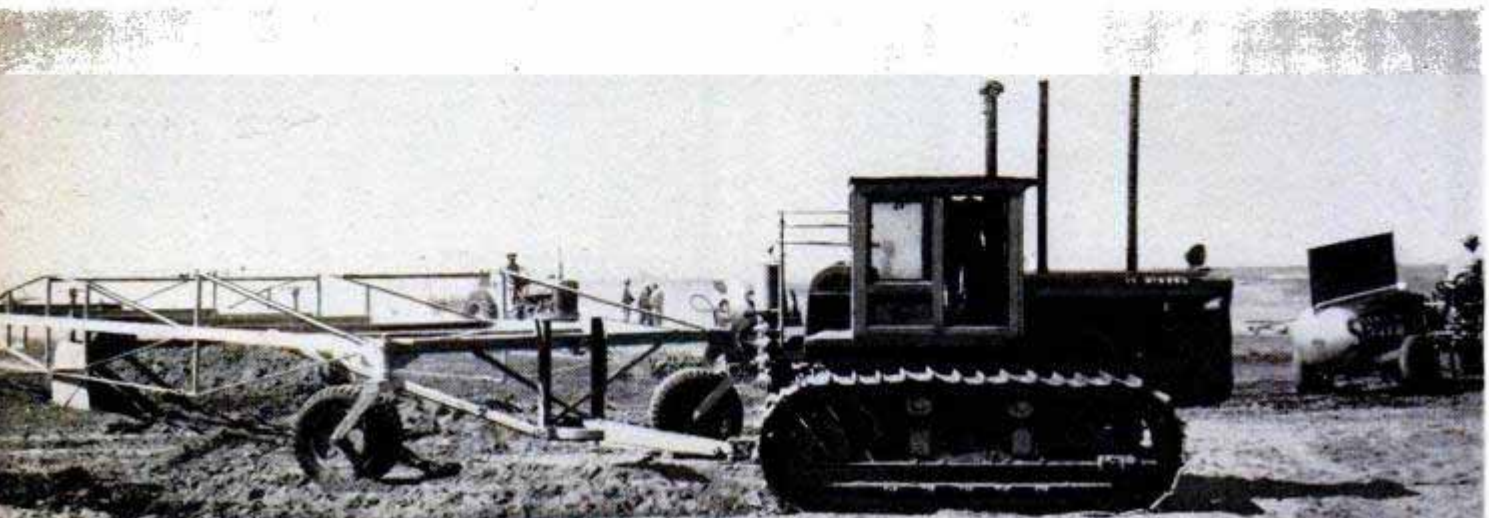
ON A WINDY day a few months ago, a cyclone of activity struck a plot of barren ground in the Columbia basin of Washington.

In 22 hours, a \$75,000 farm grew from raw and rough land which had yielded only sagebrush, cheat grass and boulders the day before. This farm-in-a-day was complete with a furnished, seven-room home, machine shed, garage and shop, cattle loafing shed and chicken house; fences, young trees, shrubs and grape arbor; 80 leveled, fertilized, planted and irrigated acres; an

array of gassed-up, greased-up machinery; a cow and baby chicks under a glowing brooder.

And it all went as a gift to a lucky but deserving 30-year-old GI named Donald Dunn. Behind the new farm was more than a year of expert, scientific planning. Five of the West Coast's top architects studied farmers' needs and habits before designing the model home. The entire farmyard was planned for convenience, serviceability and attractiveness. The crops planted were carefully selected as the best for the par-

Through the morning big land planes scraped down high spots on the farm while other machines fertilized





Exposed beams and cedar walls give a rustic but comfortable touch to the living room of the new farm home

ticular acres involved in Dunn's free farm.

The story of Dunn and the farm-in-a-day begins at 10 p.m. July 8, 1951, about four miles southeast of Marion, Kans.

The rain started coming down then—hard. It had been raining off and on for days, and most of Dunn's 400 rented acres were already flooded. The house was on high ground, but . . .

"Looks bad," Don told his wife, Vernetta. "We better get out of here fast."

Don drove their truck and Vernetta the car with their two daughters. The girls tried to find their kittens but there wasn't time.

With rain coming down in vertical waves, the Dunns pulled into Marion, already

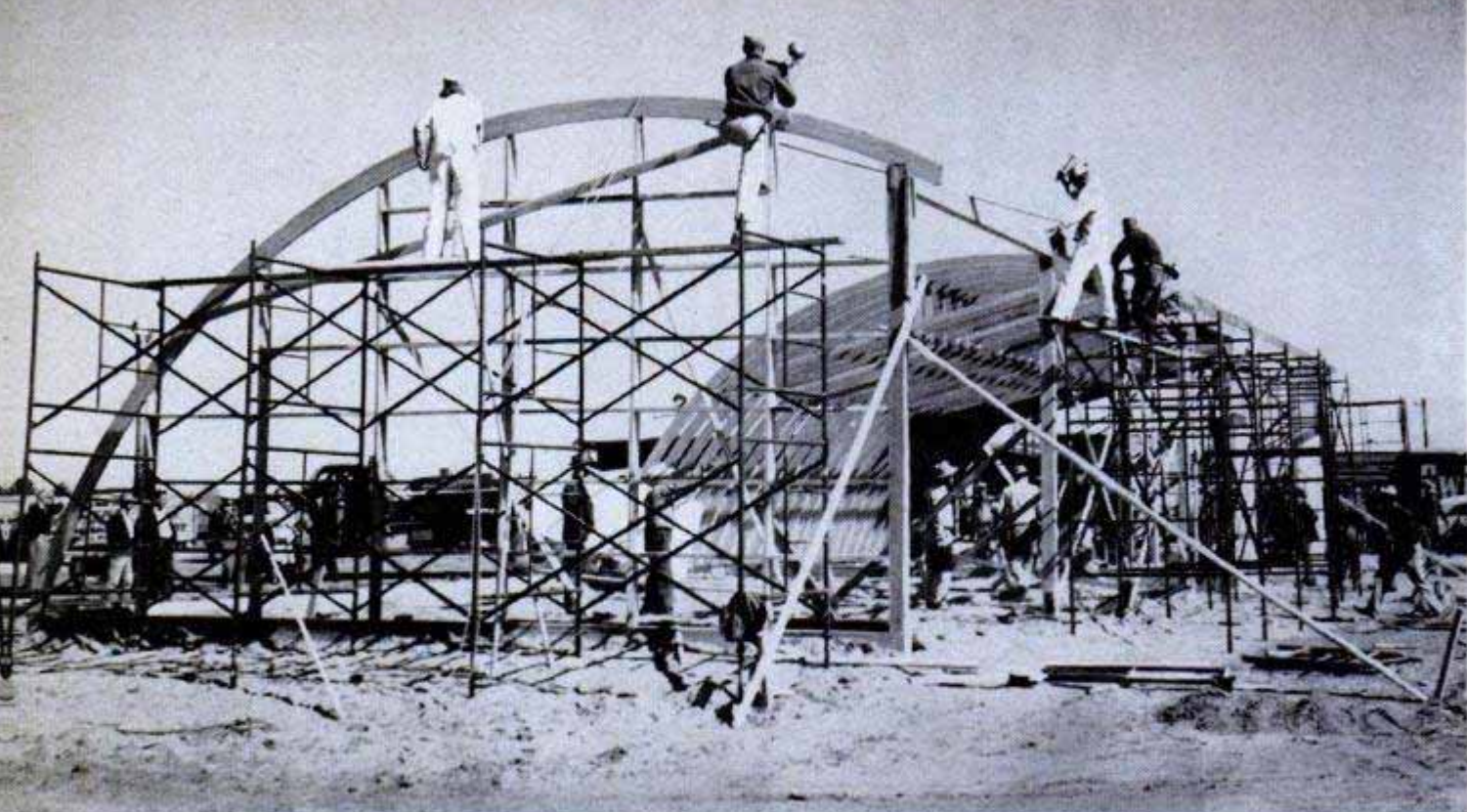
jammed with farm refugees. No electricity, no water, no telephone service. Just martial law.

By morning, 12 more inches of rain had poured down on the flooded area. Don learned that a neighboring family was caught out there in the Kansas sea. He offered to guide a rescue boat.

"Our boat passed over hedges I knew were 10 and 12 feet high," said Don. "We found my neighbors huddled on a little high patch of ground. The kids were holding their hands over their ears so they wouldn't hear the cries of drowning sheep—sheep they had raised as a 4-H project. It's things like that you remember longest about a flood."

More than 300 workers swarmed over sagebrush land to build the home, other buildings and plant the crops





As fast as carpenters nailed up a beam or board on one of the buildings, other workers rushed in to paint it

Three days later Don managed to get back to his own farm. His beef and dairy cattle had found refuge on high ground. But of 350 chickens only two were left—perched high in a tree. Grain in steel storage bins was watersoaked and worthless. Hay in the barn was slimy with mud. Farm machinery was badly damaged.

And the house. Some furniture had floated away, some had fallen apart and the rest was just a muddy mess.

The Dunns tried cleaning up for two weeks, but the task was hopeless. They

Volunteers lay up the fireplace, which was built in the dining room so the farmer could enjoy it at mealtime or relax by it without taking off his work clothes

held a sale and cleared \$18,000. This paid off all their debts — \$17,500 worth. Then Don borrowed \$2000 from a friend, bought a truck, loaded the family in it and headed west.

He had heard about some Bureau of Reclamation projects with homestead possibilities for veterans. But he wasn't lucky—not then. He took a job selling farm equipment in Yakima, Wash.

On the afternoon of April 14, 1952, a representative of the Veterans of Foreign Wars called at the little house the Dunns

Kitchen has a maximum of natural lighting, provided by the "butterfly" roof. Farm wife can see the fireplace, fields and playground through picture windows





Dining room looks out on the barnyard, but a solid-paneled fence cuts off view of the usual farm litter

had rented. He had a telegram. The telegram said that Donald D. Dunn had won the contest conducted through the nation by the VFW to select a worthy veteran of World War II to receive a farm to be built in a day. The farm was to celebrate the coming of water to the Columbia basin from the vast new storehouse behind Grand Coulee Dam.

"I still wake up in the middle of the night—wondering," said Dunn. "I was just one of millions of GIs. Didn't even rate the Purple Heart."

Maybe not, but he earned three battle stars in 10 months of the toughest combat dished out in the European theater. Of 36 tank drivers in his original outfit, he and another were the only two not killed or wounded. But the lack of a Purple Heart wasn't held against the fighting sergeant.

The man who was to get the farm had to be not only a top-notch GI, but a top-notch farmer. When Don's record was looked over among thousands, it just naturally stood out. With virtually no capital when he was discharged in 1946, Don rented 160 acres next to the land where he had been reared. He had done an outstanding job with Herefords in 4-H work, and Marion merchants were glad to stake him to any equipment he needed.

The 160 Kansas acres prospered as they never had before. Don rented 260 more acres to raise dairy and beef cattle, feeder lambs and sometimes hogs. He did custom baling for neighbors. Then the rains came.

At one second past midnight on May 29, 1952, aerial bombs were set off at the site of the new Dunn farm in the Columbia basin,

and more than 300 carpenters, bricklayers, electricians, plumbers and general helpers went to work.

There had been "farms in a day" before throughout the nation, but never on such a scale. This was big, like the Columbia basin which covers 1,029,000 acres—a new land empire as large as the state of Connecticut. It's big like Grand Coulee Dam, the world's greatest mass of concrete, which this year will bring water to more than 66,000 acres and thereafter to 70,000 additional acres yearly until eventually 13,000

All the furnishings and appliances for the house were provided. Dunns even found food on cupboard shelves





There's lots of wardrobe-closet space throughout the house. Home was built on a concrete slab, is expandable

neighboring farm units are to be served.

In predawn, work on house and farm buildings was done under floodlights. The sun rose on completed frames. The only major preliminary work on the house was the pouring of a concrete slab for the floor so the slab would be dry for construction workers.

William C. Bell of Seattle, managing director of the Western Retail Lumbermen's Association, was general coordinator of the construction phase of the farm. Heavy beams and a few other major pieces of lumber had been previously cut to size, but otherwise everything was done on the spot.

A bandsaw powered by a three-horse-

power motor rolled to the site on a trailer. Wesley Nelson of Moses Lake, who manned the saw, stuck with it from midnight until 5:30 p.m.

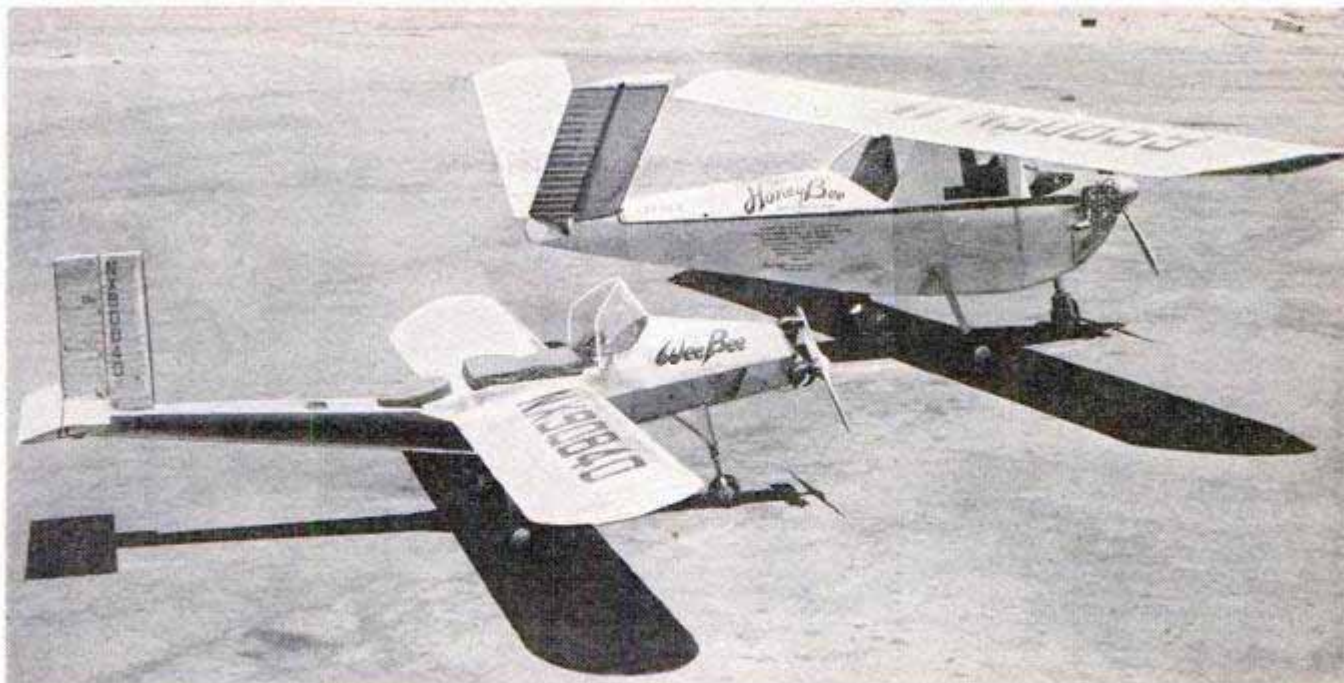
As a carpenter banged in the last nail on a board, a painter appeared beside him with a brush and an electrician notched a hole for wiring. Timing was good, but not perfect.

"I wouldn't recommend a house, let alone a whole farm, in a day as a regular diet," said Bell, midway in the construction. "I'm enjoying every minute of this, but the minutes are expensive. Speed makes for waste in both labor and materials."

(Continued to page 238)

One month after he moved in, Dunn inspects his crops, raised on land cleared, fertilized and seeded in a day





There is only a slight size difference between Honey Bee, rear, and older, midget Wee Bee in the foreground

All-Metal Lightweight Flies Over 100 M.P.H.

All metal, a 550-pound airplane built for low-cost personal flying cruises at well over 100 miles per hour. Called the Honey Bee, it has a 28-foot wingspan and is 17 feet long. A 65-horsepower engine gets the single-place craft off the ground at about 45 miles per hour and needs only 500 feet of runway. In power-on stalls it has been flown down to 35 miles per hour. Some of the Honey Bee's structural features are a spring-steel tricycle landing gear, a steerable nose wheel, hydraulic brakes and a butterfly tail. Production is expected to start early in 1953. The Honey Bee's simplicity is reflected in the equivalent of only 60 working days required for its design and construction, a low figure for an experimental plane.

As easy to enter as an automobile, new plane is a single-seater



Rain Makers Seed Clouds With Salt Particles or Water Droplets

Two rain-making recipes are being tested in the Pacific; one recommends adding water as needed to clouds, the other involves seasoning them with salt. Australian experimenters claim to have emptied cumulus clouds of their water simply by spraying droplets of the right size into the base of the cloud. The theory of these experiments is that droplets of a certain size must be present in a cloud before little drops form into big ones and rain results. In recently conducted Hawaiian experi-

ments, oceanographer Alfred H. Woodcock is proceeding on the theory that microscopic salt particles form the nuclei of raindrops over the ocean and that there is a relationship between the amount of salt in rain and the intensity of rain. Salt particles are carried hundreds of miles inland, and may play an important role in the formation of rain over land, he believes. Woodcock's plan is to seed clouds with the proper salt particles in order to induce a forced precipitation in these areas.



Houston Chronicle Rotogravure Magazine photos

Sunday services at the drive in are popular. Largest congregation was last Easter when over 2000 attended

Church Services Held in Outdoor Theater



Above, parents bring small children without fear that they will cause a disturbance. Below, a steady stream of cars roll in for the early morning service

Texas churchgoers on their way to work or play attend Sunday morning services right in their cars at a drive-in movie theater that becomes a house of worship once a week. The services, which attract an average of about 200 cars each week, also appeal to invalids who find it difficult to attend regular church services. One Easter morning service attracted 525 autos. Leading the services is the Rev. E. W. Matthias of St. John's Lutheran Church, Galena Park, who got the idea after reading about drive-in Easter morning sunrise services. Now the movie-theater service is a regularly scheduled part of the Texas church's program. It does not replace the regular services, which are conducted in the church building right after the drive-in meeting is adjourned.





Photo courtesy Sanders-Roe, Ltd.

Britain's Jet-Driven Flying Boat Starts Flight Tests

Flight tests have begun for Britain's giant flying boat, the Princess, under construction since 1946. In military use the aircraft will be able to fly 200 troops 3500 miles nonstop. With 10 jet-driven propeller units, she will be able to cruise at about

380 miles per hour and fly as high as 40,000 feet. The 140-ton Princess has a 219-foot wingspan and is 148 feet long. Three million rivets and more than 2½ miles of longitudinal members went into the construction of the large hull.

Plastic Sheet Keeps Windshield of Parked Car Ice-Free

You don't have to spend minutes on a frosty morning scraping stubborn ice off your windshield when you have protected it with a plastic shield. There is nothing to tie or adjust. The polyethylene-plastic sheet with a sewed-on cloth edge for strength is merely draped across the windshield and held tightly by shutting the doors on its ends. It does not become brittle, even at 60 below zero, nor will it adhere to the windshield.



Automobile Cigarette Lighter Doubles Its Use as Flashlight

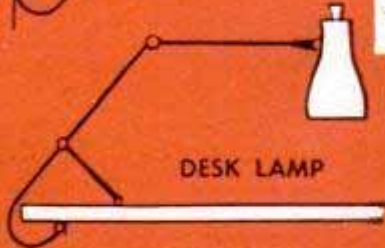


If you want a light for a cigarette or for reading a map, you can get either from a new car accessory that is a combination flashlight and cigarette lighter. There is no installation problem. You merely insert it in the lighter socket on the dashboard. It operates as a cigarette lighter in the conventional manner. A small switch turns on a light bulb that shines its beam away from the driver's vision.

☞ In Mexico, in 1535, Cortez established the first sugar mill in North America.



PIN-UP



DESK LAMP



BED LAMP

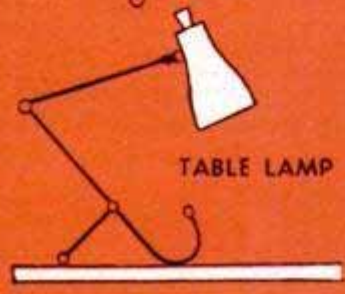


TABLE LAMP

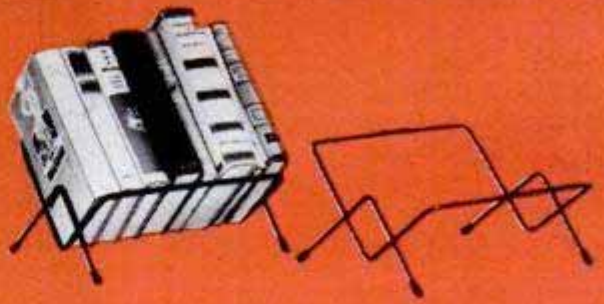
TABLE HOPPER lamp is an ideal gift for the student or anyone who is fussy about lighting. The lamp has a spotlight bulb and can be used on a wall, table or bed as shown in the illustration at left



DO YOUR Christmas

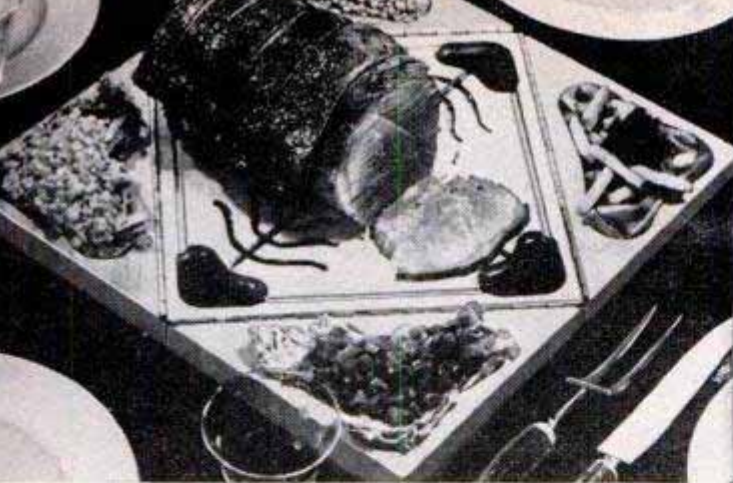


PERSONALIZED LABELS carry name and address on cellulose tape — ideal for books, tools, records, etc. **CATCHUP DISPENSER** below is of red or yellow plastic in the shape of a tomato. All it takes is a squeeze



BOOK RACK made of wrought iron in black finish lends modern touch. It's 11 inches long. **BUTTER WARMER** for the table is heated by candle and is also handy for sauces or hot syrups





FOLD-AWAY TRAY made of wood has spikes to hold meat firmly and corner wells for vegetables. It measures 17 inches square open, 12 when closed



WREN HOUSE comes in seven pieces which can be put together without nails or glue



Shopping HERE

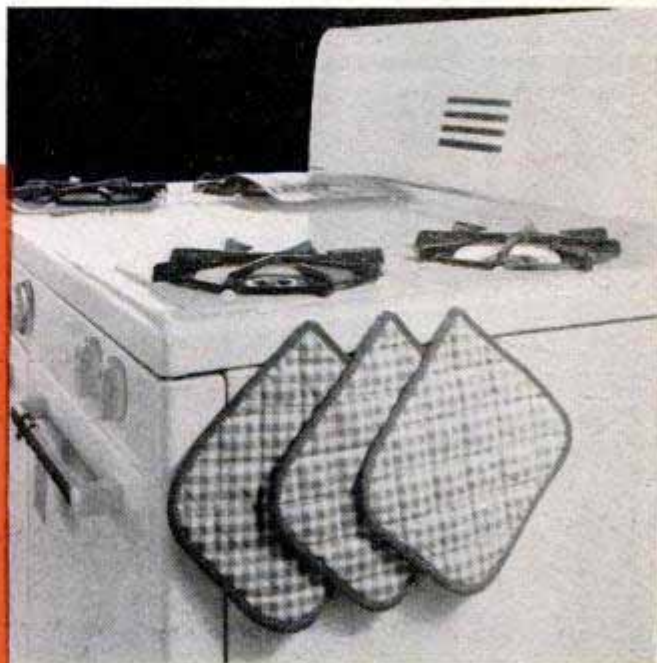
For the **HOME**—
and the woman
who runs it

Six pages of timely new Christmas gift ideas for the home, the youngsters, and the man of the family



FLOWER HOLDER is incorporated in bowl at left with slots in the top to support any short-stemmed flowers. A good gift for pansy or nasturtium growers. The vase can also be used as a centerpiece with candle in the top

MAGNETIC POT HOLDER clings to metal sides of kitchen range, refrigerator or steel cabinet. Laundering will not rust or injure the magnet insert in any way



COFFEE CADDY at right consists of a quart vacuum bottle held in a wrought-iron frame. This makes an excellent gift for the family that serves on the terrace. It is also handy for buffet suppers and parties



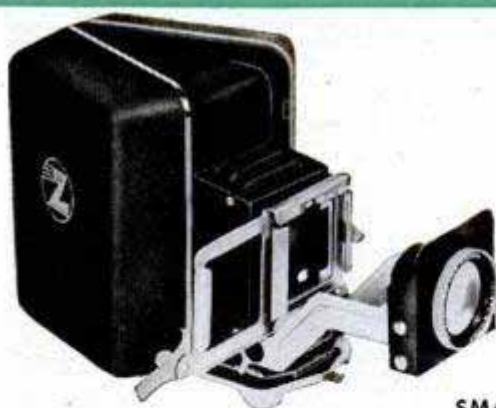


BAIT BOX made of plastic and cylindrical in shape is just the thing for a fisherman who likes something different. The lattice-work openings provide proper circulation of water when the box is tied to the belt of a fisherman or a boat. It will accommodate 12 to 15 minnows or crawfish



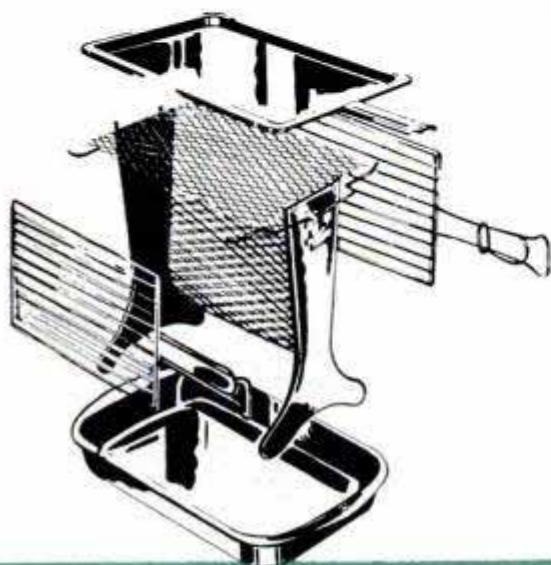
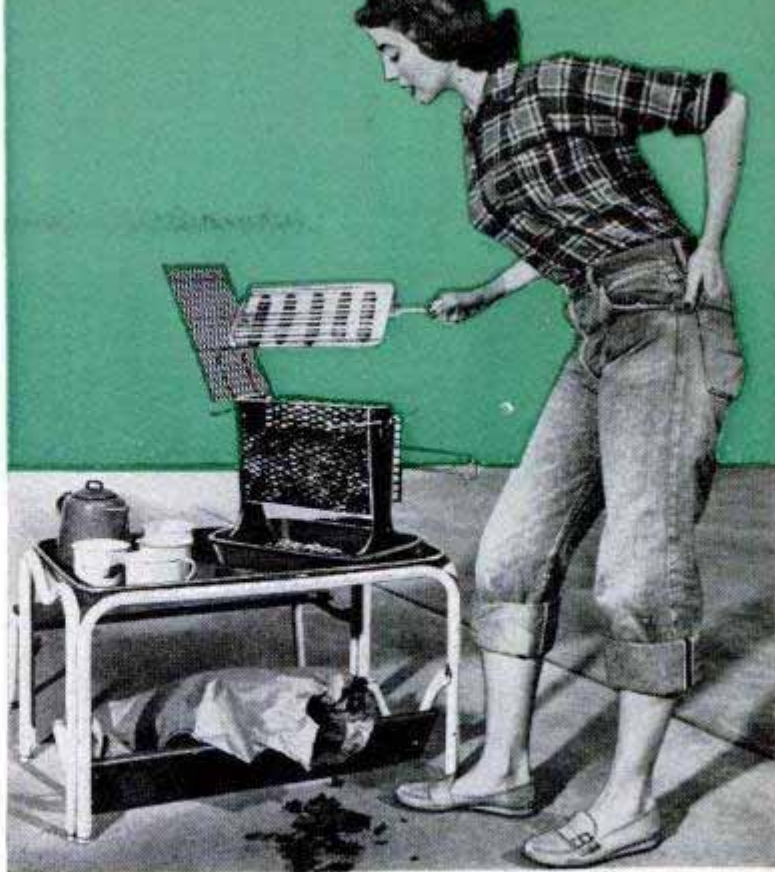
LOCKING GUN RACK holds six guns in "show position" and offers a new safety feature for the home. The drawer under the rack holds ammunition, hunting and cleaning gear. One key unlocks drawer and guns. The locking rod is polished brass and the rack itself is available in honey-tone knotty pine or mahogany. The rack is 24 by 40 inches

DO YOUR Christmas



SMALL PROJECTOR handles 35-mm and bantam-slides and projects up to 10 feet wide. It weighs under two pounds. **FOUNTAIN PEN** above at right carries its own spare point that can be changed easily — actually two pens in one. One of the points writes medium bold, the other medium fine. **MUFF** for sportsmen contains a heating unit that provides a constant 120-degree heat. It straps around the waist either over or under a coat and weighs only eight ounces. Also recommended for postmen, policemen and ice-hockey spectators





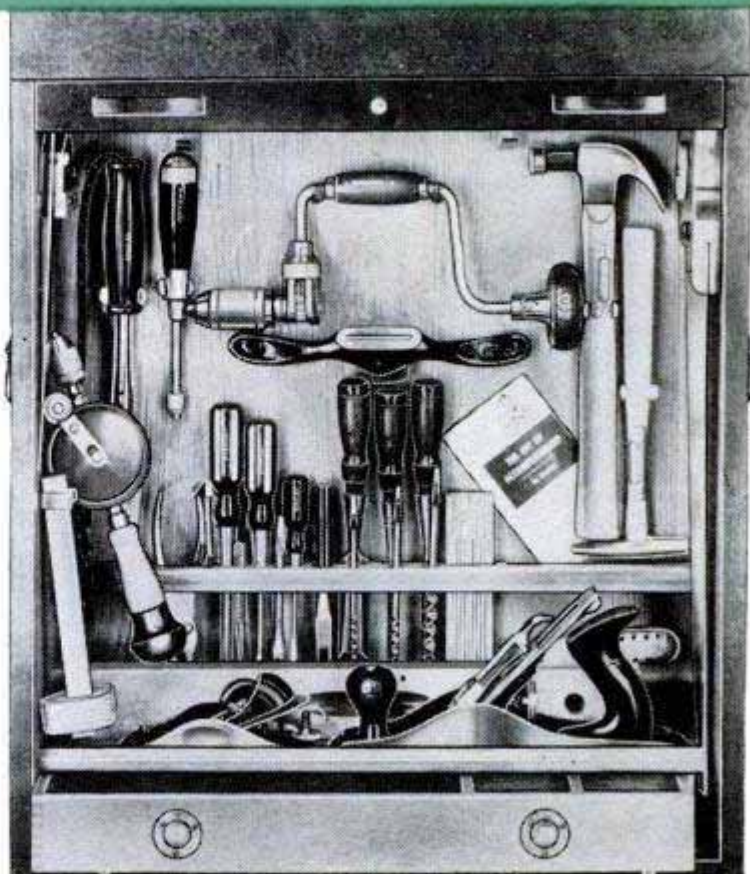
ECONOMY GRILL barbecues, broils or fries and is said to use less charcoal than flat grills. Vertical firebox makes it possible to cook on either side. The steel frying pan (in upper left photo) can also be used to control the draft on fire

Shopping HERE

For the man— and
the outdoorsman—
in the family

TOOL CHEST of varnished oak will bring a sparkle to the eye of every craftworker. It contains 29 tools, has divided drawer and a lock. A feature of the set is a roll-up door. Steel clips hold tools in proper places

SUNMAT has handy pockets for clothing or towels and two locking Zipper pockets for valuables. Features of the mat include weighted corners, printed gameboard in the center, Zipper opening for a beach umbrella



ELECTRIC CAR weighs 90 pounds and can pull load of 200 pounds, including the two-passenger trailer shown at right. The car is powered with an automobile battery which drives an electric motor. It is ruggedly built. **TOY FIRE ENGINE** below does everything but stop traffic. It's a scale model of a big American-LaFrance engine and has detachable ladders, a hose that unwinds and pumps a stream of water



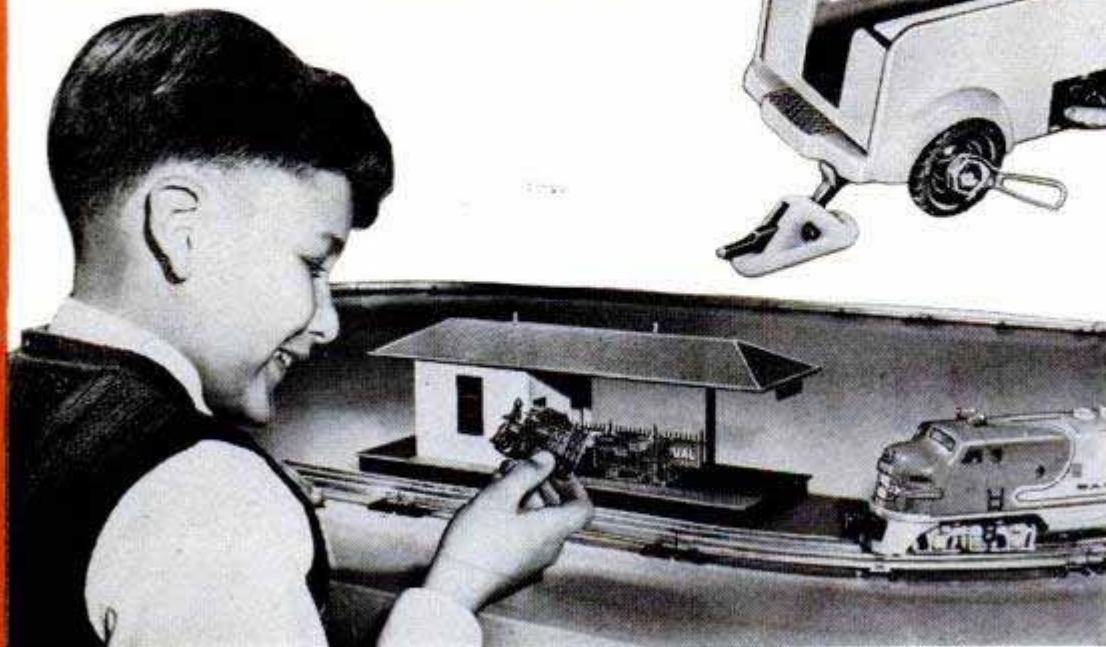
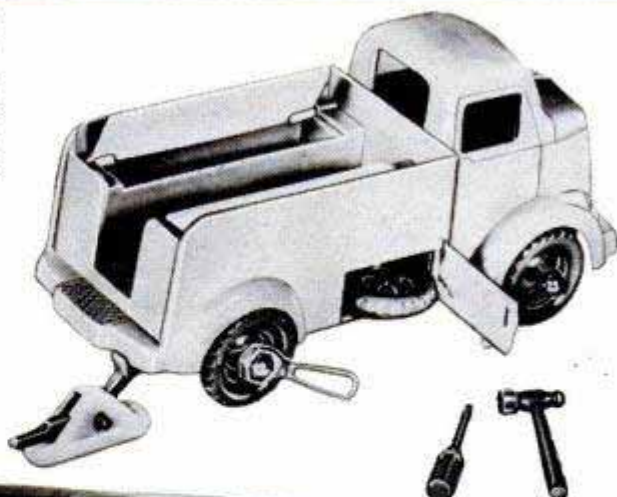
BAT BAK is the name of the game being played by the young man below. It might also be called one-man table tennis for a novel backboard lobs the ball back or returns it at a fast clip just like a live partner, depending on how fast the small ball is hit



DO YOUR *Christmas*



FIX-IT TRUCK at right is a dream come true for the junior mechanic. It has a repair kit for changing wheels and a lift jack that really works. **FREIGHT STATION** for small trainmen stands 5½ inches high. With only a slight push of a button two baggagemen zip in and out on the loaded cars



TV SHOWHOUSE below is made of cardboard and stands 40 inches high and is deep enough to accommodate a junior-size puppet operator. Children enjoy imitating other TV acts with the box. It requires no tools for assembling and folds neatly into a small unit for storage in a special carton. This gift encourages the small fry TV watchers to exercise imaginations



600 BRICKS, one bag of mortar, six windows and seven doors come with this model kit that makes building a house almost like the real thing. The miniature bricks can be broken like real bricks and they can be set with either permanent-type mortar or mortar that will dissolve in water. Shingles and foundation are made of cardboard. Houses are just the right size for electric-train scenes

Shopping **HERE**

For the youngsters



STAGECOACHES, covered wagons and other ancient vehicles of the Old West are built from interlocking parts made of metal or plastic. The vehicle kits are designed for use by very young children

BLACKBOARD CHAIR DESK can be reversed at meal-time to form an enamel table for lunch. Both frame and tray top are of smooth enamel and the blackboard has a black slate finish. Height from ground to seat is nine inches; weight is 18 pounds



"Wing flap" on Mercedes boosts braking power of the car on turns at high speed without dangerous decrease in traction



"Wing Flap" Brakes German Sports Car

Borrowing an idea from dive-bomber designers, German road racers installed a "wing flap" atop a Mercedes 300 SL for better braking on curves. The brake acts by greatly increasing wind resistance. Normally carried in a horizontal position, the hinged flap is pushed into a vertical position by the wind when it is released. It operates independently of the wheel brakes. Although the flap was installed on the Mercedes for the world-famed Le Mans 24-hour race, its use was limited to practice runs over the course. It was not used in the race which, incidentally, was



won by another Mercedes-Benz with an average speed of 96.4 miles an hour for 24 hours, covering a distance of 2314.9 miles.

Champ "Skates" Through Streets of Paris on a Pair of Wheeled Skis



Not even the lack of snow and being in the heart of one of the world's largest cities can stop a true ski enthusiast. But Paris gendarmes looked twice when French Olympic ski champion Henri Oreiller, who is also a singer-guitarist and composer, gaily "slalomed" down the Champs Elysees on a pair of wheeled skis.

Sources of available products described in this issue are listed on pages 12, 14 and 16. Sources of further information on other articles are given in the WHERE-TO-FIND-IT LIST, available from Bureau of Information, *Popular Mechanics*, 200 E. Ontario St., Chicago 11

Thermometer Traces Ills of Ailing Oil Wells

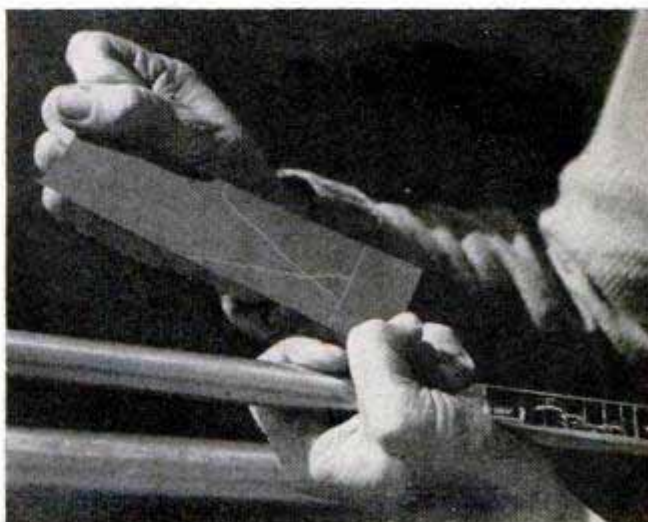
MEN IN the oil industry watch an oil well's temperature as closely as a doctor watches a child's fever. But an oil well need not be sick before an engineer reaches for his thermometer. And normal may be 300 to 400 degrees Fahrenheit. One use of the instrument is to locate the top of a cement plug after casing has been cemented. Plugs are placed to keep unwanted material, usually salt water, from flowing through the well bore. As cement sets, it gives off heat, and a thermometer lowered slowly into the bore soon after cementing shows precisely at what depth the heat is first noted. This defines the top of the plug and tells whether the cement has reached the proper point up and outside the casing. Another use of the thermometer in oil-field work is to help locate casing leaks. In these instances it points an accusing finger at the spot of the leak for there is usually an abrupt change in temperature at the break.



As the instrument is lowered a counter registers its depth. Below, inserting the temperature chart



Putting thermometer into a bore. Below, up from the depths, metal strip is a record of well's temperature





LADY WINDERMERE'S FAN:

1. (a) Deal cards into four piles of eight cards each, placing consecutive cards on different stacks. (b) Select a pile, split it, and show four cards in each hand to spectator who mentally picks one card and indicates the hand it is in. 2. Indicated half is placed under other four cards, one full pile placed on top, two other full piles placed on bottom of deck. 3. Repeat step 1 (a), dealing cards face up, from top of deck. Spectator indicates which pile his card is in. Selected card is fifth from top in pile indicated by him. Speed helps disguise the trick. Cards may also be dealt face down and "fanned" toward spectator



IT'S FUN TO BE FOOLED



... but it's more fun to know. And it's easier than you may think. Here are some simple, effective bits of card magic you can perform with a borrowed deck

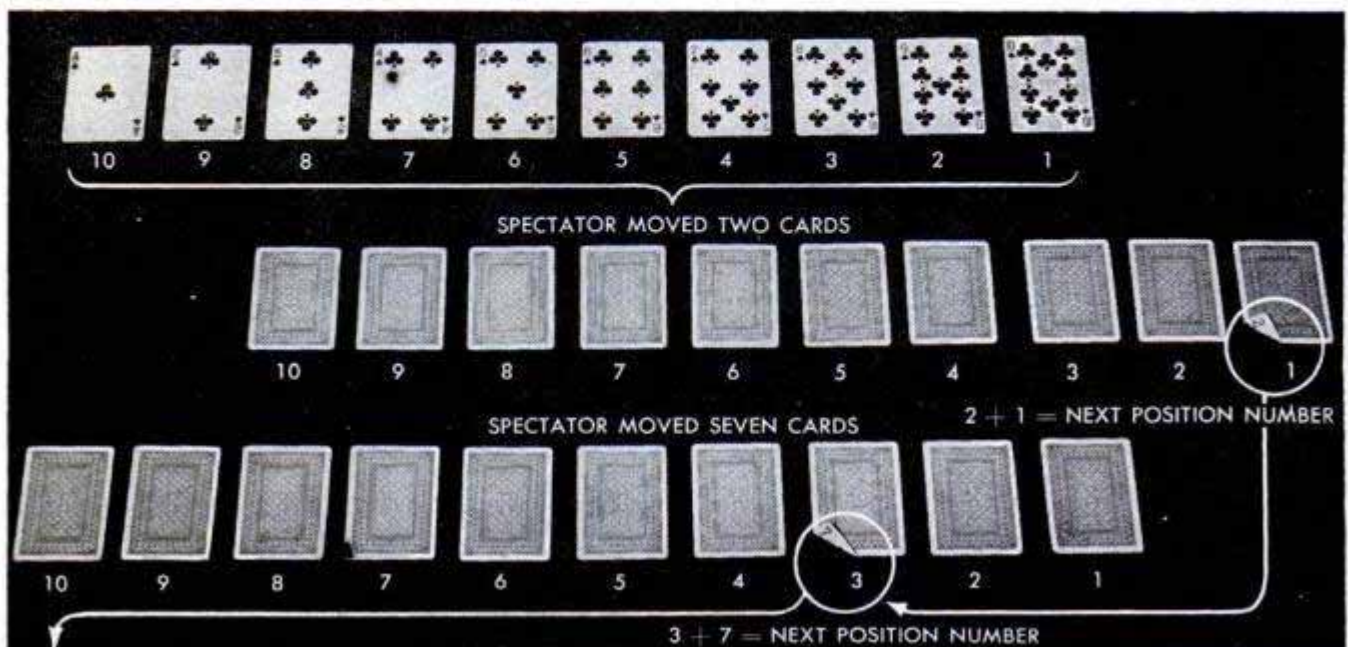
MERRY-GO-ROUND: If you'd like to pose as a clairvoyant but don't want to waste your time boning up on black magic, learn this stunt. Ten cards are laid face down on

a table; when you are out of the room, a friend moves several cards from left to right. Upon your return, you will be able to tell him the number of cards he moved.

1. Lay out first 10 cards of a suit in order of numbering. Notice that position numbers used run in the opposite direction. 2. Spectator secretly moves cards, one at a time, from the left end to right end of row. After first move, number of

card at far right is number moved. 3. Its number plus the position number of the indicator card after the next move. This formula holds indefinitely. The number of the indicator card plus its position num-

ber tells you where to look for the indicator card next time. Subtract 10 if the total sum is over 10. Limit cards moved each time to nine. Cards must be moved in order. Mystery is heightened if cards are face down even at start of trick





WHISPERING QUEEN:

1. Invite spectator to shuffle deck. Run cards, face up, from one hand to other, withdrawing queen of spades who will shortly "whisper" name of selected card. Remember the bottom card.
2. Ask spectator to cut deck into two piles approximately 39 and 13 cards each. 3. Determine his accuracy by counting smaller deck into a new pile, reversing order to bring down bottom card to top. Ask him to note top card of smaller deck, insert it in pack, and shuffle deck. Hold the queen of spades to your ear, pretending that she is whispering mystery card you already know. Then name spectator's card. This trick lends itself well to diversionary tactics. Compliment spectator on his rare cutting ability; maintain patter



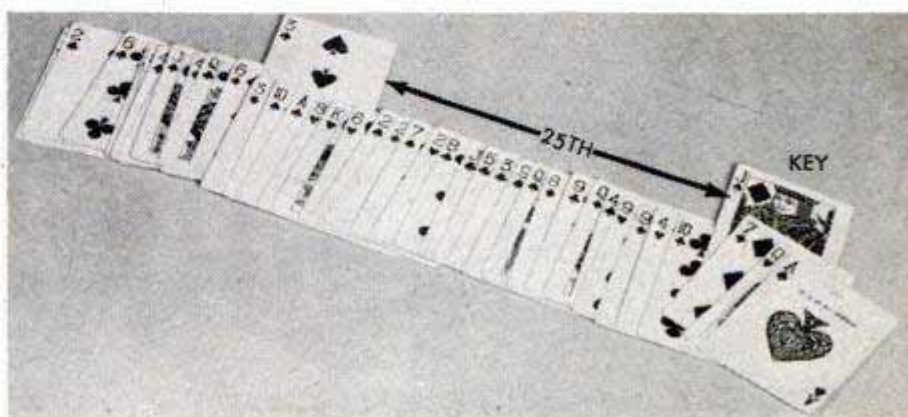
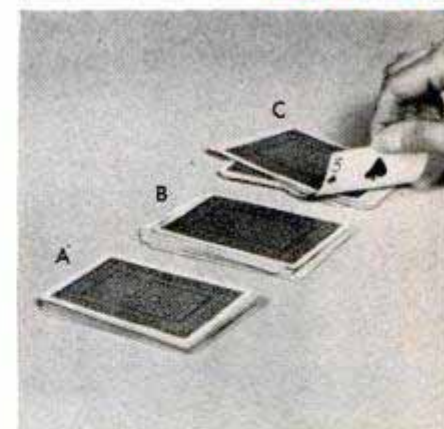
WHISPERING QUEEN: Some tricks are based upon the use of an accomplice. Dishonorable, some say—but in the above case a cardboard informer is your announced helper—and her only real purpose is to allow you to spot the bottom card. It's simple but effective.

26th CARD KEY: Here's a trick that can be repeated and still remain a mystery to some of the most acute observers. Basis of the stunt is the discovery of the key card, which is 26th from the top. The spectator's chosen card is always the 25th one past the key 26th card.



26th CARD KEY:

1. With cards face up, count deck into another pile, remembering 26th card from bottom of new deck. Turn over deck, tell spectator to cut two thirds of deck to make pile B, half of pile B to make pile C. 2. Pile C is shuffled by spectator, who chooses a card and places it on top of pile C. Trickster drops pile A onto C and pile AC onto pile B. Spectator cuts the deck. 3. With deck face up, find key card. Silently count toward bottom of deck. Card 25th past key card is spectator's. If there are less than 25 cards below key, finish count from top. You may learn the identity of the key card by any means at your disposal, of course, but the easiest ruse is to say "I want to make sure that I have 52 cards," then counting them out and making a note of the 26th card from the top. When you're looking for key card, pretend you're actually having difficulty finding spectator's chosen card

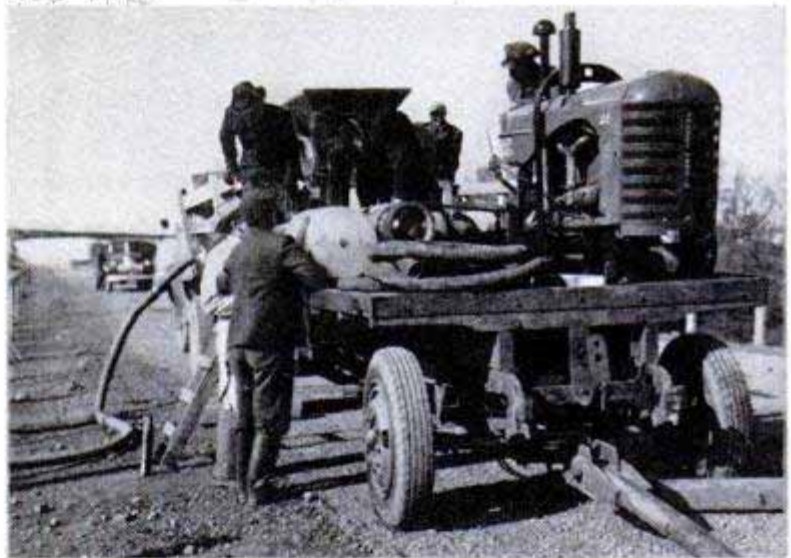




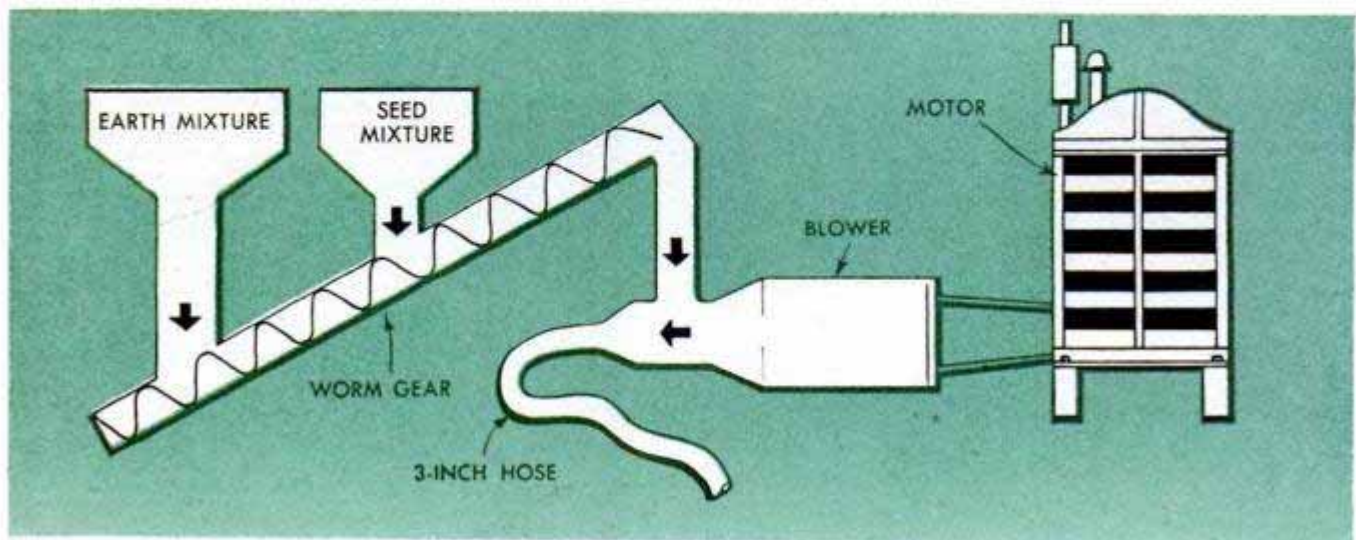
Guiding the flexible blower tube, workmen distribute grassing mixture across a sharply inclined slope

Blower Seeds Unsightly Embankments

TWO Canadians have perfected a machine that gives unsightly embankments a "facial treatment," no matter how steep, jagged and broken they are. Blowing topsoil, fertilizer, oat, grass and clover seed, and peat moss, it seeds up to 1800 square feet an hour. A week ahead of seeding operations, peat moss, oat seed and topsoil are machine mixed and set aside in piles to germinate. At first signs of seed growth, the mixture is fed to a second machine mounted on a blower-truck unit. Grass seed, more topsoil, fertilizer and clover seed are added and dropped through a trap into a long, flexible blower tube, through which the complete mixture is sprayed. Repeated sprinklings prevent the mixture from being blown away.



All the equipment used for the initial grassing experiment in Canada was carried on a flat-bed truck. Below, the mixture of topsoil, fertilizer, oat, grass and clover seed, and peat moss is drawn upward by a worm gear and blown out through hose



PLAYING SAFE

with

ATOMIC RAYS

By Rafe Gibbs

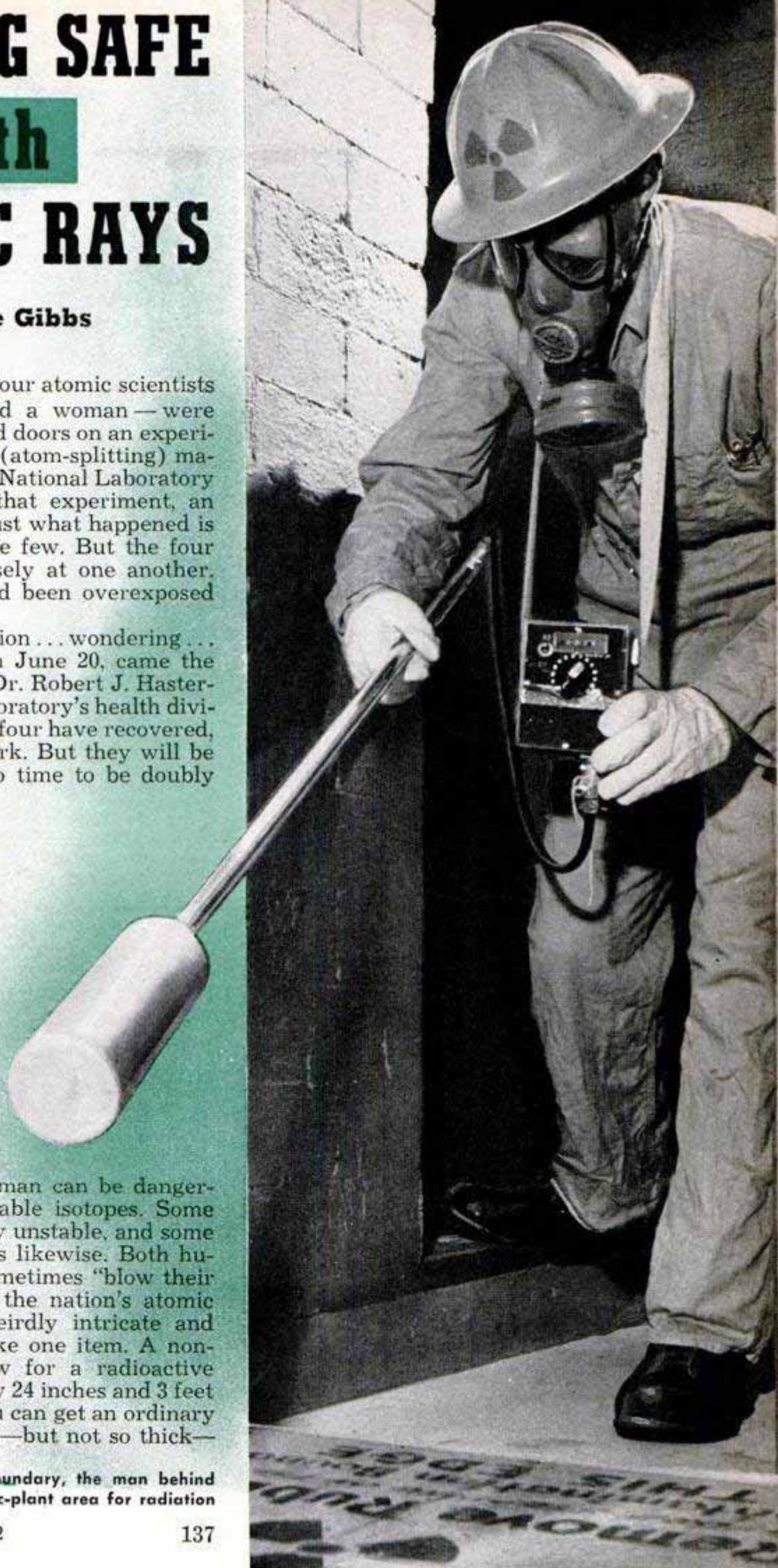
NOT LONG AGO four atomic scientists—three men and a woman—were working behind closed doors on an experiment with fissionable (atom-splitting) material in the Argonne National Laboratory at Chicago. During that experiment, an accident occurred—just what happened is a secret known to the few. But the four scientists looked tensely at one another. They knew. They had been overexposed to atomic radiation.

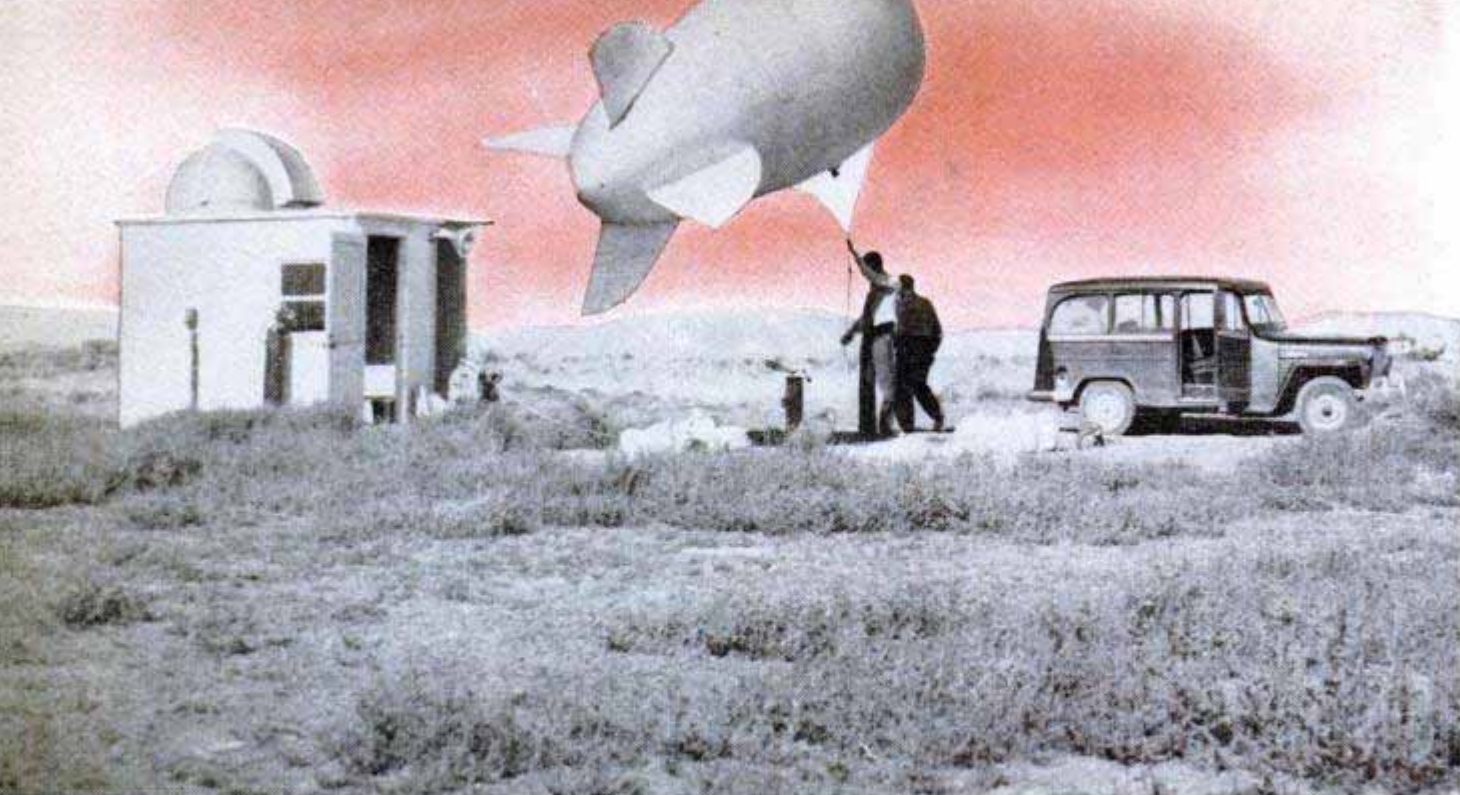
Days of hospitalization . . . wondering . . . waiting . . . Then, on June 20, came the announcement from Dr. Robert J. Hasterlik, director of the laboratory's health division: "Tests show the four have recovered, and can return to work. But they will be checked from time to time to be doubly sure."

This story is not told here to emphasize that radioactive material is dangerous. It can be! But the point in the Argonne case is that such occurrences among thousands of workers throughout the nation now dealing daily with radioactive materials are quite rare.

If not put under control, an unstable man can be dangerous. Same with unstable isotopes. Some men are just naturally unstable, and some get that way. Isotopes likewise. Both humans and isotopes sometimes "blow their tops." Safeguards in the nation's atomic plants are many—weirdly intricate and startlingly costly. Take one item. A non-coloring-glass window for a radioactive room, measuring 54 by 24 inches and 3 feet thick, costs \$8000. You can get an ordinary windowpane that size—but not so thick—

Approaching a marked boundary, the man behind mask is checking an atomic-plant area for radiation





To learn if the weather is right for an atomic test, a balloon is sent up to check wind and air factors

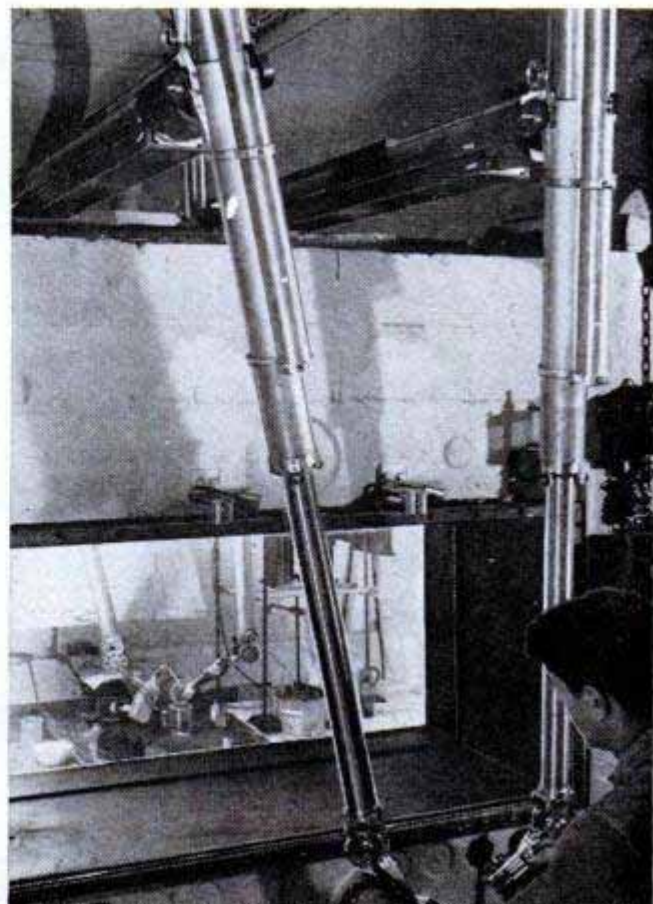
at the local hardware store for about \$1.

And some of the persons who work in atomic-energy plants go through motions that are almost out of this world. Let's take the case of Joe who works at Hanford, the place out on the semidesert lands of Washington where they deal in wholesale radiation. Some installations handle radioactive material by the gram. Hanford handles it by the ton—more than all that handled by all other places in the nation put together.

Well, Joe used to be a bus driver, but he's a "canyon operator" now. "Canyons" are the names given to massive and isolated concrete structures on the 488,000-acre Hanford project area—the places where they work with the hot stuff. Each Hanford canyon contains enough concrete to build 30 miles of highway.

The personnel experts figured it takes a steady man to drive a bus—the kind who would make a good canyon operator. And

Left, a pump draws air through filter paper and around a Geiger counter in continual checks on radioactivity. Acid squirted from a plastic bottle by mechanical hands, shown at right, washes "hot" tools in a sealed room





Long-handled tongs, mask, heavy rubber gloves and a film badge on pocket help guard against overexposure

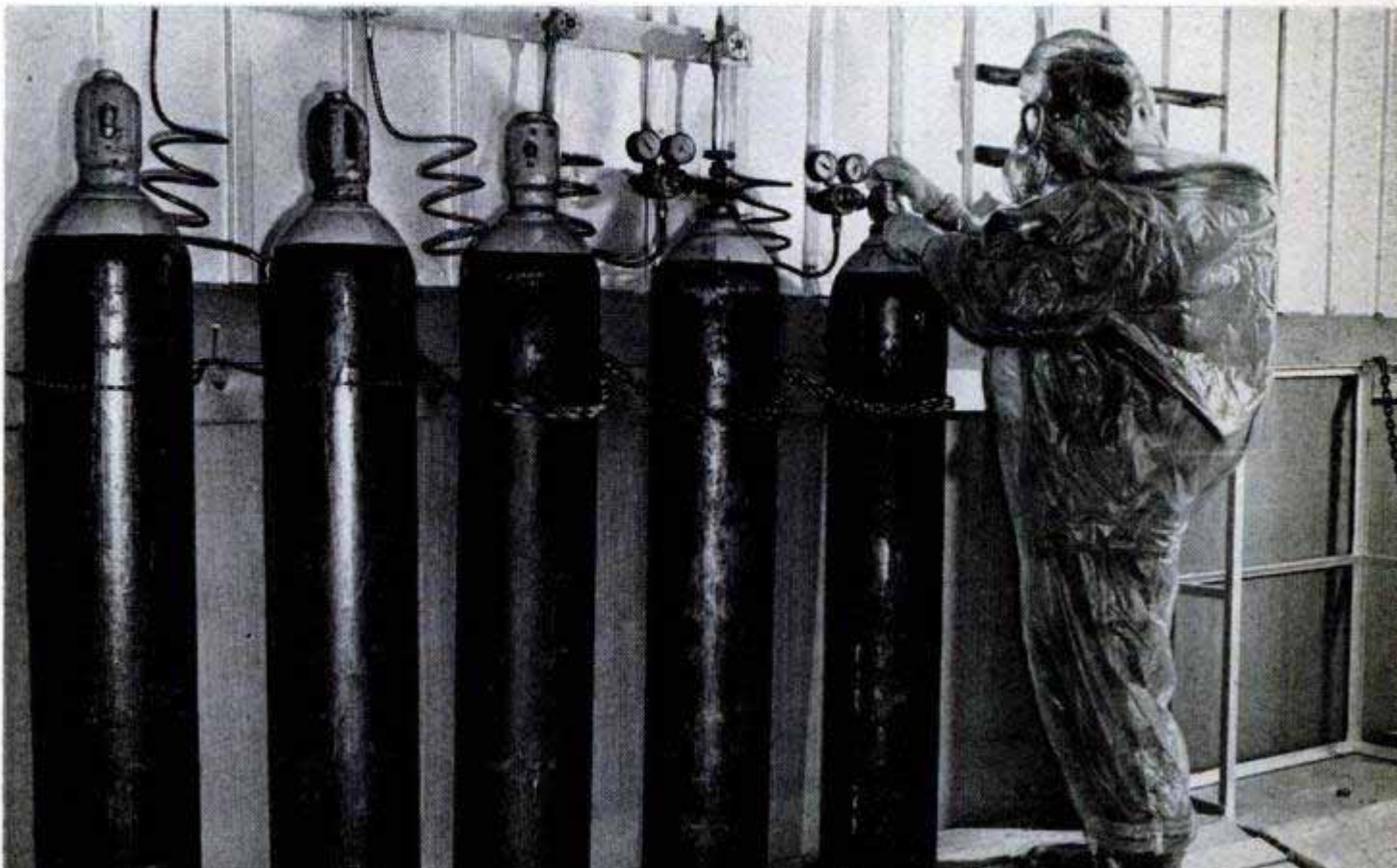
Joe wanted the job because the pay is higher, and he has three youngsters. Joe has a modest house in near-by Richland, and while there he leads a pretty average life. When he leaves home for work at the Hanford project in the morning, however, he is no longer Mr. Average.

The husky guard at the plant gatehouse knows Joe. "Hello, Joe," he says. "Kids get-

ting over the measles all right? Here are your checker-uppers."

The guard hands Joe three small objects. There are two "pencils" (pocket ionization chambers) and Joe's personal film badge. Joe must never be without these three items while in a canyon. When he leaves at night he will turn them in. The pencils will be checked immediately to determine

Air from tank on this man's back is breathed and expelled from suit to keep contaminated air from entering





Samples of plant life are taken, left, to determine radiation in vicinity of tests. With three-dimensional television, right, dangerous experiments can be conducted remotely thanks to accurate depth perception

his amount of radiation exposure; the film badge is checked at the end of the week.

Joe's wife, Ella, always packs him a lunch in a bucket. This he leaves in the plant lunchroom. He is not allowed to take it with him out to his canyon work site. There, Joe can neither eat nor smoke because of the possibilities of getting radioactive particles in his mouth. But the lunchroom is "clean"—in the usual sense, and also in the sense that it is monitored continuously for radioactivity.

Joe now enters a canyon-plant building which handles one stage of the chemical processing of radioactive materials that will eventually go into an atomic bomb. At his post, Joe stands in front of a panel with a lot of gauges—watches these closely, of course—and turns valves.

When Joe turns those valves things hap-

pen in a thick-walled, sealed-up room. Acids are added to the batch of material with which Joe is working, the material is transferred from one vessel to another, wastes are run off. Joe knows every second what is happening inside that room where death would come to any man who entered. A meter detects any unusual vibration of moving equipment. A loudspeaker even brings him the strange process noises.

And Joe is happy at his work. He feels safer than he did driving a bus. Scientific minds, which have upset the world with atomic-energy development, are now working overtime to devise more and better safeguards. One is the use in atomic goggles of glass containing cadmium, making them safe, transparent absorbers of neutrons, the penetrating particles of atomic fission. The

(Continued to page 252)

Using a beta-gamma counting device, the technician at left records the scale reading on coveralls worn by an atomic scientist. A worker coming off the job, right, checks to learn if he has a "hot" foot from radiation





Simple tire clamps may replace conventional chains as standard equipment. Only one is needed per tire



Traction tire clamp, easily placed on wheel after car is stuck, enables automobile to work itself free

Traction Tire Clip Replaces Conventional Auto Chains

Incredibly simple in design but efficient as it is easy to put on, a clamp that fits over an automobile tire gives certain traction in ice, mud or snow. In tests, a car stuck in mud up to the differential was fitted with the clips and worked itself free in less than a minute. The clamp can be attached while

the automobile is stuck, and can be placed anywhere around the tire. It will not fly off at speeds of 40 to 45 miles per hour on a paved roadway. No tools are needed to install or remove the clip, which is manufactured in three sizes to accommodate the requirements of all sizes of automobiles.



"Windmill" Device on Windshield Protects Nighttime Driver From Glare

Someone is always trying to solve the glare problem for the night driver — now an Italian inventor has a novel solution. Mounted on the top rim of the windshield, the device consists of eight opaque plastic sections each containing a narrow slit.

When rotated by a tiny electric motor, the sections form a slotted disk that interrupts the driver's vision and reduces the excessive light that causes glare. When not in use, the device folds like a fan out of the driver's line of vision.



Controlled traffic lights make sure that this equipment arrives when it is needed

“Talking” the Smoke Eaters Through Town

STOP WATCH IN HAND, I watched a trial run of Columbia, S. C. firemen. Fifteen seconds, they said, would see them out of bed and on their way down the street.

They hopped, skipped and jumped into boots and pants, shot down the firehouse pole and onto the truck with two seconds to spare.

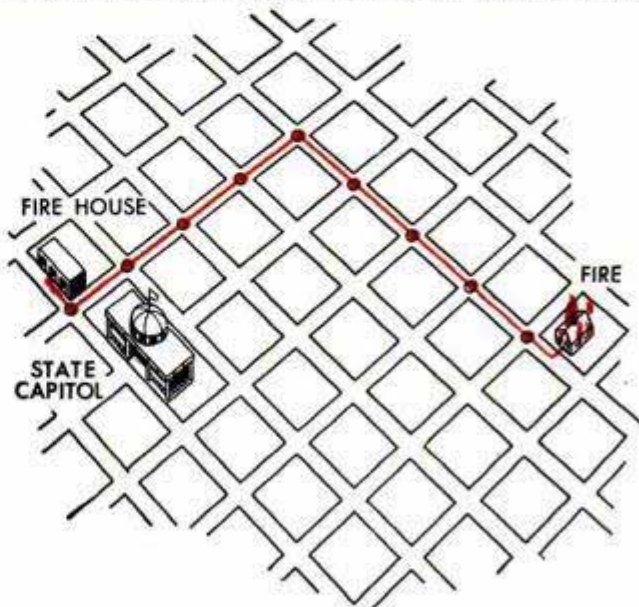
More miraculous, I thought, as the truck lurched to a stop, the rig had moved through nine intersections busy with daytime traffic and reached a fire a mile away in 69 seconds! Little wonder Columbia's fire loss is small and its insurance rate is among the lowest in the South.

How do they do it? The secret lies in the city's new fire station, fully equipped with the latest electric devices which synchronize every necessary movement and eliminate delay along the line.

Heart of the system is a remote-control wiring installation developed by General Electric engineers. With its help, a man sitting at the switchboard can turn on or

By
Raymond Schuessler

As fire trucks sped along a mile-long route, traffic lights blinked and sirens screamed to open the way





Control operator receives fire reports, alerts men, opens doors and switches traffic lights to clear route

off every light in the firehouse, open and close its eight doors and control every city traffic light.

With ordinary traffic-control methods, it would have taken us two and a half minutes to cover the mile-long route we had taken. In a flash fire, the delay of a few seconds could mean losing a whole building and some of the people in it.

When a fire report comes in, the switch-board operator turns on all lights, alerts fire fighters by loudspeaker, gives instructions and opens doors by remote control.

As the vehicles move through town, the radio man on the lead truck tells the control room what intersection he's approaching. The control operator turns the proper switch, starting a siren at the corner and turning the traffic light to flashing amber. Traffic comes to a stop and the fire trucks race through. The last piece through the crossing radios "cut," the siren stops and traffic returns to normal. With such traffic control, apparatus from the main station can reach the farthest part of the city in five minutes, one third the former time. ★ ★ ★

Approaching intersection, lead truck radios station; traffic halts as light blinks and corner siren sounds





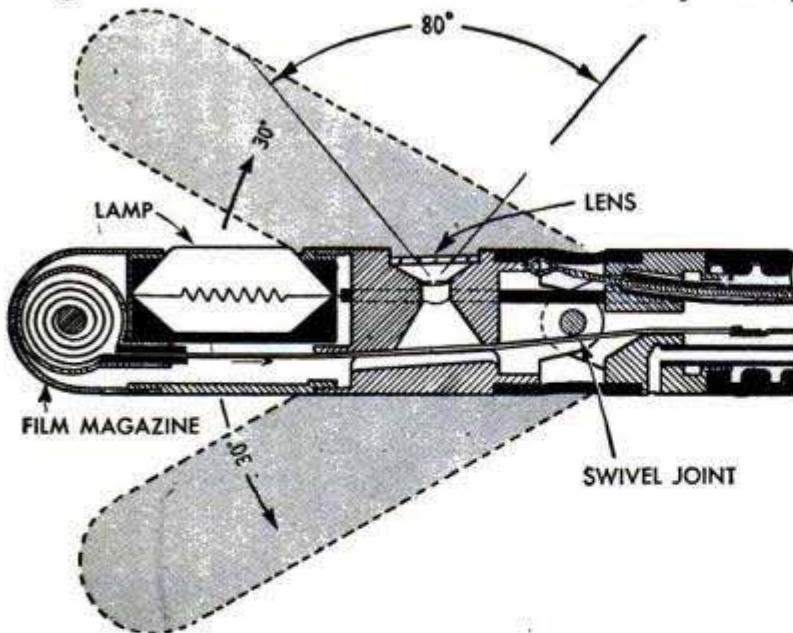
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Nazi Assault Boats Employed to Wage War on Beetles

Waging an all-out war on the cockchafer, a beetle destructive to vegetation, German forestry workers are using former Nazi assault boats to spray the banks of the Danube and Tsar Rivers. Bavarian offi-

cialists say there are 3,000,000,000 beetles in the invasion, the largest such insect threat in German history. The spray being used is a combination of DDT, poisonous exterminating gases and fire.

Finger-Size Stomach Camera Developed by Japanese Scientists

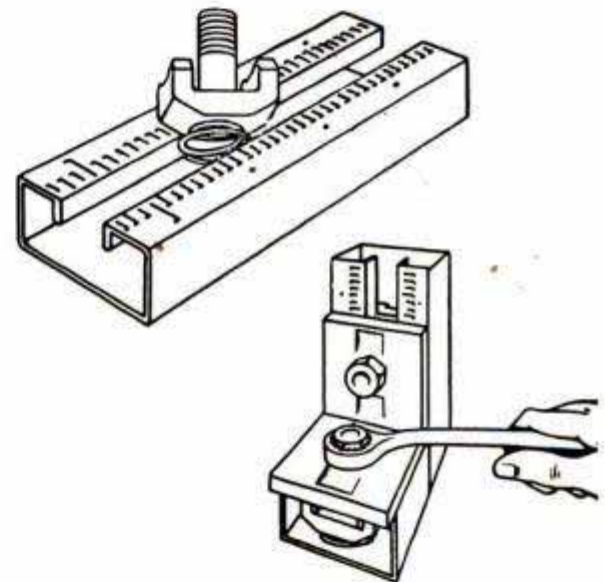
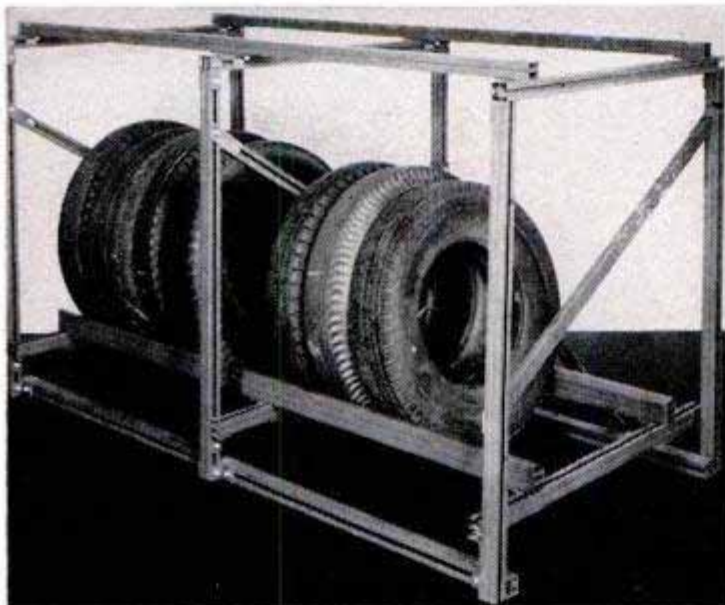
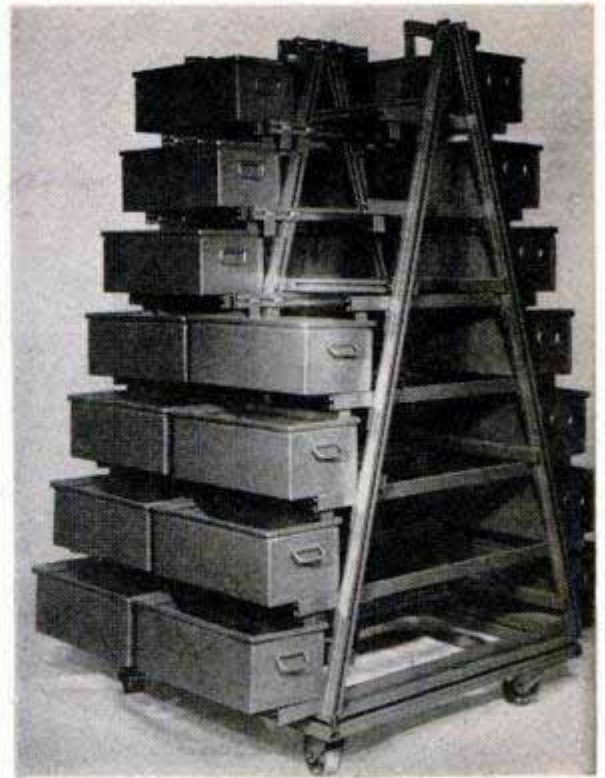
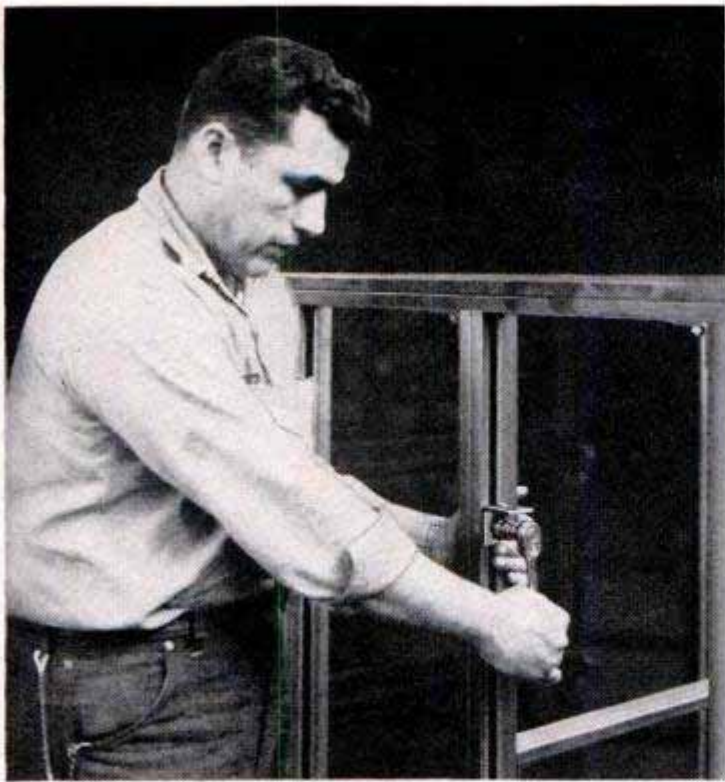


Doctors can take photographs of the inside of the stomach with a tiny camera that carries its own light supply. The camera and 16-candlepower lamp are attached to the end of a rubber tube. Film is loaded in the camera in a tiny magazine. Thirty pictures can be made in five minutes.

Airplanes of Glass?

Glass, more resistant to the searing skin-friction temperatures of supersonic flight than most metals, is being urged as the material for airplanes of the future. Glass-plastic laminate—not ordinary window glass—is the material under consideration. Thomas E. Piper of Northrop Aircraft points out that "the airplane of the future could have glass wings, ailerons, stabilizers and an all-glass fuselage. It would be fastened with glass rivets and supported by lightweight titanium and stainless-steel structural members."





Steel Framing Material Quickly Assembled in Various Shapes

Although it has only three basic units, a steel framing material can be assembled to form a multitude of shapes with no tools except a wrench. The three units are a channel frame (available in several sizes), a spring-loaded bolt and a serrated fitting (also available in different sizes and shapes). These parts can be fitted together

to form racks for service stations, supports for conduits and overhead radiators, legs for benches or racks for basement storage. A ribbing along the slot in the channel frame meshes with the serrations on the fittings to assure a nonslip joint that prevents sideways. The channel frames can be cut to size with a hacksaw.

Electronic "Stop Watch" Splits Second Into Millionths

Capable of slicing a single second into 8,000,000 parts, a new "stop watch" measures elapsed time by means of electronic counters. However, you probably wouldn't want to take the timer to a sporting event; its hair-splitting accuracy is most suited to timing relay contacts, camera

shutters, measuring geophysical vibrations, projectile velocities and telemetry frequencies. Nor would you carry this stop watch in your pocket; it is contained in two cabinets four cubic feet in volume. The lower cabinet houses the power-supply unit; the upper case contains the computer.



Having a short, powerful body, the reindeer is not the sleek gazelle common in Christmas decorations

Reindeer
For Hire

EVERY CHRISTMAS parade has Santa Claus dispensing good cheer, but his hard-working deer, Dasher, Prancer and company never seem to get into the act.

They never do, that is, except in Texas, where youngsters thrill each year to the sight of real live reindeer pulling Santa and his pack of presents.

This Christmas treat is on Grady Carothers, Goldthwaite cattle rancher who imported some reindeer from Alaska several years ago. He has trained them to haul a sleigh (which has to roll along on wheels

hidden between its runners, Texas weather being what it is) and now he gets so many requests for his animals that he's building up a herd of them.

Annually, he buys a few more from Eskimos near the Bering Sea and flies them to his Texas ranch. It takes only a couple of days to haul the animals from the land of ice and snow to one of cactus and sagebrush, but it will take much longer to make them love it! In summer, Carothers has to keep them cool with a huge fan and a water spray in their covered corral. ★ ★ ★

Something look confused here? No wonder, as cowboys help Santa train his reindeer on a dusty ranch in Texas

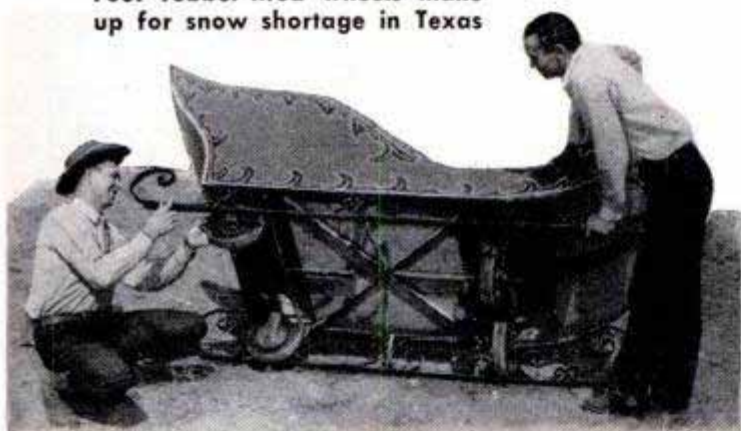




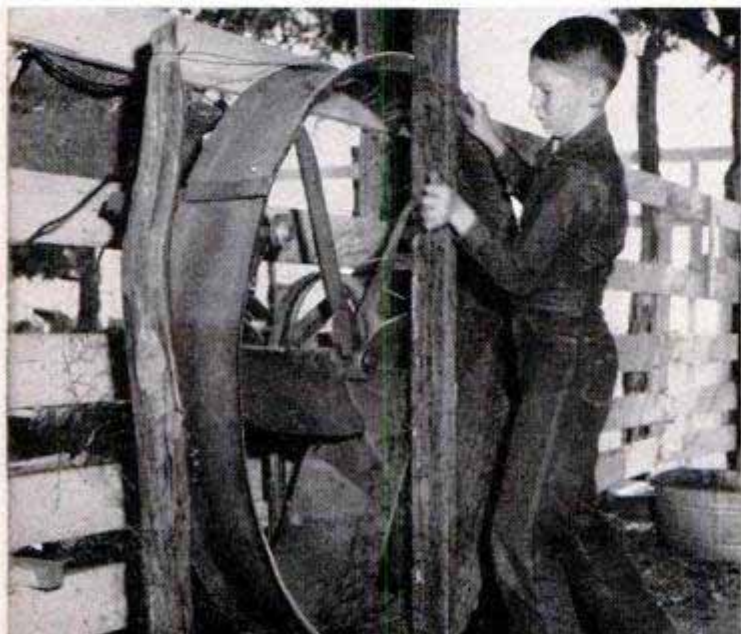
In hot weather, the broad-antlered reindeer pant like dogs. Their cloven hoofs crackle and pop as they walk

Four rubber-tired wheels make up for snow shortage in Texas

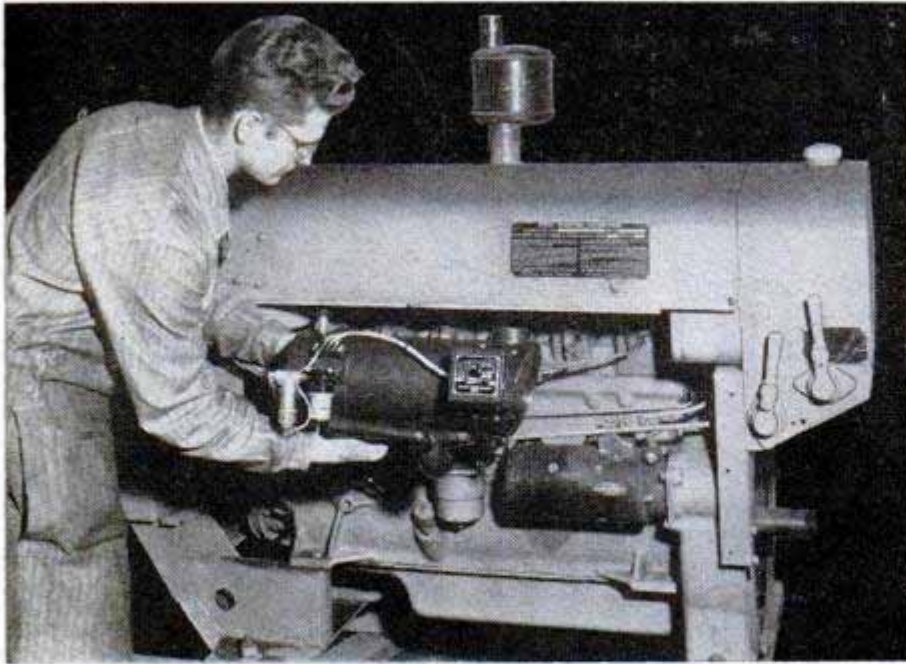
Below, the reindeer take part in up to four parades a day, being hauled from town to town in this trailer



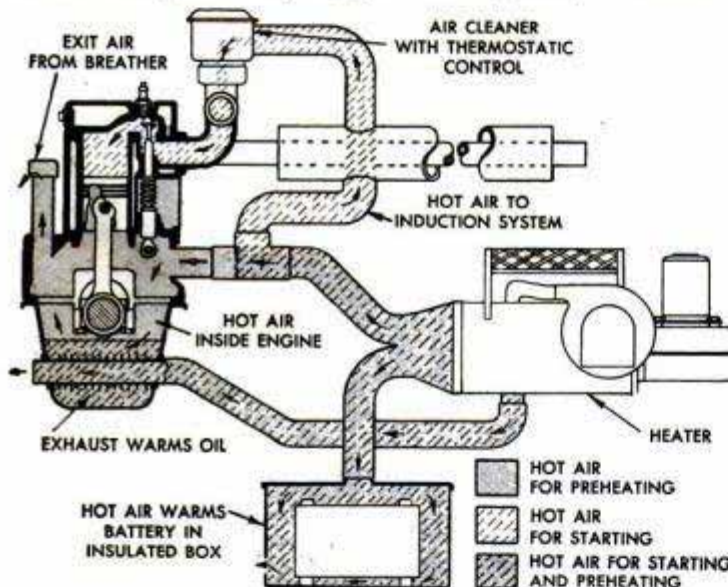
Below, to keep the animals cool, a giant fan and a water spray lower the temperature in their corral



Truck Engines Start Quickly When Preheated by Hot-Air Flow



Above, mechanic holds preheater in its approximate position on an engine. Hot-air ducts, shown by diagram below, carry heat to battery and block



Quick starts are assured at temperatures as cold as 65 degrees below zero by an engine preheater that pours hot air into the block to warm lubricants and make fuel ignite more quickly. Clean air, heated to about 400 degrees Fahrenheit, is circulated through the engine and around the battery. In 10 to 20 minutes the engine is warm enough to start easily. During the starting operation, the heated air is introduced into the engine's air-induction system for faster ignition. These heaters can be used on either diesel or gasoline engines and are at present designed only for trucks and

other heavy equipment. Once the engine has been started the heater output can be used to heat personnel, to defrost the windshield or to keep cargo from freezing in sub-zero weather.

Forecast 1000-Mile Rockets

Within five years, multistage rockets will be able to roar 1000 miles into space, Naval Research Laboratory engineers predict. Single-stage rockets will go half that distance. Already, they point out, the Wac Corporal, Viking, Aerobee and V-2 sounding rockets have carried seven tons of instruments 140 miles into the sky.

Electric-Heater Thermostat



You can make any electric heater completely automatic by plugging it into a recently developed thermostatic unit. Completely self-contained, it requires no wiring. The compact attachment includes a sensitive thermostatic control which is easily set for any desired temperature, a built-in receptacle, and a standard six-foot cord which connects to the nearest wall outlet. The unit will maintain a constant room temperature.

Sewage "Farms" Promise Valuable Feed and Chemical Products

Sewage "farms" where waste will be turned into valuable livestock feed and industrial chemicals are suggested by research at the laboratories of the University of California. Algae growing in the oxidation ponds would convert sewage to algae almost completely in a day. The single-celled aquatic plants contain up to 50 percent protein, and would reclaim the valuable nutrient elements now being poured into the sea in huge quantity. Besides providing feed for domestic animals, the dried algae could furnish raw materials for chemicals, fats, alcohol, oils, synthetic fibers, hormones and drugs. The method is said to be simpler, faster, and less expensive than present methods of disposal.

the

POPULAR
MECHANICS

CRAFTSMAN



THE MANY VARIETIES of evergreens sold during the yuletide season pose the annual problem of just which tree is best for indoor decoration. Variations in types, sizes and shipping costs determine to some extent the selection of trees on the market in any given locality, but the symmetrical Douglas fir usually is first choice. Tradition has it that the first Christmas trees were firs.

Evergreens are identified principally by variation in the needles (foliage), but as a rule the shape and appearance of the tree distinguish the fir from the pine. The form of the Douglas fir usually is a long pyramid and the shape is uniform on all sides. The pines available for Christmas trees generally are less symmetrical, the branches are less regularly spaced along the trunk and the needles grow in "bundles" of two to five, the length depending on the variety. The Douglas fir may be identified by its soft, flat needles and the buds at the ends of the branches which cause the needles to curve gracefully during development. Like the true firs, the needles

are borne singly on the branches. They range from 1 to 1½ in. long and are blunt tipped, unlike needles of the pines, spruce and certain of the cedars, which are sharp pointed. In a general way you can tell the difference by touching the ends of the needles; if they are pointed and prickly to the touch, the tree is a spruce. If the needles are in bundles, the tree is one of the pines. If they are soft and blunt, the tree is one of the firs.

A tree selected for use in the home should be from 4½ to 7 ft. in height, the foliage should be of uniform color, and the branches must be sufficiently strong to bear the weight of ornaments. In general the foliage of the spruce, hemlock and most of the pines is less durable than that of the firs. The trunk should be straight and the central leader, or tip, of the tree should be erect and sufficiently rigid to support an ornament. Firs are especially desirable in this respect. Immediately after purchase cut off the trunk diagonally about 3 in. from the end and place in a water-filled container.

Tree Decorations in

By *Norb Hildebrand*

The decorations pictured are part of an annual display of traditionally trimmed Christmas trees that is featured by the Chicago Museum of Science and Industry

FROM AN ORIGIN lost in the obscurity of Old World tradition, the Christmas tree has become an almost universal testimony of joy in the birth of Christ and, though popular tradition ascribes the first Christmas tree to Germany, almost every Christian country has a legend in its folklore to account for the honored role given the "evergreen" at Christmas time. A natural evolution in the decoration of the trees has resulted in the decorations assuming characteristic national features, first of the economic and cultural life of each country and, in more recent times, of the influence wrought by the constantly shrinking boundaries of geography and commerce.

The uniqueness and simple beauty of the original themes can be recaptured for your family tree by incorporating some of the decorations used in other lands. Homemade decorations are the rule in this case, and it is surprising what scissors, paste, colored paper and a few other common materials plus a little imagination can accomplish.

Perhaps the most unusual decorations are those of Lithuania, where straw from the fields is strung with needle and thread to form intricate geometric designs, bell towers, bird cages and a host of religious symbols. The same effect may be achieved by substituting soda-fountain straws, and

the finished ornaments will, with reasonable care, last for many years. As a still further adaptation, colored-plastic drinking straws may be used to combine the new with the old to make a colorful and unique display to which every member of the family may contribute.

The "straw" bird cages are ideal for housing fragile eggshell birds so loved by the people of Poland who use empty eggshells as the basis for all kinds of ornaments. Heads, arms, legs and wings of colored paper are glued to the shells to simulate men, animals and birds. The fresh egg is emptied by punching a pinhole at each end and forcing out the contents by blowing into one of the holes. Gay chains made by interlocking rings of colored paper continue the Polish tradition. Colored paper is used extensively all through the Balkan countries, and you will find that many varieties of decorations can be fashioned from crepe and metallic-finish papers.

People of the Scandinavian nations express an intense personal patriotism by trimming their trees with paper chains made in the national colors and by draping long garlands of miniature flags in colorful spirals on the tree. This idea may be adopted effectively in America by trimming the tree entirely in red, white and blue along

Polish



Danish



Lithuanian



Other Lands

with miniatures of the Stars and Stripes. The color harmony can be carried out with the lights as well as the ornaments. In addition to colored-paper ornaments, Danish trees include a massed display of checkered-paper bags which may be used to hold the hard candies and nuts that the children love to find.

One of the most exquisite trees is that traditional of France, the charm of the ornaments lying in the simplicity of their shape and color. Large white snowballs of cotton or foam plastic, silver-paper cornucopias filled with hard candies, and an abundance of tinsel are the only ornamentation. Yet, the effect of white spheres, silver cones and sparkling tinsel against the dark green of the tree is something fairy-like and fragile. The effectiveness of such simplicity is heightened by using lights of only one color.

According to tradition, the German tree first was trimmed with nothing but candles. Christmas cookies were added and then apples, oranges and popcorn balls until a well-stocked German tree soon became a thing of beauty to make both eyes and mouth water.

One of the simplest and most effective methods of decoration is the old British custom of trimming the tree exclusively with Christmas cards. These may be fastened with colored cord to make long garlands or hung individually from ribbons.

In Japan, the Christmas tree takes on an oriental motif, with tangerines, kimono-clad dolls, fragile glass-blown ornaments and little rice wafers known as "sembei." The latter contain fortune-telling slips of



Checkered-paper bags featured on Danish tree are just the thing for holding Christmas candy and nuts

paper to be read during holiday festivities.

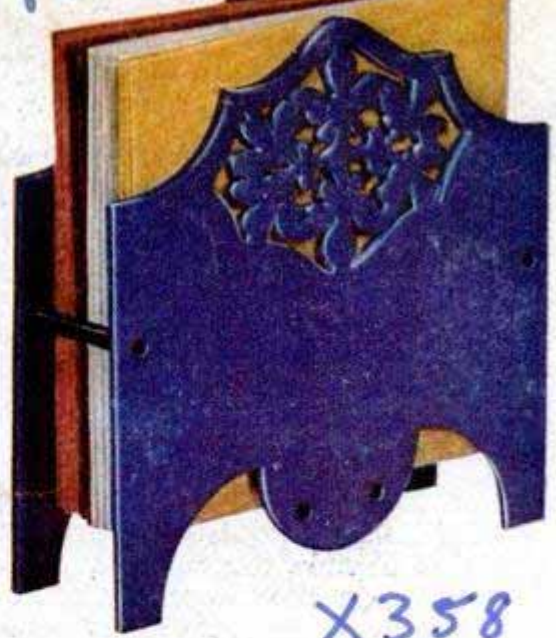
The American Christmas tree, like the nation, is a reflection of all people of all traditions. But, America has also, in a sense, made an important contribution to the Christmas-tree tradition—that of the electric light bulb, which today blossoms forth in all sizes, shapes and colors, giving light and sparkle to the tree regardless of how it may be decorated. ★ ★ ★

British

Yugoslavian

Lithuanian



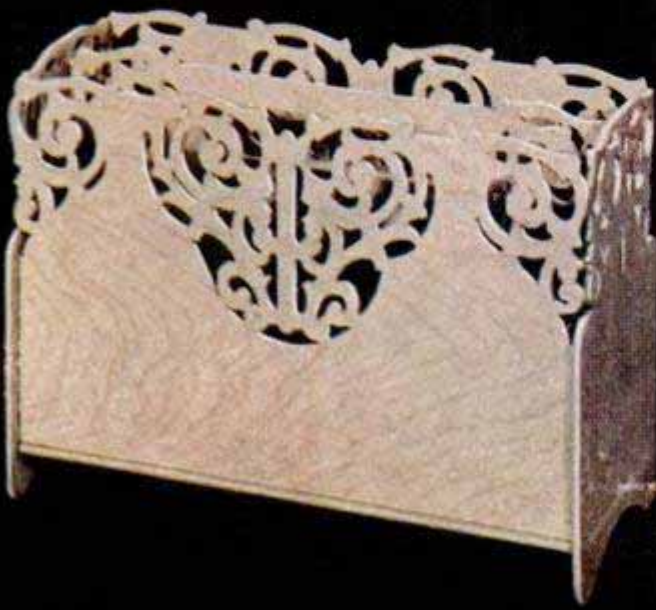


X358

JIGSAW *a Merry*

By Albert P. Belanger

These original designs are presented as a special Christmas project for the craftsmen who enjoy working with wood or plastic. The intricate patterns offer excellent jigsaw practice for the beginner as well as a challenge to the skill of the "old hand"



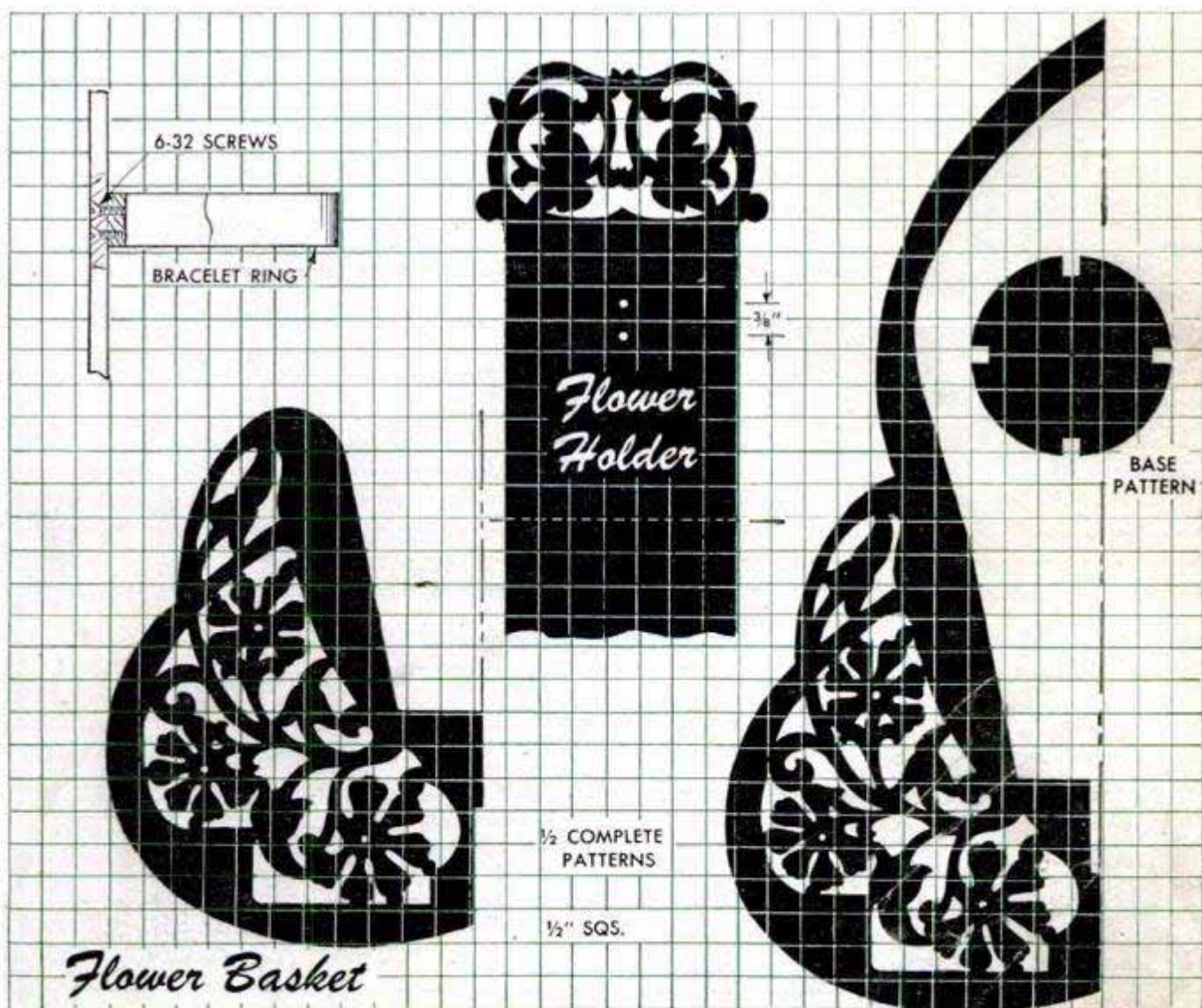
clude these beautiful scrolled pieces in your Christmas workshopping list. Made of colorful opaque plastic or hardwood-veneered plywood, any of the novelties pictured will form a long-remembered gift. Or, if you would like the basement shop to start producing a little extra cash, turn out the items in quantity and retail them through local gift shops and department stores. Their eye-catching originality means quick sales throughout the year as well as during the holiday season.

To produce the pieces in any appreciable quantity, multiple cutting of identical parts is a necessary timesaver. Although plywood panels can be tacked together, plastic sheets should be held by cellulose tape and pins as in the detail on page 155 to prevent cracking. Locate the pins only in waste stock at the corners of the sheets.

The plastic flower basket consists of two similar parts, one of which incorporates a handle. Both parts are notched to form a

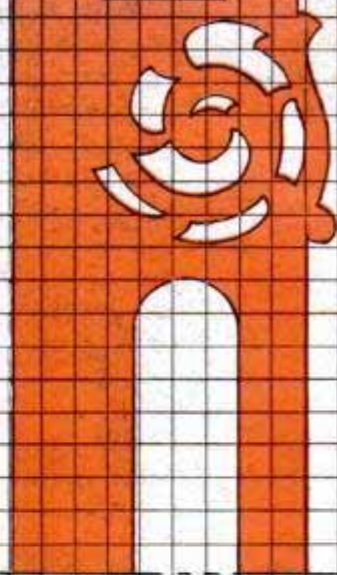


Christmas

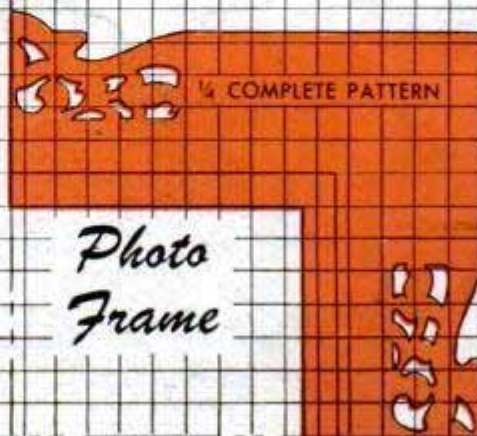
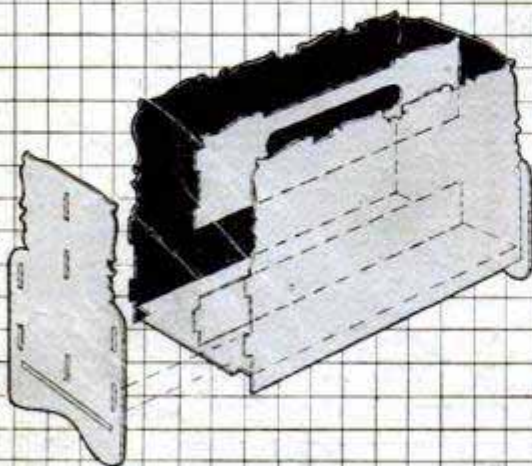
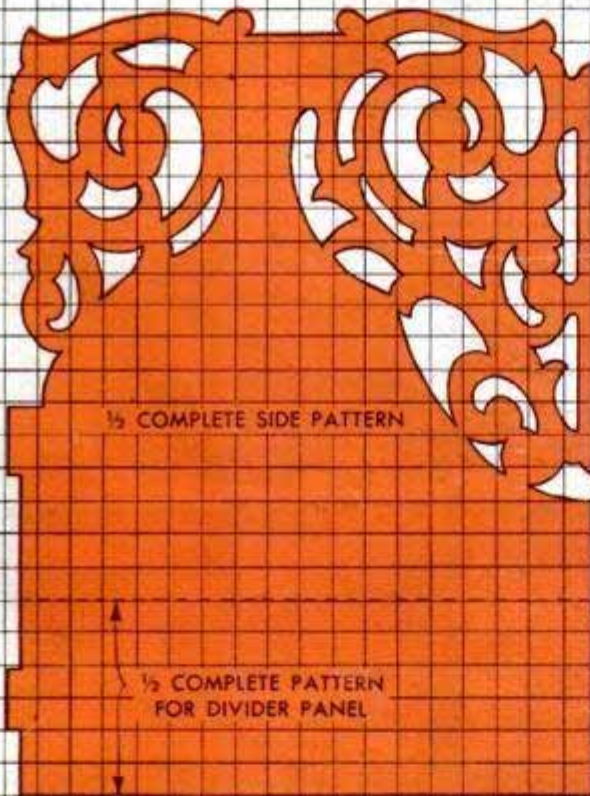




1/2 COMPLETE
PATTERN FOR
HANDLE



Magazine Rack



*Photo
Frame*

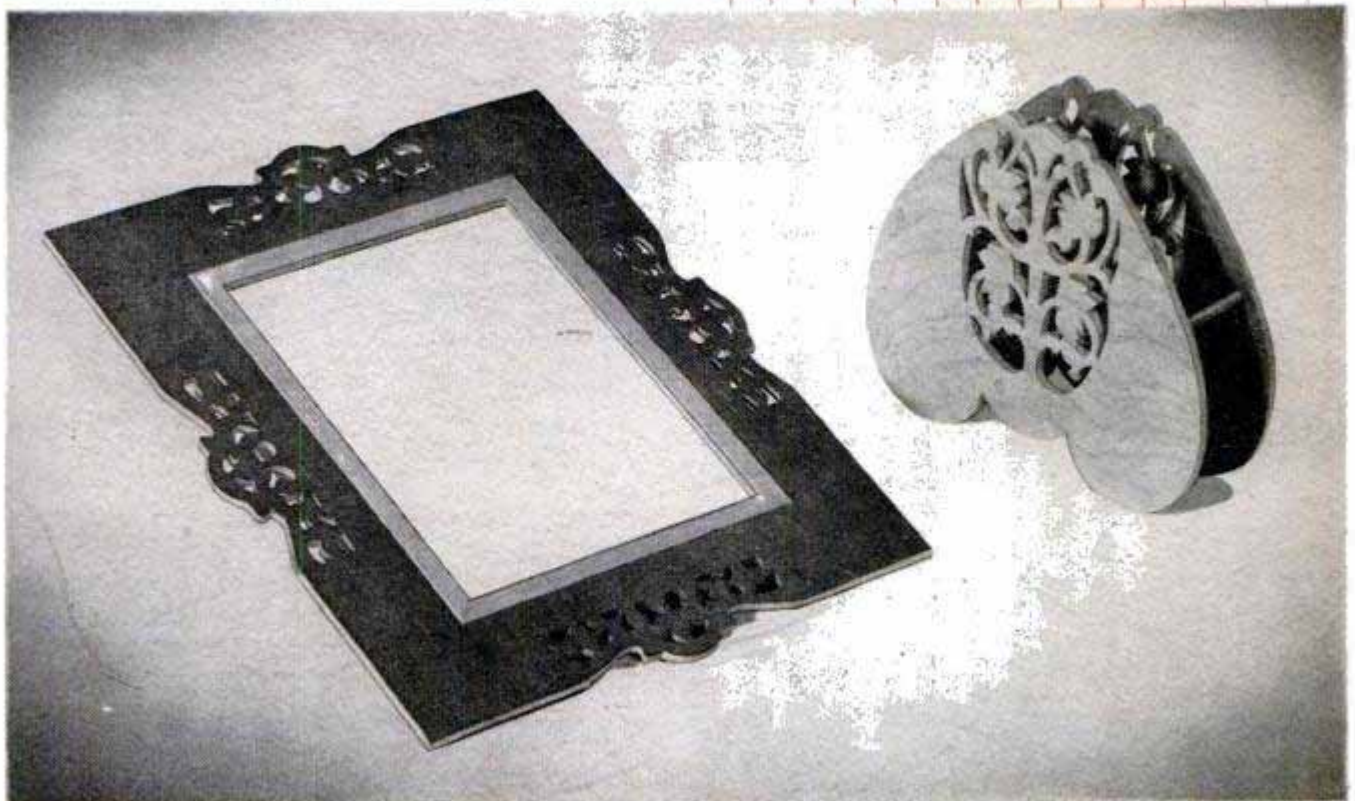
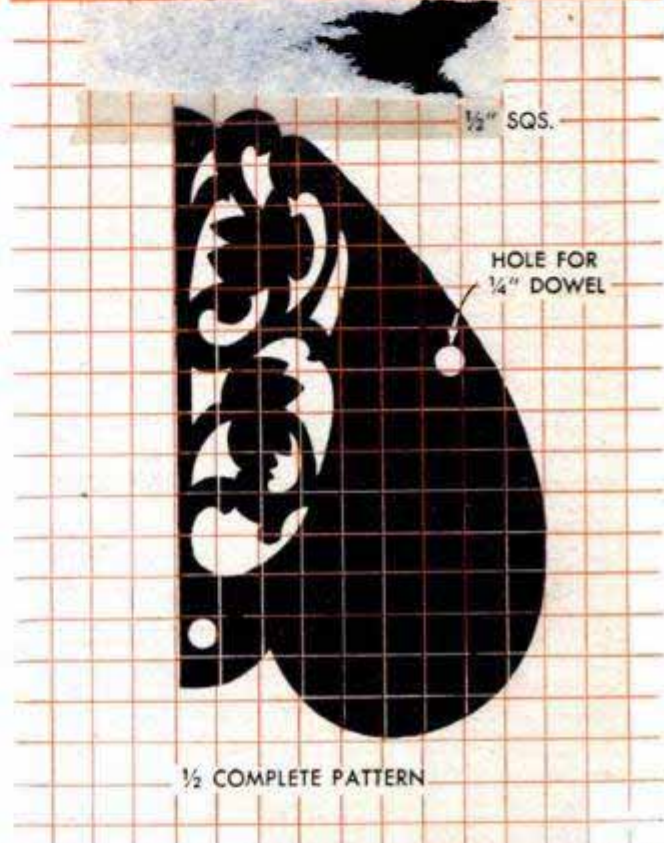
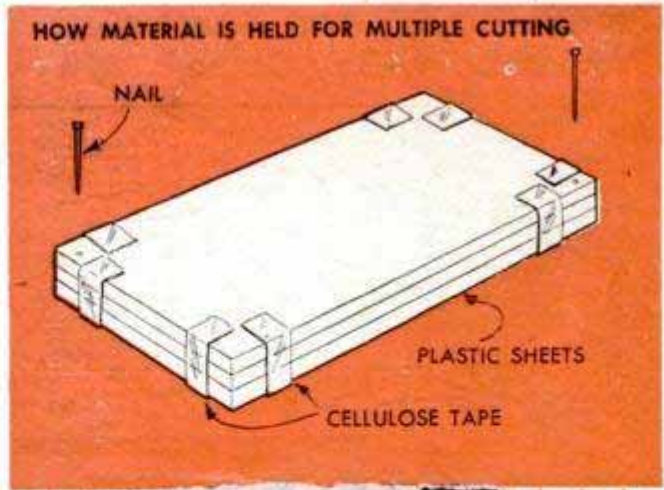
half-lapped joint at the center and are held in position with a notched spacer disk. The wall-bracket flower holder is simply a scrolled panel fitted with a plastic bracelet ring. The latter is fastened to the panel with two countersunk screws, the holes in the plastic being drilled slightly undersize so that the screws will tap the plastic as they are driven.

The magazine rack is made of $\frac{1}{4}$ or $\frac{3}{8}$ -in. plywood and assembled as in the lower left-hand detail on page 154. Note that the tabs in the side members are pinned in the slots in the endpieces with brads driven through the edges of the endpieces.

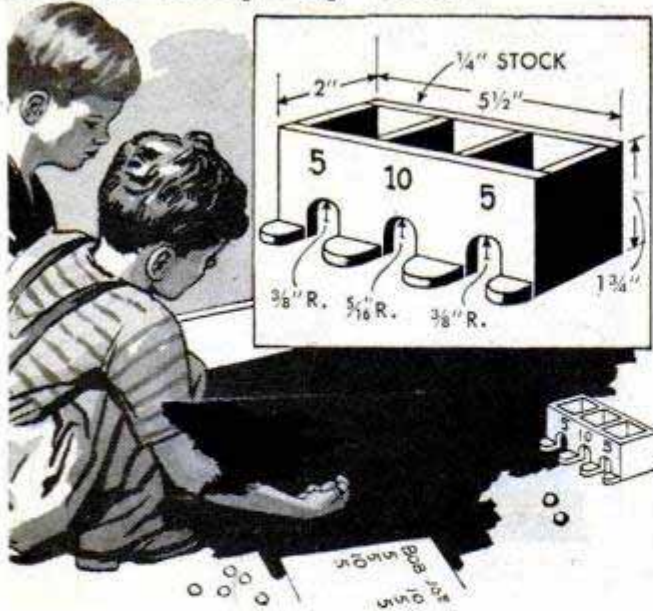
Plywood, overlaid with a $\frac{1}{2}$ -in. border of veneer around the center cutout, is used for the picture frame shown below. Glue the veneer in place before cutting out the center of the frame, as this will serve as a guide for the saw blade. Add four strips of $\frac{1}{2} \times \frac{3}{4}$ -in. stock to the rear of the frame, spacing the strips around the center cutout about $\frac{1}{2}$ in. from its edge. After inserting the glass, picture and backing, drive a few brads into the strips against the backing. The plastic frame shown in the color photo is simply a jigsawed panel, the glass and picture being held with cellulose tape.

Attractive napkin holders may be jigsawed from plywood or plastic according to the squared pattern at the right or similar to the one pictured on page 152. The sides of the holders are joined with four $\frac{1}{4}$ -in. plastic or hardwood dowels which are located to form a trough for the napkins. ★ ★ ★

Picture frame of $\frac{1}{4}$ -in. plywood is overlaid with contrasting veneer border. Either plywood or plastic is used for distinctive napkin holder to right of frame



Partitioned Box and Marbles Provide Rainy-Day Game

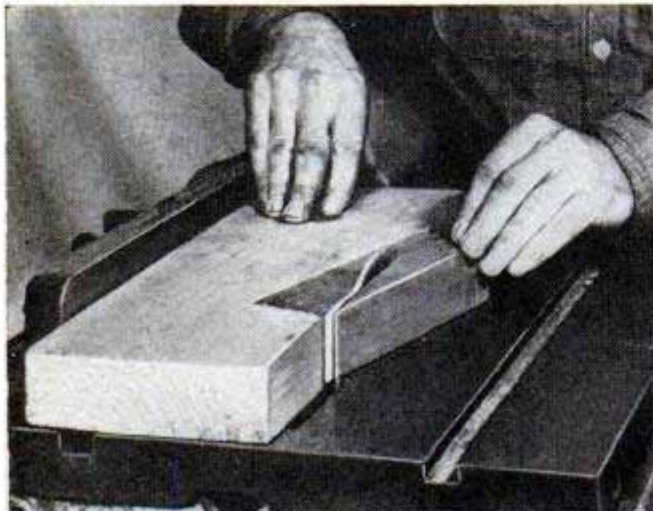


Here is a marble game assembled from scrap wood that children can enjoy indoors on rainy days. A box of the dimensions shown in the illustration is put together with glue and nails. It then is stained or painted and numerals placed above the three openings for scoring purposes. The game is scored by rolling glass marbles into the openings in the box.

I. M. Fenn, Chicago.

Cutting Wedges on a Power Saw

The difficult job of cutting wedges accurately on a circular saw is simplified with this jig, which will enable you to cut wedges that are perfectly true. The jig consists of a piece of 2 x 6 about 2 ft. long. The shape of the desired wedge is cut in one edge of the jig, after which the blocks from which the wedges are to be cut are placed in the jig and run across the saw as pictured. If you want both wedges to be exactly alike, don't forget to allow for the thickness of the saw blade when cutting the jig. In use, the jig is placed be-



tween the saw and the rip fence, allowing just enough space for the jig to clear the saw. Blocks from which the wedges are to be cut should be prepared beforehand, after which each one is run over the saw.

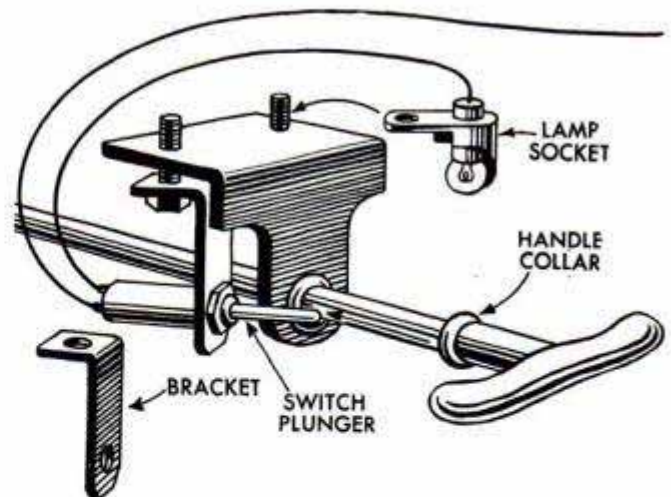
Michael Ligocki, Gary, Ind.

Oil Drum Aids Removal Of Tree Stump

One way of removing a tree stump quickly is by placing over it an old oil drum having both ends removed, after which dry grass, twigs and branches are piled around inside and then ignited. Kerosene may be poured over the fuel if desired to hasten burning. If the drum rests flat on the ground, as when burning a small stump with roots unable to support the drum off the ground, holes must be cut around the bottom edge to provide the necessary draft. When burned continuously, stumps treated in this manner usually are charred sufficiently within 48 hours to allow removal with an ax and spade.

Signal Light Warns Driver When Parking Brake Is Set

The nuisance of inadvertently driving with the parking brake on is eliminated by this neat and practical warning light. As soon as the driver turns the ignition key the light reminds him the brake is on. The items needed to assemble the light are a small automobile plunger-type switch, a socket, a 6-volt bulb and a bracket. The switch is held by the bracket which in turn is fastened to the parking-brake bracket at

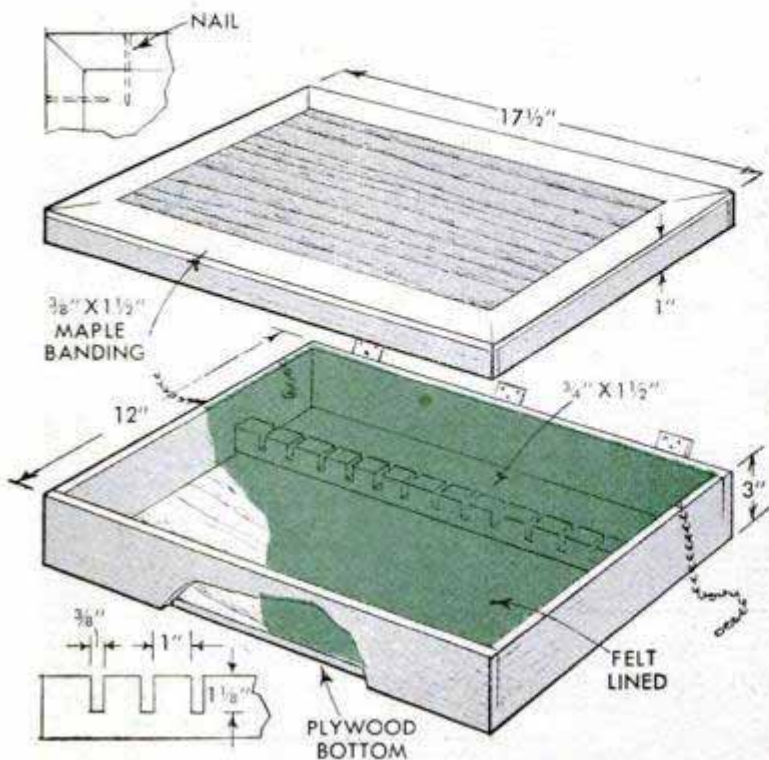
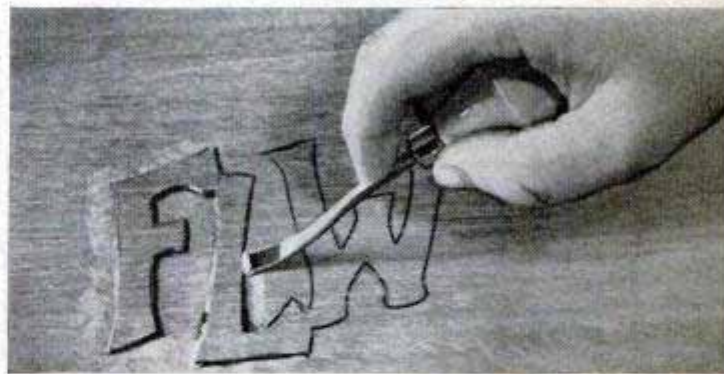
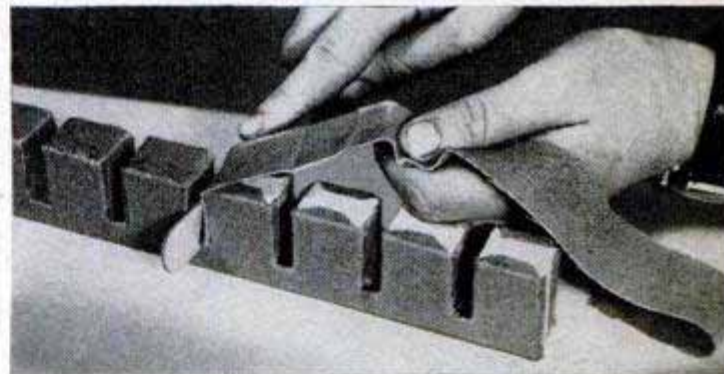


an angle so that the brake handle strikes the plunger when brake is released. When the brake is pulled to the "on" position, the plunger is released, lighting the bulb. The light also is mounted on the parking-brake bracket. The switch is wired into the ignition circuit on the "cold" side, or side that carries no current when the ignition key is turned off.—Otto Merker, Chicago.

SILVERWARE CHEST

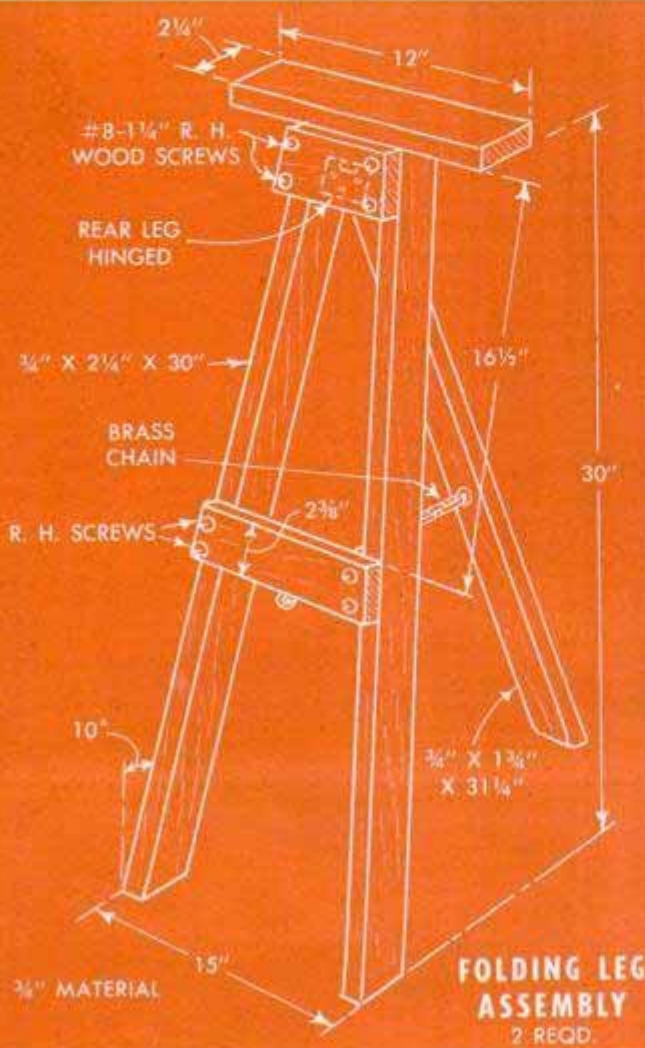
By Elma Waltner

AN ATTRACTIVE chest for fine silverware, with carved initials to add to its custom appearance, is an interesting project for the home craftsman. The chest accommodates service for 12 and is made of contrasting woods, such as maple and mahogany. Box and lid are $\frac{3}{8}$ -in. solid stock, while the bottom is plywood fitted between the sides of the box. Strips of maple mitered at the corners serve as the lid border. Small holes are drilled at intervals through the width of these strips to permit driving finishing nails edgewise through the strips into the centerpiece. The holes are put-
 tied before finishing the lid. Assemble the box with glue and finishing nails and sand thoroughly. Trace the monogram on the lid and make an outlining cut $\frac{1}{16}$ in. deep around the letters. Use a curved carving chisel to work down the background around the monogram. Narrow slots are cut in the center divider. Felt or velvet lining is held in place by a light application of glue. Note that 14 pockets are sewn to the lid lining before it is glued. Apply paste wood filler to the mahogany parts and finish with varnish.



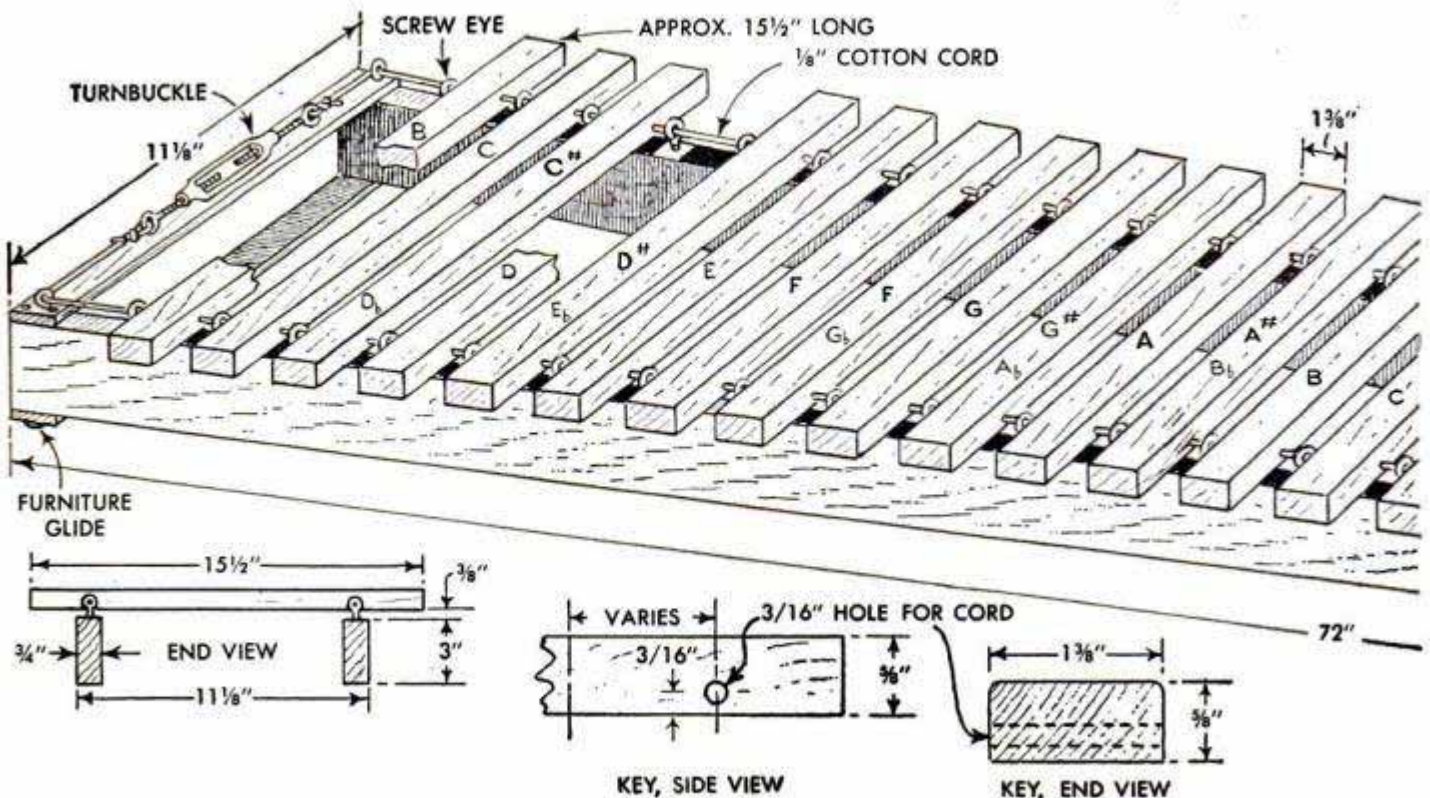
PLAYROOM XYLOPHONE

By Walter E. Gustafson



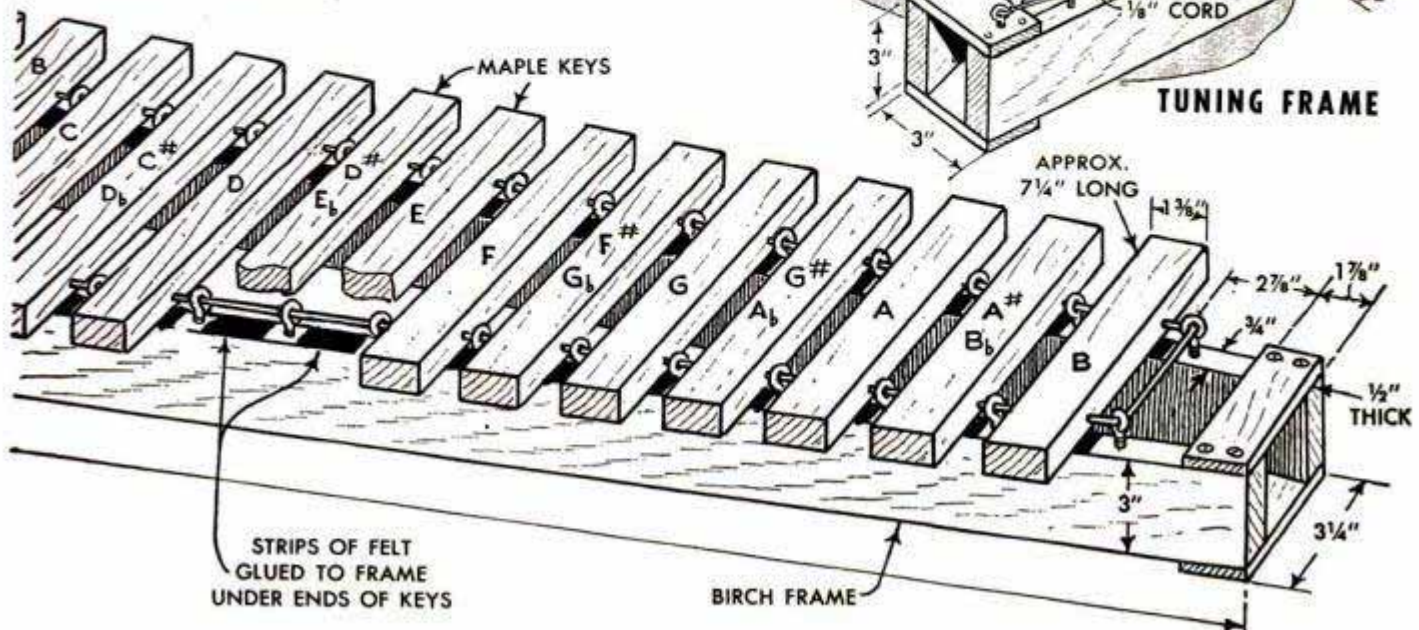
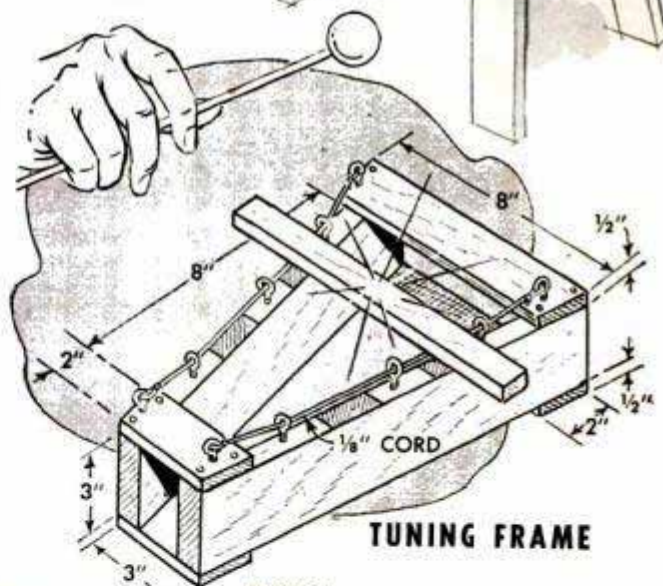
BUDDING YOUNG ARTISTS with musical leanings will have plenty of fun with this xylophone—especially when dad builds it in his basement workshop. It's not intended for professional use or advanced musical reproduction, but it does provide a means of acquiring manual skill and training for young ears in recognizing the notes of the musical scale. The keyboard includes two complete octaves, B to B, and all keys are located on one frame. Building the collapsible leg units and the keyboard frame requires only simple "sawhorse carpentry," but assembling and tuning the keys call for more time and care. The keys are ripped to the exact sectional size given, but are cut only to approximate lengths from the shortest to the longest. Use selected birch which is dry, straight-grained and sound. Each key must be tuned separately with a pitch pipe, and to do this make the tuning frame detailed on the opposite page.

Then make two hammers, or mallets, by drilling 1/4-in. holes in 1-in.-dia. wooden balls. Fit 12-in. lengths of 1/4-in. dowel as handles. Locate and drill transverse holes through all the keys as in the side view below. Place each key on the tuner as in the detail and rap it lightly with the mallet. Trim the end of the key about 1/32 in. and test again. Continue in this manner until the tone is true with the pitch pipe. Keep





the keys in order as they are tuned. There will be some variation in response in keys cut from the same piece of stock, and in some instances it may be necessary to make substitute keys which may be trimmed and tuned to the pitch required. If you take off too much stock when tuning, lay the key aside and use it for the next higher note. When all keys have been tuned, they are strung one by one on a cord running through screw eyes turned into the frame. Join the ends of the cord with a small turnbuckle so that proper tension of the cord can be maintained. Glue strips of felt to the top edge of the frame underneath the ends of each key. ★★★



Curtain for Show in Home Hung With Safety Pins

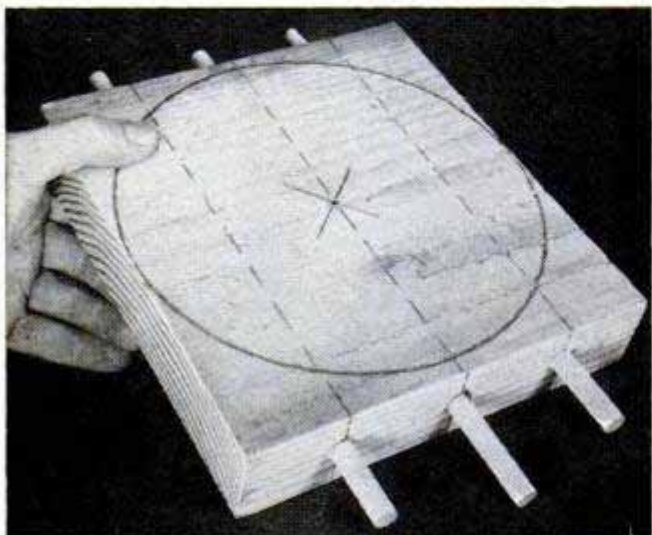


Whenever children get the urge to put on a show indoors, you can forestall the appropriation of most of your shower-curtain hooks for hanging an improvised curtain by supplying them with several dozen large safety pins. The pins may be strung on a supporting wire through the eyelets in the coiled ends and then pinned to bed sheets or light blankets.

William Crouch, Eddystone, Pa.

Dowels Keep Wood From Splitting When Bandsawing Wheels

When cutting out large wooden wheels for lawn furniture, as well as work of a similar nature, I found that the wood has a tendency to split occasionally. After some experimentation, I discovered that this can be overcome to a great extent by drilling holes through the stock and inserting dowels as shown. A long electrician's drill is



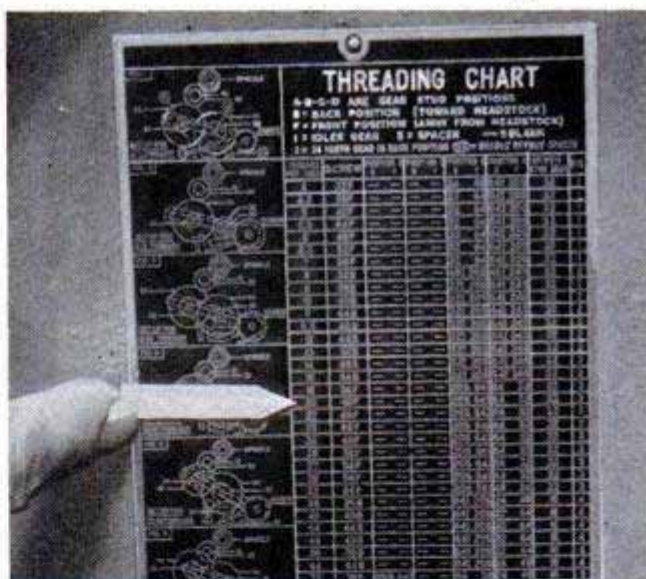
used for making the holes, after which $\frac{3}{8}$ -in. dowels, which I found most suitable for 2-in. stock, are glued in place. When the glue dries, the stock is cut on a bandsaw and, after any irregularities around the ends of the dowels have been filled with wood putty, sanded smooth.

Refinishing Marred Furniture

A professional-looking refinishing job can be done on scratched furniture by using pigmented touch-up stain. First, sand the piece very lightly with 4/0 sandpaper. The purpose of this is to roughen the old finish so that the new finish will adhere properly. After dusting, apply the stain which is available at most paint stores. Then wipe off the stain immediately with a clean, dry rag and apply one or more coats of good clear varnish or clear shellac, allowing time for each coat to dry hard. To produce a rubbed, satinlike finish, saturate a rag with furniture polish and go over the entire surface. Sand lightly to remove dust nibs, using very fine sandpaper dipped in oil to prevent scratching. Lastly, remove the excess oil with a soft, dry cloth.

Francis Henry, Pottsville, Pa.

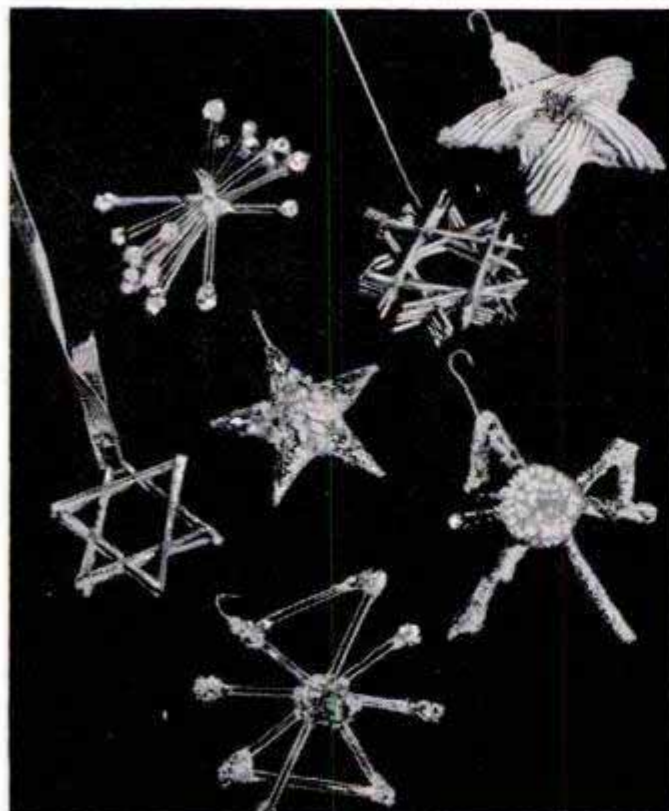
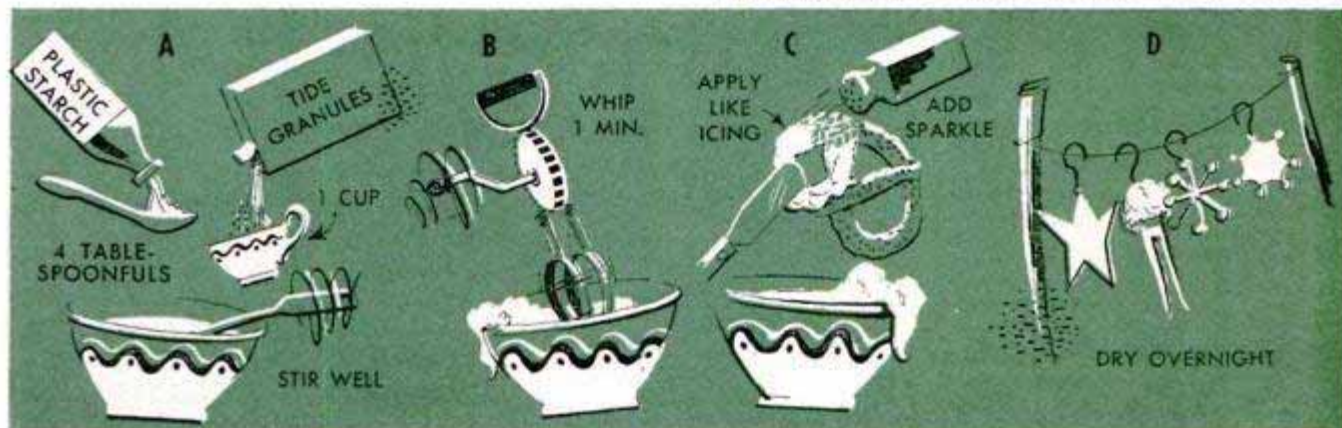
Tape Marker on Threading Chart Indicates Lathe Gear Setting



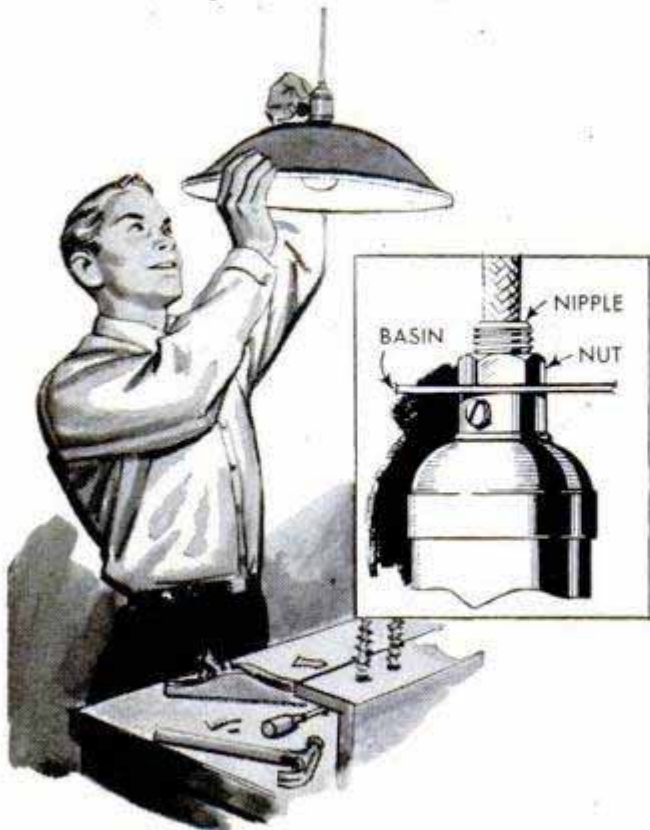
When getting ready to use a lathe fitted with change gears, an operator frequently has difficulty recalling what thread-cutting or carriage-feed setting the lathe is geared for. This usually requires the time-consuming job of checking the gears with the threading chart. One way of eliminating this problem is to place an adhesive-tape marker at the proper point on the threading chart when the gears are set, thus making it possible later to tell at a glance how the lead screw is geared the next time the tool is used.—R. Hanscom, Elmhurst, Ill.

Make Your Own TREE ORNAMENTS

IF YOU'RE TIRED of trimming the Christmas tree with the same ornaments year after year, you will find these Tide-covered novelties a refreshing change. The ornaments are made by coating a variety of common items with a mixture of Tide and plastic starch as described in the sequence A to D, below. Best results are had by applying the mixture when the humidity is low so the ornaments will dry quickly. The icing will keep for several days in a covered container. Use such items as clothespins, pipe cleaners, drinking straws, cardboard cutouts, pretzels and nuts for basic props and cover the icing with sign-maker's glitter or paint with fingernail polish. Various types of trim, such as silver or gold dust, sequins, beads, ribbons and rhinestones should be collected before icing the props.

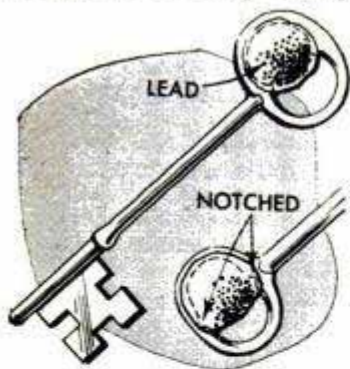


Reflector for Workshop Light Provided by Wash Basin



An old wash basin, having a hole punched or drilled in the center for installation of a socket and hung in an inverted position, will provide an ideal reflector for a drop-light over a workbench or table. The detail indicates how the socket is held in position by means of a nut and a short, $\frac{1}{8}$ -in. pipe nipple.—A. E. Fenn, Chicago.

Weighted Key Stays in Door Lock



Keys of mortised door locks are less likely to be dislodged if the handle ends are weighted. To do this, a small round piece of lead such as a split-shot fish-line sinker is peened into the handle to serve as a weight. Thus weighted, the key is off balance and will stay in place even when the door is slammed.

Thomas Trail, Catonsville, Md.

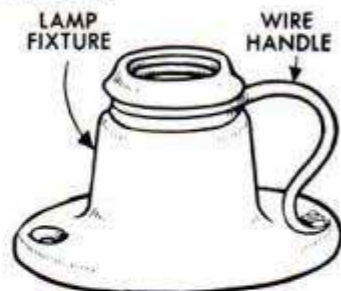
Improvised Frozen-Food Containers

Both quart and pint-size milk cartons can be put to good use as packages for home-freezing food. The staple which fastens the top of the carton is removed and the carton filled with the food to be frozen. Then the top is folded back along the origi-

nal creases to close it tightly, and the carton tied with a single wrapping of strong string.
John Krill, North Lima, Ohio.

Emergency Candleholder From Old Light Fixture

A porcelain lamp socket of the type shown can be converted to an excellent candleholder for emergency use. Remove the chain and wrap one end of a piece of stiff wire around the neck to serve as a handle. Fasten the free end of the wire to the socket with a small machine screw, first forming an eye in the end and passing the screw through a mounting hole in the socket.

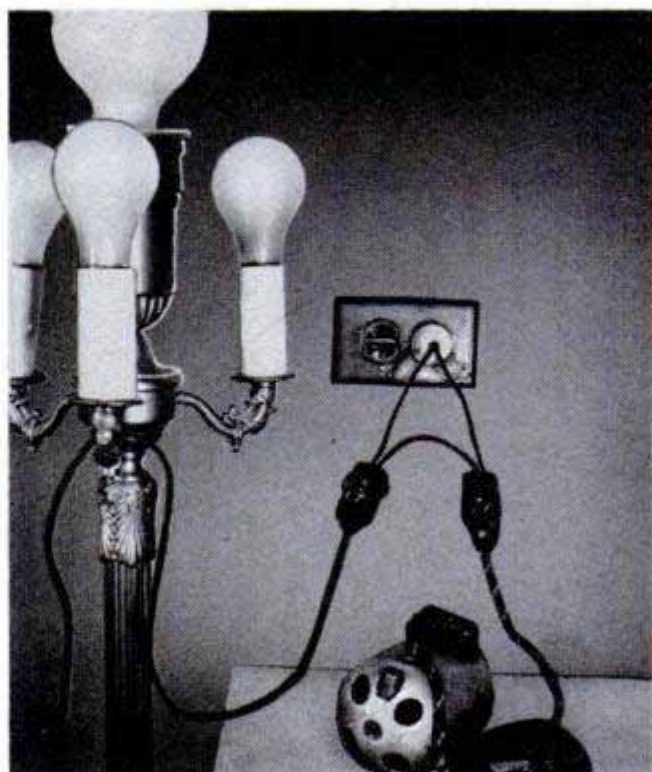


Frank Shore, New York City.

Floor Lamp Wired Into Circuit Produces Electrical Tester

For occasional electrical tests, a floor lamp can substitute for a bank of lamps. Most floor lamps have three stages on the center bulb and switches for turning on one, two, or all three of the side lamps as well. By using two 50-watt and one 25-watt side bulbs in conjunction with the center bulb, current values up to 425 watts, in steps of 25 watts, can be set up. Above this total, larger bulbs should be used in the side sockets. The wiring harness shown will put the lamp in series with the device to be tested.

Keith Heryford, Cedarville, Calif.

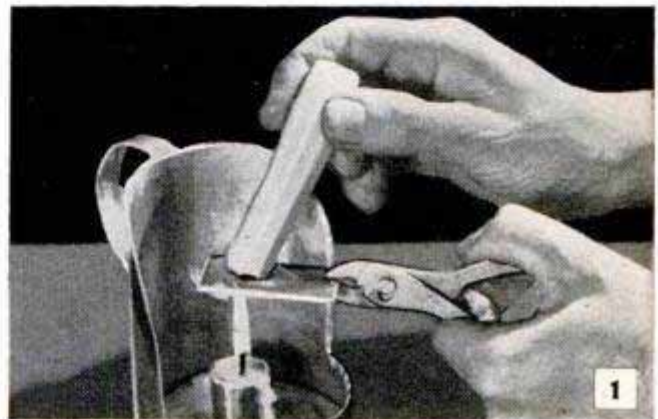


Make Fido a DOG TAG

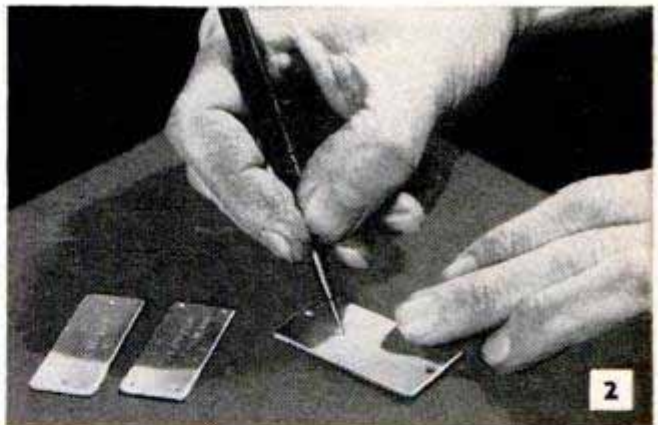
By Walter E. Burton

ETCHED identification tags for dog collars, and name plates for luggage and sports equipment, can be made with sheet metal and materials usually found in the home. Plates are cut from 14 or 16-ga. aluminum, copper or brass. The blank tag is shaped and polished with fine abrasive cloth. Then the polished side is coated with a thin layer of candle wax. Wax from candles containing beeswax adheres to the metal best. Scribe the outline of letters to be etched, cutting through the wax to the metal, then widen the lines and work in details. Use a soft brush to remove wax particles. Put the tag, waxed surface up, in a dish and cover the scribed characters with etching fluid, confining the liquid to a pool on the waxed plate. Etching acid for aluminum is a strong lye solution. For copper or brass, a solution is made by slowly adding 1 part concentrated nitric acid to 3 parts water. The time required for etching varies so that limits cannot be given, but tags in the photos were etched in 30 min. Bubbling of the solution on the scribed lines indicates its action on the metal. When the pool is covered with bubbles, draw it off with a dropper and replace with a fresh solution, several changes being necessary to complete the job. After etching, rinse plate thoroughly in clean water and warm it to permit wiping off the wax. To make the letters more prominent, they can be filled with a pigment. Aluminum tags require no other finishing. For copper and brass, polish and then coat with clear lacquer.

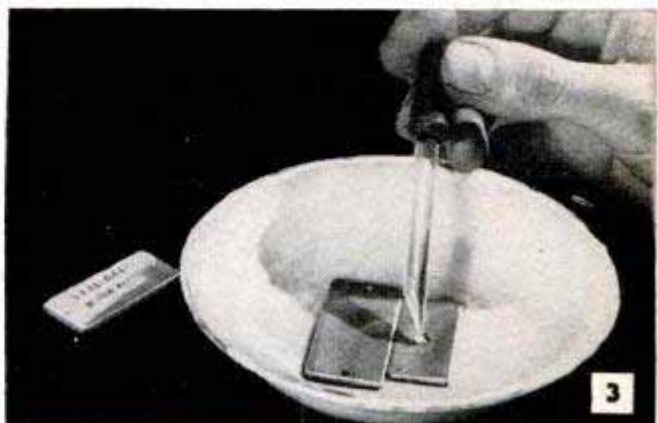
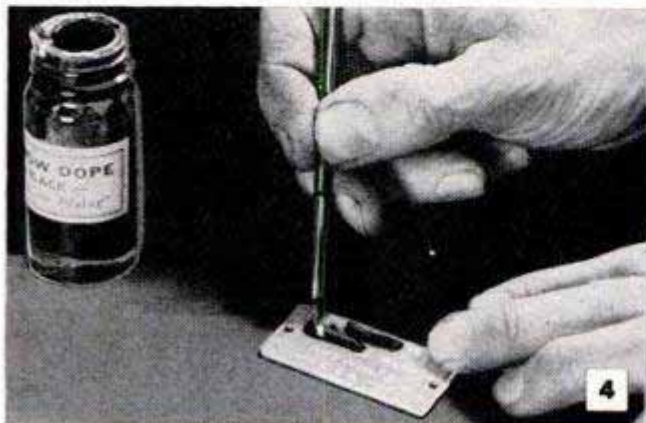
To make lettering more prominent, black lacquer may be brushed into letters. Lacquer remaining on surface is removed with abrasive cloth after drying



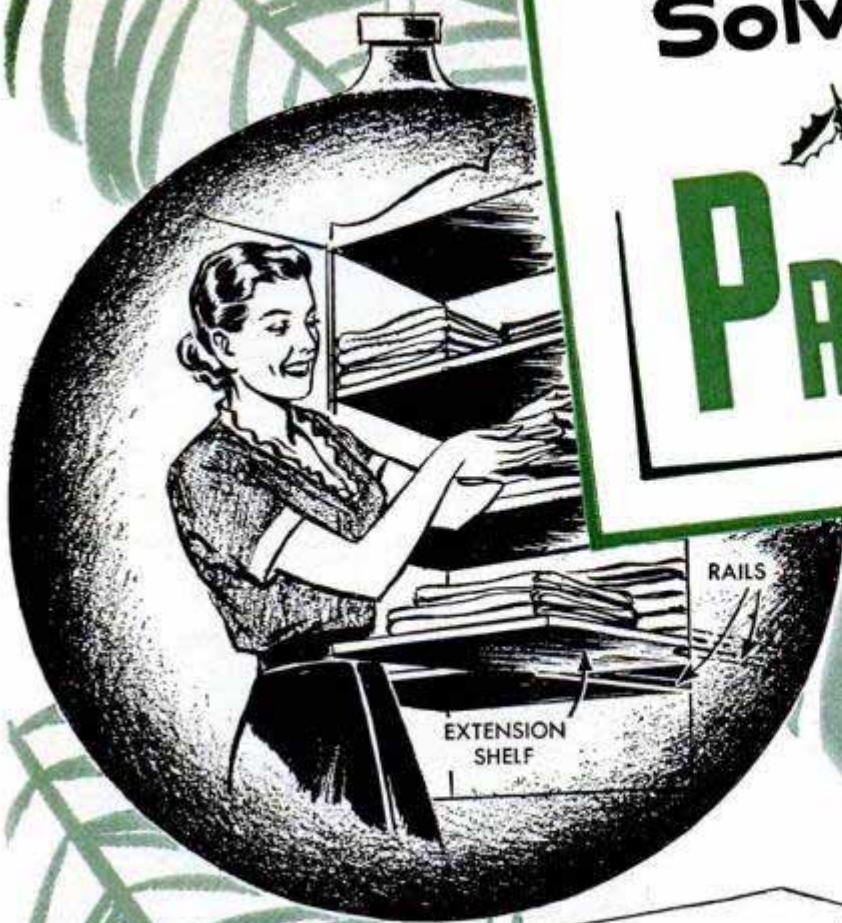
Tag is heated while wax is applied to warm surface



Scriber used above is phonograph needle in automatic pencil. Below, medicine dropper is used to apply etching solution to the waxed surface of the plate

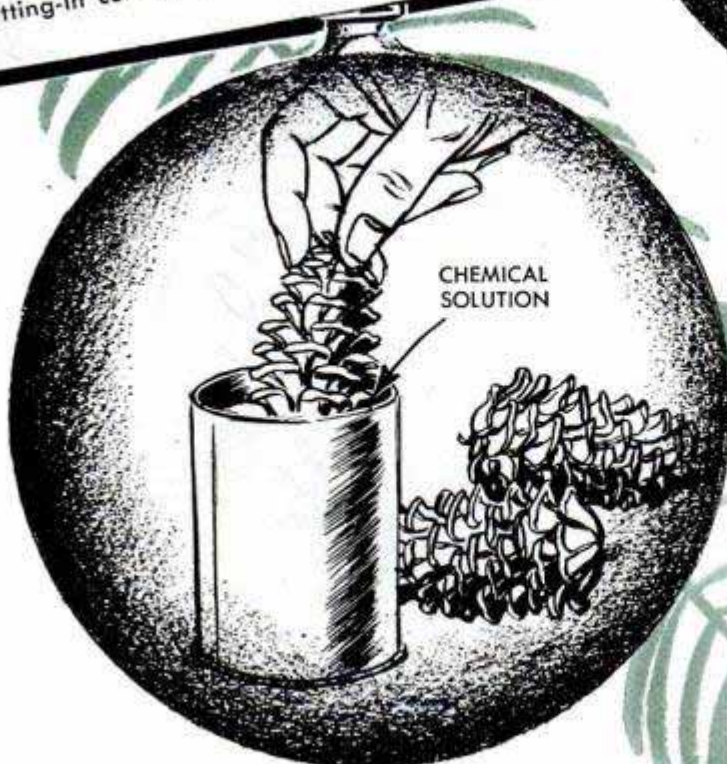


Solving HOME PROBLEMS



EXTENSION SHELF IN LINEN CLOSET forms convenient place to stack freshly laundered linens for sorting. Extension panel slides on cleats fastened to closet wall and underside of a fixed shelf

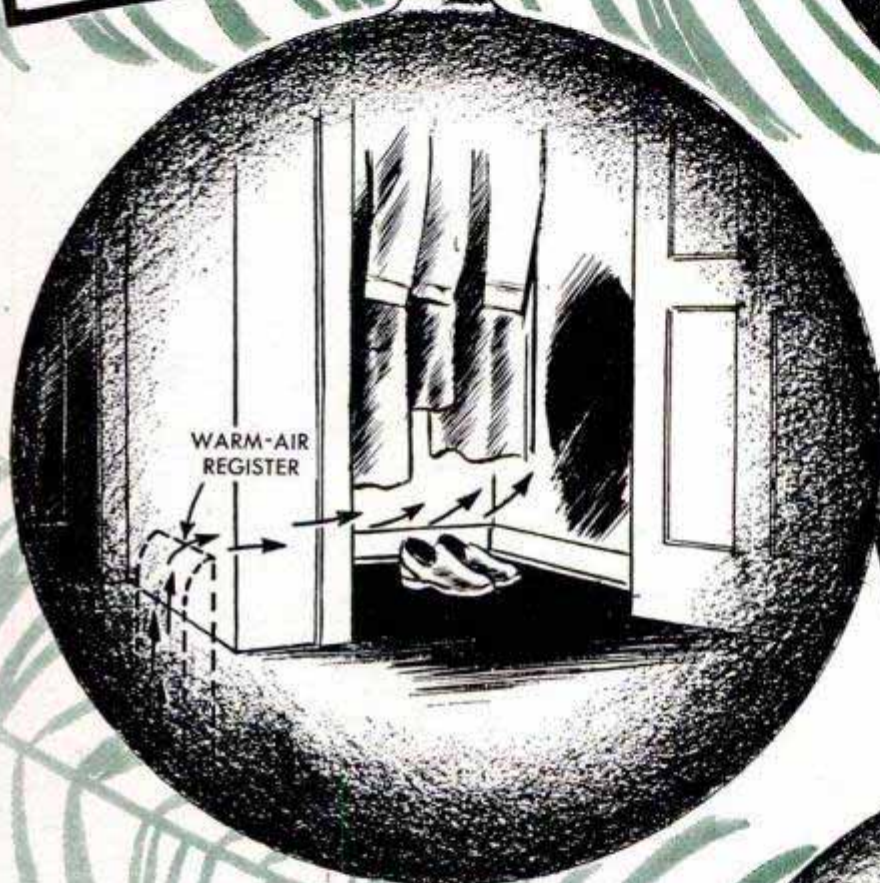
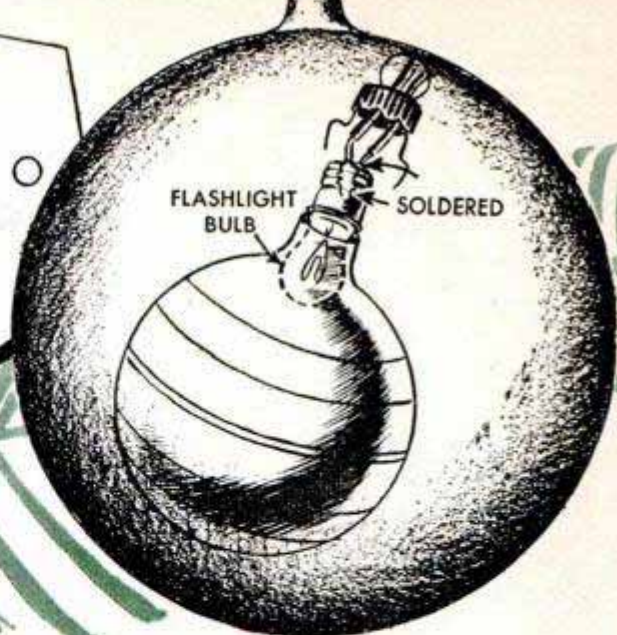
TRIMMING ENDS OF WORN BRISTLES at a 15-deg. angle transforms old paintbrush into an excellent sash brush. By tapering bristles to a chisel edge, cutting-in corners of window sash is no problem



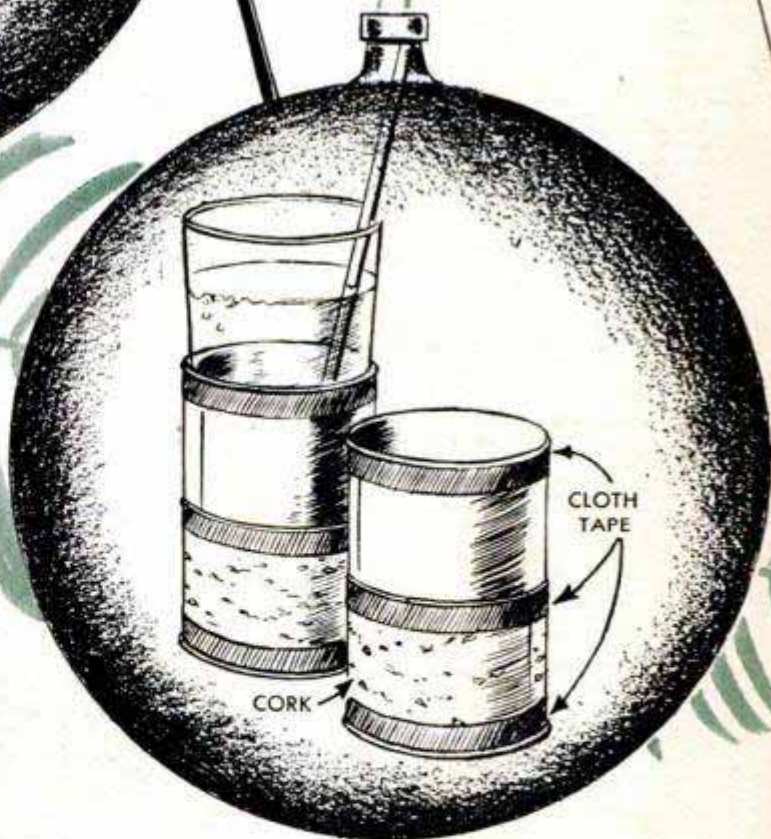
SOAKING PINE CONES in chemical solutions produces colored flames when cones are burned in fireplace. Dry cones thoroughly, soak in chemical and allow to dry before burning. Strontium nitrate produces red flames; barium nitrate, apple-green; copper nitrate, emerald green; calcium chloride, orange; potassium nitrate, yellow; potassium chlorate, violet; lithium chloride, purple

ILLUMINATED CHRISTMAS-TREE DECORATIONS are made by fitting glass ornaments with flashlight bulbs. Wired as shown at the right, 6 to 10 bulbs are connected in series to a standard doorbell transformer

WARM-AIR REGISTER installed in guest closet, below, dries and prewarms garments for winter comfort. Use 4 x 6-in. register and leave 1/2-in. clearance at bottom of closet door to permit circulation of warm air

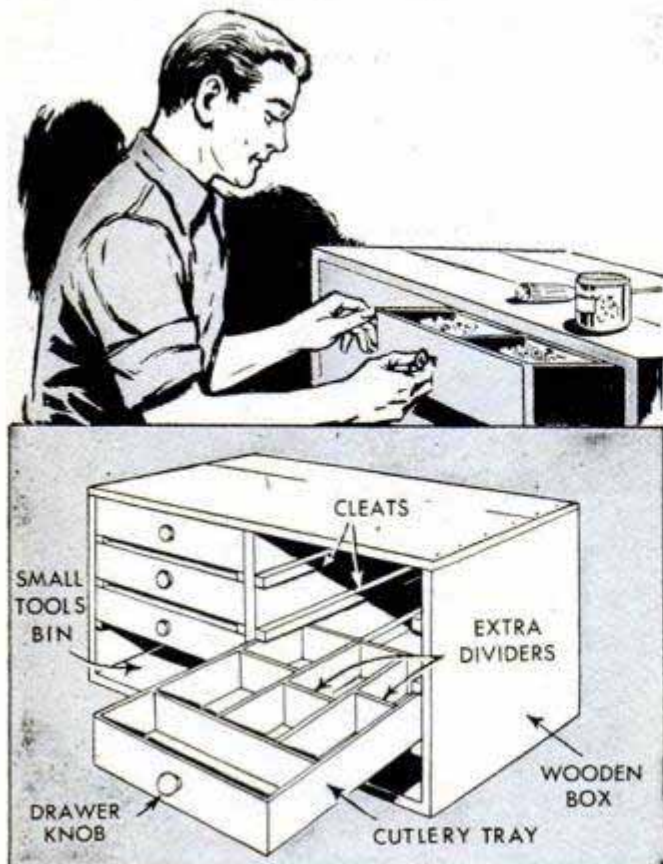


ATTRACTIVE COASTERS below, are made by partially covering tin cans with sheet cork and decorating them with colored cloth tape. Top is removed from can with rotary opener and burr filed off. Outside of can is rubbed with steel wool and polished before applying the cork



CLEAN SHOEBRUSH is excellent for polishing or dusting beaded, carved or fluted portions of furniture, as the bristles reach into narrow depressions that an ordinary polishing or dust cloth would miss

Cutlery Trays Provide Drawers For Small-Parts Cabinet



Constructed from scrap materials and virtually "built around" a number of wooden cutlery trays that provide ready-made drawers at small cost, this practical workshop cabinet will come in handy for storing screws, bolts and other small parts. An orange crate or other wooden box from a local grocer serves as the cabinet itself. Either a single or double row of trays may be installed in the cabinet, depending on whether the box is used on its side or in an upright position. Drawer slides are formed by nailing cleats to the center partition and the ends of the box, and if desired, space may be left at the bottom of the box for storing hand tools. The glued joints of the trays should be reinforced by nailing and the separators also should be nailed in place. To complete the job, drawer knobs are added to the trays and the entire cabinet painted.

Edward J. Speer, Southport, Conn.

Repairing Loose Doorknobs

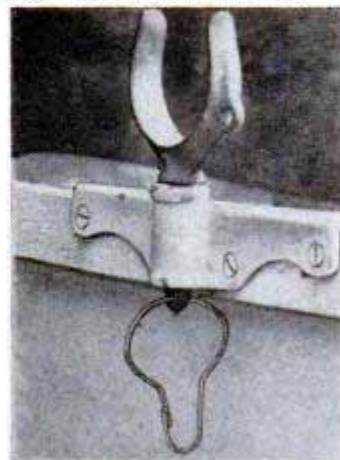
When a doorknob of the screw-on type will not stay tight, the usual trouble is that the threads have become worn and the setscrews no longer will hold the knob. To repair them economically, take out the original setscrews and replace with socket-head setscrews. Then assemble the knobs on the door and tighten the setscrews so that they will mark the shaft. Now remove

the knobs and make a deep center-punch mark in the center of each of the marks formed by the setscrews. Then reassemble the knobs, making sure the screws are tightened over the indentations in the shaft.

William Macklin, Serath, Sask., Can.

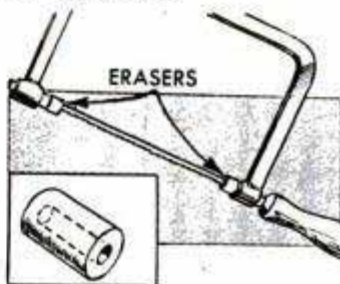
Oarlock Secured by Curtain Hook

Common shower-curtain hooks can be used effectively to secure oarlocks in their sockets. They snap out quickly when you desire to remove the oars from the boat, and provide a convenient loop for attaching stringers of fish to the boat.



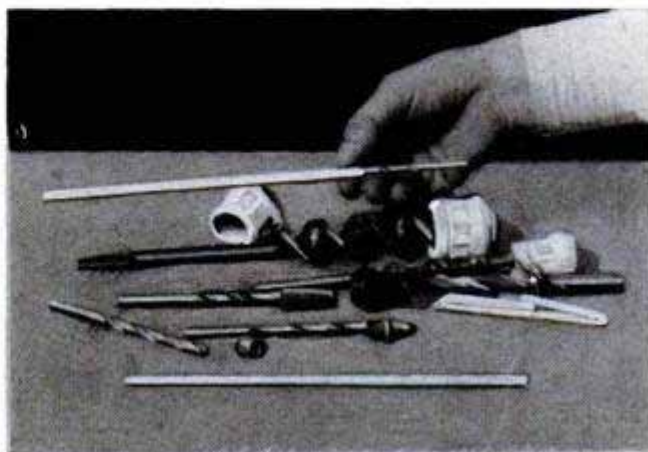
Eraser "Bumpers" on Coping Saw Protect Work From Chucks

When cutting thin stock with a coping saw, you can lessen the possibility of marring the work with the blade chucks if rubber "bumpers" are placed at each end of the blade. Simply drill holes lengthwise in two pencil erasers and slip them over the ends of the saw blade as shown.



Protecting Ends of Drill Bits

To protect the cutting ends of drill bits stored in a toolbox or drawer, one carpenter simply slips rubber crutch tips over them. The tips, which are available in assorted sizes, may be purchased in almost any hardware or ten-cent store. Rubber slip-on erasers are ideal for drills in small sizes.—Andy Vena, Philadelphia, Pa.





Custom-Make Your **HUNTING KNIFE**

WHEN PREPARING for long and difficult trips afield, hunters, trappers and explorers often discard other less essential equipment in favor of the all-purpose hunting knife. An experienced camper alone in the woods would rather lose his tent than the hunting knife in his belt sheath. He can get along without the former; the latter is indispensable.

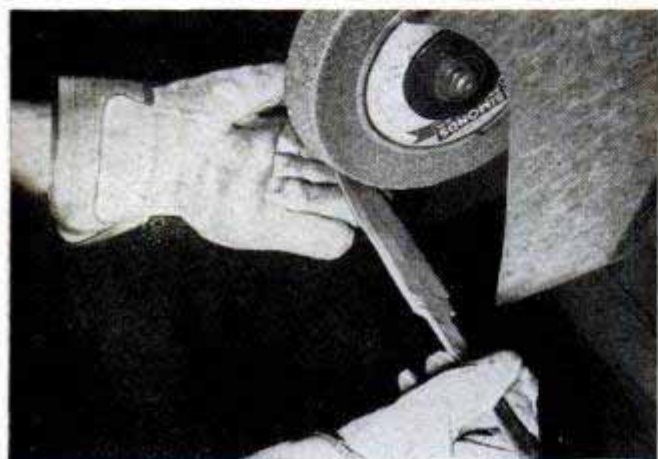
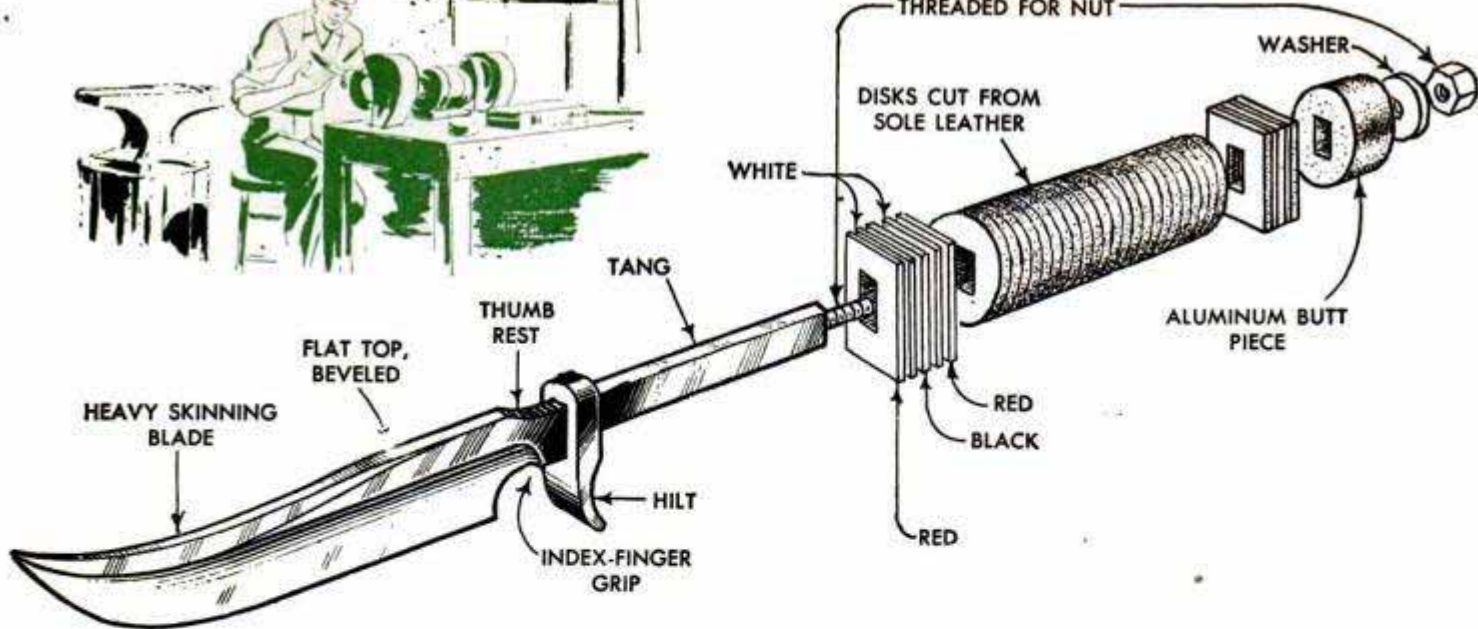
Although knifemiths usually select Swedish steels because of their stability and extremely fine grain, for the finest hand-forged custom blades, you can make a reasonably good hunting knife from a large mill file. Probably the next best material is an oil-hardening tool steel, as it has a better response to tempering and a more uniform soundness of structure than does the average file.

Photos on these pages showing the essential steps in knife making were taken in the workshop of W. D. Randall, noted knifemith who began making knives as a hobby and now is in the business of hand-forging them in various styles that class among the finest made. In the photo above Randall-made knives are shown in styles



Above, one of the first steps in making a knife is heating the blank in a blacksmith's forge. Below, after heating, the blank is hammer-forged on an anvil to draw the blade to the rough form for grinding





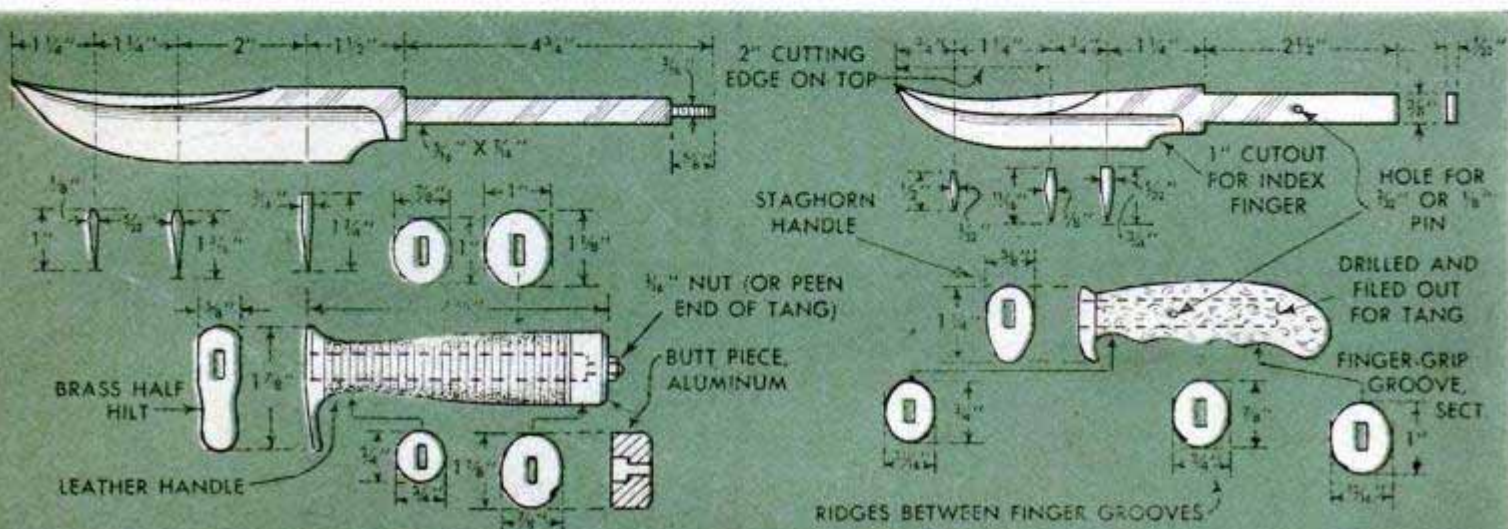
Above, rough-grinding the blank on a coarse emery wheel. Below, polishing blade on stitched cloth buff



and blade lengths suitable for all purposes.

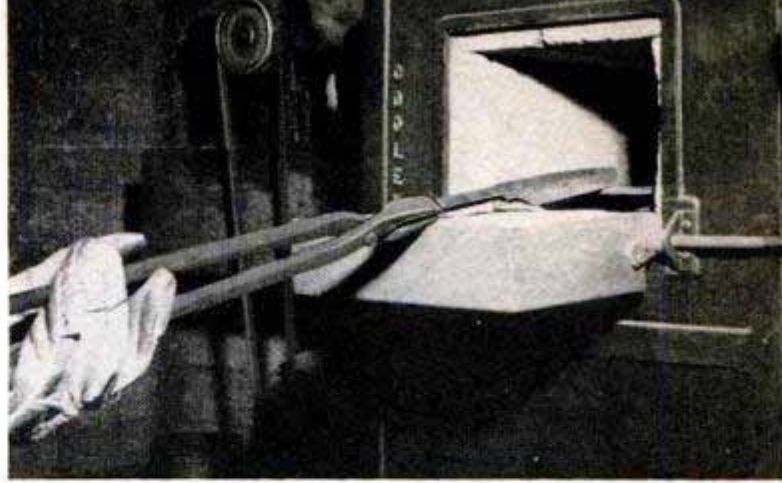
In making a blade in any of the three styles detailed below, the blank is first ground to form the tang to sectional size and to shoulder the offsets for the hilt. If a file is used, it ordinarily is annealed before grinding. Then the rough is heated to a cherry red in a blacksmith's forge (heating also can be done in a coal-burning furnace) and hammer-forged on an anvil as in the lower photo on the preceding page. Forging in this manner draws the bevels to the rough shape and gives an edge thickness of about $\frac{1}{32}$ in. Then the blade and tang are finished to exact size by freehand grinding on a coarse wheel as in the upper photo at the left. The edge bevels are ground to form a cutting edge and the narrow back bevels are ground in to shape the blade to contour. This operation requires extreme care to get the lines of the blade ground true. Note that in the photo the operator is wearing heavy leather gloves to protect his hands from injury. He also wears industrial-type goggles.

Next the blade is hardened by heating it cherry red and immersing instantly in tempering oil. On some steels it is necessary to repeat this process in order to equalize internal stresses. Use low heat in succeeding steps—about 450 deg. When properly



tempered the blade appears a straw-blue color and can be cut with a file. From this point on, special care must be used to avoid drawing the temper. True the bevels by slow, light grinding on a medium-fine wheel, checking the results continually by eye until all surfaces of the blade show a true reflection when viewed in oblique light. Before honing and buffing, the reflections will be rather dull, but they will enable you to spot irregularities in the surfaces. While grinding the blade to final contour, true up the tang and fit the hilt and butt piece. In the knives pictured and detailed, the hilt is of brass and the butt piece of aluminum. The hilt is filed to the rough shape before fitting to the tang. Final finishing of the blade is done on a hone as in the lower right-hand photo, and the fine scratches left by the final grinding are removed by buffing on a stitched buff as in the lower photo on the opposite page. The buff should be charged with polishing rouge of the type specified for steels.

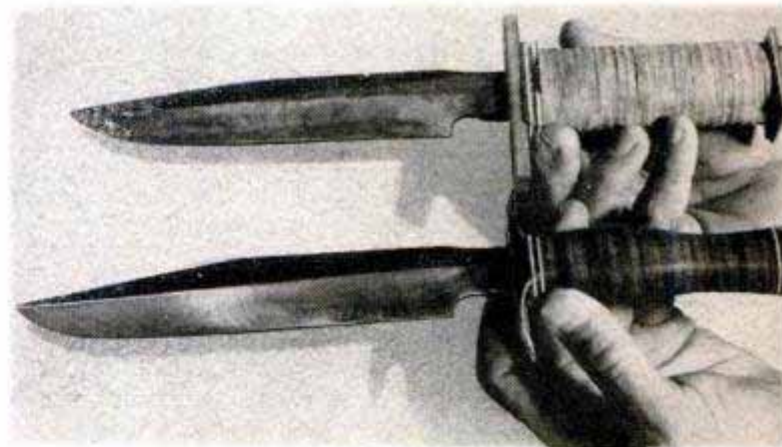
Although ivory, staghorn and even certain metals are used for handles, ordinary top-grain cowhide is recommended for hunting knives. The lower center photo at the right compares the rough with the finished leather handle. Details below and on the opposite page give sizes of the leather disks. Note that the latter are oval in rough shape and that the center holes are cut rectangular to fit the tang snugly. Five $\frac{1}{16}$ -in. fiber squares in three colors are fitted on the tang next to the hilt. Then follow with the leather disks and three or five fiber squares. Cement each disk and square to the one preceding. Then attach the butt piece firmly in place by peening the tang projection. Rough to size and shape with a coarse rasp as in the upper center photo at the right. Then finish the hilt and the entire handle with a medium emery wheel and finally bring to a high polish with a stitched cloth buff charged with polishing rouge. When buffing be careful not to heat the leather handle unduly. The shape of the handle is optional. Grind it to a form that suits your finger grip. ★ ★ ★



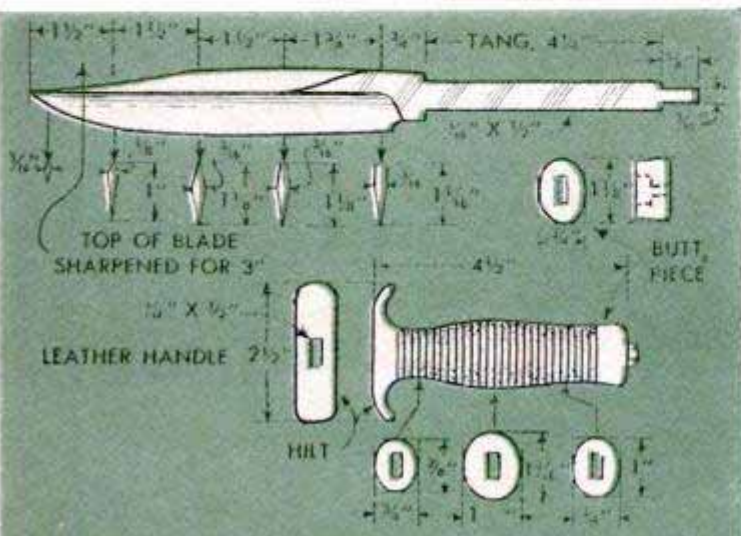
In the tempering process the blade is heated in an electric furnace which permits close control of temperatures so essential to proper tempering of steel



Leather handle is roughed out with a coarse rasp and the hilt and butt piece are filed to the rough shape. Finish with emery wheel and a stitched buff



Above, the rough and finished handles of the all-purpose knife. Below, honing the blade by hand on a three-part professional-type hone. Note blade angle



Shelf Attached to Window Sill Without Use of Nails



A decorative Christmas candle or a flowerpot that is too wide to rest on the window sill may be supported on a simple shelf which is held in place by the window lift. The shelf consists of a wooden block of a thickness to fit under the lift and having a length suitable for the object which it is to support. The block is notched on one end for the lift and beveled at the other for decorative purposes. A top from a tin can or a scrolled wooden block may be used to hold the objects set on the shelf. In use, raise the window slightly, place the block in position and lower the window so that the lift rests in the slot.

A. J Stephenson, Detroit, Mich.

Soaped Candles Burn Brighter

Here's a method of improving Christmas candles. Dip your hands into a thick mixture of soapsuds, or rub them on a wet bar of soap, and roll the body of the candle between the palms until it is well coated with soap. When dry, the soap-coated candles will not smoke or drip and will tend to burn brighter.

Yule Tree in Picture-Window Bay "Framed" by Balsam Branches

To add to the effectiveness of a table-top Christmas tree placed in a large picture-window bay almost as wide as the living room itself, my husband constructed a wooden frame extending just beyond the top and sides of the bay to which balsam branches were tied. The branches, which were tied in an upright position and overlapped sufficiently to conceal the frame,

converged upon the center of the cross-piece where a cluster of pine cones was attached. Tops of the branches were sprayed with artificial snow to high light portions of the branches. The frame was constructed from 1 x 2 stock with a braced piece extending out from the base of each upright member to hold the frame against the wall. The frame was painted to match the color of the branches.

Mrs. Evelyn B. Daum, Chicago.

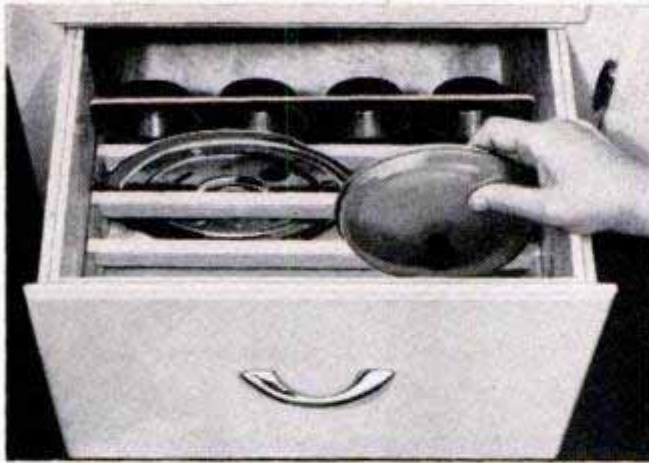
Dry Soapsuds Used as Snow On Christmas Tree

For a "white" Christmas this year, spread whipped, dried soapsuds on the branches of your yuletide tree. It's inexpensive and will add a most realistic snow effect. Also it's clean, making no mess while on the tree, nor when the tree is taken down. Empty a box of any soap flakes or soap powder into a deep bowl, add a small amount of water and whip until the suds seem dry and are of the consistency of cream. Spread newspapers under the tree and apply the suds from the top branches down with a tablespoon. For a lighter "snowfall," apply the suds along the tops of the branches with your fingers. Sprinkle soap flakes over the branches before the suds are dry to get a sparkling, fresh-fallen effect. The whipped suds will "drift" enough to look natural, and will dry overnight to a stiff, non-tacky finish that will stay in place indefinitely. The treatment also may be used on holly wreaths and other decorations, and can be applied to the corners of windows and mirrors to give a drifted-snow effect. Later, a damp rag will remove it from the glass.

Tom Riley, Portland, Ore.

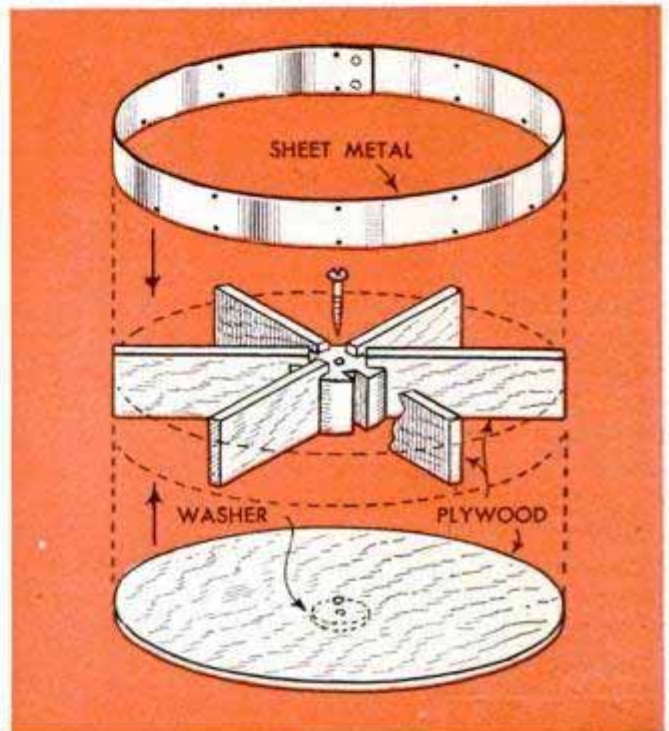


Partitioning Helps to Keep Drawers Orderly



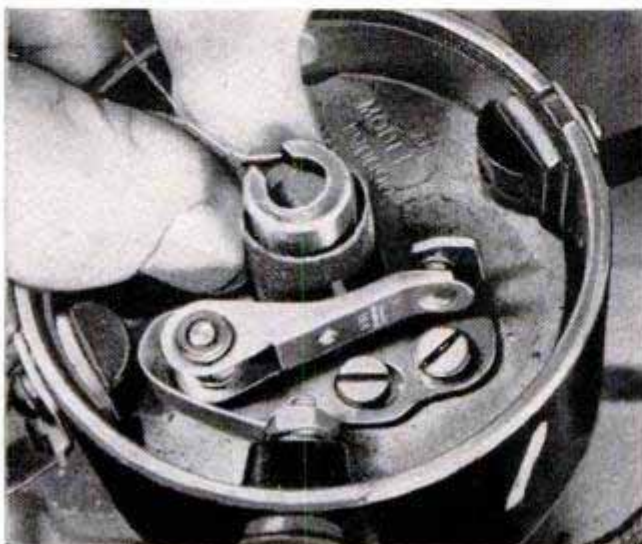
By Elma Waltner

Good partitioning can eliminate the clutter in drawers in which small items are stored in your home. Each article can be found quickly when needed, with no more fumbling. The left-hand photo shows a drawer having vertical compartments for pot lids, piepans and other flat kitchenware. The partitions in this drawer can be made by fitting square strips into notched side rails as shown, or by fastening pairs of notched cleats to the drawer sides and slipping solid panels into the notches. The Lazy Susan pictured in the detail is designed for use in drawers in which articles stored at the back are difficult to reach. Revolving the tray quickly brings the desired item to the front of the drawer. The base disk is of $\frac{3}{4}$ -in. stock cut to a diameter $\frac{1}{2}$ in. less than the width of the drawer. The side band is a sheet-metal strip 1 in. less than height of the drawer. A small disk of $\frac{3}{4}$ -in. stock is slotted to receive plywood dividers to form six preshaped sections. Small compartments may be built into any drawer by making the dividers from $\frac{1}{4}$ -in.



stock, $\frac{1}{2}$ in. narrower than the inside height of the drawer. These dividers are interlocked with half-lapped joints to form a crisscross pattern.

Method for Improving Service of Worn Distributor Points

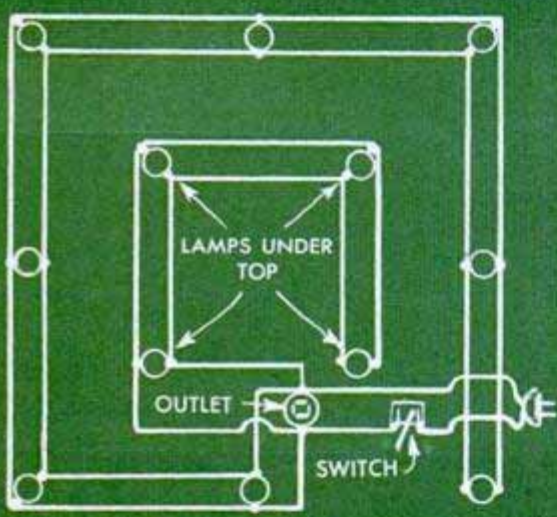


If the breaker-point arm of a distributor becomes slightly out of line or worn where it is pivoted, the end of the fiber block probably will only contact partially the curved surface of the cam. This will result in excessive wear of the block which, in turn, not only will cause further misalignment of the points but also will affect, perhaps critically, the gap interval between them. One way to correct this condition temporarily is by wrapping a strip of fine sandpaper around the cam and rotating manually to grind the end of the block to fit the contour of the cam, after which the gap between the points should be reset. Finally, remove any abrasive particles that have become dislodged from the sandpaper.

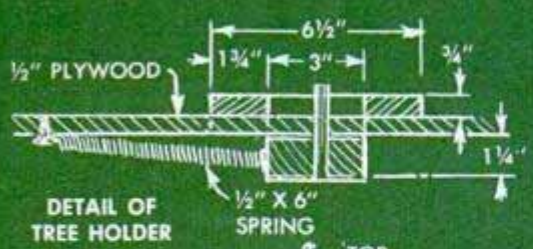
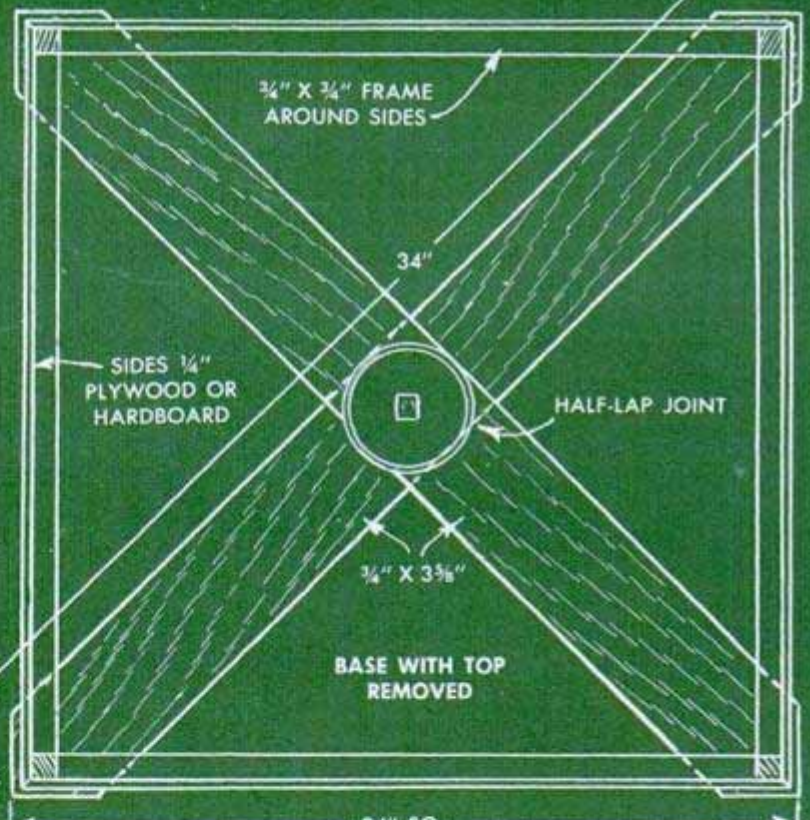
PLAN of the MONTH



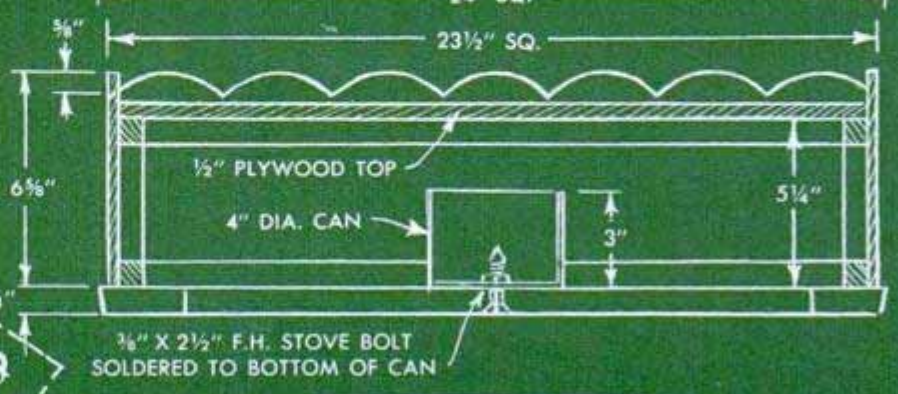
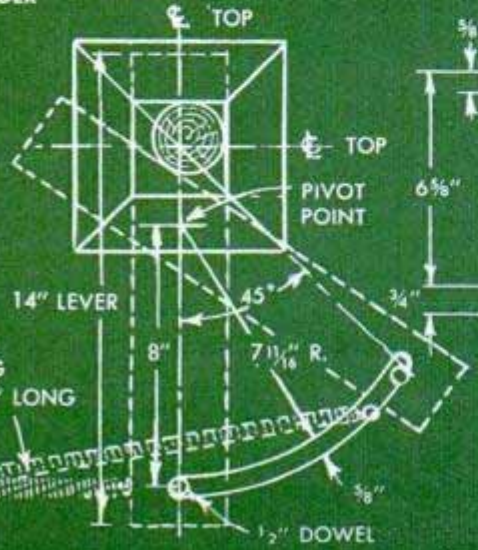
These Christmas-tree stands are Santa-approved and you'll have time to build one or more before the holiday. All are designed to hold the tree rigidly upright and provide a constant water supply. Stand pictured at left and detailed below, features a lighted base with scrolled gallery and spring-tensioned holder for clamping the tree trunk securely. Holder is shown in section and plan views at lower left. Lights are controlled by single-pole toggle switch



WIRING DIAGRAM



DETAIL OF TREE HOLDER



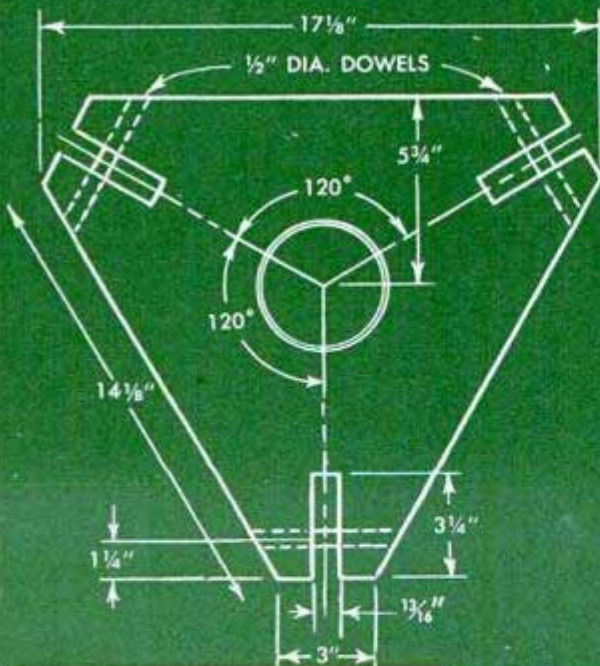
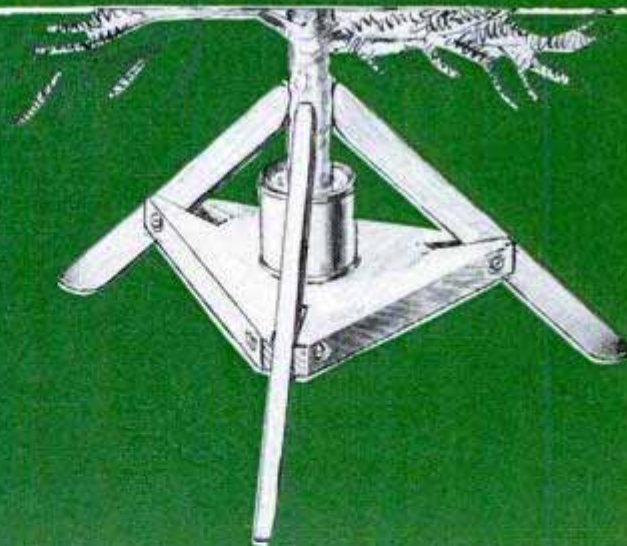
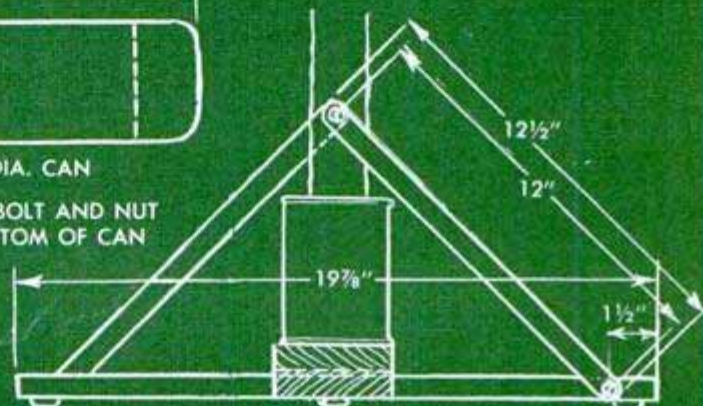
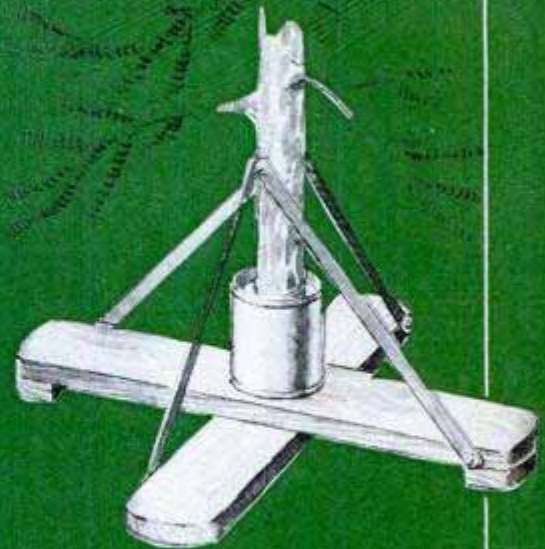
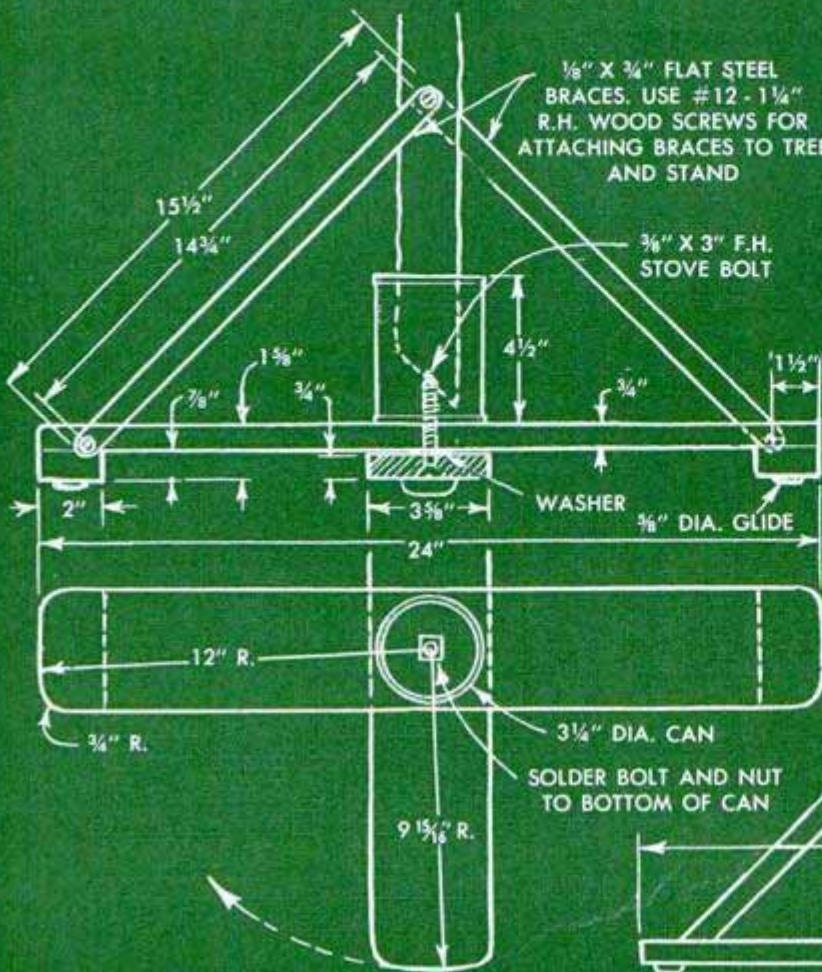
3/8" X 2 1/2" F.H. STOVE BOLT SOLDERED TO BOTTOM OF CAN

DECORATIVE CUT-OUT FOR SIDES 3/4" SQS.

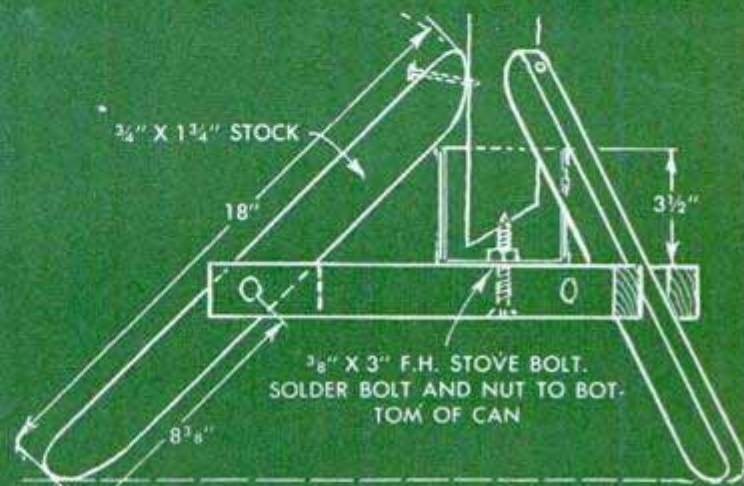


FASTEN COLORED GLASS OR PLASTIC BEHIND CUTOUT

...Christmas Tree Stands



Stands like those above can be assembled in one evening. In the upper design, flat-steel braces are screwed to the tree trunk. In the lower one, three legs pivoted to a triangular base support the tree trunk. Weight of the tree forces upper ends tightly against trunk



Decorative Wood-Putty Book Ends "Cast" in Plaster Molds



Let your own hands be the models for these unusual book ends that will be attention-getters wherever they are used. All that's needed to make them is a cake tin, petroleum jelly, wood putty and a small quantity of plaster of paris. After coating one hand with the jelly, mix the plaster to a thick, creamlike consistency and pour in the pan to a depth of at least 2 in. As the plaster begins to set, press the palm of the hand, with fingers together, as well as part of the wrist halfway into the substance, keeping it there until the plaster hardens. When ready to make the other half of the mold, coat the entire face of the completed half with the jelly and also the back of the hand if necessary. Then, after mixing more plaster, again place the hand in the depression in the completed half and pour plaster over it. As soon as the plaster has set firmly, use a knife or a wall scraper to pry apart the two halves. The next step is to coat the inside surfaces of the mold halves with the jelly, afterward pressing wood putty into the depressions until it is approximately $\frac{3}{16}$ in. thick. When the putty has hardened thoroughly, remove the halves and join together with glue, first adding putty wherever necessary to effect a smooth joint. After repeating the operation with the other hand, sand both replicas, shellac or paint in the color desired and mount with glue on two L-shaped wooden pieces in the manner shown.

Bess Ritter, New York City.

Lawn-Furniture Legs Preserved By Asbestos Roof Coating

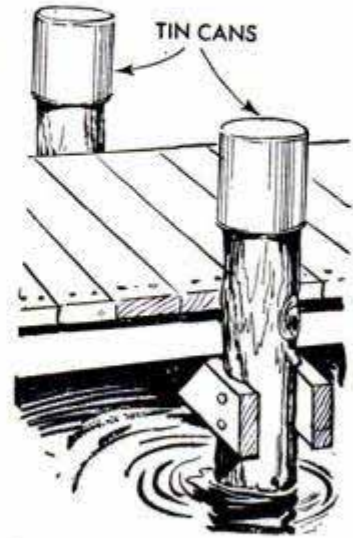
The legs of wooden lawn furniture will last longer and have a neater appearance if their bases are given an application of asbestos roof coating. Turn the furniture

upside down and paint about 5 in. of the leg. After this has dried thoroughly, apply a second coat. Be sure that the end pores of the wood are completely filled.

T. F. Watts, Charlotte, N. C.

Cans Protect Exposed Dock Piling And Serve as Channel Markers

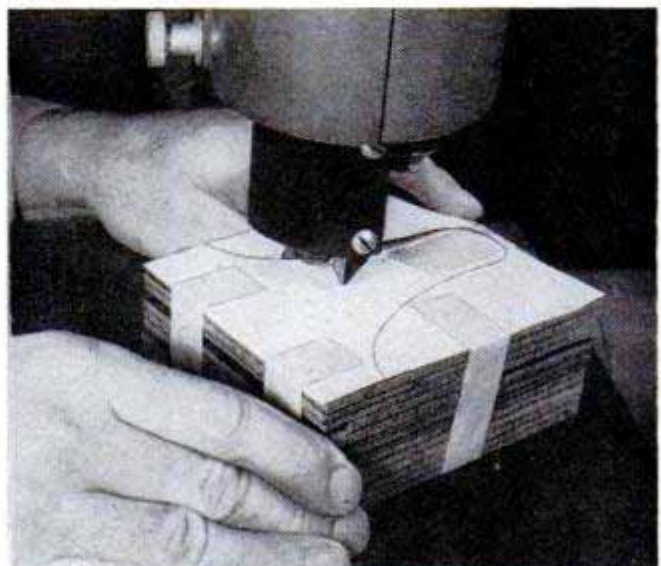
The end grain of wooden piling used for dock structures and channel markers is constantly exposed to the elements, causing the wood to rot. Tin cans afford excellent protection against this rotting. The cans must be large enough to fit over the ends of the piling, though a tight fit isn't necessary, and should be painted



inside and out with a good marine paint before being put into use. Some resort owners use painted cans to identify the channels leading to their particular cottages, while others achieve a novel effect by having cans of many different colors on their docks.

Thin Stock Taped Together For Multiple Bandsawing

When bandsawing quantities of thin stock that are to be cut into identical shapes, the job may be speeded up by taping a number of pieces together for sawing at one time. The pattern is taped to the top piece to serve as a guide. Pieces of hardboard are shown secured with masking tape while being cut into window scrapers.

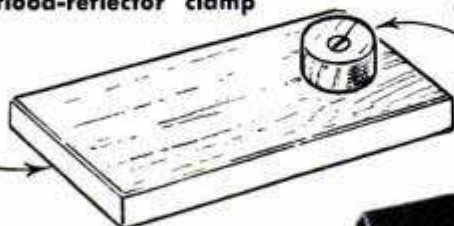


ALL-PURPOSE CLAMP

By Martin D. Koehler

For those hard-to-hold articles when you wish for a third hand, this all-purpose clamp will prove invaluable. The base construction is shown in the diagram. To complete, add a photoflood-reflector clamp

$\frac{3}{4}$ " X 5" X 8 $\frac{1}{2}$ "
WOODEN BASE

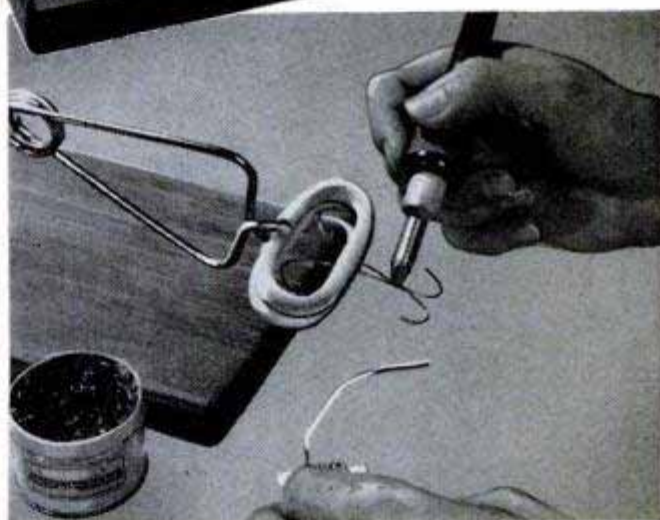


1 $\frac{1}{2}$ " O.D. X 5"
BRASS TUBE

WOODEN DISK,
SNUG FIT
INSIDE TUBE



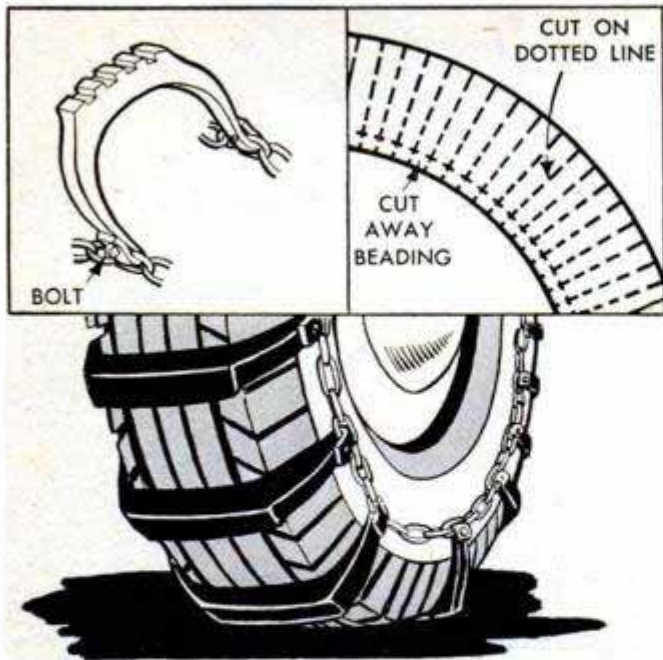
Below, left, clamp holds plans or instruction book for modelwork. Below, right, clamp provides fixture for soldering small wire parts



In left-hand photo below, "third hand" substitutes as glue clamp for small work. Center photo, flash-extension units are held in almost any position required by photographer. Lower, right, for portrait or table-top photography, clamp holds cardboard reflector as it can be adjusted at various angles to light shadows



Sections Cut From Casing Replace Worn Tire-Chain Links



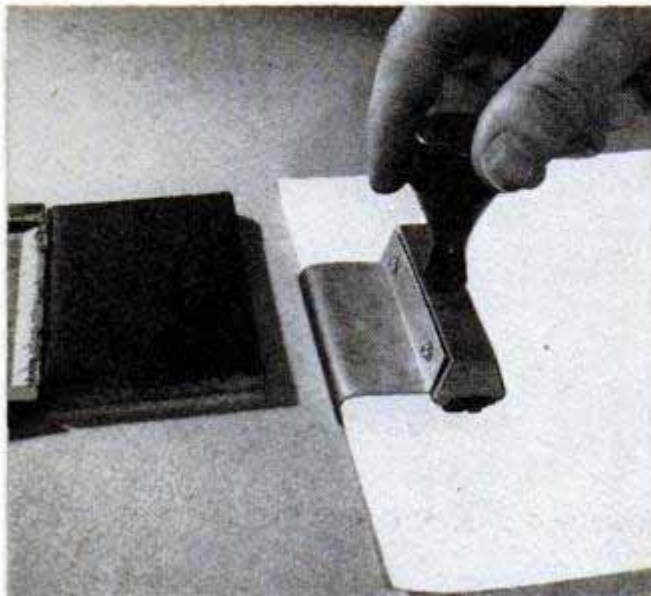
When tire chains have become worn to the extent where some of the links have separated and no longer are effective, a repair job providing chains more durable than the original ones can be done with the use of an old tire casing. First cut the wire bead from both sides of the tire. Then cut the carcass of the tire into strips $1\frac{1}{4}$ in. wide, which will pass through the side links of the chain. After the strips are cut, remove the cross links from the chain one at a time, and as you remove these, replace with rubber "links." To fasten, pass the rubber strip through the side link of the chain and bend it back with an inch of overlap. Drill or punch a hole through both layers and bolt together with stove bolts, placing the heads on the inside. These rubber chains give better traction and are much quieter in operation than the steel chains.—Walter J. Swontek, Bedford, Ohio.

Andirons of Welded Pipe Lengths Beaded to Simulate Logs

In constructing this pair of simulated-log andirons, an apprentice welder can get practice and, at the same time, produce an interesting addition to his home. The main columns are cut from 4-in. pipe while the stub "branches" are of $1\frac{1}{4}$ -in. pipe. After these are assembled, enough bead should be run on the sides of the pipe to give them a rough-bark appearance. Facings for the beveled ends of the pipe sections are cut from $\frac{3}{8}$ -in. plate and growth rings are etched on the plate to give a cut-log effect. The shanks which hold the fuel are made of square bar stock. After the rough edges are ground off, the entire andiron is given a final polishing with a wire brush and emery cloth.—O. A. Fitzgerald, Moscow, Idaho.



Rubber-Stamp Aligning Guide Assures Even Print

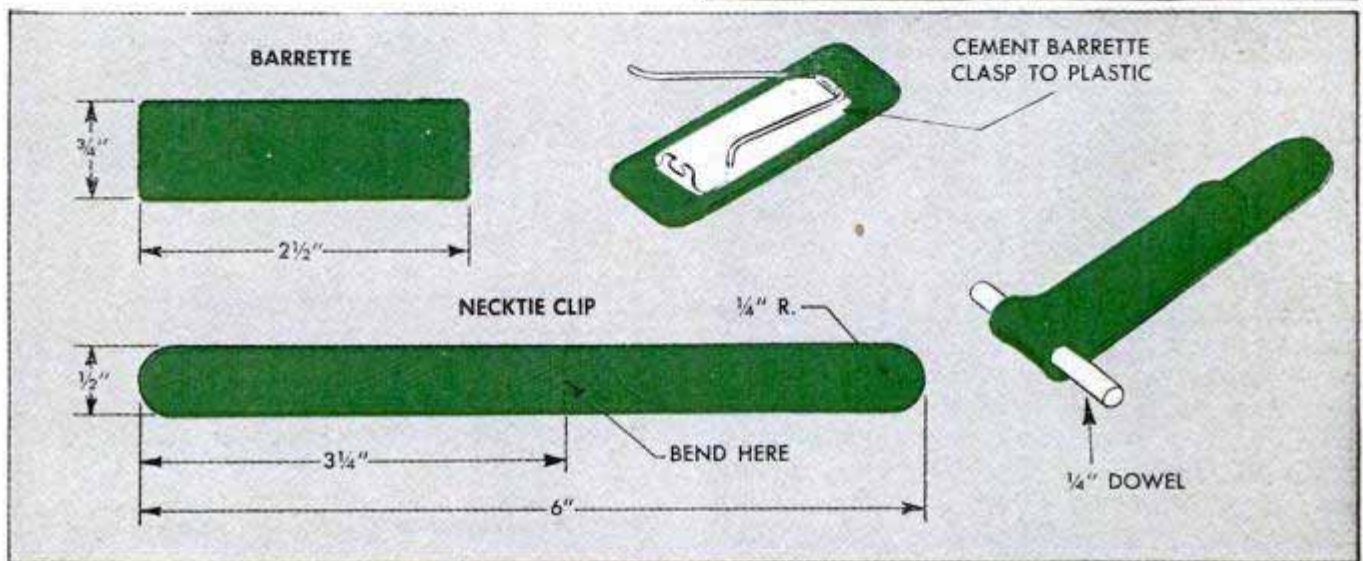
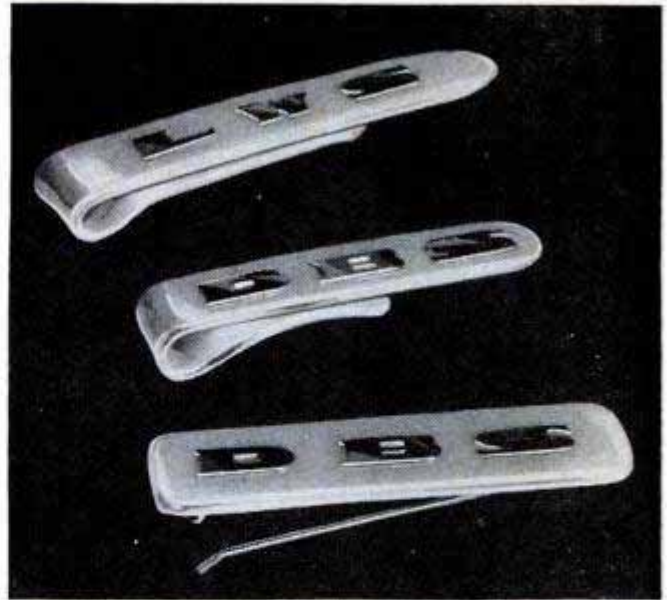


Rubber stamp impressions always will be made at the same distance from the edge of the paper, and in perfect alignment, if this simple attachment is used. It consists of a piece of sheet metal of the same width as the stamp, bent S-shape and screwed to the back of the stamp. If desired, keyhole-type slots may be made in the metal guide so it can be slipped off and on without removing the screws. The guide also assures clean impressions, as the stamp is always lowered in a level position that avoids blurring.—Ken Murray, Colon, Mich.

☞ Earthenware that imparts a clay taste to food can be conditioned to prevent this by boiling it in water about 15 min. Soak the earthenware until the water cools.

Tie Clasps and Barrettes in Colorful Plastic

Matching monogrammed clasps for the whole family, tie clasps for the male members and barrettes for mother and daughter, can be made of bright plastic in one evening. A piece of plastic $\frac{1}{8} \times \frac{1}{2} \times 6$ in. is needed for the adult tie clasp, while the junior clasp is formed from a piece $\frac{1}{8} \times \frac{1}{2} \times 4\frac{1}{4}$ in. The edges are filed smooth, sanded with fine sandpaper and finally buffed with steel wool. Remove the paper backing from the plastic just before bending, then heat over a hot plate until pliable. The senior tie clasp is bent $3\frac{1}{4}$ in., and the junior clasp $2\frac{1}{4}$ in., from one end. The tip of the shorter end is bent slightly to facilitate clipping to the shirt. Chromium-plated initials are cemented in place to finish the job.



Sturdy Rack for Gasoline Drum Made From Old Auto-Wheel Rim

This neat-appearing rack for holding a gasoline drum was made by cutting old auto-tire rims into smaller sections and welding them in the manner shown. The



supports are joined together by pieces of flat steel which are welded to the lower sections, or legs, of the rack. The legs are prevented from sinking into the ground by setting the rack on short planks. However, if the barrel is to remain in the same position indefinitely, it is a good idea to pour a small concrete slab for the purpose. A coat of aluminum paint or a regular metal paint will improve the appearance of the rack.

A. M. Wettach, Mt. Pleasant, Iowa.

Removing Oil Stains

When a garment becomes spotted with sewing-machine oil, cover the oil spots immediately with fuller's earth, putting it on thickly and allowing it to stand overnight. The next morning, when the fuller's earth is brushed off with a soft brush, the stain should have disappeared. In some stubborn cases, however, the treatment may have to be repeated.

MASS PRODUCTION

In the Basement Shop

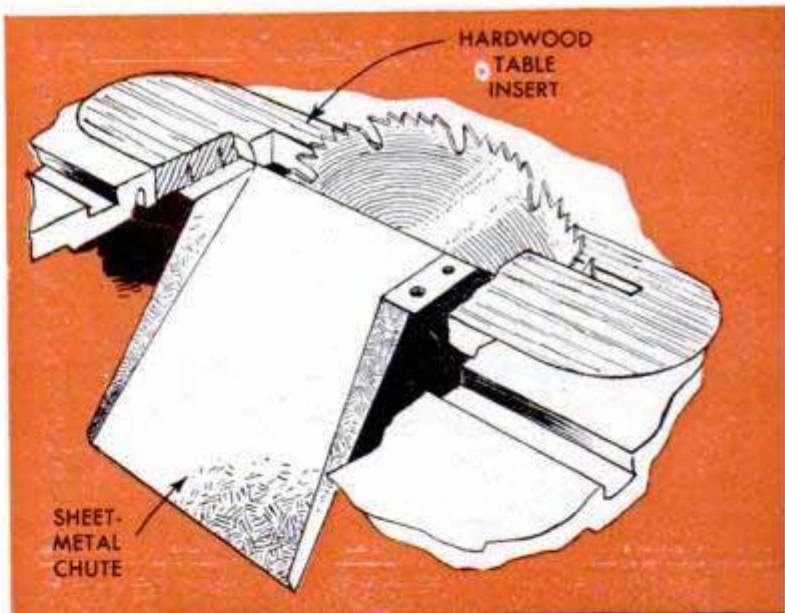
By John D. Arnold

IF YOU PLAN to put your workshop on a profitable basis, tooling up to mass-produce a certain item for the Christmas rush will help you to compete effectively with the local gift trade. Simple cutting setups, assembly jigs and short-cut finishing methods may be combined to produce a better item at a faster rate and greater profit. The small chest shown on the opposite page illustrates what can be accomplished when bandsaw and shaper operations are combined to produce a cover and legs that appear to be separate units but which actually are formed from a single boxlike unit.

The box is made by cutting sides and endpieces to the size desired, after which the sides are rabbeted on both ends to fit the endpieces. Then the sides and endpieces are grooved on the inside to take the bottom and stacked, with their respective patterns placed on top as shown, in open-box jigs for bandsawing. Following this, the pieces are placed in a right-angle jig to assure squareness when assembling the chest with glue and brads. The brads should not be driven where they might interfere with subsequent shaper operations. Then a top is cut to the proper size and secured with glue only, as the upper portion of the box is to be cut free to provide a cover.

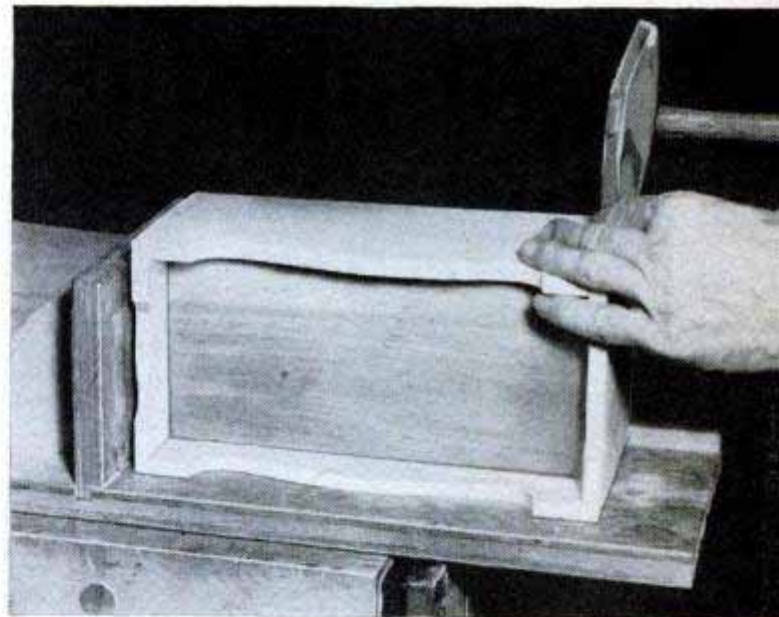
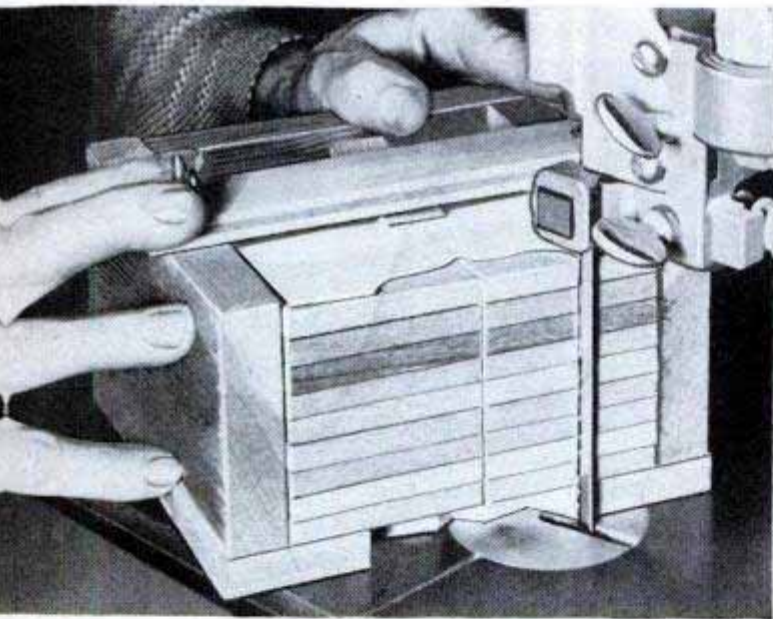
After the chest has been given a preliminary sanding, the cutters are adjusted in place on the shaper and test pieces run through to determine the proper depth and setting. When the bottom molding and groove have been cut, a small surface bead and molding are cut near the top edge in a similar manner. Then, after a final light sanding, the cover is cut from the body on a line just above the surface bead, after which mortises for the hinges are cut with a dado head.

With the arrangement shown at the right, it's easy to produce small disks or wooden wheels for toys. To overcome the problem of removing severed pieces, the regular saw insert is replaced with a wooden insert having a rectangular opening adjacent to the blade. A sheet-metal chute attached to the underside of this insert directs the pieces into a box underneath the saw table. A stop is clamped to the table as shown to assure duplicate cuts, while a fence attached to the miter gauge aligns the stock properly with the blade. ★ ★ ★



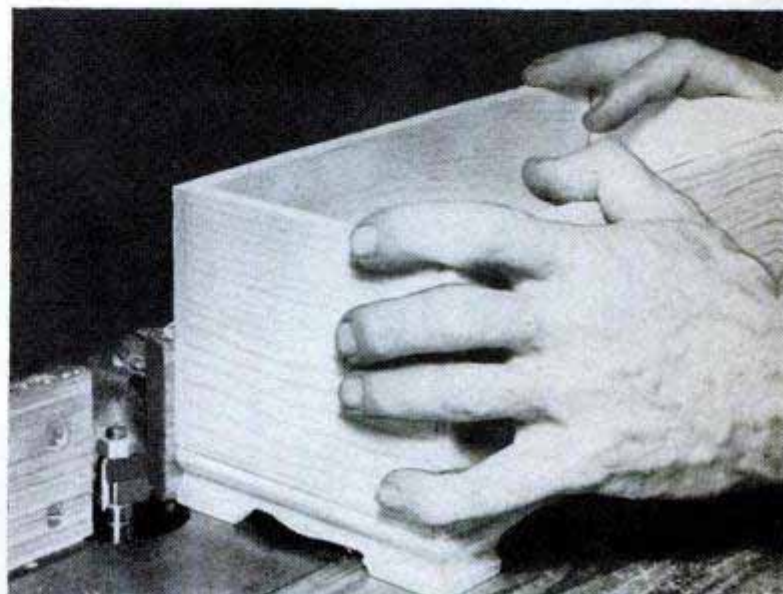
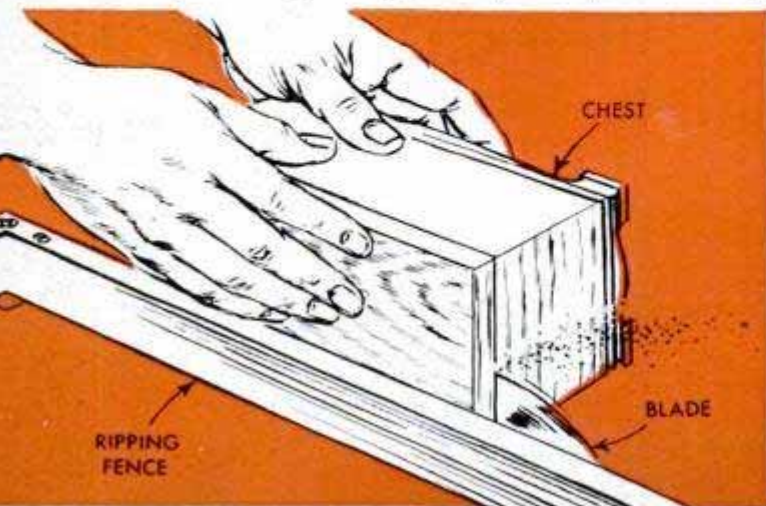


Completed chest, above right, illustrates how leg detail suggests separately molded and mounted units



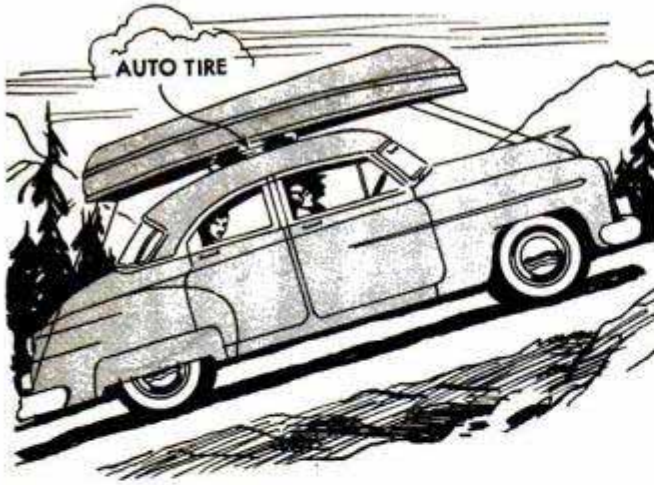
For multiple bandsawing, chest endpieces are held in open-box type of jig with pattern placed on top

Above, the sides and endpieces being assembled with glue and brads when trued in right-angle jig



Above, cutting lid from chest on circular saw; at right, shaping groove and molding in one operation

Tire Cushions Boat on Car Top



An old tire placed on the roof of your car is a good substitute for a special boat-carrying rig. Place tire in the center of car top and tie the boat to the four corners of the car. Boat will balance itself on the tire without touching the top at any point. For light boats one or two inflated inner tubes will do the job with the added advantage that your family can use them as floats.

A. R. Finley, Altadena, Calif.

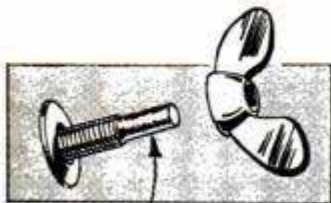
Straining Paint Quickly



Time can be saved in straining paint by placing a circular-shaped piece of screen wire cut to the same diameter as the inside of the paint can on top of the paint. Then, by pushing the screen down slowly with a

brush or stick, the skin and also any hardened lumps or particles in the paint are forced to the bottom of the can. After the job has been finished, the screen can be removed with a wire hook and cleaned for reuse.—Ken Murray, Colon, Mich.

Threaded End of Bolt Filed To Take Nut Easily



Where parts are assembled and disassembled frequently the problem of quickly starting square, hex, or wing nuts is solved by filing

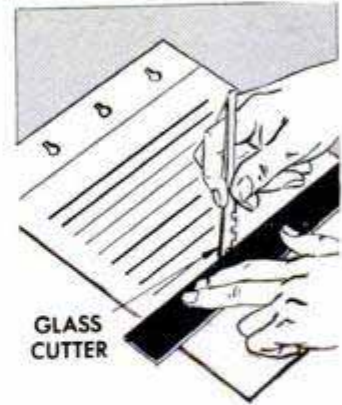
away several threads at the end of each bolt. The threads should be filed down so that the nut will slip easily over the smooth

end. When assembling parts simply slip the nut over the end of the bolt until it engages the threads and then spin it home.

Arthur Trauffer, Council Bluffs, Iowa.

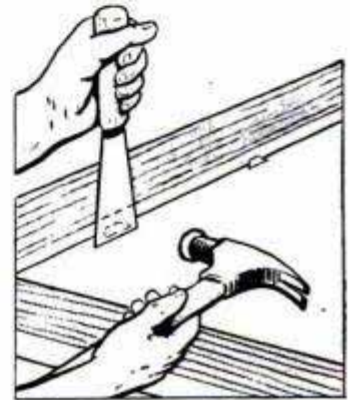
Improved Stencil Cutter

You'll find it a simple matter to draw neat ruled lines on a duplicator stencil with a discarded glass cutter. Held against a straight-edge in the manner shown, cutter wheel will leave a clear line on the stencil.



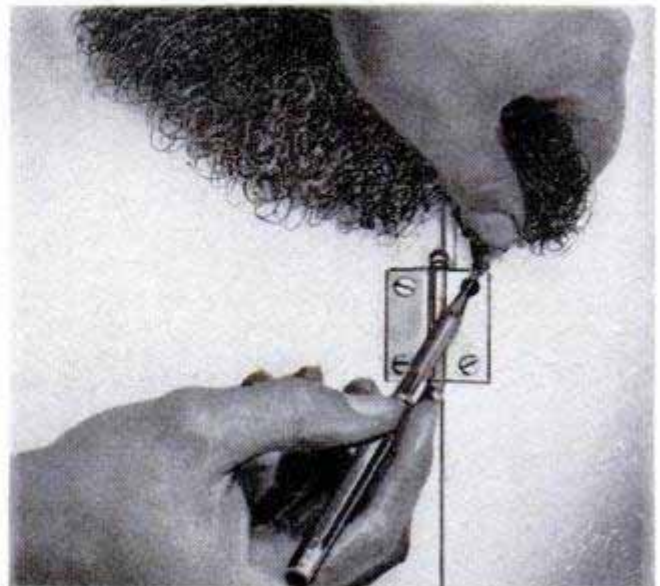
Glazier Points Driven With Putty Knife

If a driver is not available when replacing a pane of glass, you will find a putty knife helpful for driving glazier points. Hold the tool against the edge of the point as illustrated and tap it lightly with a hammer.



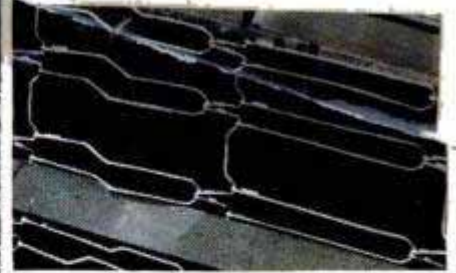
Steel Wool Tamped in Hole Tightens Loose Screw

To tighten a wood screw that has worked loose, tamp steel wool into the hole and then replace the screw. If steel wool is not available, try using a piece of scouring pad, slivers of tin or other thin-gauge sheet metal.—J. W. Rocke, Atkinson, Neb.

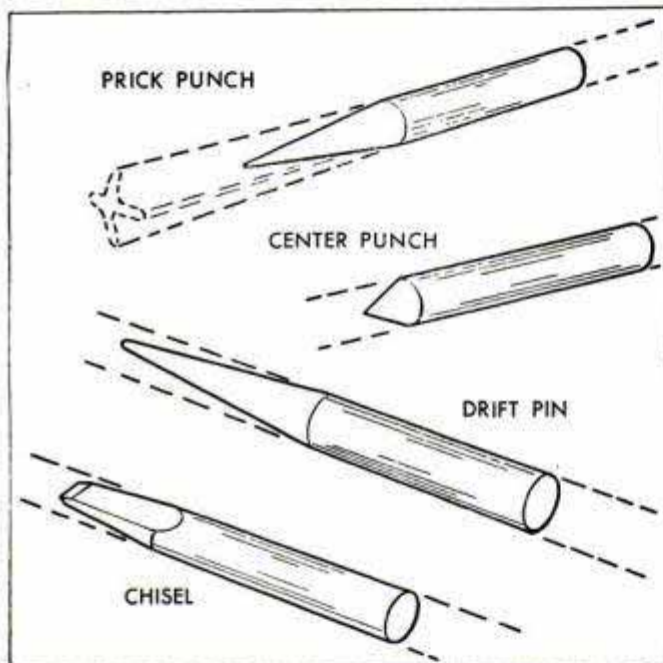


When a bedspring of the type shown sags badly, it may be repaired temporarily in most cases by crimping the individual wires and replacing any coil springs that have become stretched. Pliers, or better still, an adjustable open-end wrench and a screwdriver are all that you need for the job. The wrench is used to grip the wire while the screwdriver is inserted through the hole in the wrench handle to provide a T-handle for twisting the wrench. — Max Alth, New York City.

Sagging Bedspring Repaired Temporarily By Crimping Wire Links With Wrench



Worn Masonry Drills Salvaged To Provide Chisels and Punches



Useful tools, such as chisels, driftpins and punches, can be made from worn masonry drills. Using a hacksaw, I first remove the cutting head from the drill, leaving a shank 10 in. long with which to work. A full-length piece may be tapered and shaped on a grinder to form either a cold chisel or a driftpin. A similar length can be cut in half and the two shorter pieces shaped into center and prick punches. To speed cutting of the metal, saw around the piece and then break it in two. When pointing the metal, be sure to wet the grindstone with water from time to time.

D. A. Walker, Nashville, Tenn.

Proper Treatment of Fishing Tackle Prevents Deterioration in Storage

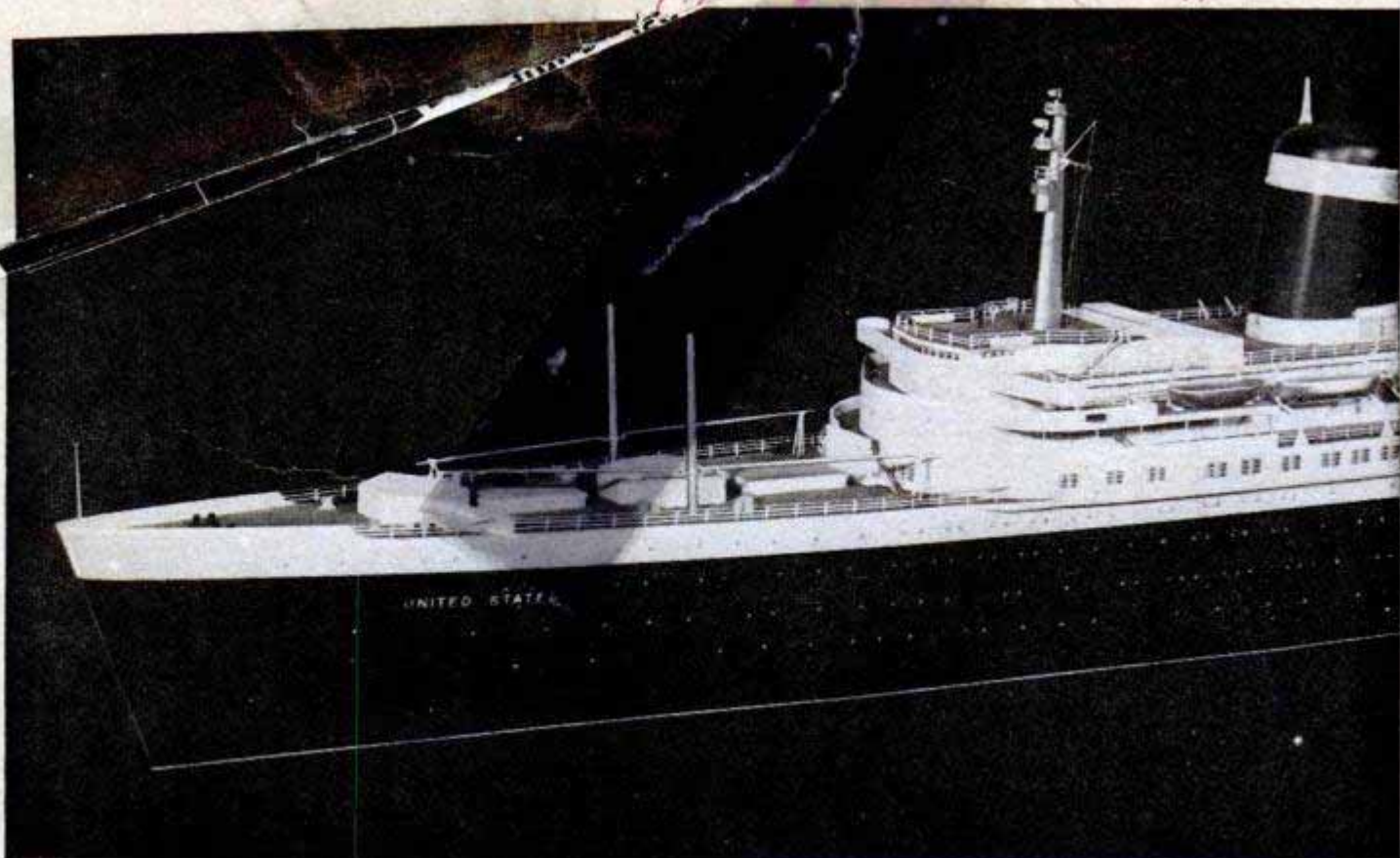
Fishermen having large selections of trout and bass flies can mothproof them by dipping each fly in kerosene before storing. To prevent rubber baits from rotting, put them in a can of tire talcum. Wash and dry wooden plugs and metal spoons and then give them a coat of floor wax. Rub a little grease over all fishhooks, or dip them in a rust-preventive liquid. Wash fishing lines in clear, cold water and, after drying them thoroughly, wind them loosely around a large cardboard tube or can. Disassemble the reels and clean the parts in gasoline. Next, wipe the parts dry and reassemble, applying a few drops of reel oil to the level-wind mechanism, end bearings and gear shaft. When finished, store the reel in a cloth bag. After assembling the fishing rods, insert small corks in the agate guides and hang the rods vertically by the tips. All tackle should be stored in a dry place.—R. A. Jenkins, St. Louis, Mo.

Longer Life for Razor Blades

Appearing in its initial stages as nothing more than brownish stains, the rust that forms on the cutting surfaces of a razor blade and eventually dulls it can be retarded to a certain extent by drying the blade thoroughly each time the razor has been used. One easy way to accomplish this is by storing the blade between folds of a blotter when not in use. The blotter may be kept on a shelf of the medicine cabinet and the folds held together by placing a jar or a bottle on top of them.

C. E. Mitchell, Chicago.

☐ To remove whitish heat stains from furniture, dip a soft, moist cloth in cigarette ashes and rub the marred finish gently.



36-in. Model of the

PART I

By Wayne C. Leckey

MODELMAKERS throughout the world have been eager to start modeling the new speed queen of the seas — the SS *United States*. To fulfill their requests, the editors of *Popular Mechanics* commissioned Mr. Robert G. C. Fee, model engineer at the Newport News Shipbuilding and Dry Dock Co., builders of the actual ship, to prepare the necessary plans. *Popular Mechanics*, herewith, is proud to present the first in a series of exclusive construction articles on building a 36-in. scale model of America's mighty superliner.

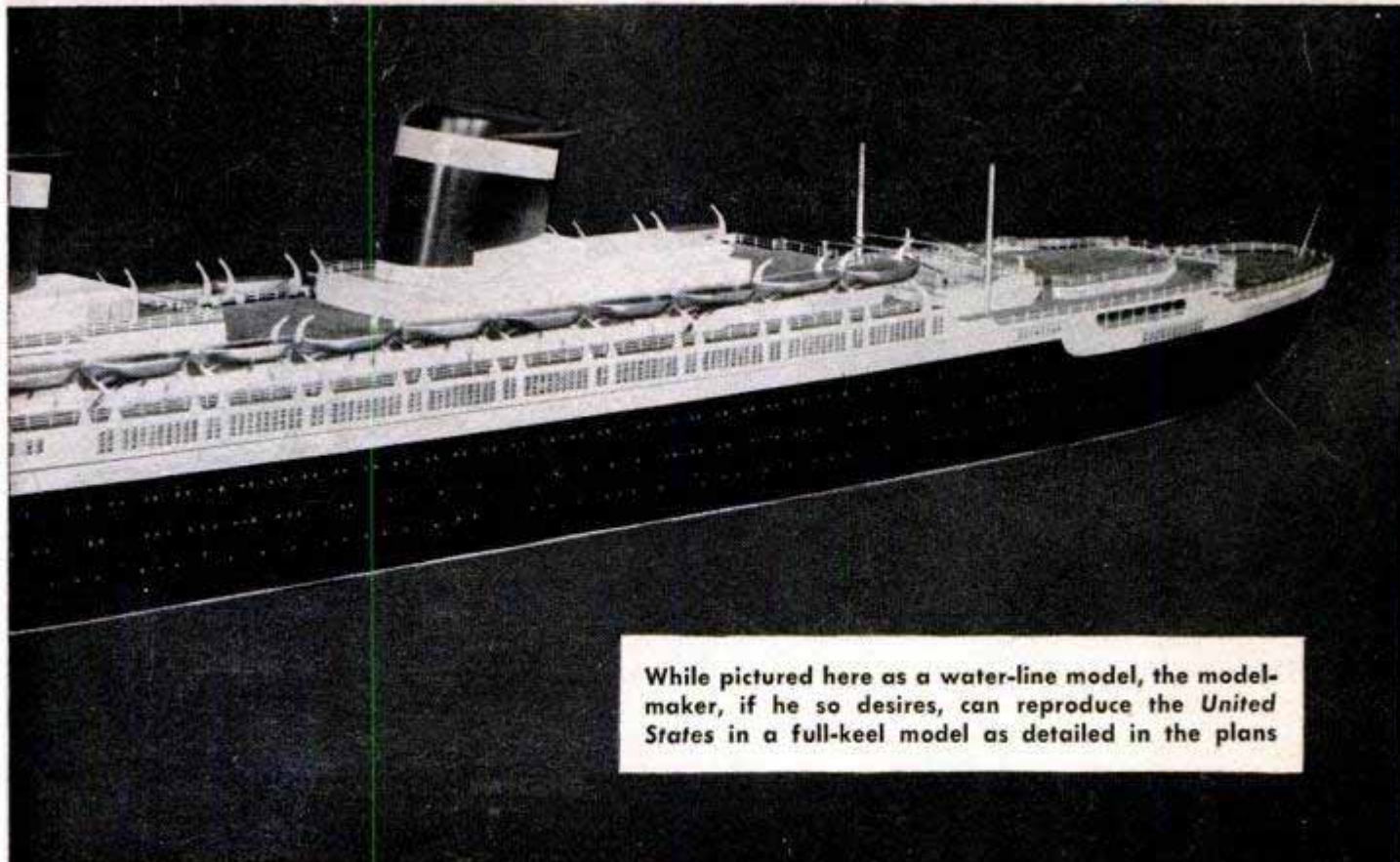
A blue-ribbon winner in her maiden Atlantic crossings, the *United States* established a record-breaking eastward run of 3 days, 10 hrs. and 40 min., knocking off some 10 hrs. running time between New York and Southampton at an unheard of speed of 41 land miles per hour. Combining aluminum with steel to help reduce her weight and increase her speed, the *United States* weighs some 30 gross tons less than her famous British rivals, the *Queen Mary* and the *Queen Elizabeth*. While built in a record-breaking time of only 1031 days from some 1,200,000 blueprints, the combined man-hours were enough to construct 6000 average-size homes.

You have a choice of building a water-line model as pictured at the top of the page or a keel model as detailed in the plans. The model to be described includes the entire hull, but if a water-line model is preferred, it's a simple matter to omit the lower half of the two-part hull and work from the water line up. In either case, the completed model is mounted on a finished baseboard, the keel-type model being supported by two brass turnings, while the water-line model is screwed to the base.

After acquainting yourself with the general construction of the model, begin by

SHIP'S DATA

Length over-all	990' - 0"
Beam	101' - 6"
Height from keelson to stack	175'
Number of decks	12
Propulsion	Steam turbine
Horsepower	118,500
Screws	Quadruple—9' blades
Speed	30 knots plus
Gross tonnage	51,500
Passengers	2000
Troops in wartime	14,000
Crew	1000
Operated by	United States Lines
Built by	Newport News Shipbuilding and Dry Dock Co., Newport News, Va.
Designed by	Gibbs and Cox, Inc., Naval Architects, New York City
Keel laid	February 8, 1950
Launched	June 23, 1951
Maiden voyage	July 3, 1952



While pictured here as a water-line model, the model-maker, if he so desires, can reproduce the *United States* in a full-keel model as detailed in the plans

Reprinted WTM 54 + Book for Boop

SS United States

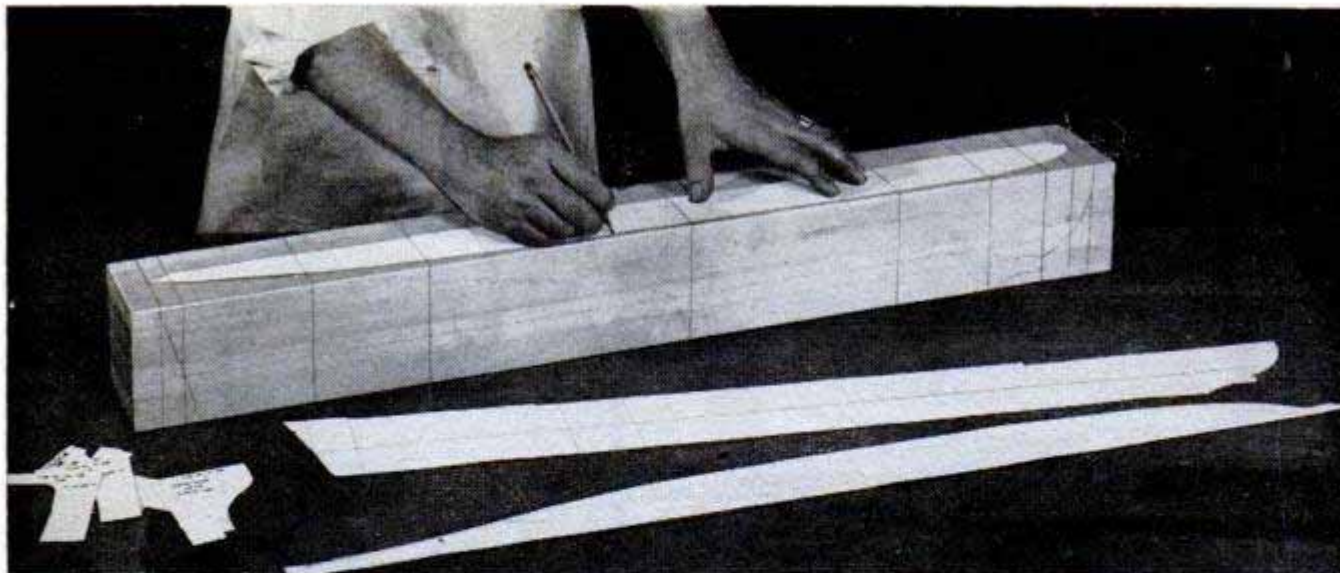
drawing full size the three templates required to lay out the lines of the hull, namely: the profile, deck and water line. These are presented one half actual size with important contour lines being shown on squares for easy enlargement. Only half-patterns are actually required of the deck and water-line templates, as they may be flipped over on each side of the centerlines to draw the complete outline. Make the templates of fairly stiff cardboard and

strive to maintain the same sweeping lines as shown in the half-size patterns. For reference in positioning the templates on the block, draw the water lines as well as the station lines on the templates and letter each one. Full-size patterns of the templates, ready for tracing, are available for those who do not wish to make their own.

The blank block from which the hull is carved consists of two separate blocks. Use sugar pine for these and, if necessary, build

Although shorter in over-all length than the *British Queens*, the *United States* can outdistance her rivals





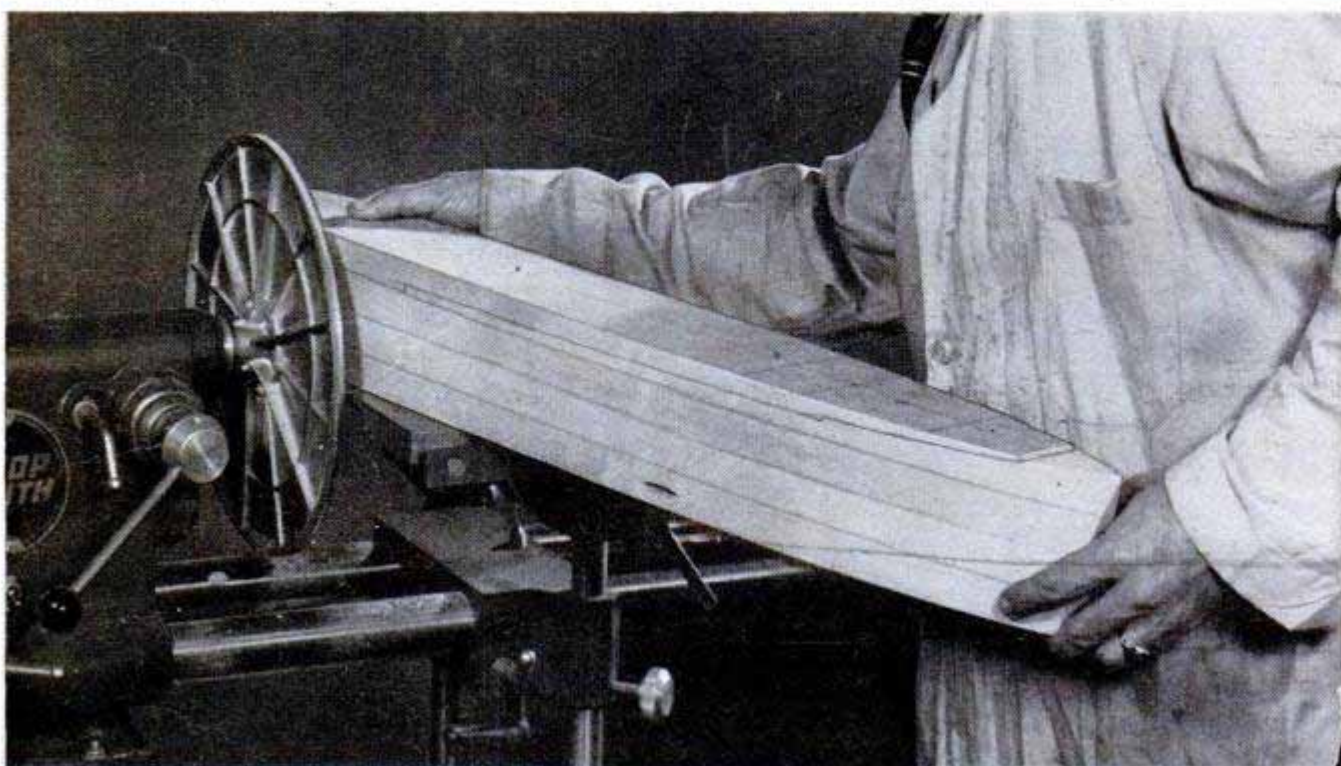
After stations and center lines are marked on the blank for the hull, outlines of the templates are drawn

up each one to the required thickness from two or more pieces. A resin-type glue is recommended in gluing the pieces together, and it's best to clamp the work. When the glue has dried, the two blocks are aligned and clamped together without glue, and holes for two registering $\frac{3}{8}$ -in. dowels are bored through the upper block and part way into the lower one. The dowels allow the two sections of the hull to be taken apart and later replaced in exact alignment. The joint between the two blocks represents the water line of the hull.

Next, the complete block is marked with a centerline along the top and bottom, and the station lines are drawn across the top and down one side of the block. In tracing the outline of the deck template on the top of the block, carefully align the centerline

of the template with the centerline on the block and draw around the template with a sharply pointed pencil, checking to see that the station lines correspond on both the template and the block. It's a good idea to use tabs of cellulose tape to hold the template in position on the block. To draw the complete outline, simply flip the template over, again aligning it with the centerline on the block. After the deck pattern is traced, the water-line template is also traced on top of the block in the same manner, positioning it in line with respective station points. Finally, the lower section of the two-part hull is removed and the same water-line template is traced on the top of the lower section. Then the two blocks are placed together again for rough sawing.

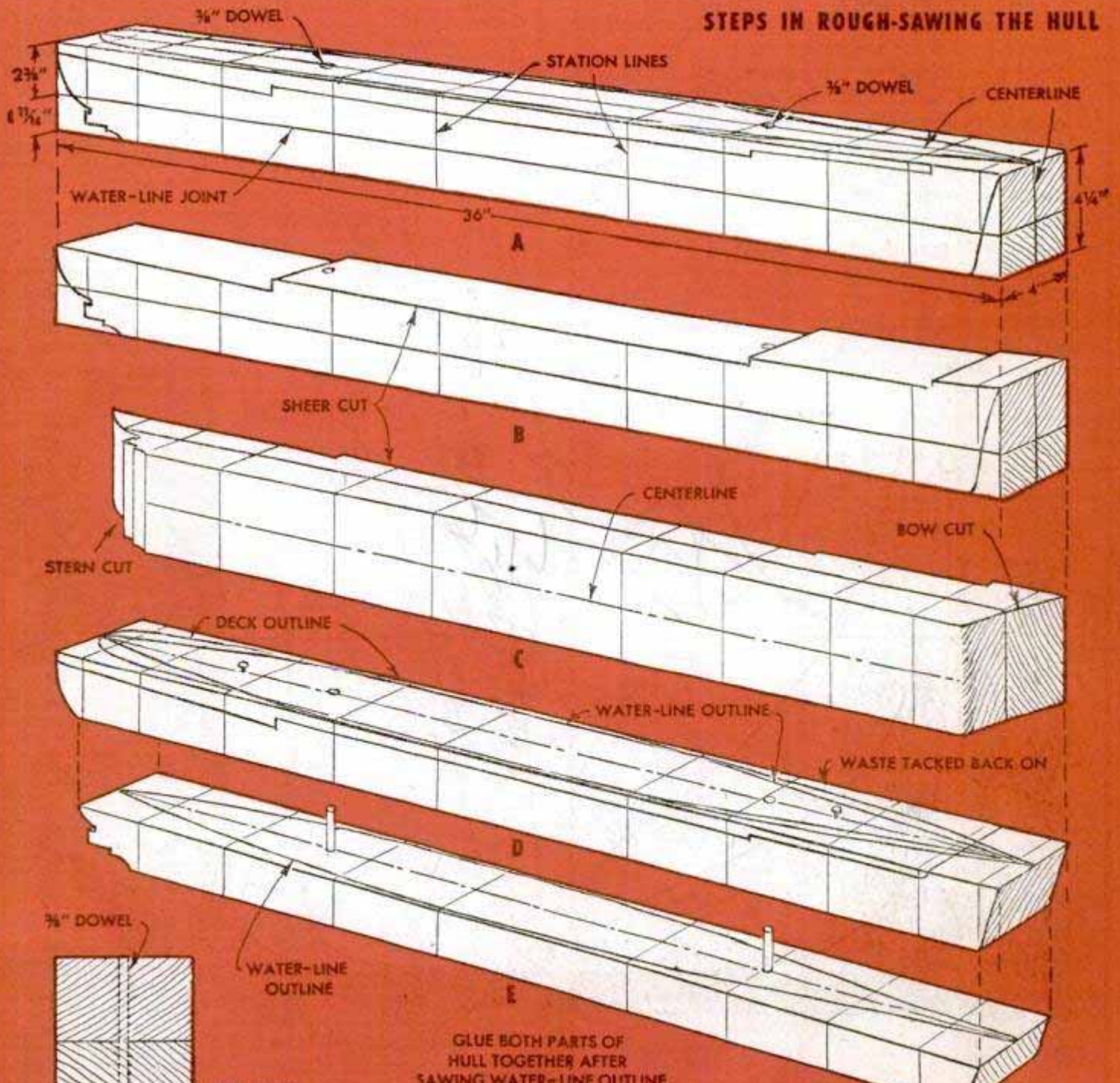
Bringing the rough-cut deck and water lines to exact line is done neatly and accurately on a disk sander



Rough-sawing the blank to the general lines of the hull is done most easily with a bandsaw. The block is placed on its side and the deck sheer line is cut first. Then the waste piece is tacked back on to re-establish the deck and water-line outlines. Next, with the block on its side, the bow and stern profile cuts are made, sawing carefully to line. After this, the two sections of the hull are again taken apart. It is important to note before sawing the deck outline, that since the hull has a tumble home (inward rake) at station E-E, the water-line outline must be followed at points where it overhangs the deck outline. If you have a disk sander, you can cut outside the line roughly and then bring the block down to line nicely on the sander. Finally, the water-line outline on the top of the lower section is cut and sanded to line. This establishes the exact shape of the hull at the water line and also the depth that the hull is carved at the various sta-

tions along the water line. The two sections of the hull now can be glued together permanently, clamping them for a tight joint.

Ten different cardboard templates are required to check the progressive carving of the hull contour. These are given in actual size on page 184B for tracing directly on cardboard, each respective template being used at the same station point on each side of the hull. Supporting the hull in an inverted position for carving is best done by screwing a scrap block to the deck and then clamping the block in a bench vise. The rough hull is gradually brought down to the proper contour by carving it a little at a time and then checking repeatedly with the respective template. Start at station E-E and work each way. In using each template, hold it vertically and even with the centerline on the bottom of the hull and align the water-line mark on the template with the water line of the hull. Several hand tools, such as a small block plane,



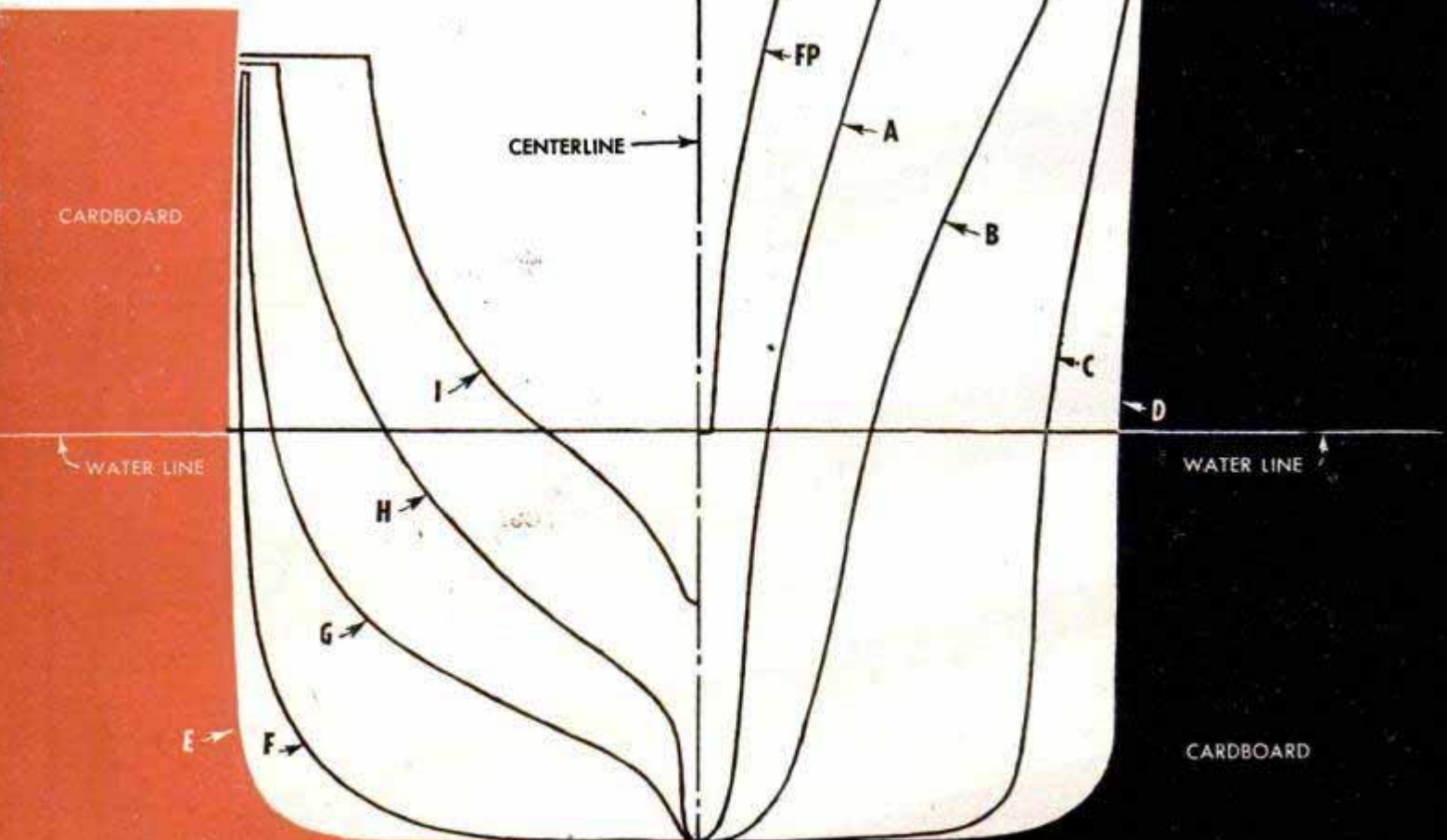


Cardboard contour templates are used to check the lines of the hull as it is carved. These are held at respective station points on each side of the hull. Carving is done with hull supported upside down

gouges, chisel and wood rasp, as well as coarse sandpaper, all are helpful in shaping the lines of the hull to coincide with the templates. Remember that the tumbler home at station E-E makes the hull wider at the water line than at the deck at this point. Try to obtain smooth, flowing lines between station points. When the hull is carved to your satisfaction, give it a good final sanding with 4/0 paper.

Part II will describe cutting the various lifts comprising the superstructure, adding the propeller-shaft housings and rudder, shaping the stacks, installing anchors and painting the hull with an initial coat of sealer.

(Continued next month)



TEMPLATES ON THIS SIDE OF CENTERLINE USED AT STATIONS E-E AND AFT

TEMPLATES ON THIS SIDE OF CENTERLINE USED FORWARD OF STATION E-E

HULL PAINTING SCHEDULE

Boot topping Red
 Stripe above boot topping White
 Hull above stripe (to paint line)..... Black
 Hull above paint line..... White

SUPERSTRUCTURE

Deckhouse sides White
 King posts, booms, spars, staffs, mast on stack Aluminum
 Breakwater and hatch coamings White
 Radar tower Aluminum
 Stack above band Blue
 Stack band White
 Stack below band (to paint line)..... Red
 Stack (paint line to deck)..... White

DECKS AND TOPS OF HOUSES

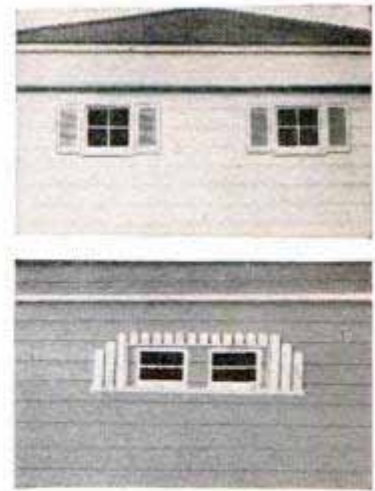
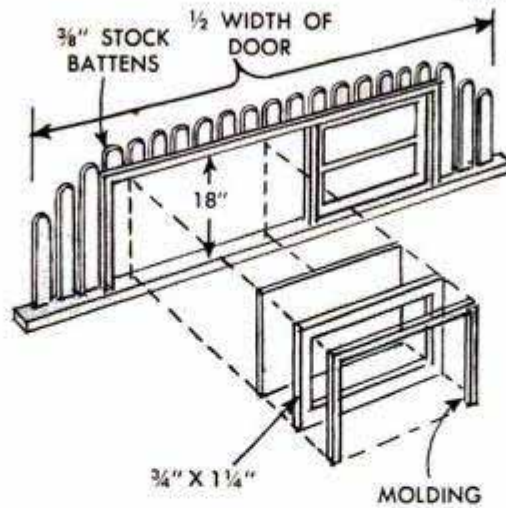
Upper deck Dark green
 Promenade deck, sun deck..... Dark green
 Hatch covers (forward) Light gray
 Hatch covers (aft)..... Dark green
 Top of forward deckhouses..... White
 Sun deck Dark green
 Sports deck Dark green
 Navigating bridge, wheelhouse, after-stack deckhouse, forward-stack deckhouse Dark green forward, aft white
 Wheelhouse top (aft of rail area)..... Dark green
 Wheelhouse top (within rail area) White
 Tops of houses White

FITTINGS AND MISCELLANEOUS

Rail (cap) Aluminum
 Rail and stanchions (other than cap)..... White
 Bitts Black
 Winches Medium gray
 Capstans Medium gray
 Anchors Black
 Lifeboats Aluminum
 Boat davits White
 Inclined ladders (stringers) White
 Inclined ladders (treads) Dark green

The monotonous, blank-wall effect of solid garage doors can be remedied easily, without cutting into the door itself, by attaching dummy windows similar to those shown in the illustrations. A frame to accommodate the simulated window sash is constructed from 1 x 2 stock, while the "panes" of the windows themselves are 1/8-in. hardboard framed in 3/4 x 1 1/4-in. pine, edged with a molding. To add a decorative note, 3/8-in. battens are used above the windows and at the sides. If the windows are to be set apart individually, imitation shutters may be included for a pleas-

Dummy Windows on Garage Doors Relieve Blank-Wall Effect



ing effect. If the windows are to be set apart individually, imitation shutters may be included for a pleas-

ing effect. If painted light blue and set in a white frame, the hardboard will suggest real glass.—Hi Sibley, Nuevo, Calif.

Method for Cutting Glass Produces Even Separation

Several years ago I cut glass by a method which usually resulted in the glass separating unevenly. After resting the glass on a smooth surface, I would place a straight-edge in position and score the glass, often going over it several times. I then would raise the glass and tap the underside along the scoring until it cracked. The disappointing results led me to order the glass cut where it was purchased—until a crafts-

man told me of the method he uses. Now, when ready to score the glass, I start the cutter at the far edge and draw it toward me in one, unhesitating stroke. I then raise the glass and tap the edge only where it is scored. As soon as the glass cracks slightly, I grasp it on both sides of the score and, by employing a slight twisting motion of the wrists, snap apart the two pieces.

Frank Vavrina, Washington, D. C.

Packaged Cereals Kept Crisp When Stored Near Hot-Water Heater



Owners of ranch homes and other dwellings which include utility rooms have an ideal means of keeping dry cereals crisp at all times. One homeowner simply hangs cereal packages over screw hooks on the inside of the door to the hot-water heater enclosure. Another method of hanging the packages is to use large paper clamps, one leg of which is screwed to the door or wall near the hot-water heater. Warm dry air that circulates in the heater compartment will keep the cereals dry and crisp.

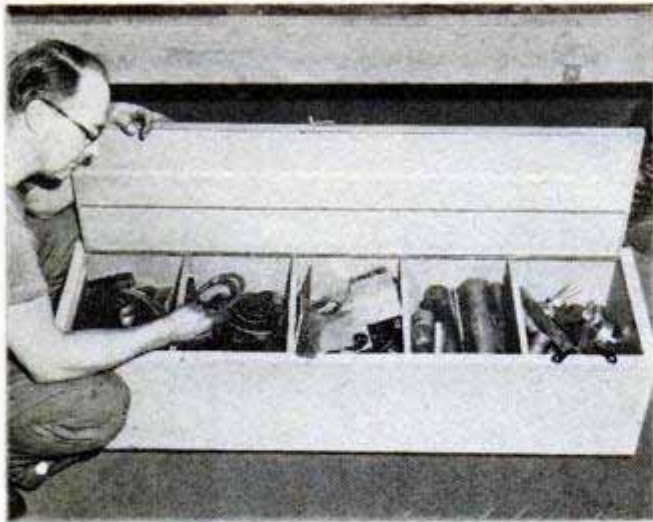
Ed Packer, LaJolla, Calif.

Emergency Crimping of Stovepipe

When installing new stovepipe and later, when replacing worn gutters, I found that uncrimped scrap pieces could be salvaged by crimping them with a pair of needle-nose pliers. By alternately gripping and twisting the edge around the circumference of the pipe, the diameter can be reduced sufficiently to allow the end to be fitted into a mated piece.

William Bernard, Cincinnati, Ohio.

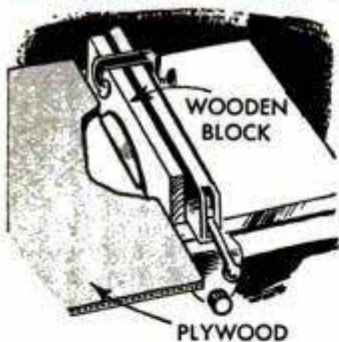
Gymnasium Locker Laid on Side Provides Workshop Storage Bin



Laid on its side as shown, a gymnasium locker provides L. V. Grover of Los Angeles, Calif., with a handy bin in which metal parts and leftover materials are stored. The original shelves, which serve to divide the bin into compartments, were left intact, although one or two may be removed to form larger compartments if necessary. Casters were fitted to the underside of the box so it can be rolled under a workbench out of the way.

Tom E. Stimson, Jr., Santa Monica, Calif.

Bench Saw Pinch-Hits as "Jointer"



If you don't have a jointer and are confronted with the task of edge-planing plywood panels, a slotted block, employed as a depth stop will permit your bench saw to do the job. As shown in the

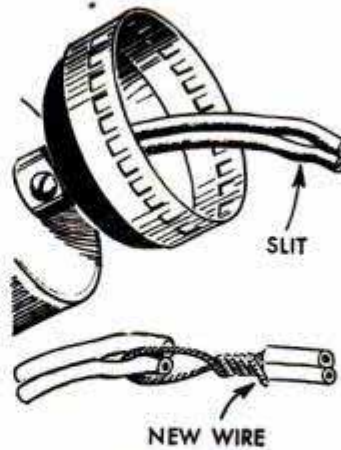
sketch, a block of $\frac{3}{4}$ -in. stock is trimmed to height of the saw fence. Then, using the fence as a guide, the block is lowered onto the saw blade to cut an arc one half the thickness of the blade in the side of the block. The block is clamped to the saw

That finishing touch . . .

You can give many woodworking projects a distinctive "old craftsman" appearance by chip-carving them with a neat, geometric design. Chip carving produces beautiful results, yet it's one of the easiest forms of wood carving. The requirements are simple: two homemade knives and a small package of patience. Next month's issue will contain a fully illustrated feature on chip carving—how to make the tools, lay out and chip away the design, and finish the wood. Don't miss it.

fence after which the edge of the plywood is guided along the block. This allows a skimming cut to be made by the exposed portion of the blade.

Rewire Ornamental Lamps Easily

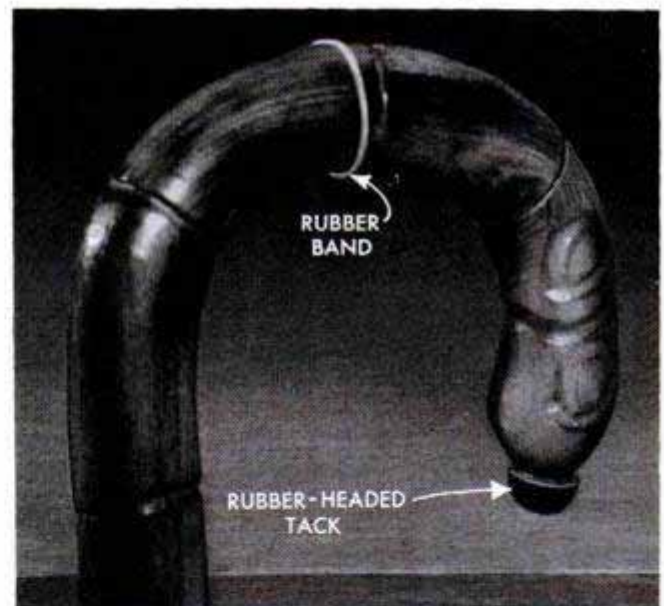


An ornamental table or floor lamp can be rewired quickly by using the old wire to pull the new wire through the base and socket. Pull up enough of the old wire to trim it off and cut a slit between the two wires about $\frac{1}{2}$ in. from the end. Bare

about 2 in. of the new wire and taper the insulation down to the wire. Twist the bared wire tightly, pass it through the slit in the old wire and fasten it securely in a loop. By pulling on the old wire at the lamp base, the new wire will follow through without catching.

J. L. McClay, Pasadena, Calif.

Rubber Tip Checks Sliding Umbrella



A rubber-headed tack driven into the end of the curved handle will help prevent an umbrella or cane hung on the edge of a table or chest from slipping off. Likewise, the addition of a small rubber band around the handle will keep an umbrella or cane from sliding off the rounded back of a chair.

☐ Holes or short tears in canvas may be repaired by using rubber cement to apply patching material. Weight the patch for several hours to be sure that it adheres.



This Plywood **WARDROBE**

"grows" with child

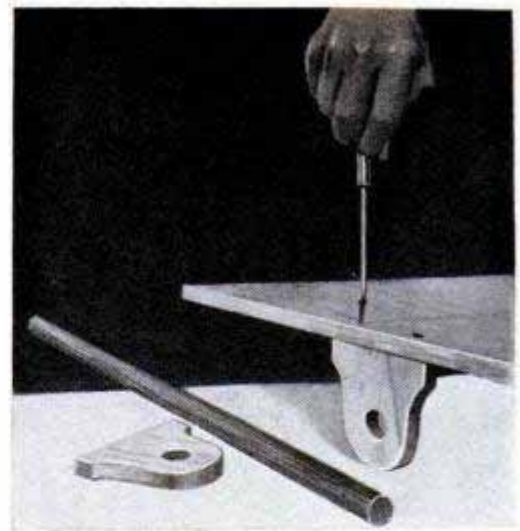
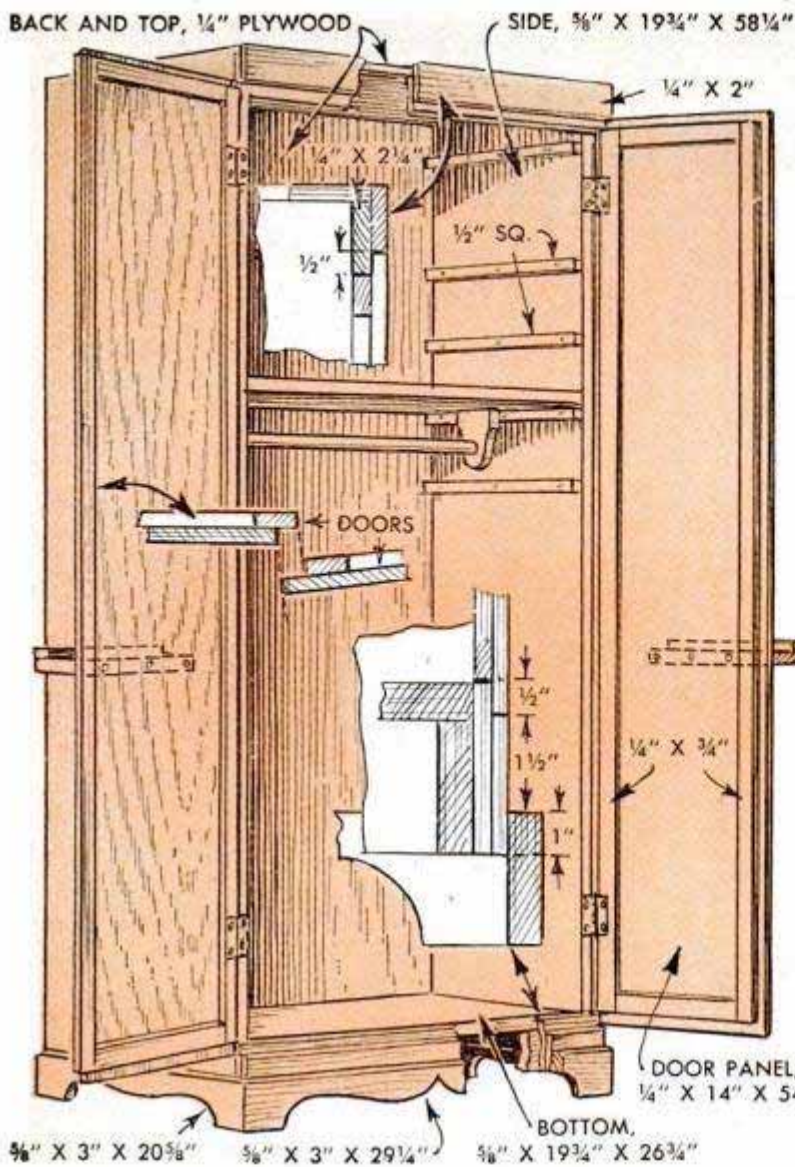
By Charles and Bertram Brownold

HERE'S AN attractive wardrobe that your child can use from the time she is old enough to hang up her own clothes until she is a young lady. The clothes-pole section of the wardrobe is expanded to suit the height of the youngster by raising the storage shelf and the attached clothes pole along with it. Five $\frac{1}{2}$ -in.-sq. cleats are screwed to each side of the cabinet so that the shelf may be raised in stages from a height of $2\frac{1}{2}$ or 3 ft. to a point which utilizes the full height of the cabinet for hanging clothes.

The appeal of the wardrobe to the youngster is enhanced by a blackboard mounted on the face of the double doors, and appropriate decoration may be added by fastening jigsawed letters and numerals to the doors, as shown in the upper right-hand photo. If desired, decals may be substituted for the jigsawed overlays or the doors left plain. The decoration can be changed easily to suit the varying interests of the child through the years.

The wardrobe is made primarily of plywood, as in the detail on the following page, although hardboard may be substituted for the door, back and top panels. The $\frac{5}{8}$ -in. plywood sides and the $\frac{1}{4}$ -in. back panel extend 1 in. below the top edge of the scrolled base. Top and bottom front rails consist of two lengths of $\frac{1}{4}$ -in. plywood, which are glued together as in the sectional details, or single lengths of $\frac{1}{2}$ -in. plywood rabbeted as indicated. The $\frac{5}{8}$ -in. bottom panel rests on cleats screwed to the inside of the base so that the top of the panel is flush with the top edge of the front rail. Corners of the base rails should be mitered if you intend to stain or varnish the wood. However, if the finished cabinet is to be painted, butt joints may be used, filling them with wood putty and sanding before painting.

The door panels are mounted on frames of $\frac{1}{4} \times \frac{3}{4}$ -in. stock. Note how the frames are positioned so that the double doors overlap when closed. The frames serve as dust stops at the top, bottom and center of the doors, and dust stops may be provided along the side of each door by tacking felt weather stripping to the edge of the side



Clothes-pole brackets are screwed to underside of shelf, above. Jigsawed letters, below, decorate doors of wardrobe



panel. Cut away the felt over the hinges so it does not keep them from closing. The two door handles double as a blackboard rail when the door is closed.

A plywood or hardboard blackboard can be made in one piece, set on the combination rail-handle and lifted off when the doors are to be opened. Or, it may be made in two pieces and fastened permanently to the doors. Cover the board with blackboard paint or three coats of flat-black wall paint. If you wish, a blackboard or slate of suitable size can be purchased, and its wooden frame painted to match the ward-

robe or the decorative jigsawed overlays.

Wooden clothes-pole brackets are fastened to the underside of the shelf as in the upper right-hand photo. These are located just far enough from the edges of the shelf to clear the cleats on the sides of the cabinet. Before obtaining a length of dowel for the clothes pole and drilling the holes in the brackets, check the hangers used for the child's garments to be sure that the diameter of the dowel is not too large for the hangers. The brackets may be redrilled to take a heavier dowel when the weight of the clothing makes this necessary. ★ ★ ★

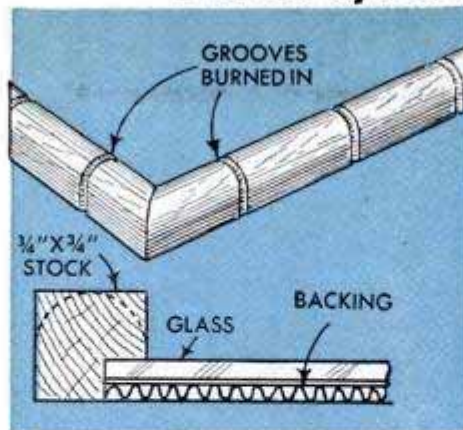
Cleaning and Handling of Plastics Important to Final Appearance

When making articles of acrylic plastic, you can enhance their natural beauty by cleaning and handling them properly. These plastics are covered with a masking paper when purchased and, to prevent excessive scratching of the surface while working, this masking should not be removed until the last possible moment. When the masking is removed an electrostatic charge which attracts dust is built up on the surface of the plastic. This charge

can be removed by wiping the plastic with a damp chamois. However, don't use a dry cloth as this will increase the charge. To wash a plastic surface, use soap and water and a grit-free chamois or sponge. Remove grease and oil with kerosene or white gasoline but don't use ethyl gasoline, lacquer thinner or carbon tetrachloride as these will soften the surface. Next apply wax to cover minor scratches and buff with a soft, dry cloth.—H. Suter, Daytona Beach, Fla.

By rounding the face of molding and then burning it at 3-in. intervals to represent joints, one craftsman produced "bamboo" picture-frame molding that closely resembles the real thing. Finished with light maple stain, the scorched grooves make the deception nearly perfect. The "branding iron" consists of a stiff wire shaped to fit over the molding, but formed slightly narrower. The wire is heated red hot and pressed against the wood to burn a shallow groove on three sides. The frames may be finished with either a coat of flat-

Imitation Bamboo Picture-Frame Molding Formed by Burning Wood With Hot Wire



drying varnish or clear shellac that is rubbed with fine steel wool and then waxed.

C. E. Verrill, Pasadena, Calif.

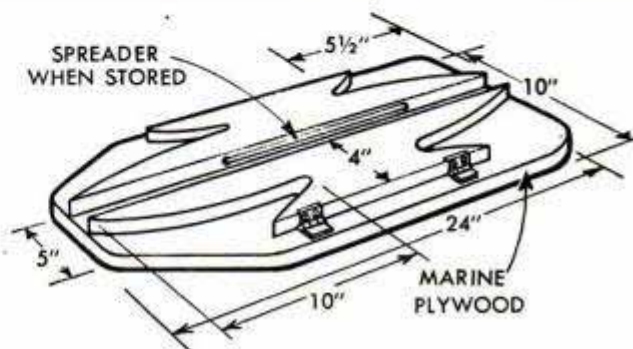
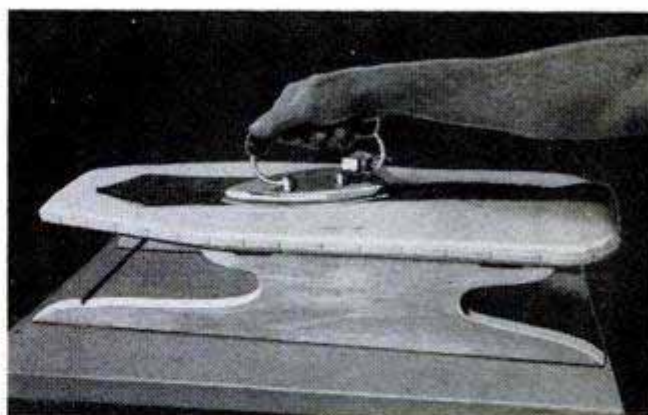
Spring Contacts on Voltmeter Speed Testing of Dry Cells



By adding two spring-brass strips to the terminals of a small voltmeter, you can use it for instant checking of dry cells without using lead wires or prods. A hole is drilled near the end of each strip for bolting to the meter terminals and the ends of the strips are bent at right angles in order to contact the top and bottom of a standard flashlight cell. Cells will be easier to insert if ends of the strips are bent up slightly with a pliers. Smaller cells can be tested by squeezing the strips between the thumb and forefinger to make the contact. Large dry cells which have both posts on the top also can be tested in this manner.

Folding Ironing Board for Travel Can Be Packed in Suitcase

Small enough to go into a suitcase, yet strong enough for all ironing needs, this ironing board makes a good traveling companion. The board is $\frac{3}{4}$ -in. marine plywood, 10 x 24 in. The corners of the board are rounded, and one end is tapered to 5 in. For steadiness, the 4-in. high legs are the full length of the board. To allow garments to slide over the board, the legs are cut in an anvil shape. The cutback from the narrow end of the board is 10 in., but from the rear is only $5\frac{1}{2}$ in. The legs are hinged to the board so there is a $\frac{3}{8}$ -in. gap between them when they lie flat, to allow storage space for a spreader used to hold the legs of the board in the open position. The spreader is a 9-in. metal rod with a $\frac{1}{2}$ -in. right-angle bend at each end, and is inserted in holes drilled 2 in. from the front of each leg. When the board is folded, the ends of the spreader are inserted in holes in the underside of one leg. A pad on top of the board is covered with cloth that is tacked in place.—Ed. Packer, Chicago.

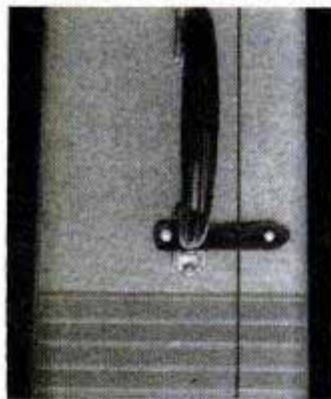


Rings and Bull's-Eye on Paper Plate Provide Easy-to-Make Target



The backs of paper plates will make ideal targets for air-rifle practice, since no backing is required as there is with paper targets. Simply draw the rings and bull's-eye on the bottom of the plate and nail to a tree or building as shown.

Safety Latch for Suitcase



Your suitcase or overnight bag will not fall open unexpectedly if you equip it with the simple leather catch shown in the photo. The catch is a 3-in. strap cut from an old belt or a woman's shoe and punched at both ends. Attach

the strap to the body of the suitcase with a roundhead machine screw and nut, and then set a similar bolt in the suitcase lid with two nuts, one on the inside and the other on the outside of the lid. Slip the end of the strap over the bolt head to lock the case. It may be necessary to slit the strap at the hole to accommodate the head.

Mrs. T. F. Watts, Charlotte, N. C.

Extending Auto-Battery Life

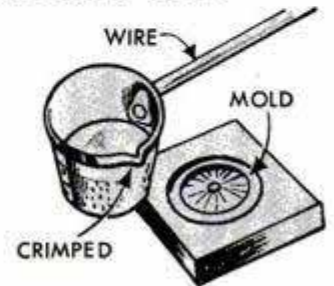
Automobile-battery life can be extended considerably if the battery is cleaned and refinished every six months. Remove the battery from the car and plug the small vents in the caps with match stems. Then thoroughly wash the entire casing. If corrosion is difficult to remove, use a soda-water solution to clean it. After this clean-

ing, any small cracks such as those frequently caused by overtightening of the mounting bolts will be discernible. Mend them by applying a soldering iron to the cracked area until sufficient melting of the hard-rubber casing occurs to fill the crack. Finally, coat the casing with rubber paint of the type used on tires. The battery will look like new and unnecessary damage by corrosion to both the battery and battery cables will be avoided.

Jack Ray, Los Alamos, N. Mex.

Tiny Ladle Used in Modelmaking Made From Thimble and Wire

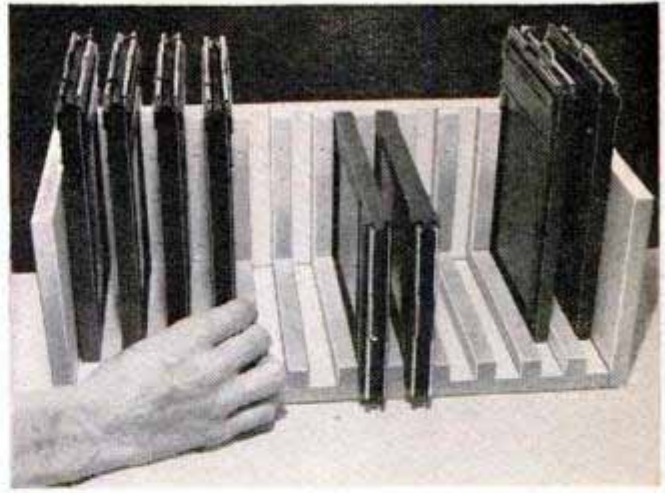
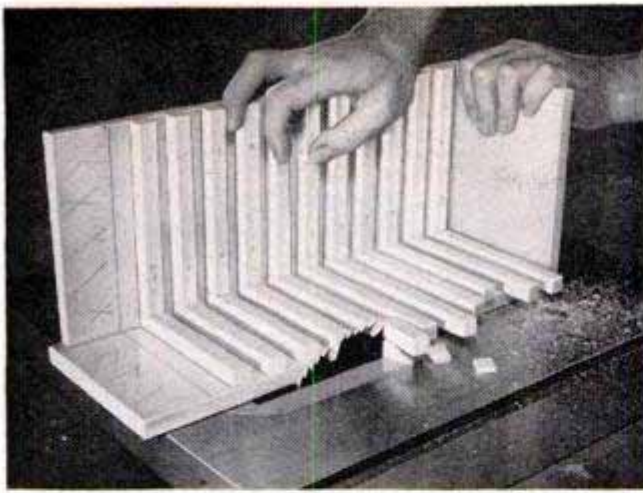
Finding an ordinary ladle too large for pouring lead into small castings, one modelmaker used a thimble and a short piece of stiff wire to make a tiny ladle suitable for the purpose. After the rim was crimped to form a pouring spout, a hole was drilled in one side of the thimble to take the end of the wire handle. To anchor the wire in the hole, a short tenon was filed on the end of the wire to permit peening it over on the inside of the thimble.—Lewis Booker, Louisville, Ky.



Talcum Powder Applied to Glass Furnishes "Bite" When Marking

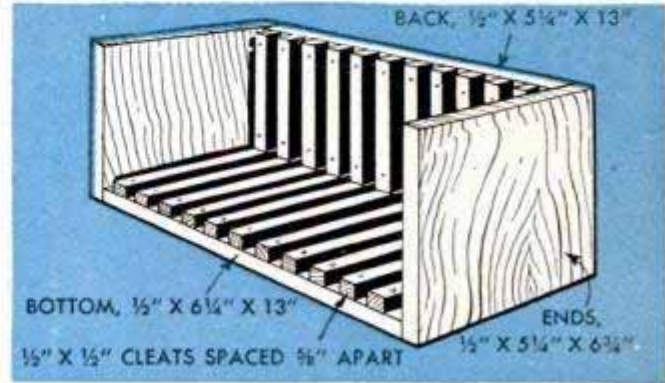
When using a grease-type marking pencil such as the type designed for writing on glass or other slick surfaces, it sometimes is almost impossible to make a mark on some jars or bottles, even when they have been washed with soap and water. A simple trick for overcoming this condition is to dust a little talcum powder on the glass. One or two applications will supply sufficient abrasive on the glass to assure positive results with the most detailed markings.





STORAGE RACK

FOR CUT-FILM HOLDERS



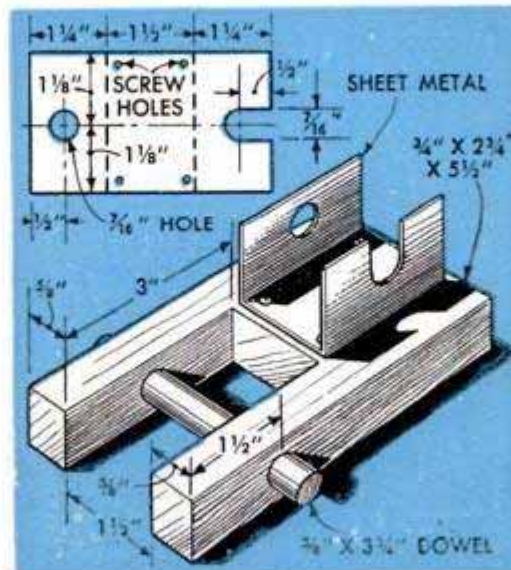
The problem of keeping track of cut-film holders, as well as that of storing them, was solved easily for one photographer by the construction of a rack from scrap $\frac{1}{2}$ -in. stock. The rack, which is nothing more than a box lacking the top and one side, is fitted with cleats spaced $\frac{5}{8}$ in. apart. Ends of the side and bottom originally are cut longer than is required to simplify finishing the last slot accurately. After the box is assembled with glue and nails, $\frac{1}{2} \times \frac{1}{2}$ -in. cleats are nailed to the side and bottom,

using a spacer $\frac{5}{8}$ in. wide. The cleats, also cut slightly longer than required, are later trimmed evenly on a power saw in the manner shown. Following this, the side and bottom are trimmed and the remaining end attached. In use, loaded 4 x 5 holders are placed in the left side of the rack, while empty ones are stored in the center. Holders containing exposed film may be placed upright in the right side of the rack as indicated in upper right-hand photo.

Walter Haase, Hartford, Conn.

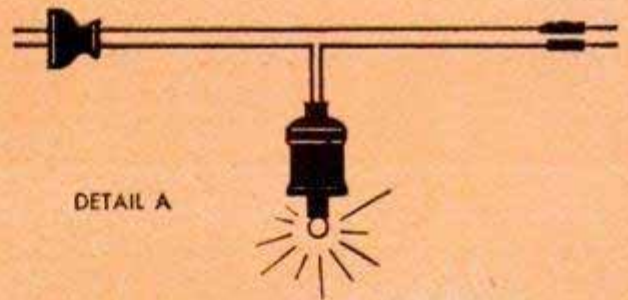
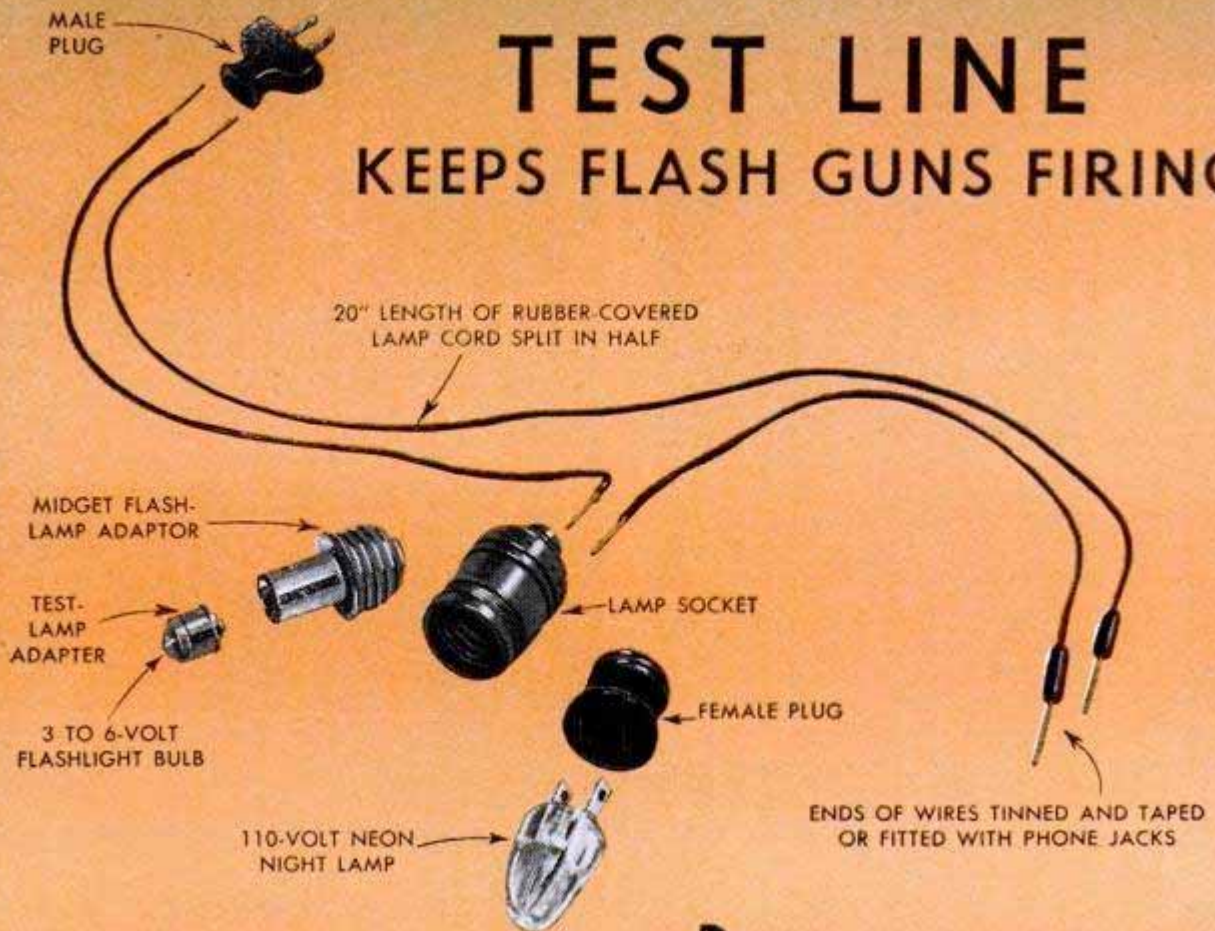
Inexpensive Winder Speeds Loading of Film-Cartridge Reel

This simply constructed 35-mm. bulk-film winder, for use either in a darkroom or inside a changing bag, can be made inexpensively in practically any home workshop. Made from $\frac{3}{4}$ -in. stock, the base is slotted to form two 3-in. prongs, each of which is drilled in the center to take a $\frac{3}{8}$ -in. dowel. A small piece of sheet metal, drilled near one end and slotted at the other as shown, is bent to hold the reel from a film cartridge and attached to the base with screws.—John J. Rea, Urbana, Ill.



In use, roll of film is placed between prongs of the base and a dowel inserted to hold in place. Film is engaged in reel slot and wound with right hand. Single notch cut in rim of reel permits counting each turn

TEST LINE KEEPS FLASH GUNS FIRING

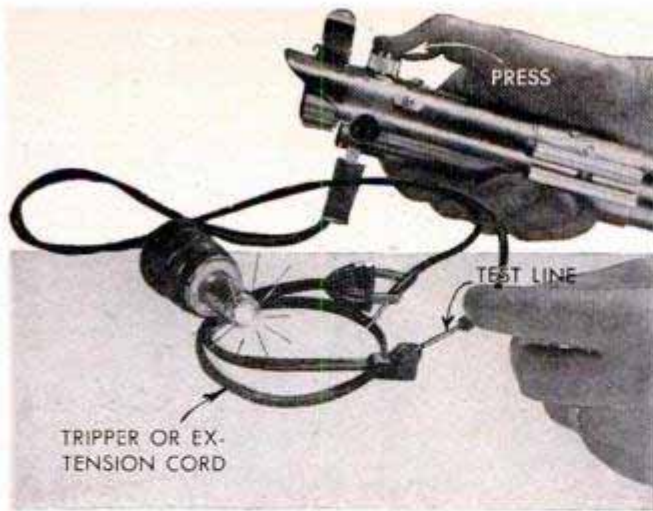


By Frank P. Fritz

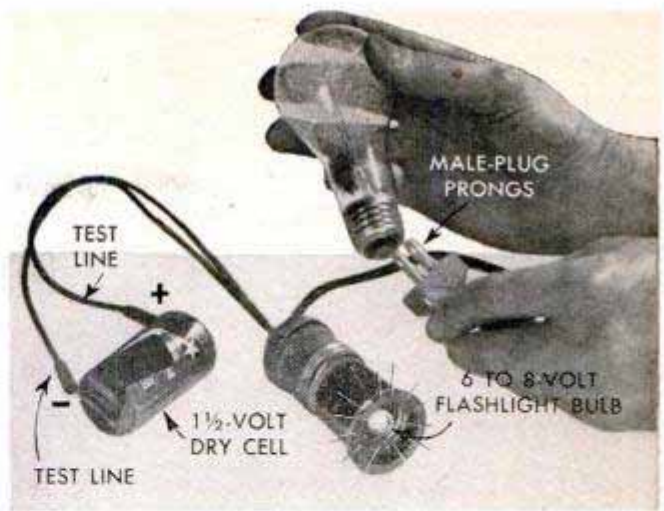
ALTHOUGH a good photographer tests all of his equipment before leaving home, trouble may occur on the job. This simple "series" test cord, with essential accessories, will locate quickly circuit breaks and point out flash failures. All the necessary parts to assemble the test cord, as well as the method of assembly, are indicated in the diagram above. Series wiring means that all elements in the circuit must be connected to complete the cycle of current. Thus, in detail A above, when the test cord is plugged in, the phone jacks would have to touch, completing the circuit, before the test lamp would light. The methods of trouble shooting with this test line are described in the photo captions. Note also that flash-bulb cord polarity may be tested with this.

To test flash-gun switch and flash socket, insert test lamp in gun and push button. If the test lamp lights, that portion of the gun is good. Then test sockets on the side of the gun, as they may be bad

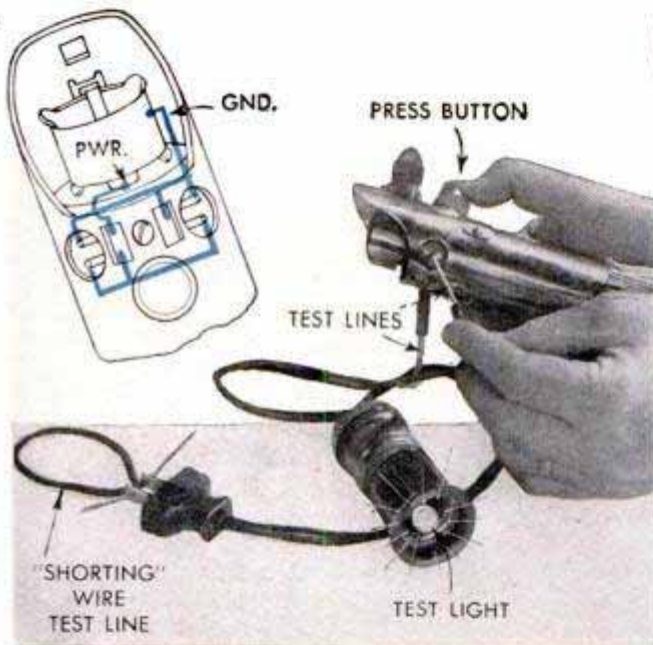




To test cords, tripper, side light and extension, insert male plug in flash-gun socket. Insert bare wire in one side of cord plug, touch other end of cord with other bare wire. If lamp does not light, touch other side of plug. If lamp lights, that side of line is good. Test other side of cord in same fashion



To test flash bulbs, fasten test cord to plus and minus ends of a flashlight dry cell. Touch prongs of male plug to base of flash bulb so that one prong touches base and other touches side of base. If test lamp lights, flash bulb is good. Do not test the flash bulbs on a 110-volt current as they will flash



To test flash-gun sockets, connect prongs of male plug with short wire. Insert test wire in one side of plug receptacle on flash gun. With other test wire, touch bottom prongs of sockets. If test lamp lights, connections are good. Repeat test, using other plug receptacle and top prongs of flash-gun sockets



To test side lights, insert male plug in power on flash gun. Insert one test wire in socket receptacle and touch bottom socket prongs with other wire, touching flash-gun button to apply power. Lighted test lamp indicates good connections. Move test wire to opposite receptacle to test top prongs of sockets

Toning Down Scratches and Abrasions on Old Negatives

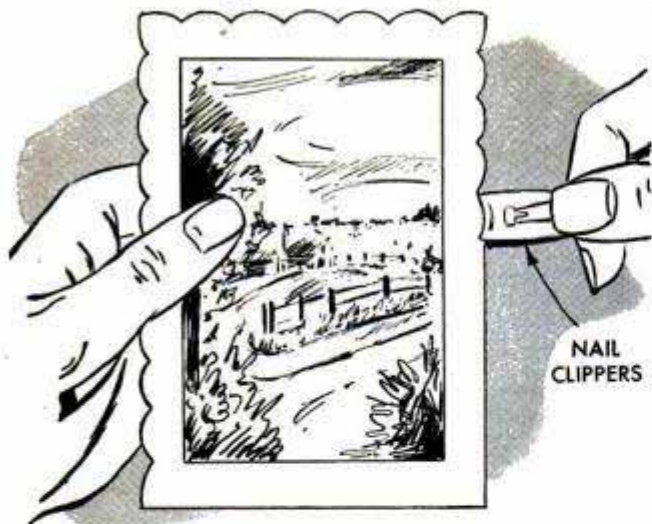
The use of oil from the human skin for toning down fine scratches and abrasions on old negatives is a common practice among professional photo finishers. Unlike petroleum jelly, which often proves sticky and difficult to handle, oil obtained by rubbing the finger across the forehead, nostrils, or bridge of the nose is so fine that it is barely visible and will not pick up lint as do heavier oils. It is applied directly to the negative with the finger in a brisk rubbing motion across the abrasion. In those cases

where it is necessary to use petroleum jelly, the jelly should be applied and removed with lens-cleansing tissues. The tissues are more absorbent than cloth and will leave less lint. In removing the jelly from the negative, wipe off as much as possible to eliminate any stickiness.

Robert Florian, Chicago.

☐ To simplify changing of storm and screen doors, replace regular hinge pins with pins having an eye formed in the upper end.

"Deckle" Edges for Snapshots



Here's a simple, quick way to give snapshots attractive scalloped edges similar to those provided by a professional photo finisher. Ordinary fingernail clippers, used in

the manner illustrated, is all that is necessary to do the job.

George Kapitan, New York City.

Spreader Tightens Clamp-On Lamps

The clamp-on type of photoflood lamp is often found to be weak in spring pressure so that it does not clamp securely. To exert extra clamping pressure, notch a small strip of wood or plastic to fit over the widest part of the wire arms.



By forcing this strip toward the narrow end, outward pressure is exerted on the arms to bring additional clamping pressure on the jaws. Friction holds the strip in place.

Popular Mechanics Bookshop

"What Can I Make, Dad?"

That's a question every father has heard hundreds of times. Too often it's left unanswered. A man leans over his bench, intent on a project, while a boy stands at his side begging for something to do with his own inexperienced hands. For 40 years *The Boy Mechanic* has been the standard handbook for young craftsman. Now it's available in a completely new edition that contains 500 fascinating projects, 500 answers to that old question, "What can I make, Dad?" *The Boy Mechanic*, by the editors of *Popular Mechanics*, tells in easy-to-read instructions, photos, diagrams and drawings how to make all kinds of things. Here's a fine, practical introduction to almost any hobby—chemistry and metalwork, engineering and carpentry, archery and carving. Price is \$2.95 from Popular Mechanics Press, 208 E. Ontario St., Chicago 11.

Adventure!

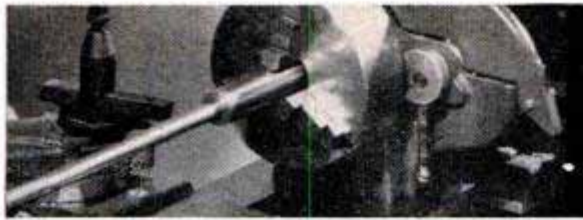
There's real excitement in the parade of American history—especially when it's told in terms of prairie schooners and canal boats, stagecoaches and balloon ascensions. You'll live the adventures of all kinds of fascinating people from the Daniel Boone trail blazers to the pioneers of jet transportation in *Popular Mechanics Picture History of American Transportation*. Here's a book that traces the movement of our people down the first Indian trails, along the waterways and across the prairies in a long train of Conestoga wagons. You'll find some humorous memories of local transportation

—cable cars, horse-drawn streetcars and early subway systems. You'll ride the trains of America, from the little wood-burning Tom Thumb of 1830 to the streamlined giants of tomorrow. You'll drive the Duryea brothers' first horseless carriage and join the parade of American automobiles. And you'll watch the development of American aviation, from the time George Washington watched a balloon ascension in 1793 to the road of a modern jet plane. Here are 320 pages of American history told in exciting text and more than 100 photographs, drawings and diagrams. The price is \$5.00 from Popular Mechanics Press, 208 E. Ontario St., Chicago 11.

A Time of Magic

Christmas is the excitement of youngsters hanging up their stockings, the warm memories of an old-timer, the wrapping of secret workshop projects. It's the spicy smell of fruit cake and the stickiness of popcorn balls. It's hanging your heart on an evergreen tree along with all the decorations saved from other years. You'll find thrilling fun for all the family in *Popular Mechanics Christmas Handbook*. Here are gift projects for everyone, decoration ideas for holiday hostesses, instructions for making beautiful greeting cards and advice on selecting and decorating your Christmas tree. It's time now to start planning your holiday season, and here's a book you'll use for many years. Clothbound, it's only \$2.00 from Popular Mechanics Press, 208 E. Ontario St., Chicago 11.

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SHOP NOTES

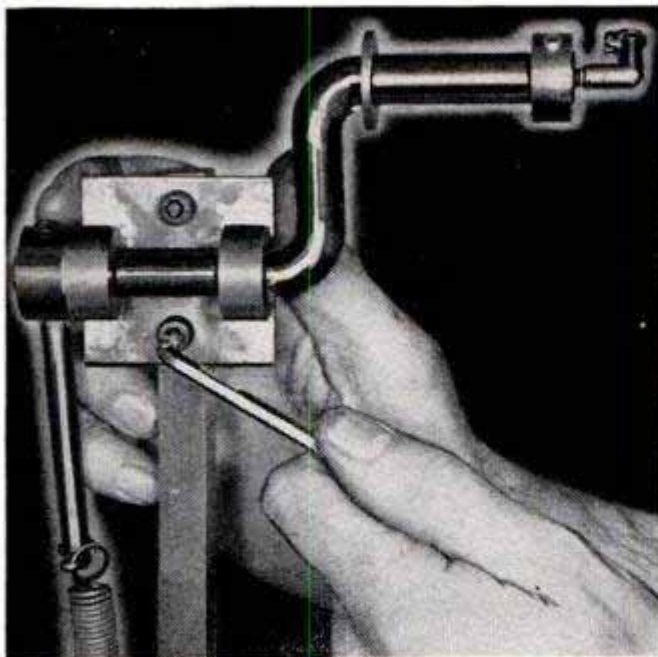
Direct-Drive BELT SANDER

By Hugh Smiley, Jr.

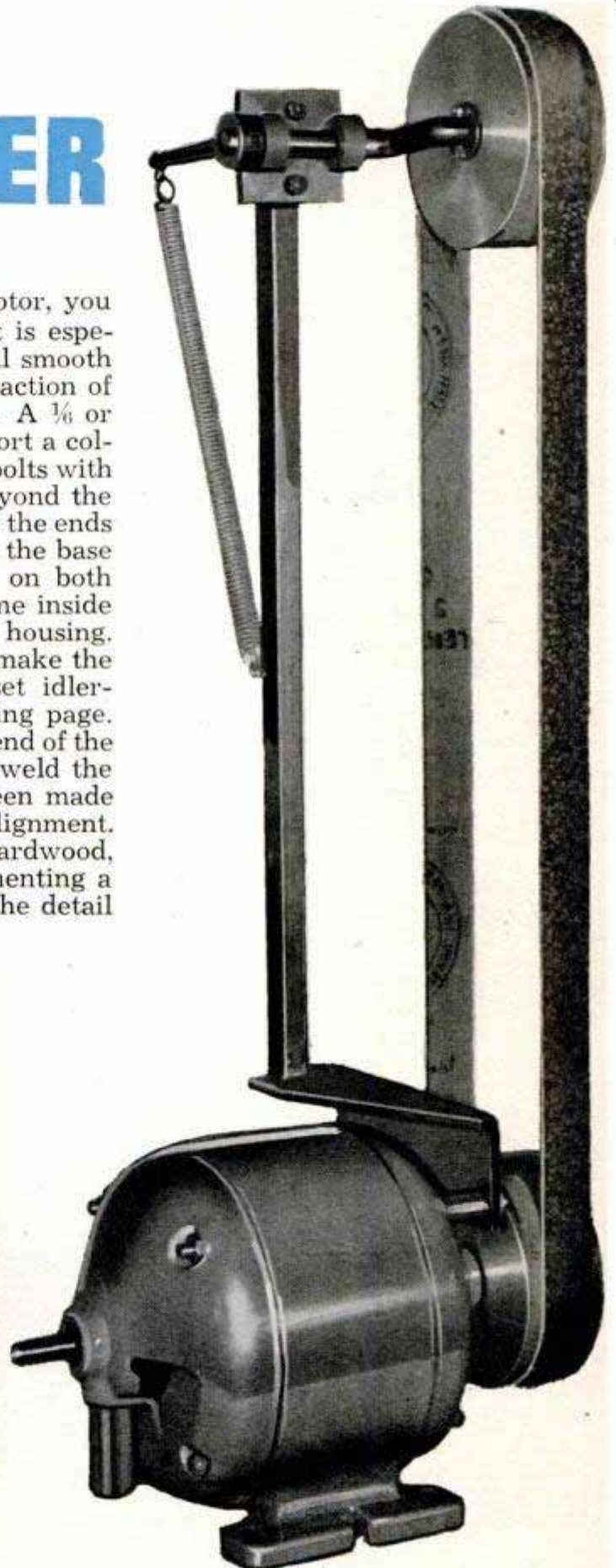
FOR LITTLE more than the cost of a motor, you can have a direct-drive belt sander that is especially designed for freehand sanding. It will smooth and polish irregularly shaped pieces in a fraction of the time required to finish them by hand. A $\frac{1}{8}$ or $\frac{1}{4}$ -hp., 1750-r.p.m. motor is adapted to support a column and base by replacing the top housing bolts with longer ones that will extend about 2 in. beyond the motor housing. The base is drilled to fit over the ends of the two bolts, spacers being used to hold the base away from the housing. Nuts are turned on both bolts to bear tightly against the motor frame inside the end bell to relieve undue strain on the housing.

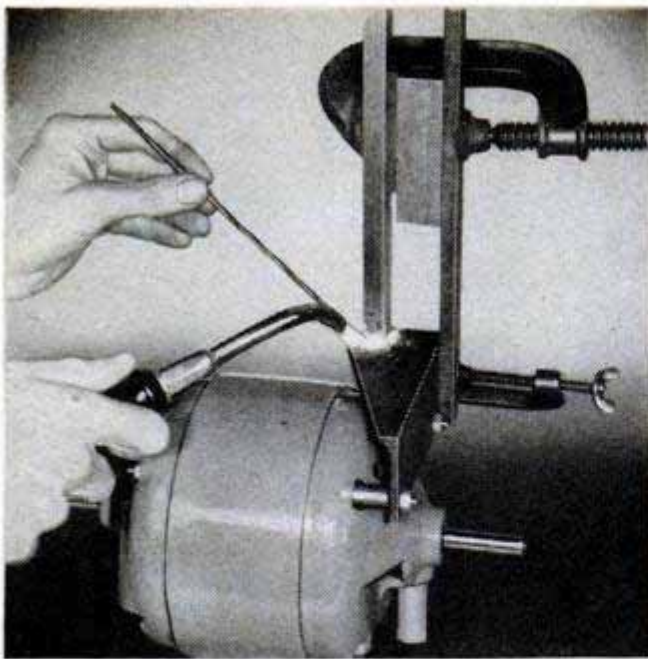
After the base is mounted on the motor, make the head-assembly plate, spring arm and offset idler-pulley shaft as in the detail on the following page. Then fasten the head assembly to the upper end of the column with socket-head setscrews. Don't weld the column to base plate until pulleys have been made and can be temporarily set up to check alignment.

The pulleys are made of fine-grained hardwood, and can be given a "factory" finish by cementing a thin aluminum disk to each face. Note in the detail

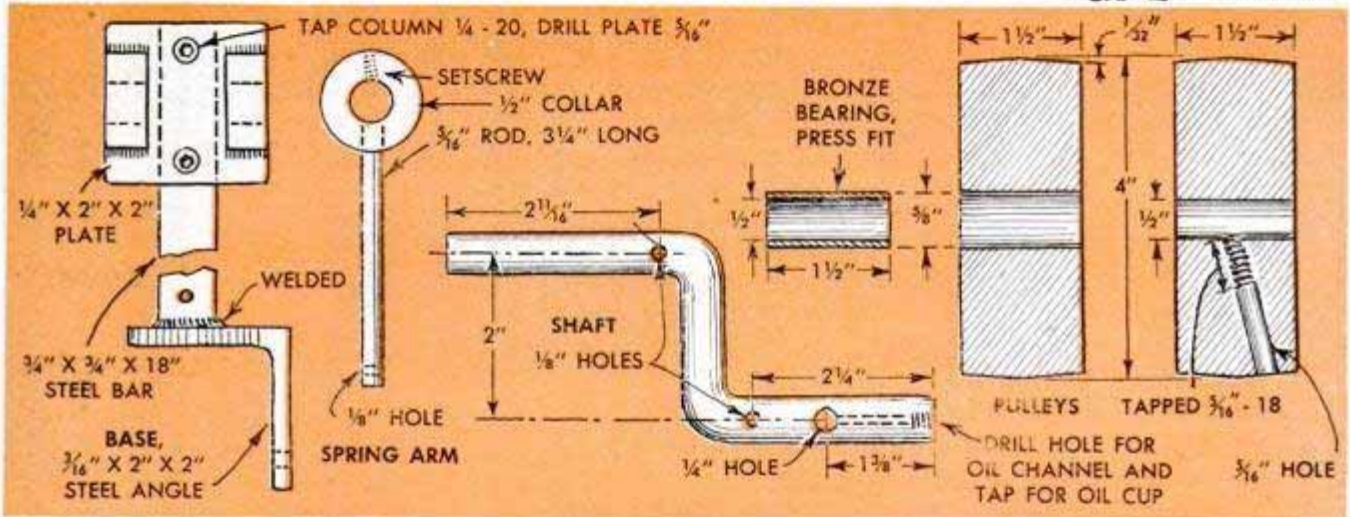
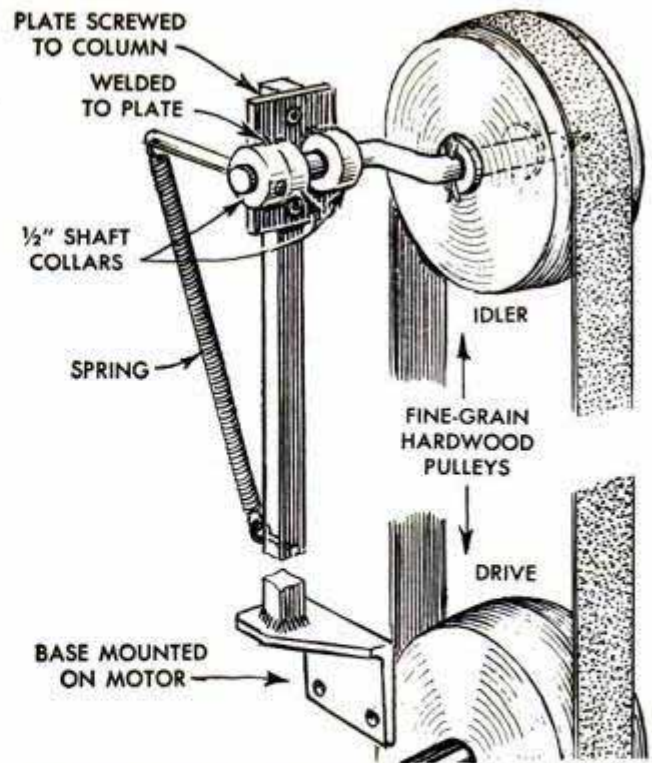


Head assembly is attached to top of the column with socket-head setscrews. Note oil cup at end of shaft





Column is held in position for welding by clamping to temporary vertical support and required spacers



how the pulleys are crowned $\frac{1}{32}$ in. to keep the belt running in the center of the pulleys. The idler pulley is fitted with a bronze bearing and the driving pulley is locked to the motor shaft with a socket-head setscrew. In the latter case, the setscrew is turned into an undersize hole drilled at an angle in the pulley.

Before permanently mounting the idler pulley, insert a $1\frac{1}{8}$ -in. piece of pipe cleaner into the oilhole drilled and tapped in the end of the shaft. Pack the intersecting $\frac{1}{4}$ -in. hole with felt, and keep the felt pressed in place until the pulley is slid over it. Screw a small oil cup into the tapped hole and fill with SAE 20 oil.

The sanding belts are made from 1-in. cloth-backed abrasive belting. The belting is cut diagonally so that the splice is at an angle of 45 deg. or more. Allow a $\frac{1}{4}$ -in. overlap and, before cementing the ends of the belt together, scrape all abrasive material from the lapped portion of the belting to obtain a smooth joint.

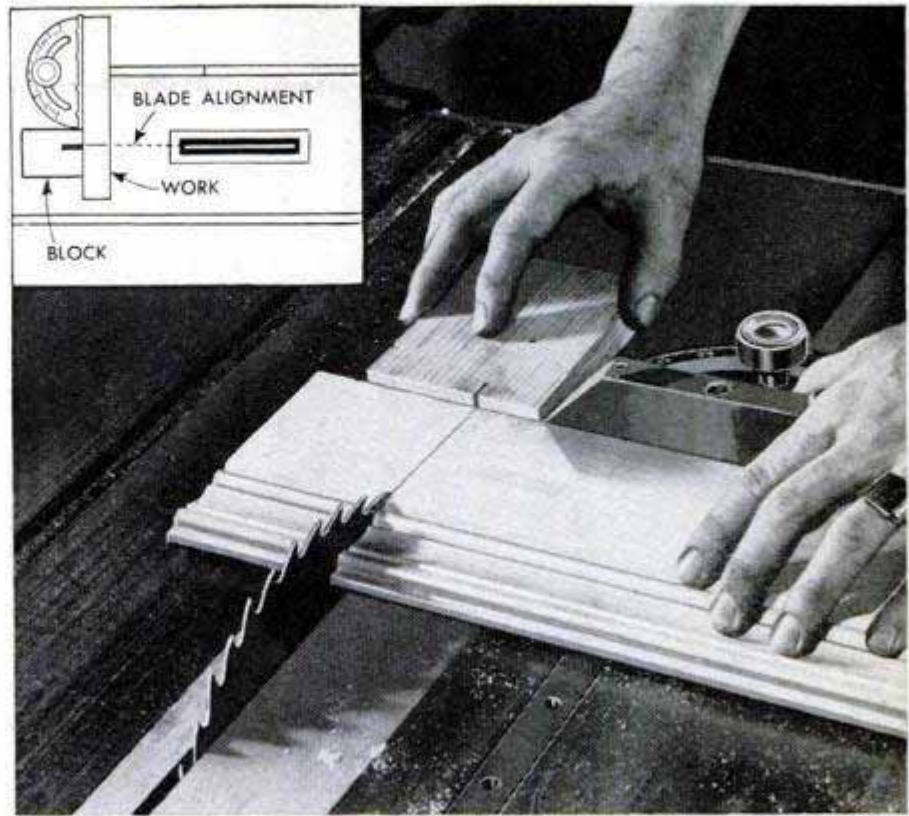
With enough spring tension to keep the belt from slipping, turn the motor by hand to see if the belt runs in the center of the pulleys. If not, the pulley alignment can be corrected by shimming either side of the base plate with thin washers or by cutting down the length of one or both of the spacers. Spring tension is adjusted by loosening the spring-arm setscrew and moving the arm in relation to the offset section of the shaft. ★ ★ ★

Treatment for Scuffed Suede Gives Shoes New Look

After suede shoes become scuffed and old looking, they can be given new life by rubbing them with a clean cloth dipped in vinegar. Rub the scuffed parts especially well. Allow the shoe to dry thoroughly, then brush vigorously with a suede brush. As a result of this treatment, the scuffed places will disappear and the shoes once again will look like new.

Slotted Block Aligns Stock on Circular Saw

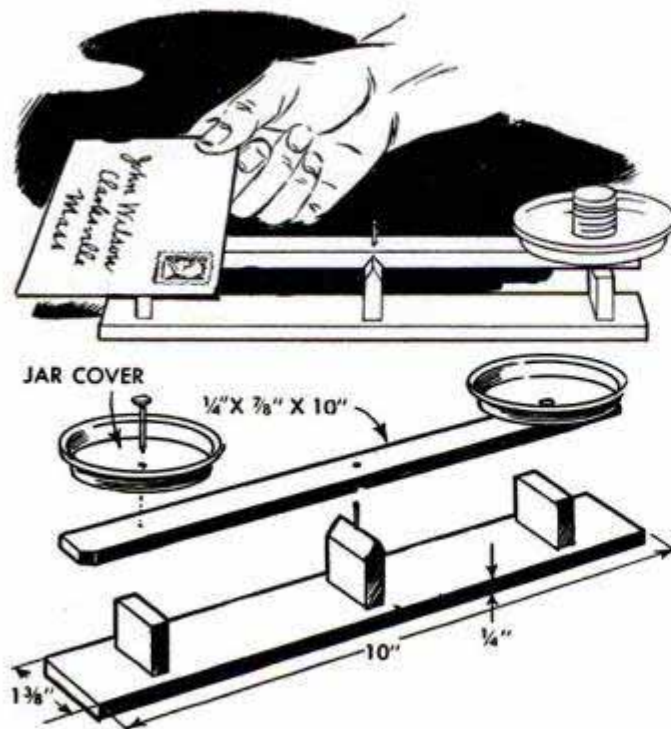
Every craftsman is aware of the difficulty and uncertainty of aligning a pencil mark on wide stock with either the side or center of a circular-saw blade. This guide block assures an accurate cut every time. Place the block against the end of the crosscut guide which is nearest the saw blade. Holding the block tightly against the guide, run it into the saw blade until the cut is about $\frac{1}{2}$ in. deep. To use, pencil the dimension line on the stock, place the piece against the crosscut guide and bring up the block against the end of the guide as pictured. Then align the pencil mark with either the center or the side of the slot in the block. In some cases it will be more convenient to align the mark with the side of the slot rather than attempt to center it.



Make the cut as illustrated and the piece will be the length required.
Mrs. Carolyn Clark, Chicago.

Jar Covers and Wood From Crate Used to Make Letter Scales

Having an occasional need for a letter scale, I made one from two fruit-jar covers and a few pieces of scrap wood. After a piece had been cut to serve as a base, two short pieces were nailed upright near the ends to provide stops, while a slightly long-



er one was nailed in the center of the base. The longer piece was beveled on top to form a pivot for the balancing bar, with a brad driven in the edge as shown. I made the bar narrower than the base and, after nailing the lids to the ends, measured the piece carefully to determine the exact center. I then cut a shallow groove across the underside of the bar at the center point and drilled a small hole through the center of the groove so the bar could be slipped over the brad. Copper pennies, weighing about $\frac{1}{8}$ oz., or eight to the ounce, are used in place of regular weights. It was discovered later that the scale also is handy for weighing cooking ingredients.

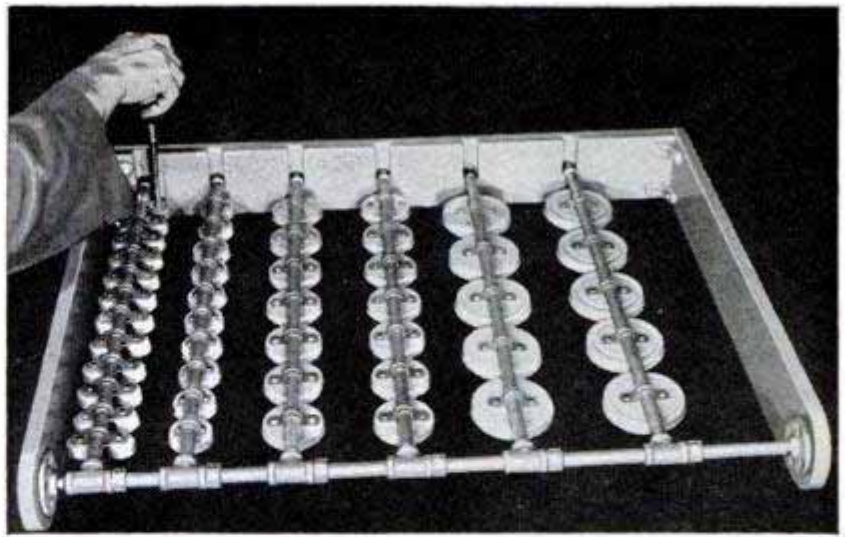
P. Casperson, El Cajon, Calif.

Felt Dauber Applies Layout Ink

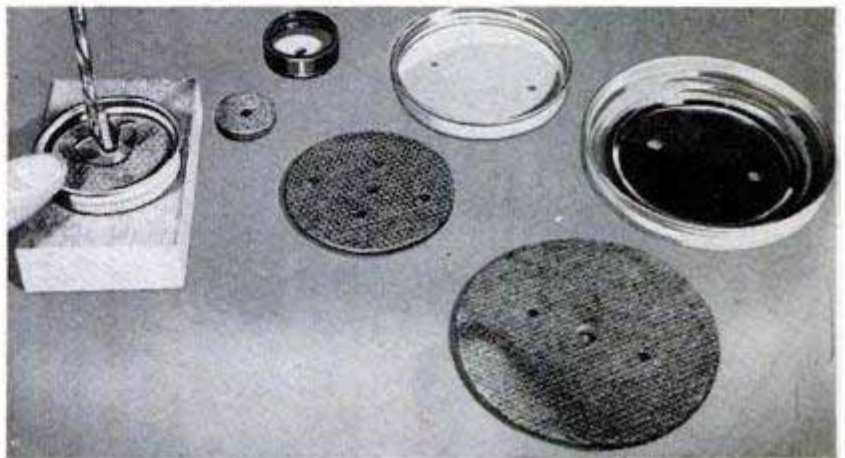
When cleaned thoroughly, the felt dauber from a discarded liquid-shoe-polish bottle will come in handy for applying layout ink used in engraving plants and machine shops more smoothly than the ordinary inking brush. In addition, the polish bottle is a good container for the fast-drying ink, since the wooden stopper effectively prevents evaporation.

L. E. Fannon, Huntington Park, Calif.

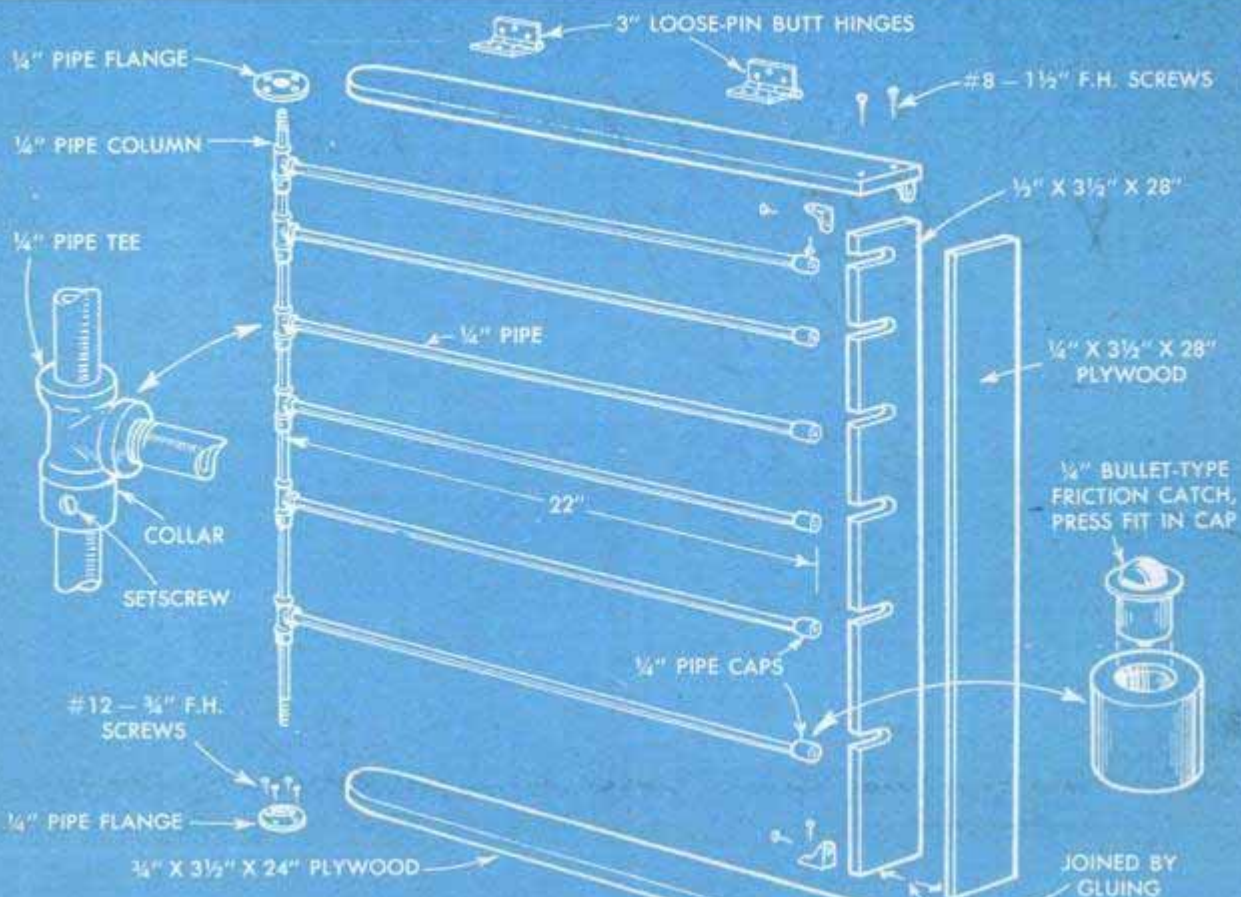
A 1/4-in. plywood back is attached with screws. The cabinet is hung with two loose-pin butt hinges so that it may be removed from the wall if necessary. Next a length of 1/4-in. pipe is cut to fit between the top and bottom members of the cabinet. The ends are threaded for flanges. Then six lengths are cut from 1/4-in. pipe and the ends threaded. One end of each is fitted with a cap and each cap is drilled and fitted with a bullet-type catch as in the detail. Next, six pipe tees are reamed so that they slide over the pipe column and the arms are screwed into the tees. Now, with six collars of a size to fit over the pipe column you're ready to assemble the unit. First, screw a flange onto one end of the column and tighten it, then slide one of the arms over the column and follow with a collar. Proceed in the same manner with the remaining five arms. Note that each collar has a setscrew and can be locked at any point on the column. Screw on the other flange and mount in wall cabinet. When mounting be sure that bullet catches engage the cover piece with sufficient friction to hold arms in place. ★ ★ ★

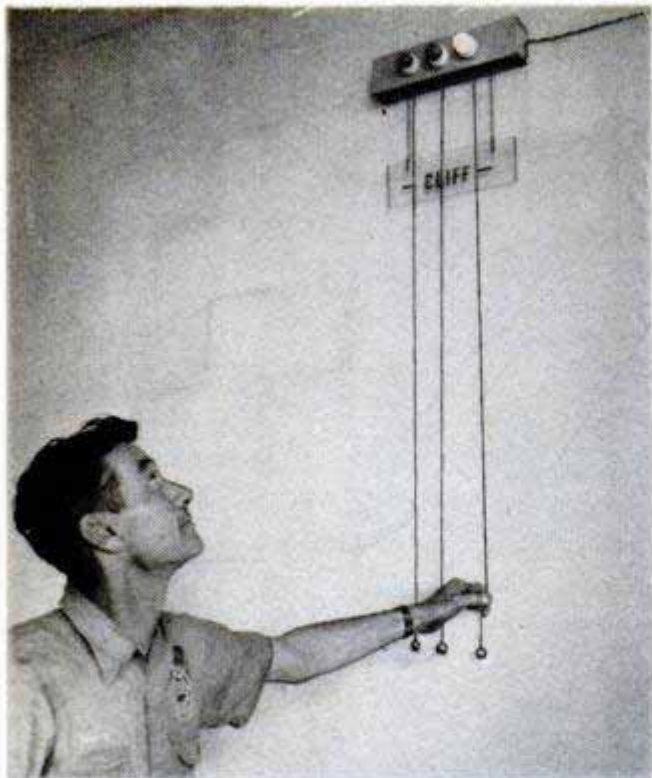


Covers of the glass jars are attached to the pipe arms with pipe hangers. Conduit hangers serve for the smaller jars. Note how free ends of arms enter slots cut in end piece of the hanging cabinet



Covers of glass jars are reinforced with disks cut from hard-pressed board. Holes for the stove bolts holding the covers to the hangers are drilled accurately in the simple jig shown at the left in the photo

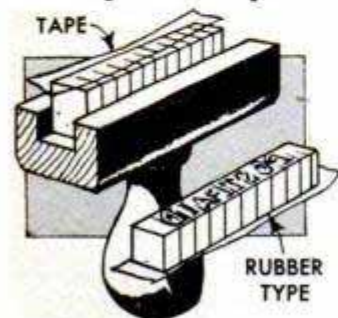




Mechanics Signal Work Status With Colored Lights

To enable the service manager to tell at a glance from almost any part of the garage the work status of each mechanic, one garage owner installed high above each work stall a set of three lights of different colors. These are controlled separately by long cords hanging within easy reach. Red, yellow and green bulbs are used, each having a different meaning. If a mechanic is busy and expects to remain so for an indefinite period, the red light is kept on. A yellow light, on the other hand, is a signal that a mechanic is nearly finished with a job and soon will be ready for another. If the green light is shining, it means the mechanic has finished and is idle. The system not only frees the manager from making frequent check ups in person of the work progress of each mechanic, but also allows him more time for other duties.

Tape Holds Line of Rubber Type Ready for Repeated Use



To simplify changing lines of type in rubber stamps, one shipping clerk sets each line in the holder with bottom ends of the type up. A narrow strip of cellulose tape then is applied to hold the line assembled so that it can be used when needed without resetting the type each time. This

method is better than using rubber cement or glue to hold the type as the tape may be removed at any time and the type redistributed without need of special cleaning.

G. E. Hendrickson, Argyle, Wis.

Bleeder Screw Releases Air Lock In Car-Heater Line

On many cars, draining and re-filling the water jacket results in an air lock in the top of the car heater. Although manufacturers have drilled small holes in the heater-out-



let pipes to permit releasing this air lock, the hoses must be loosened and moved aside to expose the holes, often damaging the hoses and causing leaks. One mechanic solved the problem by drilling and tapping a hole in the tubing just beyond the hose and fitting it with a machine screw. A washer cut from gasket material seals the opening, and the screw simply is removed to bleed the air from the line.

Clinton R. Hull, Costa Mesa, Calif.

Excessive Rotor Gap Reduces Spark

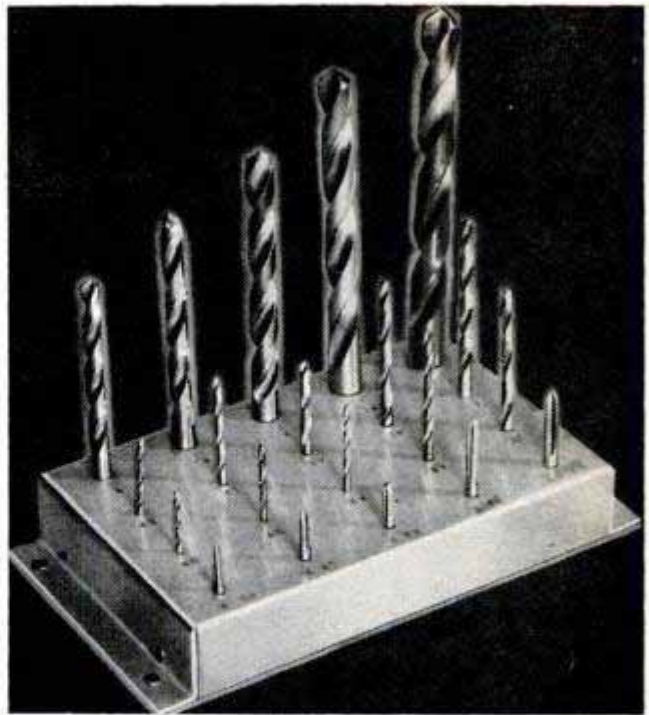
When a car misses regularly on acceleration from any speed and when ordinary ignition checks fail to show anything wrong, careful auto mechanics check the gap between the rotor and the contacts in the distributor cap. An excessively wide gap, as shown in the left-hand view, can cause the miss but it isn't always easy to locate the "weak" plug resulting from this defect. To check the rotor gap, place a small quantity of wax on each contact and replace the cap. After turning the engine over several times with the starter, remove the cap, whereupon a close examination will reveal the low contact. If the gap varies more than a few thousandths of an inch from the others, it should be replaced.



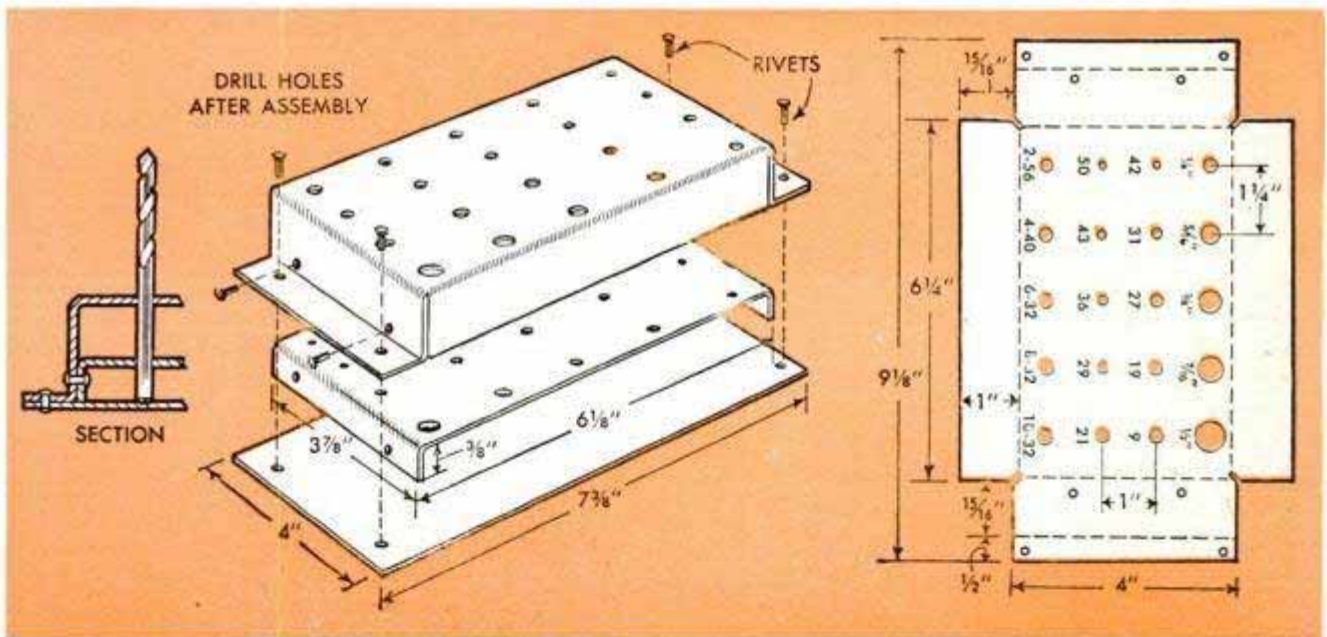
DRILL and TAP STAND

By Karl Greif

The convenience of selecting tap and body drills without consulting a chart makes this stand a worth-while project. Lay out the top section on $\frac{1}{16}$ -in. aluminum and cut to size, relieving the corners for end overlap. Before bending, pilot-drill the hole positions. Stamp the drill sizes and fill with a marking pencil. Bend the inside shelf ends to make a sliding fit, slip into place and drill the rivet holes. Rivet the bottom plate into position. Using a drill press, drill holes through the top and shelf successively, using the drills to be stored.

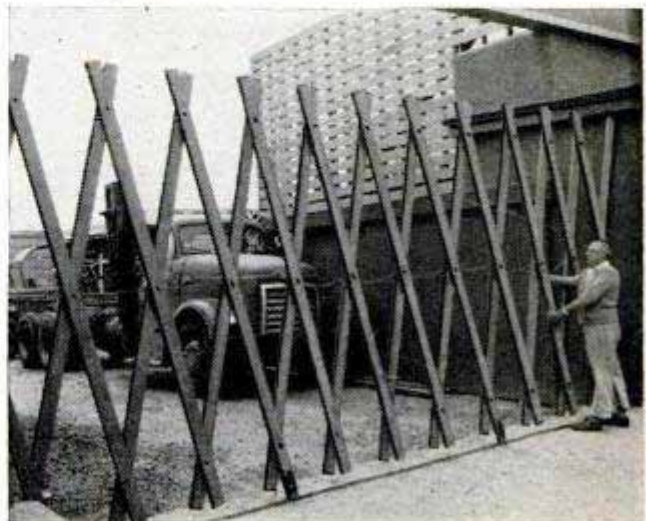


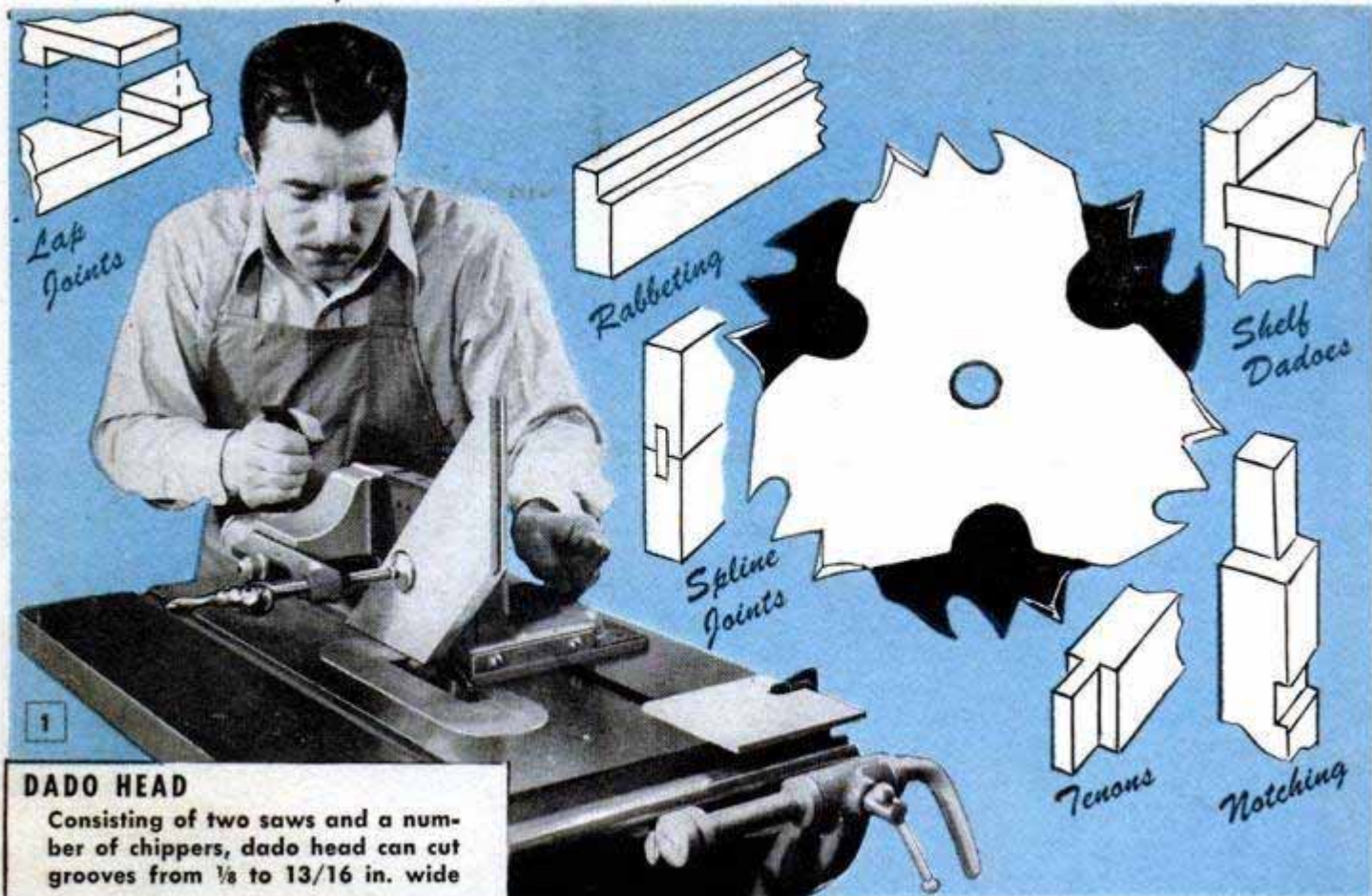
Combining popular tap sizes with tap and body drill for each size, this stand is fine school-shop item



Giant "Nursery" Gate Closes Truck Parking Lot

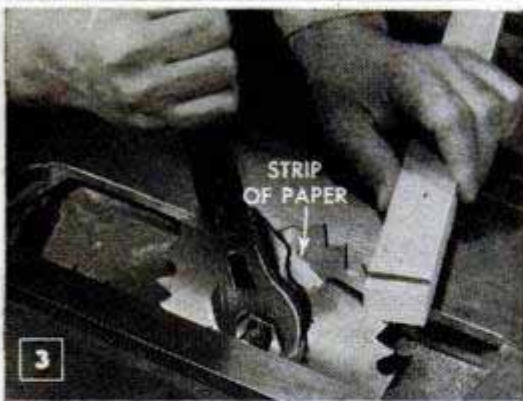
The accordion-type nursery gate has grown up. Now made of 10-ft. 2 x 4s, it is swung across the driveway of a commercial parking area to keep unauthorized vehicles from passing through. The 4-in. pivot bolts at the top and bottom are located 12 in. from the ends of the boards. The center pivot bolts are 5 1/2 in. long, since they also must hold 23-in. lengths of chain that regulate the uniform opening of the gate. At the fixed end of the gate, the lower 2 x 4 is pivoted in an angle iron. At the top, a carriage bolt in the 2 x 4 slides in a 24-in. slot formed by two strips of flat steel screwed to a 2 x 6. Two casters sliding in a groove ease gate opening and closing.





DADO HEAD

Consisting of two saws and a number of chippers, dado head can cut grooves from $\frac{1}{8}$ to $\frac{13}{16}$ in. wide

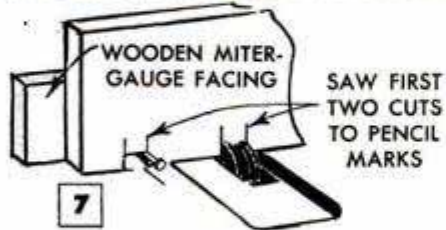
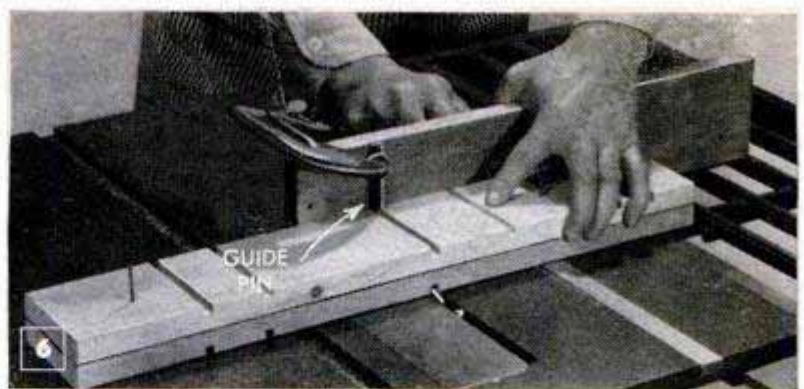
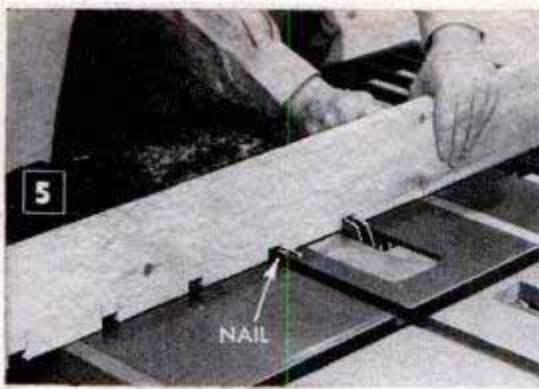


How to Use Your DADO HEAD

By Sam Brown

WHEN PURCHASING a dado head for your power saw, you can select from several styles. The spring-set head, shown in the photos at the left, has the advantage of low cost and easy maintenance. If you have an 8 or 10-in. saw, a 6-in. dado head is the proper size to use. Each blade of a dado saw commonly cuts a $\frac{1}{8}$ -in. kerf, while the addition of chippers increases the width of cut to $\frac{13}{16}$ in. by sixteenths. One saw plus one $\frac{1}{16}$ -in. chipper can be used to make a $\frac{3}{16}$ -in. groove. In any combination, the chippers next to the saws should be arranged to fall in saw gullets, Fig. 2. When mounting a dado head put the saws and chippers on the arbor one at a time, keeping the chippers evenly distributed around the circle. To remove the head, take off the outside saw, spin the chippers together and remove in one group. Two saws together will cut a $\frac{1}{4}$ -in. groove. This can be increased slightly by inserting paper between the saws, Fig. 3. Gummed paper washers, Fig. 4, also can be used.

Cutting duplicate dados: Fig. 6 shows the best method of duplicating dados when the cuts are not regularly spaced. Make the first piece by cutting the dados to pencil marks. Use this piece as a pattern and nail it to a second piece. Now, with a nail



DUPLICATE DADOES

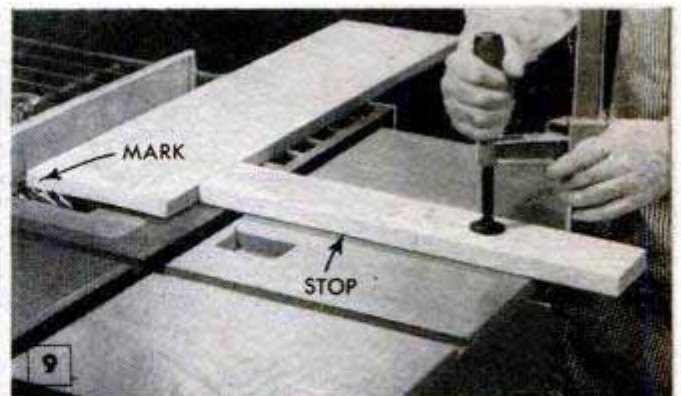
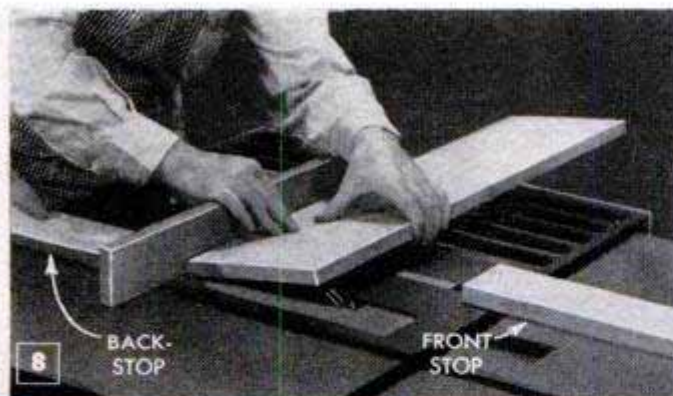
By using first piece as a pattern, duplicate dados can be cut. This pattern is nailed over other pieces to be dadoed and cuts are located with a guide pin. Left, equally spaced dados are worked by fitting nail guide in first of two cuts made to pencil marks. By setting each cut in turn to this guide pin, as many evenly spaced cuts as needed may be made

or wooden guide pin to engage the pattern, the second piece can be cut to duplicate the first. When cuts are spaced regularly, the first two cuts on the first piece are made to pencil marks. Then, with the dado head engaged in the second cut, a nail is placed along the edge of the first cut and driven into the miter-gauge facing, Fig. 7. By setting each cut to this guide pin, as many evenly spaced cuts can be made as desired, Fig. 5.

Blind dados: Accurate work on blind dados requires the use of stops, Fig. 8. These are located, as in Fig. 9, with the work placed alongside the saw which is set at the required cutting depth. A back stop, Fig. 10, is useful as it locates the cut and prevents any kickback when the work is lowered over the saw. When dadoing one

or two pieces, it is practical to work to pencil marks instead of using positive stops.

Corner joints: The dado head is used to make several kinds of corner joints, the most popular being the simple rabbet joint shown in Figs. 11 to 13. The dado-head setup should be a little wider than the thickness of the work, Fig. 11. For short-run work a narrower setup can be used, making the rabbet in two passes. The dado-and-rabbet joint, Fig. 14, is popular for drawer backs. In short-run work, piece B is cut with the work flat on the table, using the same setup as for part A but changing the depth. This has a disadvantage in that any variation in work thickness will affect the thickness of the tenon. To assure a constant tenon width, the cut should be made with the tenon side against the fence,

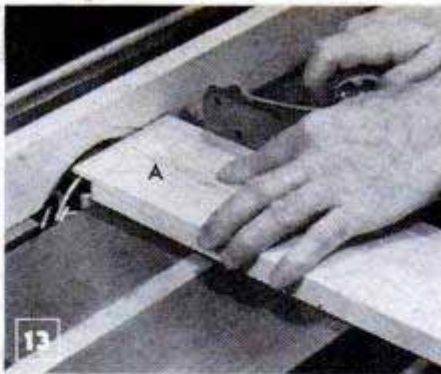
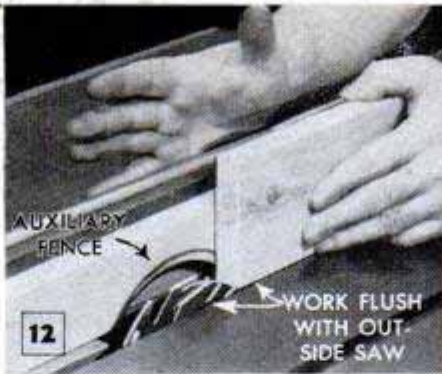
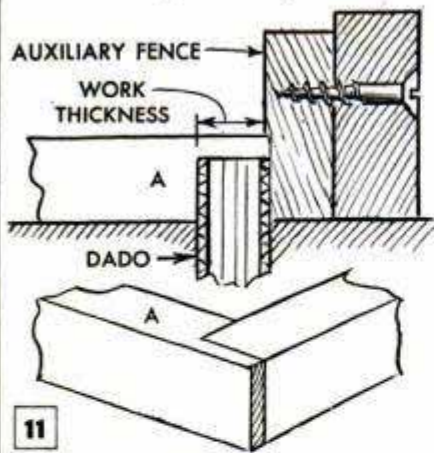


BLIND DADOES

Grooves stopped short of one or both ends of the work are called blind dados or gains. Stops assure accuracy and the starting stop also prevents kickback when work is lowered onto the dado blade. For offhand work it is more practical to work to pencil marks instead of using positive stops

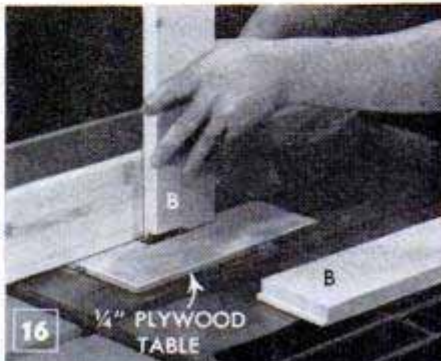
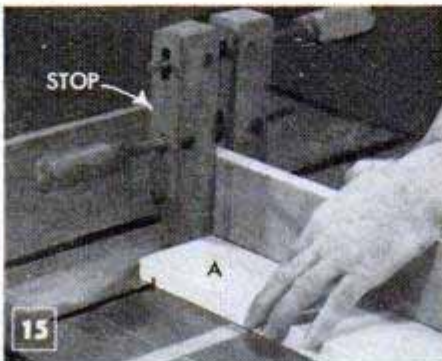
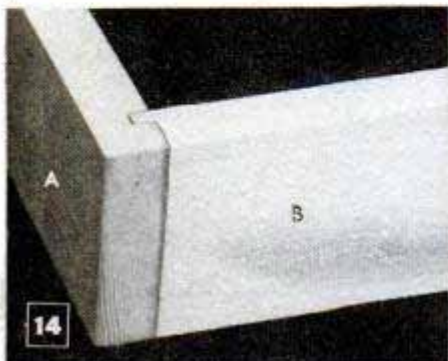


Dado Corner Joints



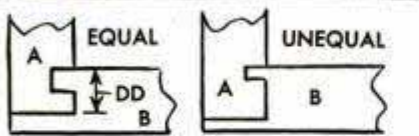
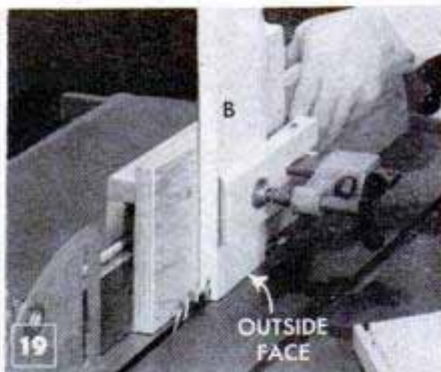
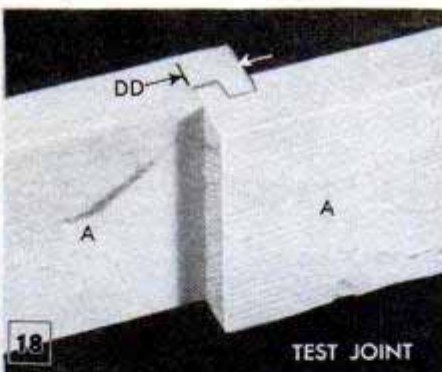
RABBET JOINT

Rabbet joint is useful and easy to make. Only part A is cut. Fig. 12 shows fence, used as stop, being set to work thickness. A faster setup is made with stop clamped to miter-gauge facing or saw table



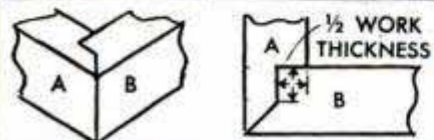
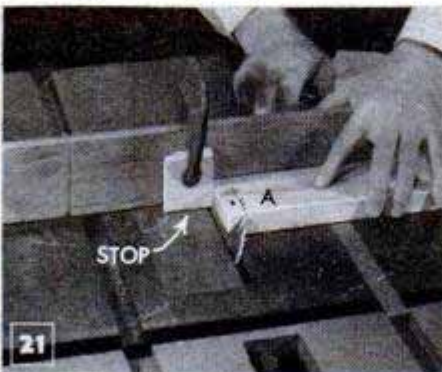
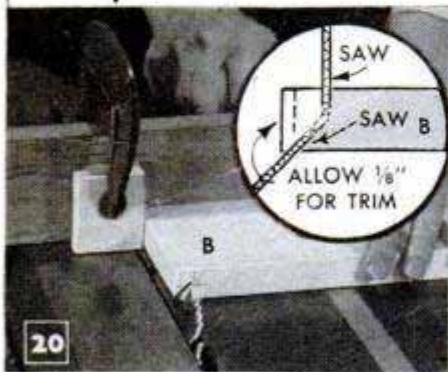
DADO AND RABBET

Dado and rabbet uses 1/4-in. dado for 3/4-in. stock. Part A should be cut first. For one or two joints, Part B is worked flat on the table. For production runs, an end cut, Fig. 16, is more accurate



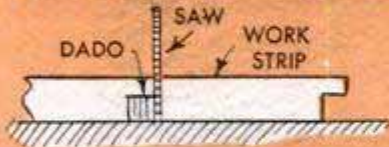
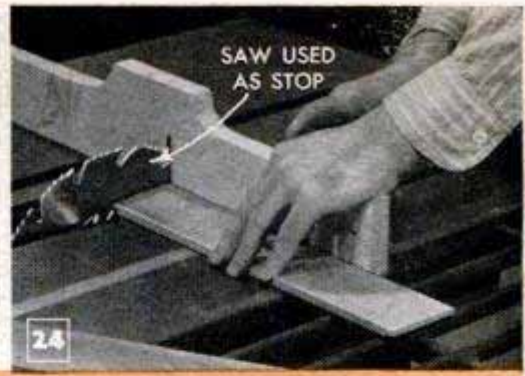
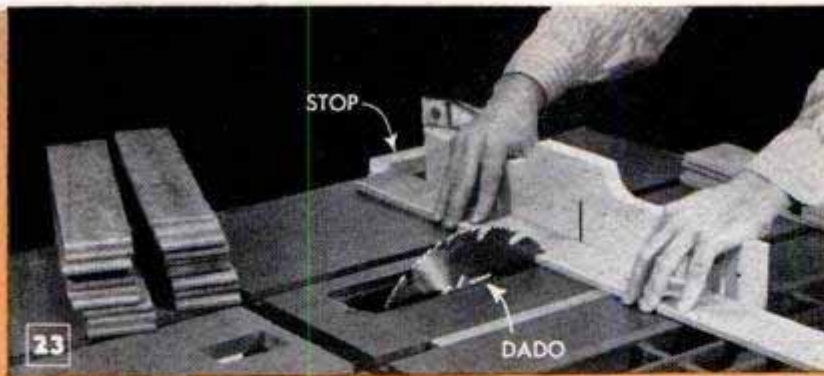
DOUBLE DADO

Double dado with equal dados is easiest to set up but unequal construction is stronger. Double-dado spacing is maintained by using tenon jig as stop for piece A and as work-holding device for piece B



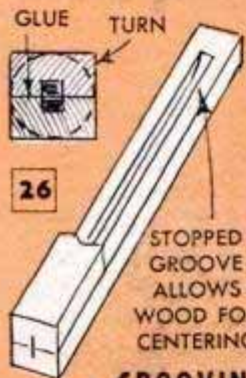
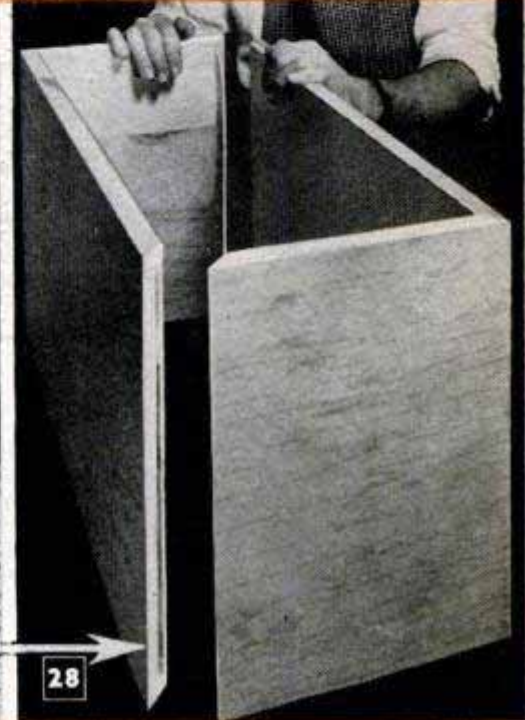
RABBET AND MITER

To get a clean miter, rabbet and miter should allow 1/8 in. per joint overlength. Part B is cut entirely by sawing. Part A is sawed at 45 deg., after which dado head is used to cut rabbet, Fig. 22



STRIP CUTTING OF RABBET JOINT

Strip cutting of rabbet joint is useful timesaving technique for mass cutting. Combined saw and dado cut work to length and make rabbet in one pass. Rabbet at opposite end of piece is cut by using saw blade as stop



GROOVING

Lamp-table construction features grooving with $\frac{3}{8}$ -in. dado for wiring groove and single saw for splined miters. In grooving for spline keep the cut well to inside for maximum strength

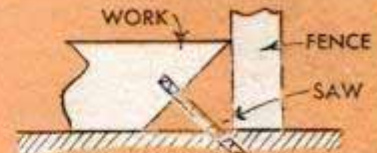


Fig. 16. If an auxiliary table or insert is used, cuts of this kind can be made free-hand. *Caution:* Never freehand narrow work over the regular dado insert because the large opening may let the work drop through to the table. The double-dado and rabbet-and-miter joints shown in Figs. 17 to 22 are useful dado joints, but are subject to variations both in proportions and working methods. Methods of cutting them are learned more readily by practice than by reading, and working methods often depend on the number of pieces to be cut. Time can be saved by combining a saw with the dado head, Figs. 23 and 24, to cut the work to length and make the rabbet in one pass.

Grooving: Grooving is just another name for dadoing, although it is used specifically

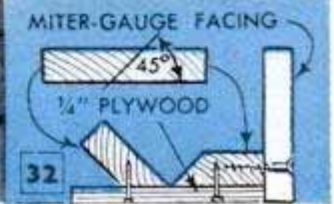
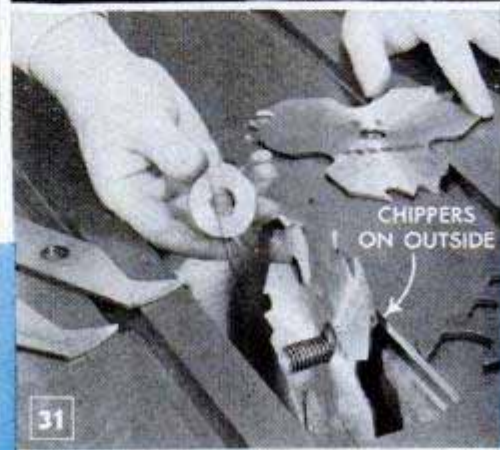
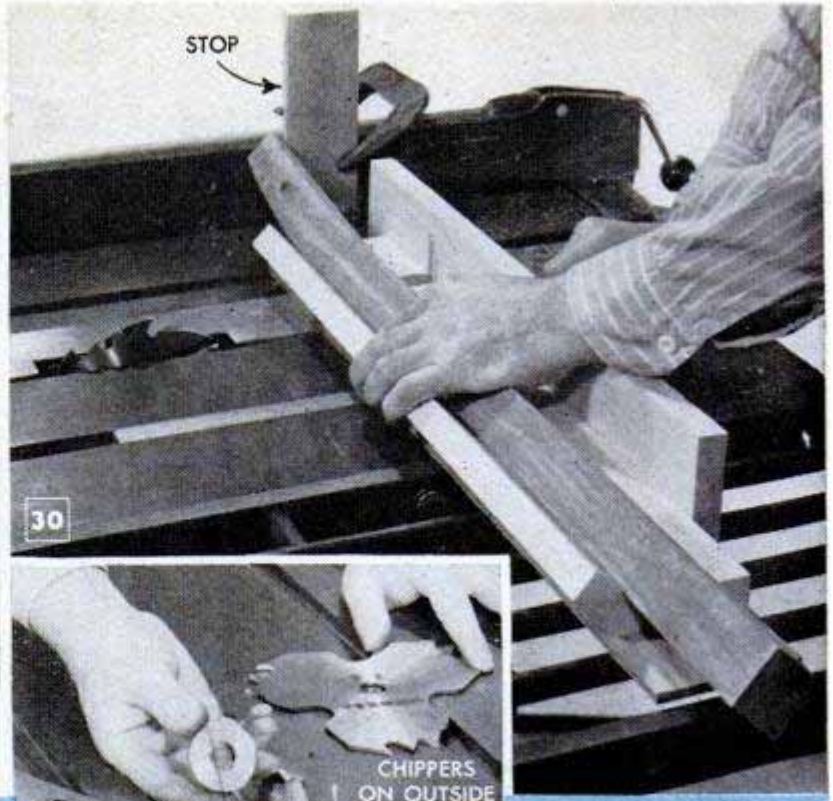
for narrow cuts or cuts with the wood grain. A typical application is the wiring groove for a lamp, Figs. 25 to 27. When turning the work after gluing, many workers prefer a blind groove, Fig. 26, so that the ends of the work will present solid stock for lathe centering. After the piece is turned, it is a simple matter to drill in an inch to connect with the grooves. The splined miter joint, Fig. 28, is commonly grooved with a single dado saw, keeping the cut well to the inside for maximum strength, as shown in the diagram. The cut usually is stopped at both ends, using stops as previously described for square cutting.

Angular notching: The angular notch provides a simple means of fitting table legs, Fig. 29. It is poor practice to attempt this freehand or with makeshift support



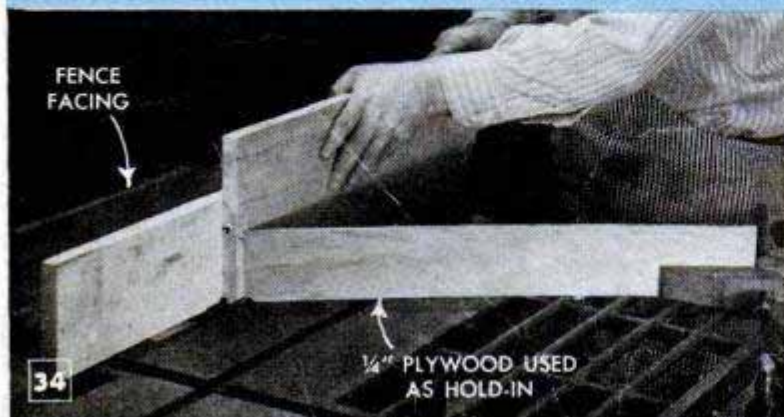
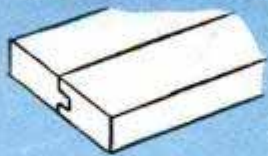
ANGULAR NOTCHING

Simple jig holds work at required 45-deg. position for angular notching. It is poor practice to attempt this cut freehand or with makeshift support blocks jammed under the work



TONGUE-AND-GROOVE

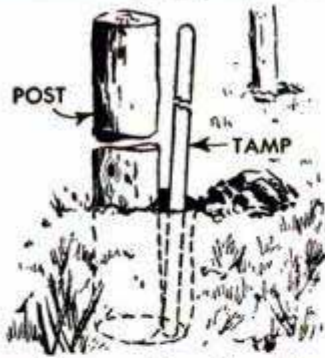
Tenons and tongue-and-groove joints can be cut with dado saws spaced by suitable hardwood collar



blocks jammed under the work. Take time to do the job right by ripping a piece of $\frac{3}{4}$ x 4-in. stock at a 45-deg. angle and nailing the two parts over a plywood base, Figs. 32, to provide a rigid holding device for the work.

Tenons: A quick way to make tenons is to work the stock flat on the saw table and cut away the waste wood from either side by turning the work over. Like all work using this reversal method, the thickness of the tenon will vary with the work thickness; hence this method is practical only when using wood of uniform thickness. For tenoning a number of pieces, a setup with a spacing collar between the saw blades does an excellent job independent of work thickness. This reverses the usual dado setup, since the saws are on the inside and the chippers outside, Fig. 31. The tenoning operation is shown in Fig. 33. Obviously, the same arrangement will work for the tongue of the tongue-and-groove joint, Fig. 34. The spacing collar can be metal or hardwood and should be thicker than the desired tenon by the amount of set on the saws. ★ ★ ★

Firmer Support for Fence Posts



When setting a fence post, one farmer has found that a post will be supported more firmly if placed against one side of the hole instead of in the center. Positioning the post in this manner not only provides it with a solid backing against the undisturbed earth at the side of the hole, but also allows plenty of room for tamping loose earth around the post.

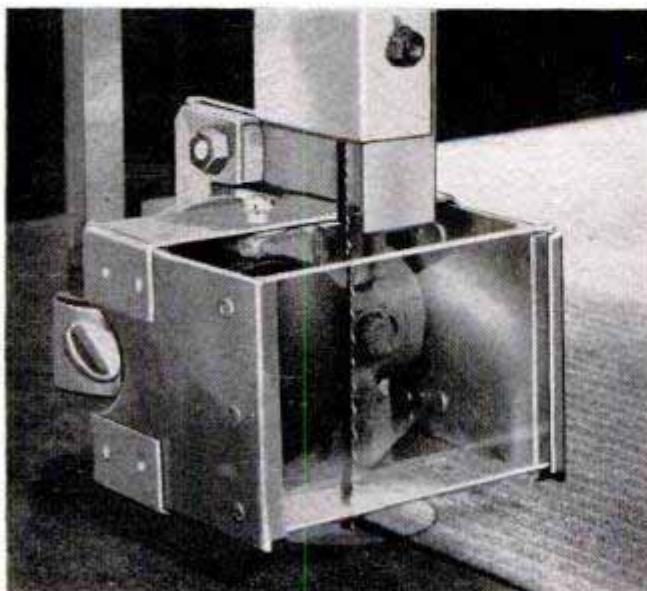
Metal Lath Attached to Cornice With Softboard Spacers

Where the type of building construction requires the application of stucco to porch ceilings and cornices, many builders first apply metal lath to assure a permanent job. In order to space the lath the proper distance from the nailing strips, one builder uses small squares cut from insulating board. The squares are attached to the joists or nailing strips with waterproof glue mixed to a fairly heavy consistency.

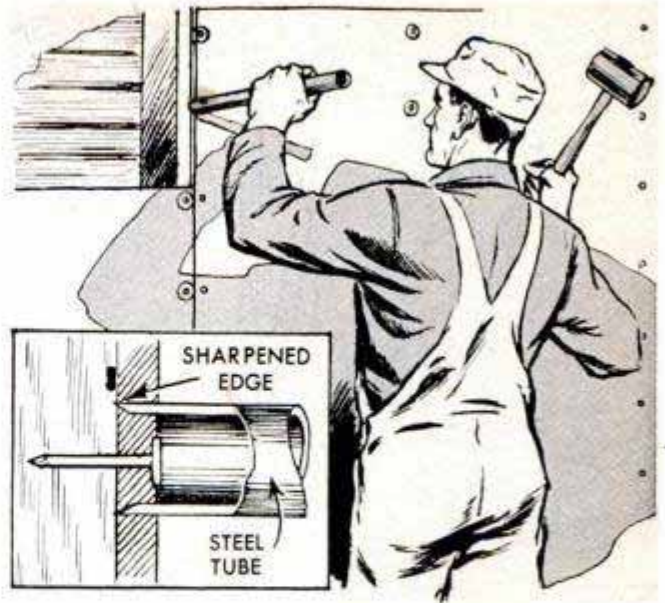
Edwin Love, Palmdale, Calif.

Glass Window on Bandsaw Guard Permits Safe View of Work

Designed to protect a bandsaw operator from flying particles while at the same time providing an unobstructed view of the work, this box-shaped guard consists of two sheet-metal sides that support a piece of $\frac{1}{4}$ -in. safety glass in front of the blade. The sides are joined together behind the blade by two strips of metal which connect the top and bottom edges and are riveted in place.—Bill West, Arlington, Va.



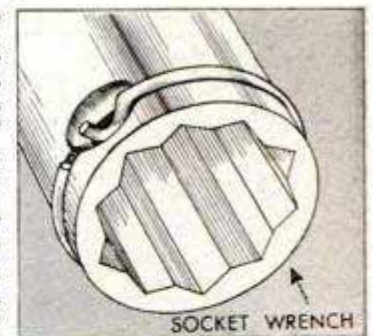
Hollow Punch From Steel Tube Aids in Removing Plasterboard



If you find it necessary to remove a section of a plasterboard wall during construction, you can do it neatly without damaging the plasterboard by using a steel tube sharpened at one end. Serving as a hollow punch, the tube is placed over the nailheads and struck sharply. A short length of rigid electrical conduit makes an excellent punch. To replace the plasterboard, the sheets simply are fitted over the nail-and-plaster projections on the studs and renailed.—B. Franklin, Azusa, Calif.

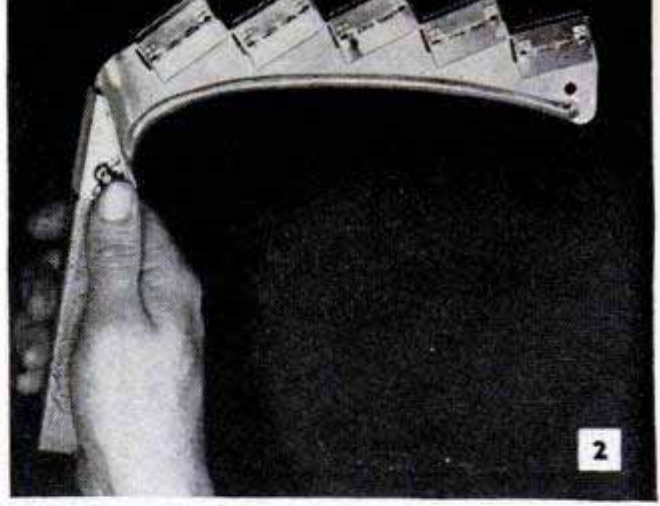
Altered Wrench Socket Grips Spark Plug

To simplify the removal of spark plugs from cylinder heads having deep plug recesses, one mechanic altered a thin-walled wrench socket so that it grips the body of the plug after it is unscrewed. First, he ground a notch in the wall of the socket near the open end, cutting deep enough to form an oval opening in the wall. Then he ground a concave groove entirely around the wall of the socket in line with the notch. The groove seats a length of tempered wire, one end of which is bent back on itself to form a short lug. This is inserted in the open notch and the wire ring is then snapped into place in the groove in the same manner as a retaining ring. When the socket is pushed over the plug, the lug catches below the spark-plug shoulder and holds it in the socket so that it is withdrawn easily from the recess in the cylinder head.





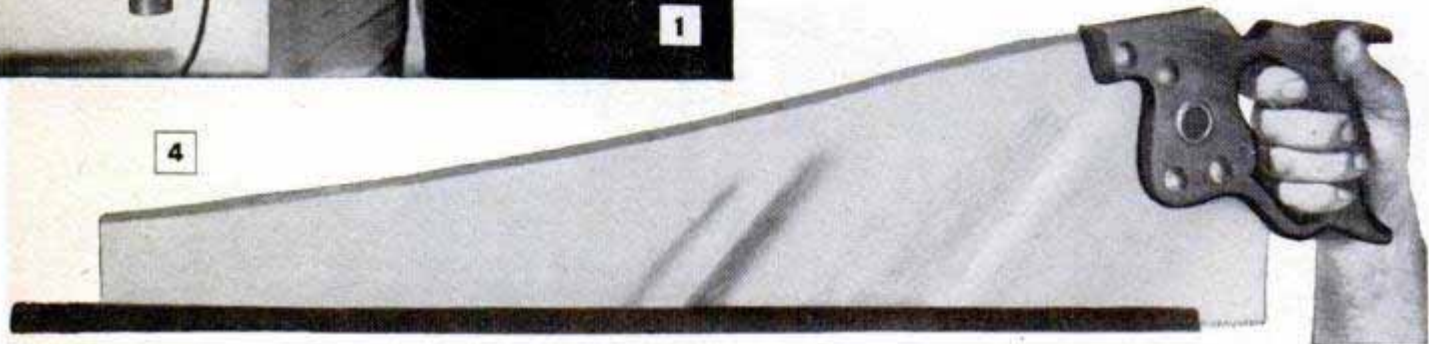
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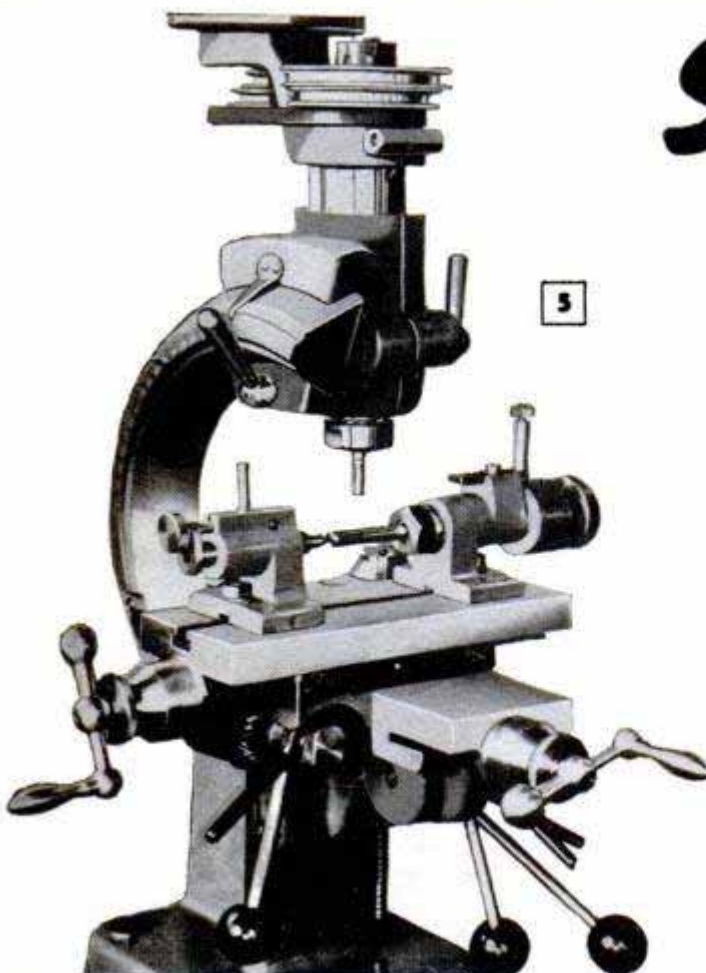
4

SHOPPING

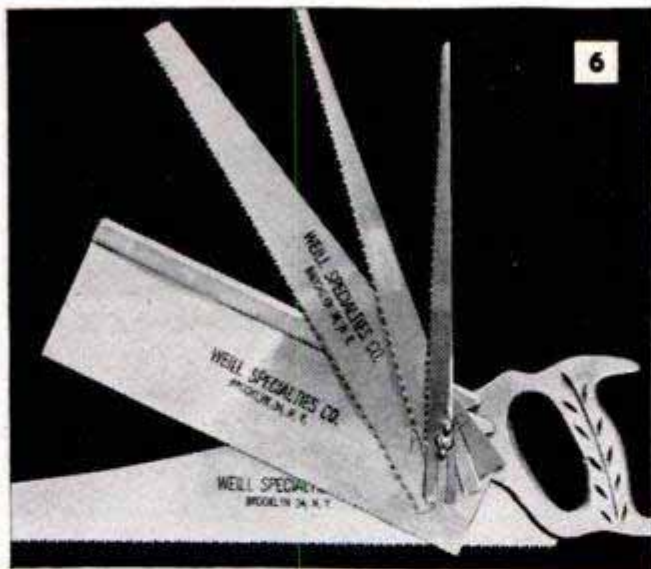
1. COMBINATION SAW-SETTING machine doubles as a sharpening machine for planer and jointer knives, hand-plane irons, wood chisels and other tools. Set up in varying combinations it will joint, gum, bevel-grind and set all types of circular-saw blades from 4 to 48 in. in dia. Will grind planer and jointer knives up to 24 in. in length by changing setup

2. GRASS CUTTER utilizes the keen edge of safety-razor blades to shear grass with an easy motion of the hand and arm. Blade holder is similar to a sickle except that the cutting edges are on the outside instead of on the inside as in the conventional tool. Just the thing for trimming grass in hard-to-get-at places around trees, shrubbery and along walks

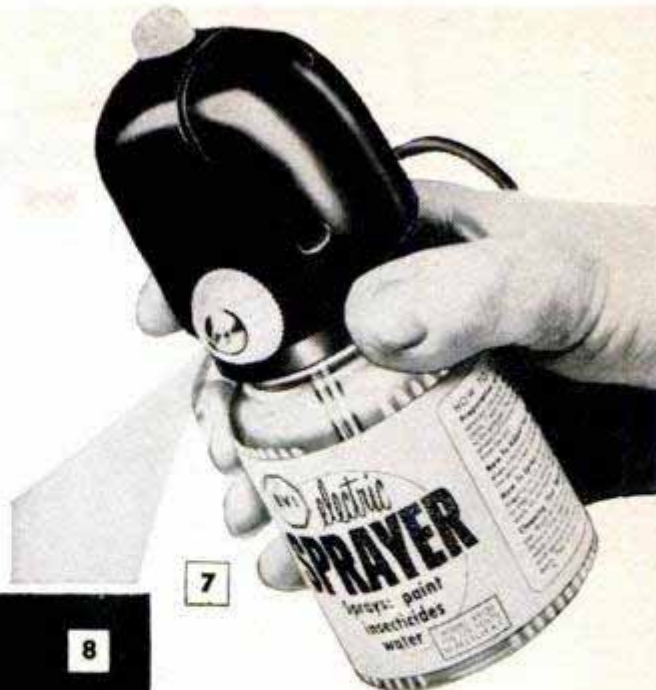
3. SMALL-BORE DIAL GAUGE is designed for accurate inspection of small-dia. bores measuring from .250 to .375 in. It is designed to check tolerances up to .005 in. Utilizes interchangeable "centering size" disks which attach to the head of the instrument and are locked securely in place by means of a knurled clamping nut. Dial is hooded for maximum protection



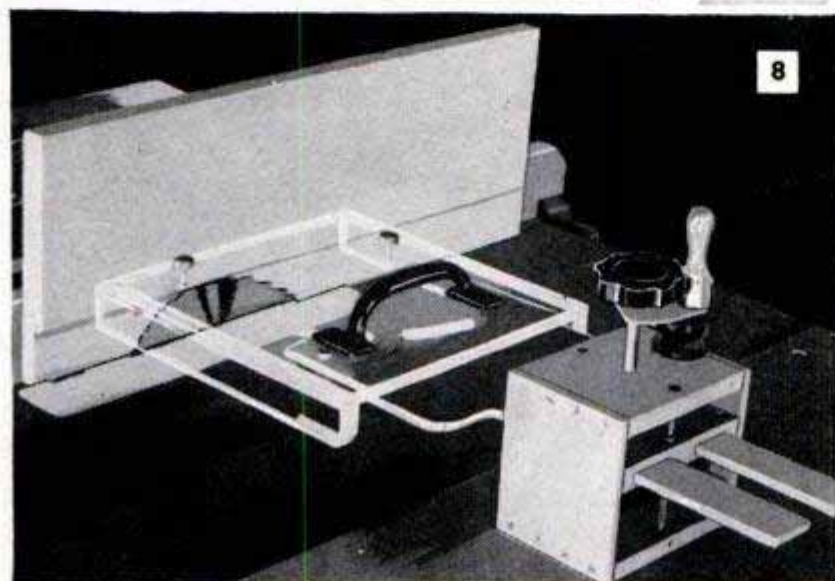
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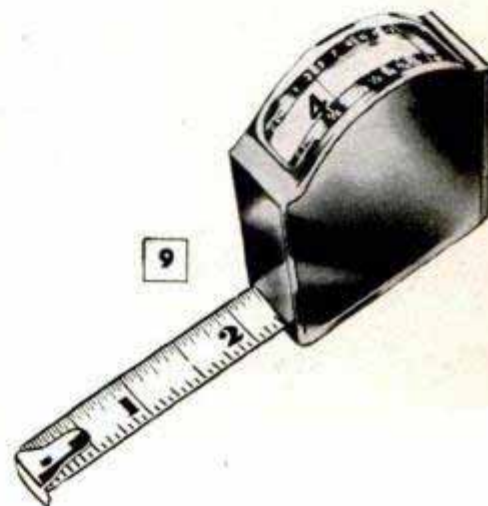
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7



8



9

FOR TOOLS

4. **SAW-EDGE PROTECTOR** is made from plastic and is designed to protect handsaws from dulling when they are carried in a toolbox. Impervious to oil, gasoline and sunlight. Simply slide it over the saw teeth. The protector is held in place by friction which is sufficient to cause it to grip the sides of the blade securely. Made for all ordinary handsaws

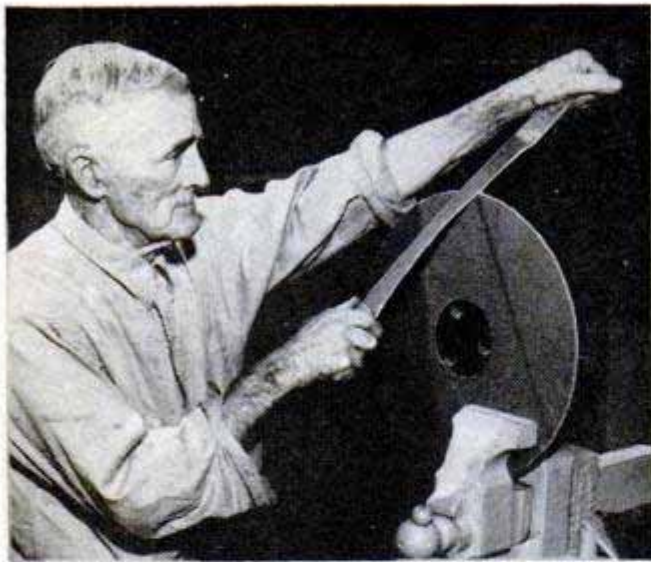
5. **NEW MILLING MACHINE** has milling-spindle assembly which can be locked in any position between vertical and horizontal. Tools are held in spindle by collets, the maximum bore of which is 13/32 in. A universal 3-jaw chuck can be used instead of the collets when the nature of the work permits. Table travel longitudinally is 4 in. and vertical movement is 4½ in.

6. **FIVE-PIECE SAW SET** makes an ideal Christmas gift for the man of the house. The five blades are made of alloy steel and are hardened and polished. Set includes 16-in. panel saw, 12-in. backsaw, 15-in. pruning saw, 12-in. compass saw and a 10-in. keyhole saw. All blades lock securely into the natural-finished hardwood handle and are slotted for easy insertion

7. **TINY ELECTRICALLY OPERATED SPRAYER** is just the thing for modelmakers and for touch-up work around the house with paints and enamels. Is controlled by a finger-tip switch and operates on 110-volt, 60-cycle current. Sprayer is held in the hand rather than by a handle, thus giving close control of the application of paints, enamels, lacquers and certain insecticides

8. **SAFETY SAW GUARD** is made of clear plastic so that work can be seen at all times and is so designed that the guard itself exerts a downward pressure on work. Nearly all common circular-saw operations can be performed with the guard in normal position. Can also be used as an overriding fence for angular work. Should prove useful in school shops

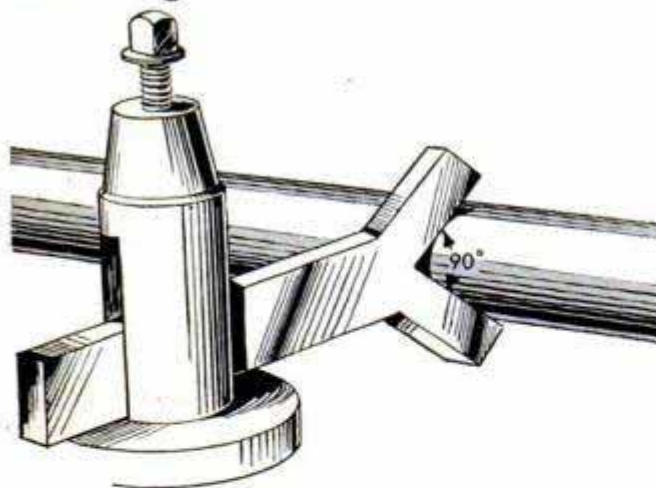
9. **PUSH-PULL STEEL RULE** gives accurate dial readings showing measurements to fractions of an inch under a vernier "window" where they are easily read. Dial face is white with black figures and is calibrated with all fractions to 1/16 in. Rule is equipped with cleaning and oiling pads to keep it in good condition and to prevent rusting while it is in use



Sanding Disks Trimmed Easily With Sharpened Hacksaw Blades

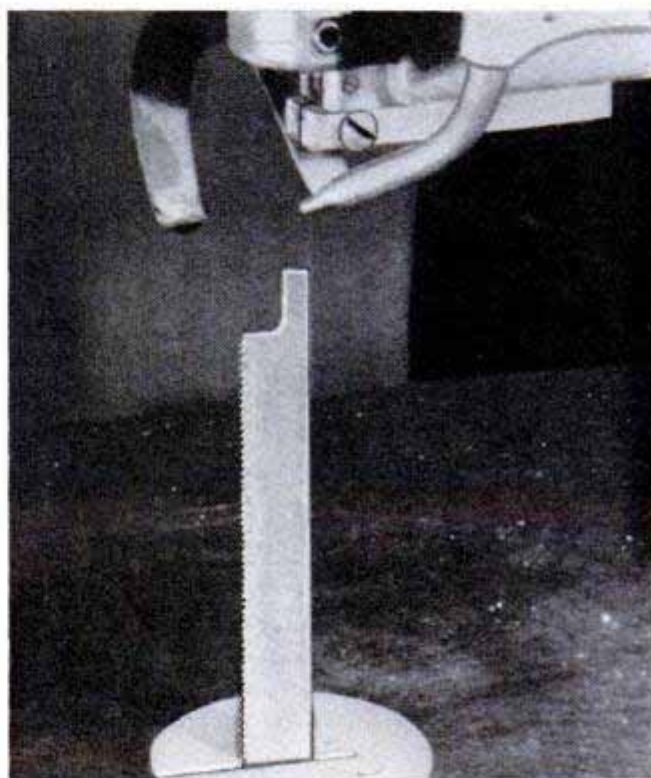
Discarded power hacksaw blades are utilized effectively by one manufacturer for trimming sanding disks to the exact size of the backing plates. The operation, which formerly had been accomplished with wood rasps, wore out two or three rasps a week. In the preparation of a saw blade, the toothed edge of the blade is sharpened and the ends wrapped with tape to serve as handles. With the tool used like a draw-knife, the operation now requires only half the time formerly required, provides neater edges on the disks and practically eliminates any possibility of wear on the backing plates.

Centering a Worn Shaft



In job machine shops specializing in repair work, the machinist often encounters the problem of centering a badly worn shaft in the lathe in preparation for truing up the bearing surfaces. This is especially difficult when the shaft has been worn out of round, or where it is necessary to true the journals concentric with that portion of the shaft on which a rotating cutter-head or other part is mounted. One ma-

chinish does this job accurately with the simple centering fork shown in the detail. This is made from a piece of tool steel. Arms of the fork forming a 90-deg. angle are welded or brazed to the body and all surfaces are machined and ground true. The device is mounted in the lathe tool post with the bottom of the vee on the horizontal center line of the lathe. Then the work is mounted with one end on the live center and the fork is brought into a position to bear on the unworn surface of the shaft. Chuck a center reamer or center drill in the tailstock, start the lathe and feed the center drill into the work, holding the latter in place in the fork with the left hand.—H. B. McDermid, Norwood, Ohio.



Cutting Metal in Your Jigsaw

Anyone having only an occasional job of sawing metal will find that it can be done easily on a jigsaw. All that's necessary is to convert 6-in. pieces of hacksaw blade so they can be clamped in the chucks of the jigsaw. This is done by grinding the ends of the pieces to fit the chuck. Blades most suitable for use are those made of high-speed steel, which give long service and produce clean, straight cuts. Be sure to mount the blades so that the cutting is done on the down stroke. This is necessary in order to cause the pull to come on the motor and not on the spring that raises the blade in most jigsaws. Before this method can be used, however, the speed of the jigsaw must be reduced approximately 50 percent. This is done by changing the sizes of the pulleys on both the jigsaw and the motor.—Herbert R. Pfister, New York City.

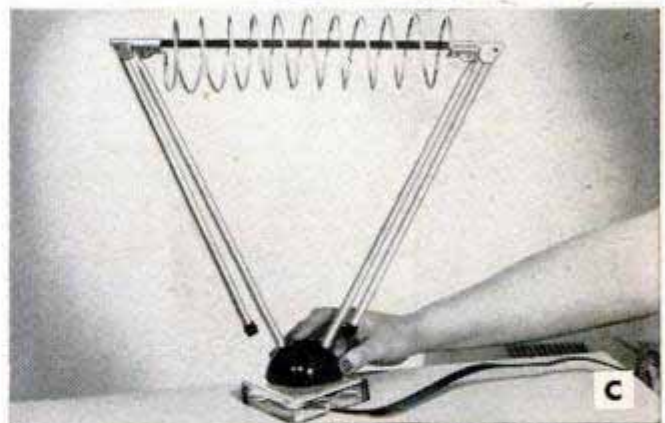
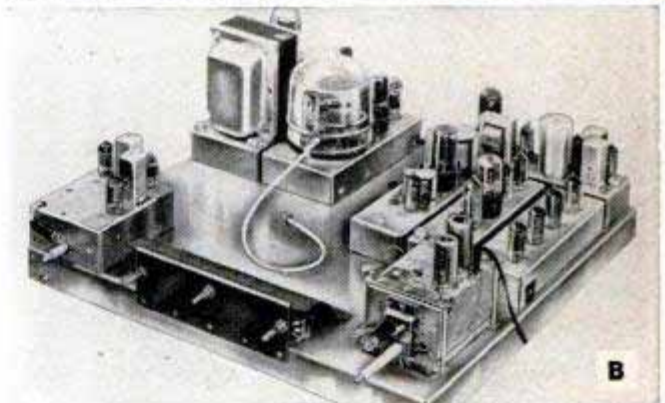
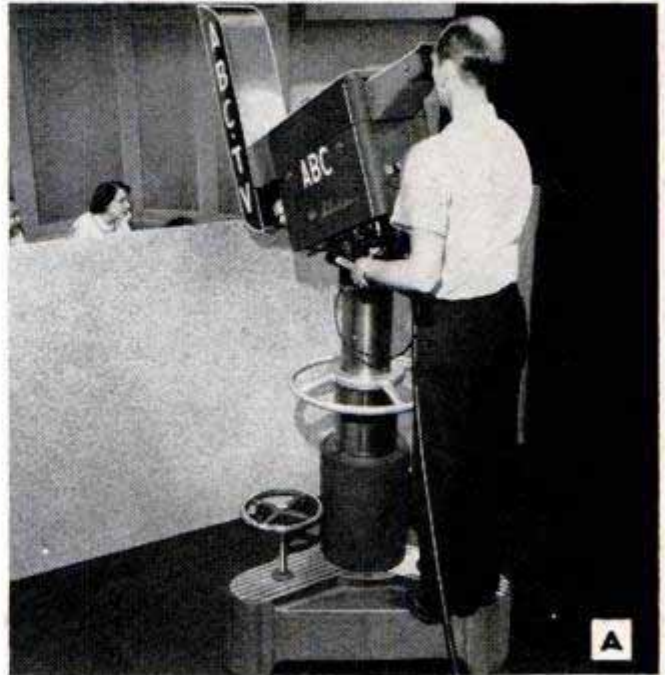
TELEVISION TODAY

KEEPING an eye on new television equipment today is like trying to watch all the performers in a three-ring circus. One of the outstanding devices that ABC-TV engineers have recently introduced is the "Periscope Eye" shown in photo A. This attachment gives their TV cameras an extended view over the heads of crowds and into places previously closed to television.

The "Unit-ized" television chassis, illustrated in photo B, consists of a base and eight compact plug-in units, each individually tested to maintain uniformity and simplify maintenance. The domelike high-voltage unit is sealed against humidity to prevent arcing.

Another recent addition to high-gain indoor TV antennas is the one illustrated in photo C. It is claimed to tune all 12 VHF-TV channels and employs the following TV antenna principles: helix coil, folded dipole, straight dipole and delta-match transformer. One of the new all-channel UHF selectors is shown in photo D. It is designed for use with existing TV receivers to bring in the UHF programs as soon as they are available in your area.

TV is generally illegal in cars. However, this photo E installation passed rigid Pennsylvania motor-vehicle inspection because it cannot be operated when car is in gear.





CHILDREN'S RECORD PLAYER

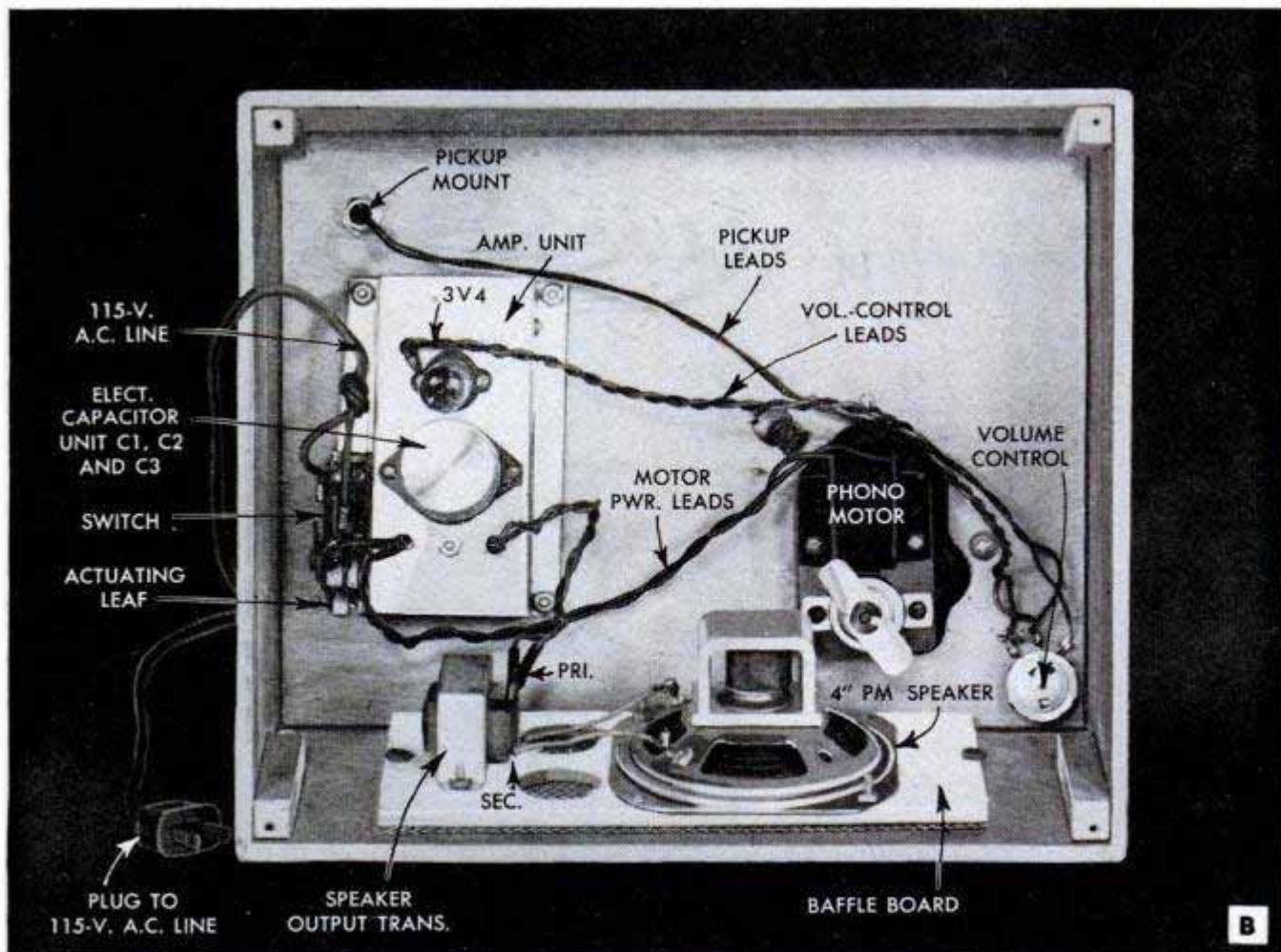


SURPRISE the small fry at your house this Christmas with a simple record player. Not just an ordinary player—but one that you can build yourself; a phonograph that practically starts and stops itself. It employs a quick-heating 3V4 miniature tube in the audio amplifier for instant warm up and starts playing just as soon as the operator lifts the pickup arm from its rest. After the record has been played, the arm is replaced on the stop pin which opens the line switch and shuts off the amplifier and the turntable motor. There are no controls except for volume. The bottom of the cabinet is covered with a pressed hardwood panel to keep out little fingers.

The completed unit is shown in photo A. An underside view, with bottom cover removed, appears in photo B. All construction details for the cabinet and sheet-metal chassis base for the amplifier are given in Fig. 2. A pictorial wiring diagram for the audio amplifier appears in Fig. 1; the component parts are shown in their relative positions under the base, and all wiring details are indicated. The leaf-spring switch may be the Unimax MXT-1 leaf-spring hinged type shown in photos D and C or any similar variety. This switch is mounted

RESISTORS

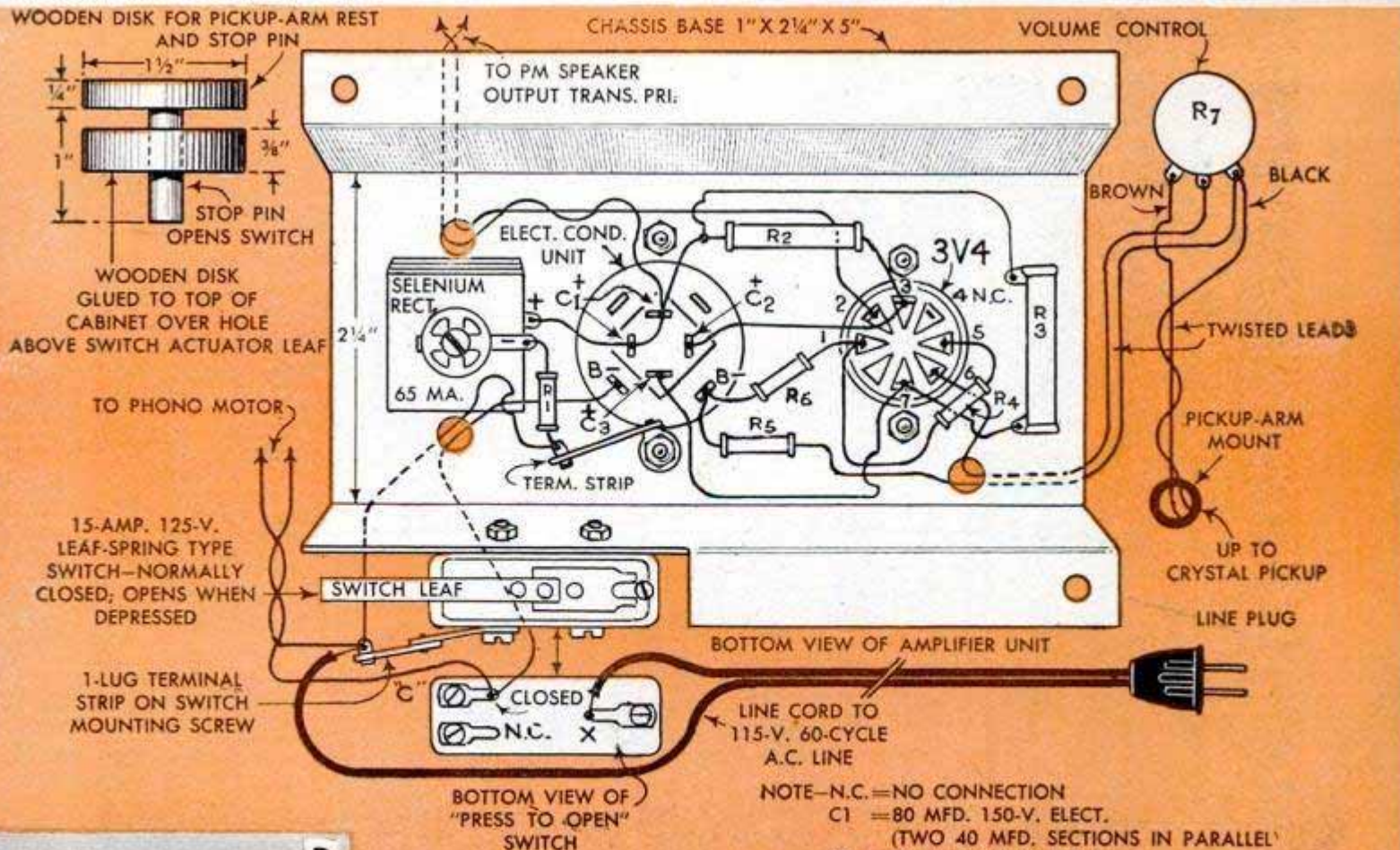
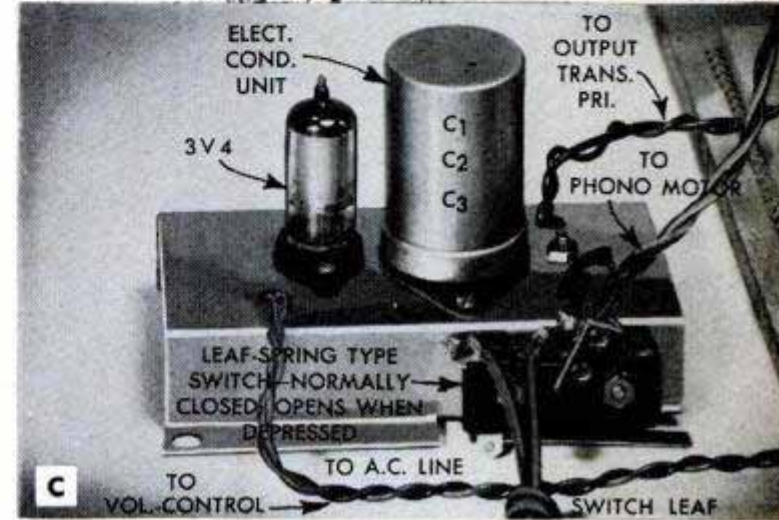
- R1=27-OHM, ½-WATT CARBON
- R2=10,000-OHM, ½-WATT CARBON
- R3=2500-OHM, 5-WATT WIRE-WOUND
- R4=150-OHM, ½-WATT CARBON
- R5=25,000-OHM, ½-WATT CARBON
- R6=68-OHM, ½-WATT CARBON
- R7=1-MEGOHM VOLUME CONTROL LINEAR TYPE, WITHOUT SWITCH



HAS AUTOMATIC START AND STOP

on the chassis base by means of two 6-32 machine screws as shown in Fig. 1; the proper connections appear in the underside view below. The switch is normally closed with the connections shown and opens when the actuating leaf is depressed by the weight of the pickup arm. The wooden disk, detailed at upper left, pushes the stop pin through a hole in the top of the cabinet located directly above the actuating leaf of the switch. The mounting holes for the chassis base are made slightly oversized so that the base can be shifted a little if necessary to bring the leaf directly under the hole.

The schematic circuit diagram is given in Fig. 3. Capacitor values are listed in Figs. 1 and 3. A chart of the resistor values appears on page 212. The miniature tube socket is preferably of the shock-mounting type. All parts for the amplifier are available from any radio parts house. A selenium rectifier does away with the usual rectifier tube. The chassis base can be formed from a piece of sheet aluminum bent to shape in a vise between blocks of wood. Drill the necessary holes with a hand drill and enlarge them to size with a tapered reamer. A keyhole saw will be required



- NOTE—N.C.—NO CONNECTION
 C1 = 80 MFD. 150-V. ELECT.
 (TWO 40 MFD. SECTIONS IN PARALLEL)
 C2 = 40 MFD. 150-V. ELECT.
 C3 = 50 MFD. 25-V. ELECT.
 ALL ABOVE CAPACITORS IN EITHER
 A 3 OR 4-SECTION METAL CAN

FIG. 1



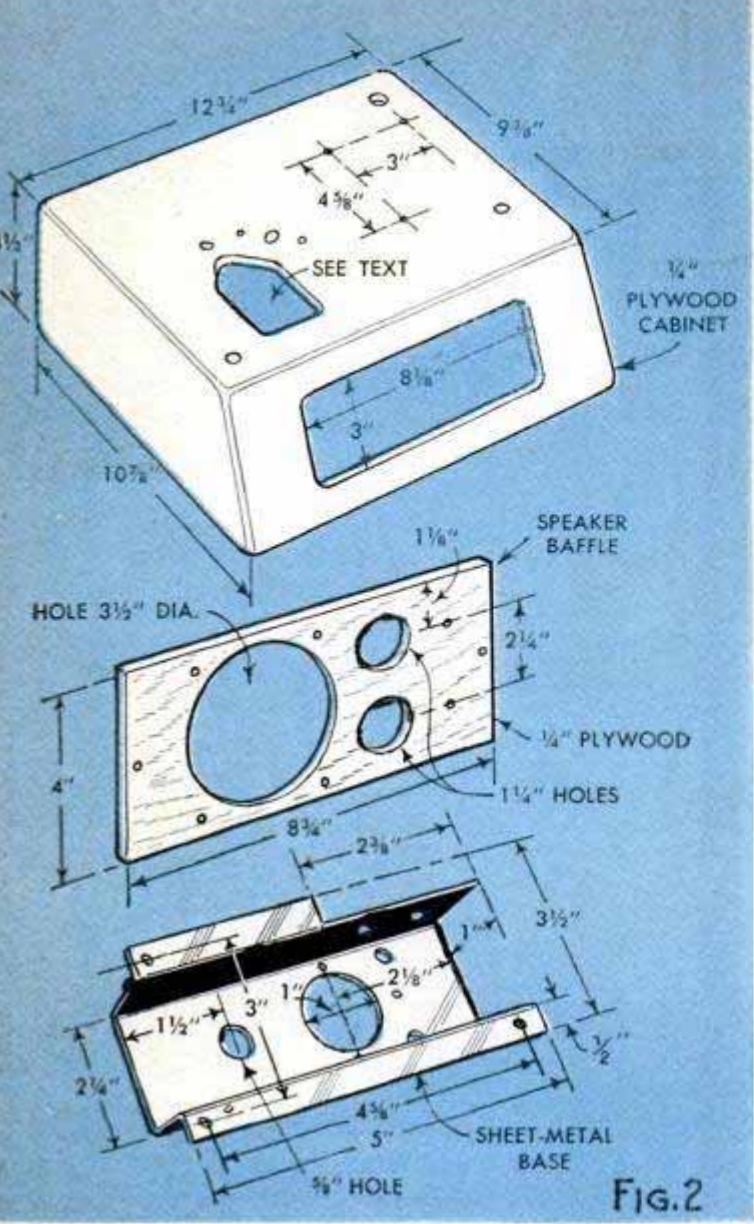


FIG. 2

to cut the openings for the speaker in the 1/4-in.-plywood baffle and cabinet. The two extra holes in the baffle are for necessary ventilation. The speaker output transformer is also mounted on this baffle which is fastened with wood screws behind the cut-out in the front of the cabinet. The cutout section is backed up with either gold or tan grille cloth.

Use rosin-core wire solder for all circuit connections and make every soldered connection carefully. No. 20 hookup wire with push-back insulation can be used for all circuit wiring. The terminal lugs on the 7-pin miniature tube socket are rather small and close together so careful soldering at this socket is important. Use a small iron and only enough solder to make a good connection.

The phono motor and 8-in. turntable can be either an Alliance or General Industries inexpensive 78 r.p.m. rim-driven type, complete with mounting plate. The size of the motor-mounting hole in the top of the cabinet in Fig. 2 will depend upon unit used.

Bolt all parts attached to the cabinet and speaker baffle securely. After the wiring is completed, attach the bottom cover to the cabinet corner blocks with wood screws. The plywood cabinet may be given a coat of bright-red or yellow enamel, dressed up with appropriate decals and mounted on rubber feet. Detailed student material list R-415 is available from Popular Mechanics Radio and Electronics department upon receipt of ordinary letter postage. ★ ★ ★

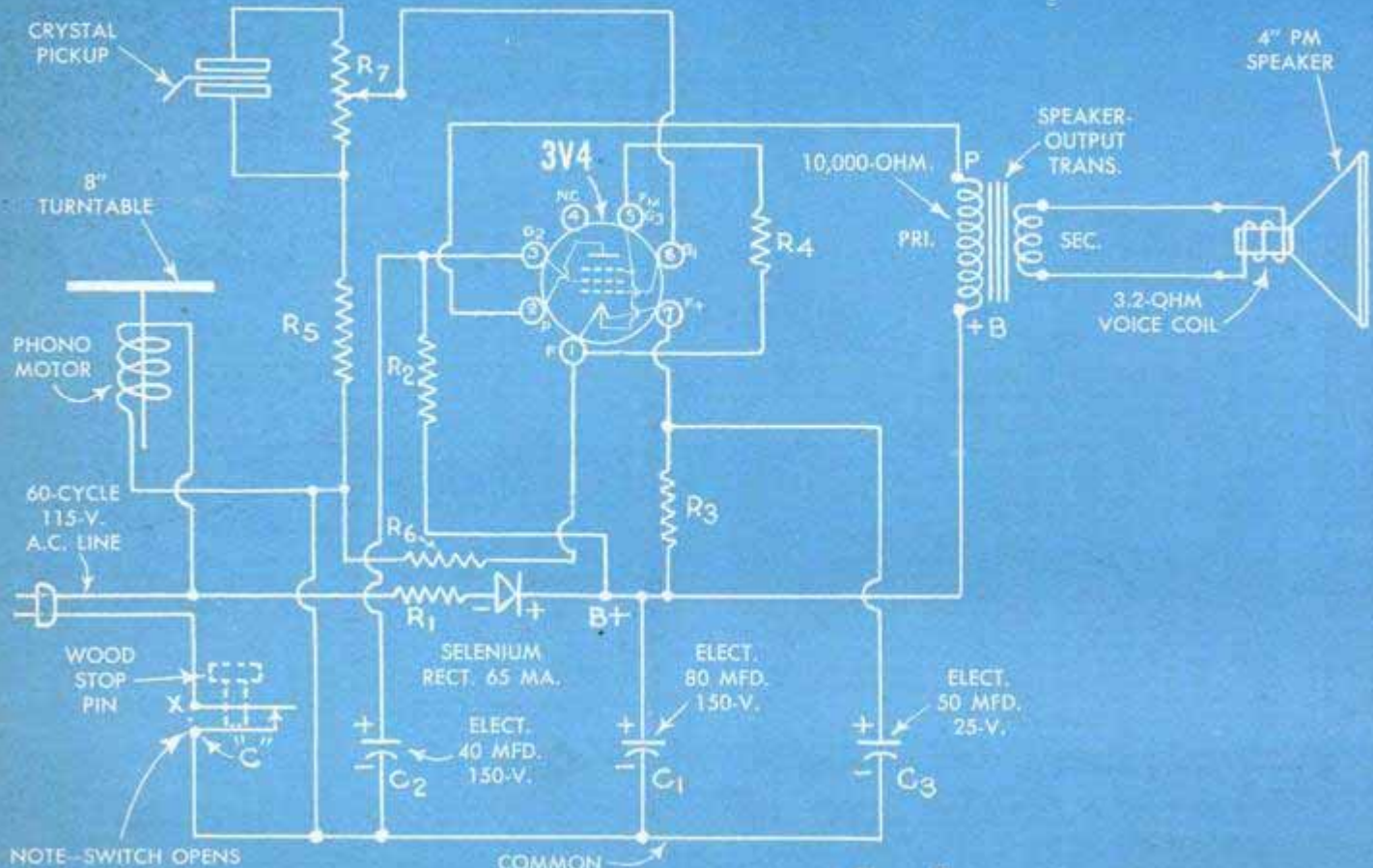


FIG. 3

NOTE—SWITCH OPENS WHEN STOP PIN IS DEPRESSED.

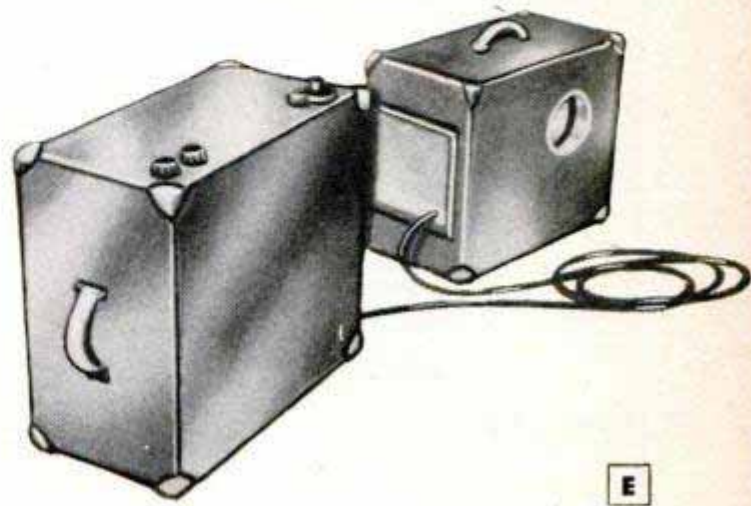
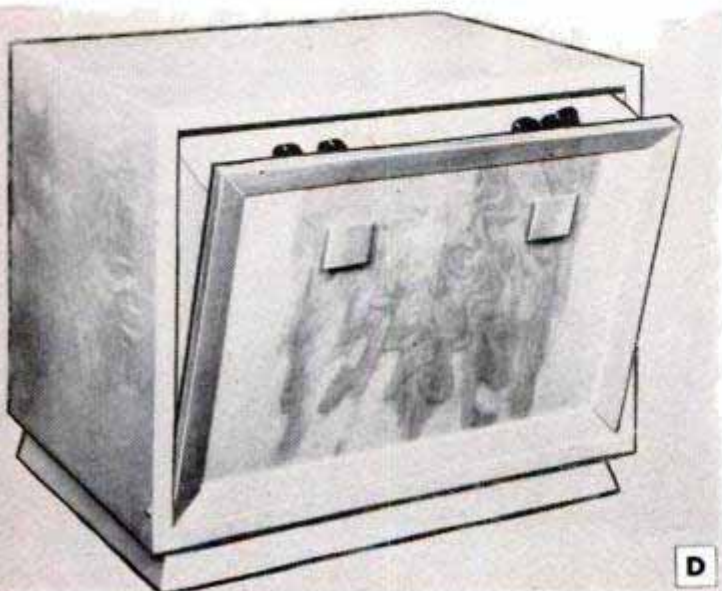
Projection-TV Installations In the Home

LIFE-SIZE television now is available for your living room, den or that basement game room you have been planning. Imagine TV pictures 3 ft. high and 4 ft. wide. Smaller picture screens (30 x 40 in.) are being built into walls with the projection equipment behind the screen.

A Pittsburgh, Pa., firm is installing these projection sets in that area, and similar installations have been made elsewhere. This firm combines an RCA model 630 TV receiver with the North American Phillips "Protelgram" lens system. These are custom-built into the units shown in the inset photo A, and photos D and E. In photo A the projection unit is housed in a modern end table and photo B shows the unit mounted in the ceiling in the white box. Reverse projection behind the screen is employed in the living room shown in photo C.

In installation A, the picture is projected directly onto the screen from the inconspicuous end-table unit on which a lamp is placed, at the right. The cabinet projection unit, photo D, may be placed on the floor or at any hidden point in the room. Portable units, photo E, are available for indoor or outdoor viewing, and for use in classrooms or wherever you wish to set up a screen in exactly the same manner that you would show home movies. The large cabinet houses the TV set and speaker, while the smaller cabinet holds the projection unit. With these units the picture size can be adjusted from 2 x 3 ft. to 8 x 10 ft. if desired. These new units may be separated up to 35 ft. permitting control from a remote, tamperproof location.

The self-contained projection unit, photo D, employs a 42-tube TV chassis and the picture is adjustable from 12 to 48 sq. ft.





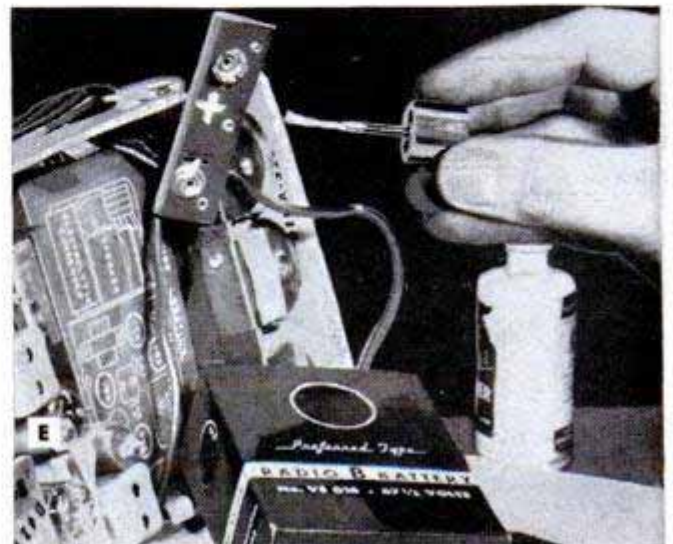
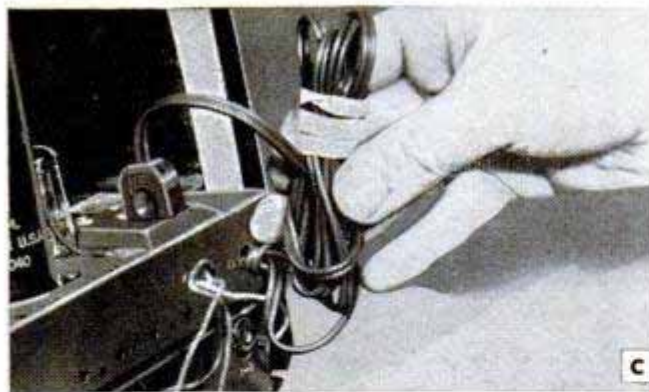
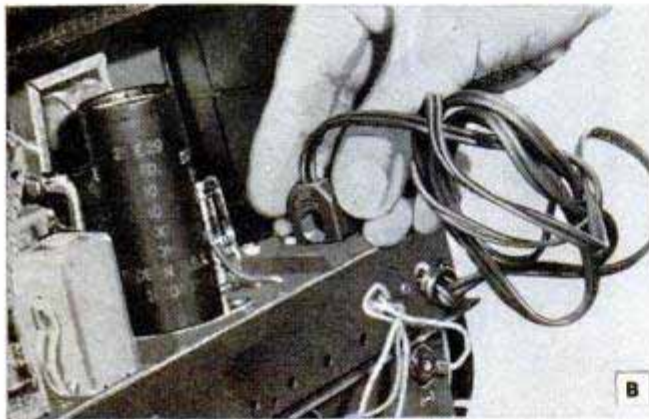
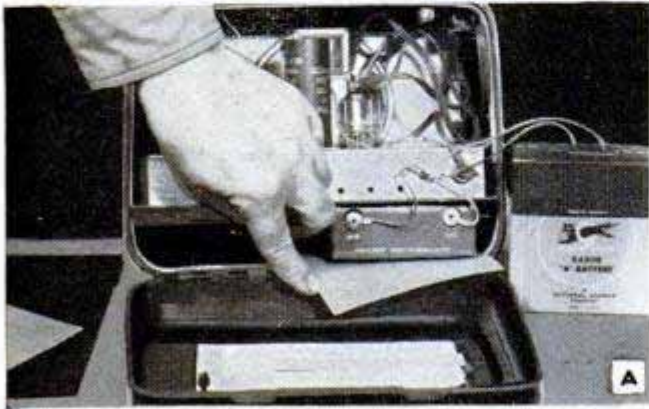
SERVICE HINTS FOR PORTABLE RADIOS

By Harry F. Leeper

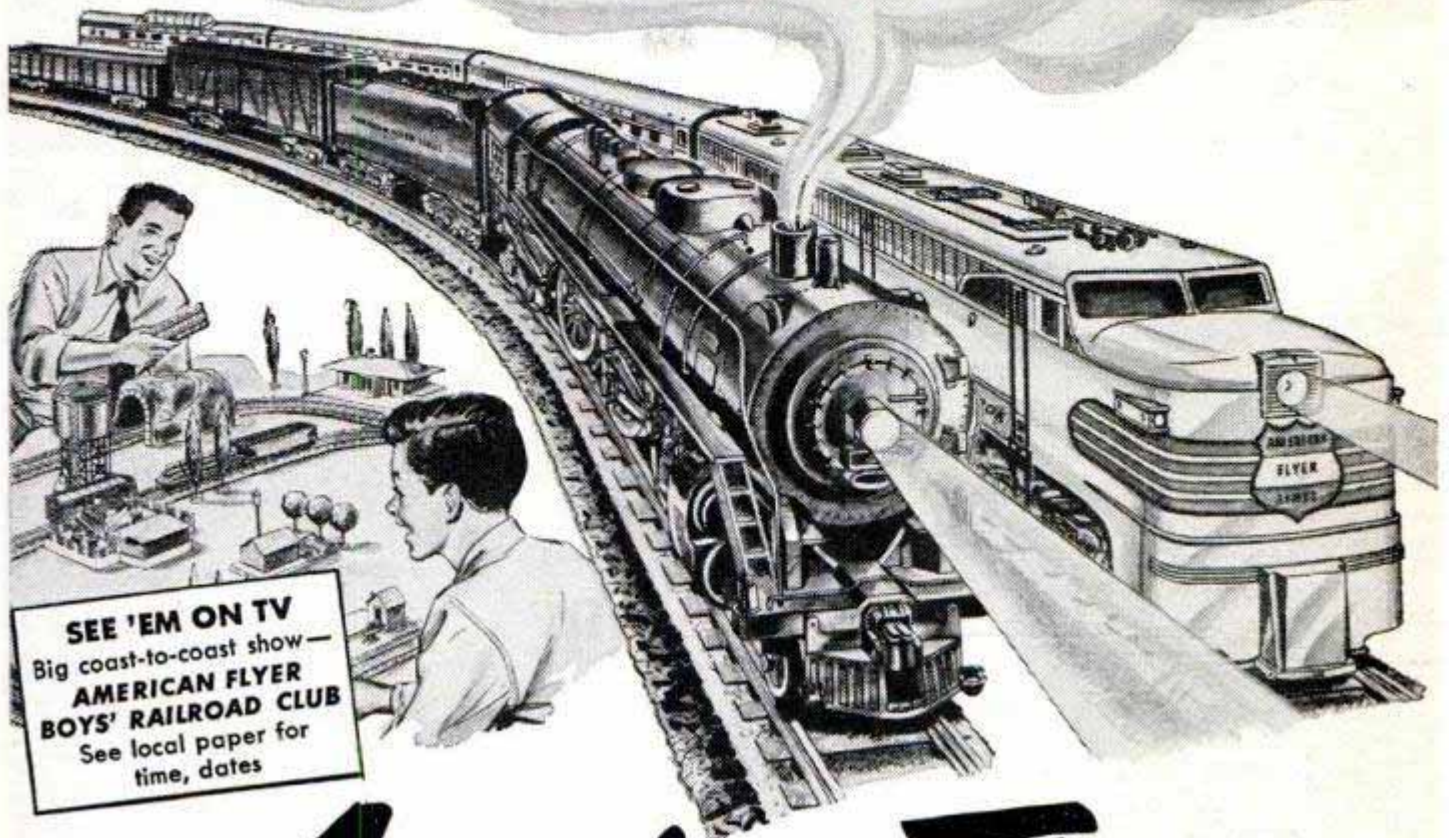
WINTER SPORTS are more fun if you take along your portable radio. You can keep in touch with weather reports and football-game broadcasts in almost any location provided you have not neglected to check over your set after returning from your summer vacation. Many battery-operated portables are set aside and given very little attention between trips. Never leave batteries in the set over long periods when not in use as they will deteriorate.

Portable radios of the type shown in photo A often have the loop antenna underneath the battery compartment. Some manufacturers provide a support to hold the batteries above the antenna wires, but it is always a good idea to slip a piece of cardboard between the batteries and the loop as insurance against possible trouble. If your radio is a three-way portable type, photo B, and it refuses to operate on the battery circuit, make sure that you have good contact at the line-cord plug before you decide that the batteries are dead. Move the plug a little with the set turned on and tune in a local station. If a signal then is received, remove the plug and bend the prongs slightly so they will make better contact. Use either tape or a rubber band to hold the folded line cord so that it will fit into its compartment, as illustrated in photo C. If you expect to use the set on an indoor power line, it is a good idea to take along an extension cord as outlets in cabins and motels are not always at convenient locations. A cord of the type shown in photo D provides two handy outlets.

Battery clips and terminals, if broken and replaced, should be marked for correct polarity as indicated in photo E.



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Basic essentials for developing and printing pictures, including roll-film tank. Kodacraft Photo-Lab Outfit, \$8.75.



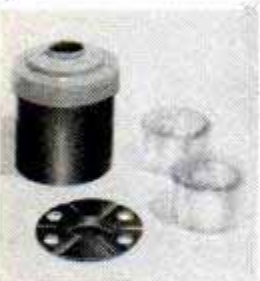
Complete developing, printing equipment, incl. metal printer. Kodacraft Advanced Photo-Lab, \$14.10.



For efficient print drying. Counteracts tendency of prints to curl. Use it over and over. Kodak Blotter Roll, \$2.88.



Easy to use, load, and pour. Takes 620-120, 616-116, and 127 roll films. Kodacraft Roll-Film Tank, \$2.53.



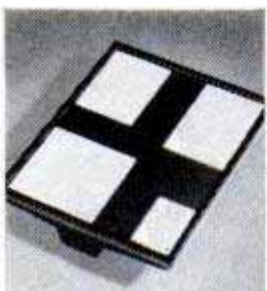
For simultaneous development of two rolls of 828 or 135 film. Kodacraft Miniature Roll-Film Tank, \$2.53.

Save time—Shop here for the photo fans on your Christmas list

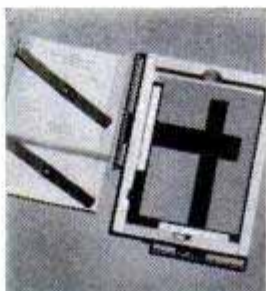
These two pages give you some idea of the many useful and inexpensive gift ideas at your photo dealer's. Visit him soon. He'll be glad to help you choose just the right gift for every photo fan on your shopping list.



Permits loading and processing of 35mm. films to be carried out in daylight. Kodak Day-Load Tank, \$9.30.



New-type printing frame of steel construction. Includes a set of masks. Kodacraft Printing Frame, \$1.29.



Adjustable—accepts all sizes of negatives up to 4 x 5 1/2 inches. Kodak Auto-Mask Printing Frame, \$2.79.



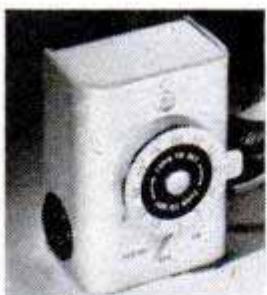
Converts ordinary tray to efficient, trouble-free washer for prints or films. Kodak Automatic Tray Siphon, \$4.50.



Frees both hands for handling equipment and material in the darkroom. Kodak Utility Footswitch, \$10.00.



Tilting base, minute and split-second hands, large dial. Covers intervals to 60 minutes. Kodak Timer, \$7.20.



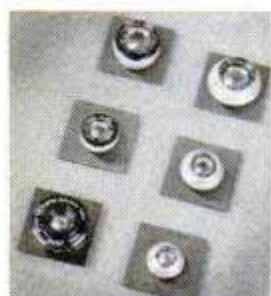
Gives precise timing in contact and projection printing, 1 to 57 seconds. Kodak Electric Time Control, \$13.50.



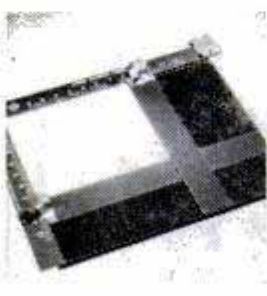
Handsome chemical-resistant plastic housing protects all working parts. Kodak Chemical Scales, \$9.90.



Cool, Circline fluorescent lamp, integrating-sphere lamphouse are prominent features in each enlarger. Kodak Hobbyist Enlarger (left), \$44.00, complete with f/6.3 lens. Versatile Kodak Fluorolite Enlarger (right), \$99.50, without lens.



Lenses for the Fluorolite Enlarger range from 50mm. f/4.5 "Ektanon" to 4-inch f/4.5 "Ektar." From \$14.00.



For accurate masking of enlargements—use it with any vertical enlarger. Kodak Masking Easel, 11 x 14, \$9.60.



For determining correct printing time—saves both paper and time. Kodak Projection Print Scale, \$1.15.



Feature-packed view-type camera—permits one-to-one close-ups. Kodak Fluorolite Camera Combination, \$60.00.



Permits use of 35mm. film with Fluorolite Enlarger or Recomar-type cameras. Kodak 35mm. Film Adapter A, \$45.00.



Includes three cups for darkroom work with both papers and films. **Brownie Darkroom Lamp Kit, \$1.75.**



New darkroom safe-light that provides direct or indirect illumination—or both. **Kodak 2-Way Safelamp, \$4.50.**



Can be used either from a drop cord or in a wall plug. Includes safelight filter. **Kodak Darkroom Lamp, \$4.70.**



Attaches to wall, shelf, bench. Includes switch, cord, safelight filter. **Kodak Adjustable Safelight Lamp, \$7.40.**



Expertly made, offers sound protection together with smart appearance. **Kodak carrying case. From \$2.65.**



Adapts de luxe model Kodak Tourist Cameras to take Kodachrome Film. **Kodak Tourist Adapter Kit, \$13.25.**



Permits use of economical Bantam-size (828) color films. **Kodak 828 Adapter for Kodak Reflex Cameras, \$4.59.**



Automatically trips shutter, permits photographer to get into picture. **Kodak Auto-Release, \$3.86.**



Provides dependable "flash" for most internally synchronized cameras. **Kodak Stand-Standard Flashholder, \$8.25.**



Sensational new battery-condenser flash system. **Kodak Ektalux Flashholder (Standard Bracket), \$29.75.**



Condenser-type power for dependable "flash." **Kodak B-C Flashpack, \$2.95 (without 22½-volt battery).**



Twelve-inch reflector focuses readily from wide to narrow light beam. **Kodak Vari-Beam Clamplight, \$10.50.**



Permits close-range picture taking with most fixed-focus cameras. **Kodak Close-up Attachment, \$1.63.**



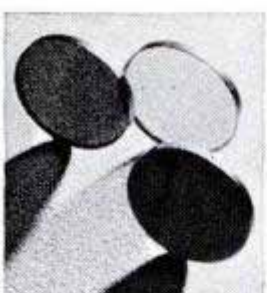
Now a filter designed for inexpensive box cameras—emphasizes clouds. **Kodak Cloud Filter, \$1.72.**



Provides an excellent means of darkening the sky and clouds in color pictures. **Kodak Pola-Screen, \$6.75.**



Shades the camera lens and reduces sky flare—attaches directly to adapter ring. **Kodak Lens Hood. From \$1.65.**



Popular yellow (K2), red (A), and green (X1) filters to fit most cameras. **Kodak Wratten Filters. From \$1.65.**



Two compartments hold 4 filters, adapter ring, lens hood. **Kodak Combination Filter Cases, \$4.25, \$4.95.**



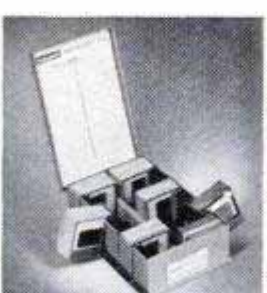
New-type slide-feeding mechanism, cool operation, elevating device. **Kodaslide Merit Projector, \$26.10.**



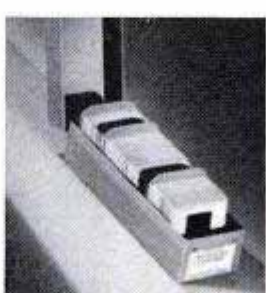
2 x 2 projector and screen in a single unit. Usable in fully lighted room. **Kodaslide Table Viewer, 4X, \$49.50.**



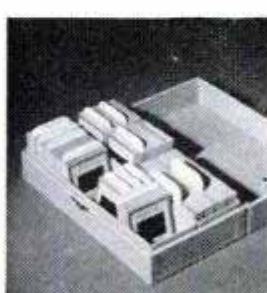
Projector, screen, slide changer in one unit. **Kodaslide Table Viewer, Model A, \$97.50.**



Compartments for 240 cardboard or 96 glass slides. **Kodaslide Compartment File, \$3.94.**



Protects 140 cardboard or 55 glass slides—keeps them organized. **Kodaslide File Box, \$1.57.**



Holds 360 2 x 2-inch or 160 stereo slides. **Kodaslide Flexo File, \$1.25.**

Prices subject to change without notice and include Federal Tax where applicable. Consult your dealer.

EASTMAN KODAK COMPANY, ROCHESTER 4, N. Y.

Kodak
TRADE-MARK

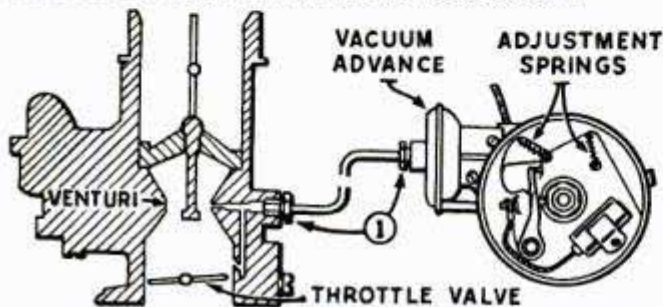


Care and Feeding of Engines

BY S. P. CORP

POOR TIMING WASTES GAS

Your ignition distributor interrupts the primary circuit for correct timing of the spark, advancing the timing as your engine accelerates. A vacuum distributor advance connected to the distributor governs timing for sudden loads on the engine, such as fast acceleration.



VACUUM DISTRIBUTOR ADVANCE HOOK-UP

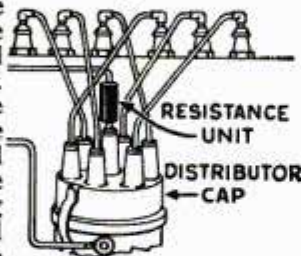
A small pipe line connects this vacuum advance to the carburetor, which furnishes the vacuum. Should this line become clogged, poor engine performance and low gas mileage can result. An engine may backfire and fill this line with gasoline, which would clog it.

To correct, loosen nuts at each end of pipe marked (1), remove pipe from fittings, and blow it clear. **Caution:** When replacing, turn nuts halfway by hand before using a wrench, as threads are very fine and can be crossed, causing an air leak. It is a good idea to have the vacuum advance unit checked for diaphragm leaks, to protect gas economy.

ONE CAUSE OF HARD STARTING

Your car radio uses a resistance unit to remove ignition interference. This is installed in the high tension lead from ignition coil to the center of the distributor cap. Being a carbon resistance unit, its resistance increases with age and heat from the engine.

Such increased resistance interferes with current to the spark plugs and can cause hard starting, also a high speed miss. As a rule, the correct resistance is marked on the outside of the unit. It can be removed and checked by any radio service man. Remove it by pulling the wires out of each end and placing the coil wire back into the distributor cap.



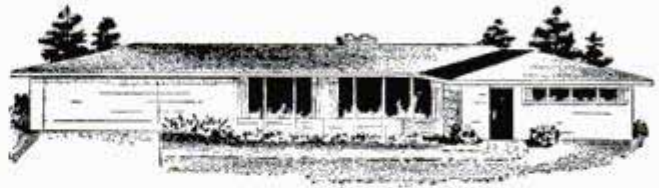
With unit removed, check starting of engine. If trouble is corrected, get a new unit. Car radios require such a unit for good operation.

GET VALUABLE BOOKLET FREE

"MORE POWER, Less Gas, Less Oil," a new booklet on car care, is yours for the asking. It tells about new Sealed Power KromeX Ring Sets. Write Sealed Power, Dept. G-12, Muskegon, Mich.



Clinic for Homemakers



As a service to our readers in solving the hundreds of problems pertaining to a home—inside or out—the editors of *Popular Mechanics* invite you to present your problems to The Clinic Editor for help and advice. Address your questions to The Clinic Editor, *Popular Mechanics Magazine*, 200 East Ontario Street, Chicago 11, Ill.

Removing Stump

Q—Recently I cut down two large trees in my yard and now I'm faced with the problem of removing the stumps. I'd considered attempting to dig them out, but have hesitated because of the labor involved and the unavoidable damage to the lawn. Is it practical to burn them out and if so, how do I go about it?

M.A., Tenn.



A—Eliminating a stump by burning is a rather tedious job as a fire must be maintained over a period of time and generally the smoke is objectionable. The usual procedure is to drill several 1-in. holes deep into the stump and repeatedly fill these with kerosene until absorption ceases. Then place wood or other material around the stump, ignite it and add fresh fuel to keep the fire burning until the kerosene-soaked wood ignites and burns freely. As a rule the stump can be burned out to a point well below ground level. Where smoke is objectionable another method produces fairly satisfactory results, although it takes more time. Drill holes in the stump in the same manner as described and fill the holes with the packaged chemicals sold by hardware stores for making compost. These speed up normal decay to a fraction of the time ordinarily required.

Paint Defects

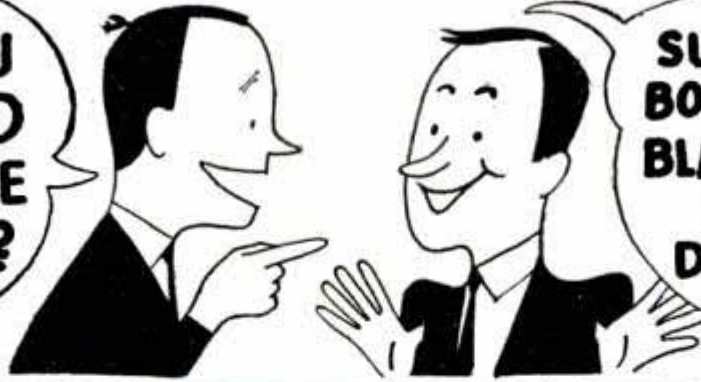
Q—What causes checking, blistering and wrinkling of paint when applied to wooden siding?

R.T., Colo.

A—Checking generally means short, narrow breaks in the paint film. As a rule both checks and cracks (longer and larger cracks) are the result of shrinking and hardening of the paint film so that it no longer has sufficient elasticity to resist atmospheric changes. Moisture penetrating the walls from the room side is a common cause of blistering paint. Moisture in the form of vapor will penetrate all common building materials except barriers, and eventually will collect under the paint film. Moisture in the form of excess humidity may have as its source steam from the preparation of food in the kitchen, laundering and shower bathing. In new homes slow drying of plaster is a cause of paint blistering on exterior walls. A common cause of wrinkling is the application of a heavy finish coat over undercoats which are not thoroughly dry. It should be understood that only the more common causes of paint defects are given above. There are, of course, other causes.

(Continued to page 222)

WHAT? YOU INSULATED YOUR HOUSE YOURSELF?



SURE-WITH GOLD BOND ROCK WOOL BLANKETS-AND WHAT A DIFFERENCE!

WITHOUT INSULATION THE FURNACE HEAT WAS GOING RIGHT UP THROUGH THE ROOF.



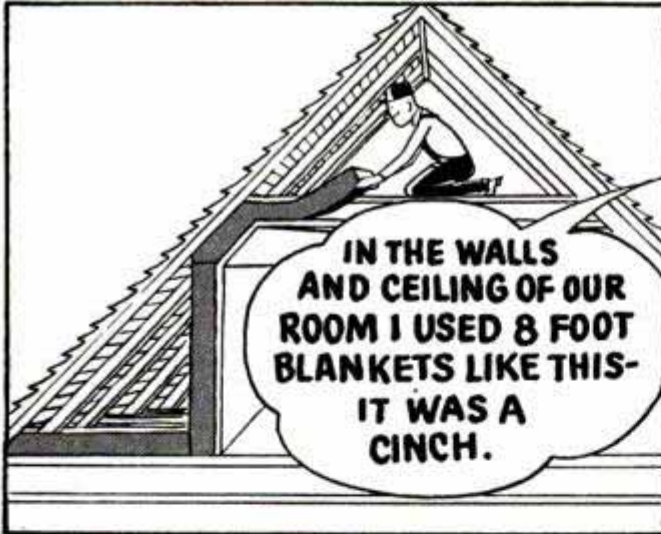
SO I PUT FIREPROOF GOLD BOND ROCK WOOL BLANKETS IN THE ATTIC. IT SURE WAS EASY!



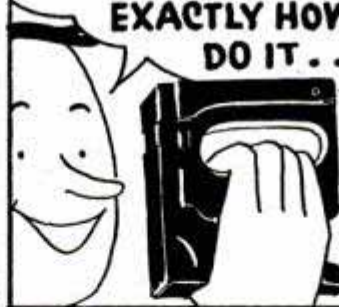
IN THE UNFINISHED PART, I JUST LAID THE BLANKETS WITH THE VAPOR BARRIER DOWN!



IN THE WALLS AND CEILING OF OUR ROOM I USED 8 FOOT BLANKETS LIKE THIS- IT WAS A CINCH.



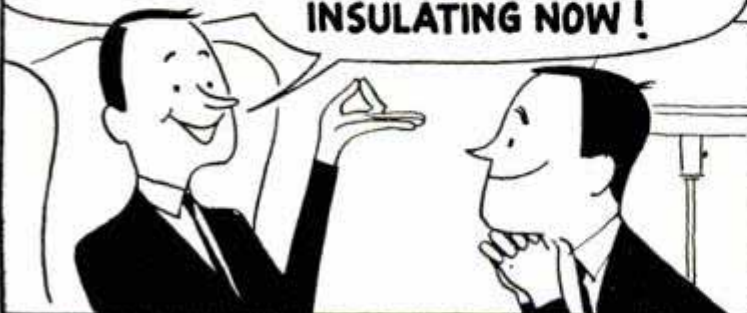
MY GOLD BOND LUMBER AND BUILDING MATERIAL DEALER FIGURED THE WHOLE JOB - SHOWED ME EXACTLY HOW TO DO IT...



EVEN SUPPLIED A STAPLING GUN- (NAILING IS EASY, TOO!)

BUILD BETTER WITH Gold Bond BUILDING PRODUCTS

MY FUEL SAVINGS HAVE MORE THAN PAID THE COST. THE WHOLE HOUSE IS WARMER IN WINTER AND MUCH COOLER IN SUMMER! WHY DON'T YOU SEE YOUR GOLD BOND DEALER ABOUT INSULATING NOW!



LOOK FOR THE STRIPED PACKAGE



NATIONAL GYPSUM CO. BUFFALO 2, N. Y.

ADD-A-ROOM NOW! with Gold Bond BUILDING PRODUCTS

Do it yourself with

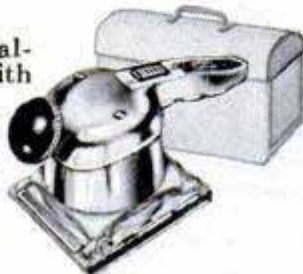


Speed Way Speed Tools

Build, repair, install, finish or refinish—at your convenience, at low cost. Powerful SpeedTools take the drudgery out of work, help you do "professional" quality work in a hurry.

No. 150 SpeedSander

An all-ball-bearing, orbital-motion, finishing sander with powerful 3450 r.p.m., A.C. induction motor and cast aluminum body. **\$34.50**



150-K SpeedSander Kit

The Sander with Accessories including: deep contour pad, finishing plate, felts for free abrasives and wet rubbing, lamb's wool bonnet, 90 sheet abrasive covers, etc. in fitted steel carrying case. **\$49.50**

No. 1000 SpeedSaw

1/4 H.P. Universal Motor, cast aluminum housing, safety shut-off switch. Cuts all angles to 45°, any depth to 1 1/8" **\$29.95**



SpeedDrills

(for metal or wood)

Extra power, high speed, electric drill with cast aluminum cases, and geared chucks.

No. 200-J 1/4" SpeedDrill **\$19.50**

No. 400

1/2" SpeedDrill **\$39.50**

also other sizes, types.



Drill Kits

Several fast selling kits. Painters and Householders Kit (illustrated) is typical. It has: 1/4" Hornet Drill, Abrasive Discs and rubber backer plate, grinding wheel, wire brush, buff, etc. In attractive display carton. **\$19.95**

Write for catalog



Speed Way MANUFACTURING CO.
1863 So. 52nd Ave. • Cicero 50, Illinois

Attaching Knotty Pine To Basement Walls

Q—I'm planning a basement recreation room to be finished in knotty pine. According to the plan the boards must be attached to the masonry walls. I'm told that the best method is to install studding and nailing members inside the masonry walls, but the space available is comparatively small and this construction would reduce the size of the room. Isn't there a way to attach the boards directly to the masonry?—T.U., Ky.



A—Yes, one way is to drill holes in the masonry walls with a star drill and insert screw anchors. Then attach wooden furring, or nailing strips, by driving screws through the strips into the soft-metal anchors. The strips can be spaced from 18 to 36 in. apart. If the wall slopes slightly, then the thickness of the strips will have to be varied so that the boards will stand perpendicular. Another method utilizes the metal fasteners which are attached to the wall with a special adhesive. These are located at measured levels on the wall and equally spaced. A nail is welded to each metal plate with the point projecting. When the adhesive is dry, the furring strips are centered on the projecting nail points and then tapped with a hammer causing the nail points to enter and pass through the strip from the back. When the strip is in place, the nail points are clinched tightly to hold the strip securely. The knotty-pine boards are then nailed or screwed to the strips.

Sweating Masonry Walls



Q—My home is built of concrete blocks and for the last two winters I've been troubled by the walls sweating. Moisture seems to collect near the ceilings and drops run down the walls. Paint and wallpaper are being damaged and unless I can find and cure the trouble there's no use of re-decorating. I've looked

in the low attic for leaks but there seems to be none. What is causing this and how do I cure it?—A.B., N.Y.

A—You did not describe the wall construction. That makes it difficult to judge, at this distance, but basically the trouble is due to an excess of moisture in the air inside the house. Variations in the temperature of the air and the walls will cause the moisture to condense on the inside surfaces of the walls, which are colder. The trouble is more pronounced where the plaster is applied directly to the masonry without proper insulation and the installation of a vapor barrier. If this is so in your case, then the only remedy that can be considered effective is to attach wooden furring strips to the walls, apply insulation and a vapor barrier and then plaster over metal lath or a plaster base. Some types of insulation made especially for installation between furring strips have a vaporproof membrane attached to the room side. In order for this to be fully effective care must be used when installing to assure a moistureproof seal. Follow the manufacturer's instructions in all details. The insulation tends to prevent penetration of cold to the inner surface of the wall, and this means that the temperature of the walls on the room side remains at more nearly the temperature of the air. In some cases reducing the humidity of the air in the rooms will prove helpful in minimizing condensation. Some homeowners have found that a kitchen ventilating fan operated each day will reduce the humidity by removing cooking vapors and excess moisture from the weekly laundering.



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REG. U. S. PAT. OFF

No Finer Gift

FOR THE MAN WHO OWNS A CAR

Mile-O-Meter is the most practical and fascinating gift any motorist can receive. It mounts permanently on the dashboard (with no holes to drill) and indicates continuously both "miles per gallon" and overall motor condition, warning clearly when minor adjustments are necessary to prevent costly breakdowns and repairs. Fully guaranteed on a firm "money-back if not satisfied" basis. Endorsed by leading automotive associations. Really simple to install. Fits all cars. Mile-O-Meter is the perfect gift for the man who owns a car.

SAVE GAS

CUT MILEAGE COSTS

THE PERFECT GIFT

MONEY-BACK GUARANTEE

EASY TO INSTALL

ILLUMINATED

FITS ALL CARS



Save Three Ways with MILE-O-METER

Save on Gasoline — because Mile-O-Meter makes it easy to drive economically.

Save on Repairs — because Mile-O-Meter continuously indicates the performance of your engine.

Save on Tune-Up — because Mile-O-Meter shows you how to make 31 different motor adjustments quickly and easily.

AND . . . Mile-O-Meter takes only a few minutes to install. Accurately measuring the manifold vacuum, Mile-O-Meter "translates" this important information for you by an easy-to-read calibrated dial. It's the most important investment you can make for overall driving economy. Pays for itself over and over again.



You'll save when you drive by instrument instead of instinct . . . when you drive with a Mile-O-Meter on your dashboard.



Mile-O-Meter is beautifully gift-wrapped, with all accessories included. A gift card will be enclosed at your request. We mail anywhere in the USA on the same day order is received. When payment is enclosed, we pay postage. Add 35c for special delivery.

(C.O.D.'s accepted.)



\$14.95
Ppd.

Deluxe Illuminated Model 3 1/4" dia Fed. Tax incl.

\$9.75
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Standard Model 2 1/4" dia. Fed. Tax incl.

Order from GALE HALL ENGINEERING Dept. 283
107 Northampton St., Boston 18, Mass.

Please send . . . Deluxe . . . Standard Mile-O-Meters at \$

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Check enclosed C.O.D. Gift Wrapped (free) Gift Card (if desired)

Send check or M. O. . . . shipped prepaid (add 35c for special delivery). C.O.D.'s accepted (plus postage).

FREE! Huge 24-page Motorist's Manual and Instruction Booklet PLUS Mileage Calculator.

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Here is a radio that strides the world at the touch of a dial. Now you can hear historic world events direct, hear the BBC, Paris, Australia, exciting ship-to-shore broadcasts, amateurs from all over the world, the Voice of America, Russian propaganda, police calls, and in addition you get powerful long distance, broadcast-band reception.

Here is a radio that gives you superior short-wave and standard broadcast reception, yet costs no more than you'd expect to pay for an ordinary radio. Only Hallicrafters skill and know-how, the experience gained in years of producing more military type radio communications equipment than all other manufacturers combined, could produce this set. See it. Hear it—hear what you've been missing.



HALLICRAFTERS
MODEL S-38C Only **\$49⁵⁰**

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WORLD'S LEADING PRODUCER OF PRECISION
COMMUNICATIONS RADIOS

Clymer Tests the Kaiser

(Continued from page 92)

throttle locations are good. The hand-brake lever is operated by the right hand. Starter is push-button type. The "bin type" glove compartment is convenient but I don't like the idea, as articles fall out too easily when it is opened and too much slamming is required to close it. The windshield is two-piece and curved. It is extremely high and wide, affording excellent vision as corner posts are very narrow. Rear vision likewise is excellent, but the rear-vision mirror does not offer full use of the large rear window. Ventilation is good and controlled for either or both sides by separate knobs. The heater is excellent and its controls operate easily.

The hood is counterbalanced, easy to open and close and is locked from the inside. The luggage compartment is ample, but not so large as that in the first Kaiser cars when the body was higher. The spare tire lies flat in a well on the floor with a metal cover. The cover lock could stand much improvement. When a flat occurs, luggage must be removed before the tire can be taken. It's a space-saving idea, but not a practical one.

Even in the dusty and rough desert the car developed no rattles, squeaks or dust leaks and in 100 miles of rain no water came in, which indicates better assembly than in earlier Kaiser models.

The new Kaiser took all the abuse I gave it and came through in good shape. I would rate it a good, sound, reliable and economical car.

In his cars, Henry J. Kaiser offers many fine features, some of which are better than those found on competing makes, yet it is hard for some people to see anything good in a Kaiser. I've said many times and say again that Kaiser products are far better than most people think they are. In spite of opinions of some nonowners, you'll find Kaiser owners rate among the highest in praise of their cars. If you don't think so, just ask the next 10 Kaiser or Henry J owners you meet how they like their cars. By and large, they are real boosters and some are fanatical in praise of Kaiser. Of course, you'll also find a few "knockers" among the owners.

Some say Kaiser is an "assembled" car, and in early days some sort of stigma seemed to be attached to the word "assembled." It is true that Kaiser is an assembled car, but so are all the others. These are the days of specialists and even the larger makers no longer make all the units used in their cars.

Kaiser probably builds as much of his

(Continued to page 228)

The Perfect Christmas Gift For Any Man

All-Purpose WELLER GUN

**Does Dozens of Money-Saving Jobs
Plus All Types of Soldering**

With this instant-heating electric tool, he'll repair metal equipment, spouting and toys—fix radios, TV, appliances and wiring—heat-seal home freezer packages—build model railroads—make costume jewelry—regroove tires. Weller Guns with finger-tip heat control and prefocused spotlight are available in Christmas Gift packages at your Hardware Dealer

WRITE FOR BULLETIN telling all about Weller Guns.

Weller

**SOLDERING
GUNS**

816 Packer Street, Easton, Pa.



cuts rubber or composition floor and wall tile



removes old, hard putty from windows



repairs furniture scratches with stick-wax

**WATERLOO
METAL
BOXES
AND
CHESTS**

Santa's 1st Choice
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Craftsmen in every phase of automotive, radio, electrical, or industrial work choose Waterloo boxes. Why? ... Because they are designed to meet the exacting requirements of tool experts ... because they are unmatched for lightness, strength and beauty. They feature:



• GABLE TOP TOOL BOX



• SMALL PARTS CABINET



• HEAVY DUTY
CARPENTER'S BOX



• GENERAL UTILITY BOX



• MECHANIC'S BOX

• Embossed metal Reinforced corners Automatic trays Heavy draw bolts.

• Piano type hinges. Water shed Green baked enamel electrostatically applied

• Lifetime handles ... double edges.

See these boxes now at your Hardware Dealer ... or write for free catalog.

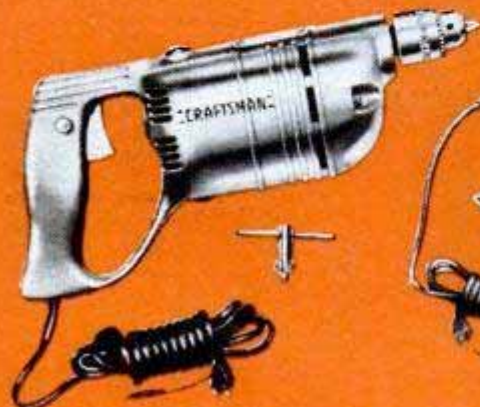
**WATERLOO VALVE SPRING
COMPRESSOR CO. • WATERLOO, IOWA**

America's most complete line

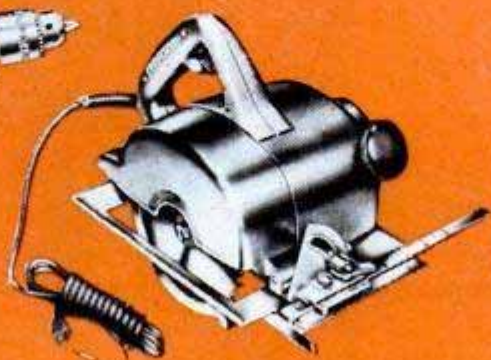
Saving money for industry . . . giving greater pleasure in the home workshop
 Designed with plus-performance and features professional craftsmen want

Man! Look at these big, rugged, streamlined beauties . . . and look at their amazing low prices! No wonder Sears lead all America in power tool sales! All are precision-built by the most expert, efficient manufacturing methods known. All are laboratory tested . . . and GUARANTEED to give you complete satisfaction or your money back!

CRAFTSMAN and DUNLAP Power Tools come in a complete range of types and sizes for industrial or home workshop use. Buy with confidence! See these sensational extra-value tools at your nearest Sears Retail Store TODAY! Compare them feature-by-feature with ANY others . . . and prove to yourself that Sears Power Tools give you more for your money!



CRAFTSMAN 1/2-inch Electric Drill
\$25.95 Cash \$3.00 Down



CRAFTSMAN 6 1/2-inch Electric Hand Saw
\$55.00 Cash \$5.50 Down
 Without case



CRAFTSMAN Ball Bearing Capacitor Motor
\$28.00 Cash \$3.00 Down
 1/2-H.P. 1750 R.P.M.



DUNLAP 1/2-inch Electric Drill
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CRAFTSMAN Rotary Tool Outfit
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 Complete 54-piece set



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CRAFTSMAN and **DUNLAP** Tools by **SEARS, ROEBUCK and CO.**
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of fine quality Power Tools!

Compare them yourself! We don't think you can match these values anywhere!
Just a small down payment on Sears Easy Terms puts one or more in your shop!



Free!

1953 CRAFTSMAN Power Tool Catalog! Get yours NOW from the Hardware Department of your nearest Sears Retail Store!



CRAFTSMAN 8-inch Tilting-Arbor Bench Saw

\$60.00 Cash \$6.00 Down

Less guard, motor, extensions



CRAFTSMAN 3-Drum Belt Sander

\$58.95 Cash \$6.00 Down

Without case



CRAFTSMAN Ball Bearing Drill Press

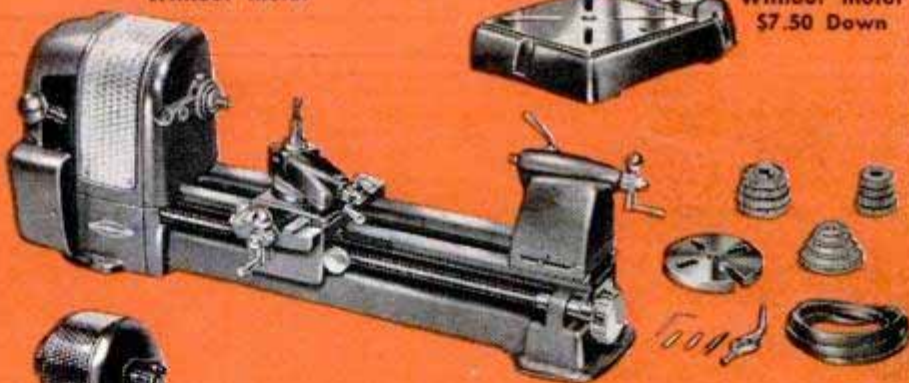
\$75.00 Cash

Without motor \$7.50 Down

CRAFTSMAN Metal Turning Lathe

\$47.50 Cash \$5.00 Down

Without motor



CRAFTSMAN 18-inch Jig Saw

\$32.50 Cash \$3.50 Down

Without motor



CRAFTSMAN Ball Bearing Wood Lathe

\$46.50 Cash

Without motor \$5.00 Down



CRAFTSMAN 3-wheel Band Saw

\$53.00 Cash \$5.50 Down

Without motor



CRAFTSMAN 4 1/2-inch Jointer-Planer

\$50.00 Cash \$5.00 Down

Without motor

Your nearest Sears Retail Store will furnish you with exact selling prices which will not exceed O.P.S. ceiling prices.

Famous for fine quality... precision performance... low price!

car as many others, inasmuch as he builds his own bodies. Although the engine carries the Kaiser-Frazer name, it sometimes is referred to as a Continental, which certainly carries no stigma; thousands of taxis that require stamina in engines use the same unit.

Borg-Warner supplies Kaiser with transmissions, as it does Ford, Lincoln, Mercury, Studebaker, Packard, Nash and Willys, including transmissions for such trucks as Reo, Mack, Ford, International, Buda, Diamond T and others.

For clutches Kaiser went to Borg & Beck, which supplies Chrysler, DeSoto, Dodge, Plymouth, Nash, Studebaker and others. When Kaiser engineers wanted a steering gear, they went to Gemmer (in business 42 years) which supplies all Chrys-

(Continued to page 230)

1952 KAISER-FRAZER SPECIFICATIONS

ENGINE

	Kaiser	Henry J "6"	Henry J "4"
Type	6-cyl., L-head	6-cyl., L-head	4-cyl., L-head
Bore and stroke	3 ¹ / ₁₆ in. x 4 ³ / ₈ in.	3 ¹ / ₈ in. x 3 ¹ / ₂ in.	3 ¹ / ₈ in. x 4 ³ / ₈ in.
Piston displacement	226.2 cu. in.	161 cu. in.	134.2 cu. in.
Brake horsepower	115 @ 3650 r.p.m.	80 @ 3800 r.p.m.	68 @ 4000 r.p.m.
Compression ratio	7.3 : 1	7.0 : 1	7.0 : 1
Transmission	3-speed conventional.	Conventional with overdrive unit optional on all models. Dual-Range Hydra-Matic optional on Kaiser only.	

GENERAL

Steering ratio	25 : 1	24 : 1	24 : 1
Steering, lock to lock	5 turns	4 ¹ / ₄ turns	4 ¹ / ₄ turns
Turning radius	19 ft.	17 ft. 6 in.	17 ft. 6 in.
Brakes	Hydraulic with riveted linings—all models.		
Tire size	6.70 x 15	5.90 x 15	5.90 x 15
Recommended pressure	24 lb. front 24 lb. rear	24 lb. front 20 lb. rear	24 lb. front 20 lb. rear
Weight (unladen)	3171 lb.	2350 lb.	2300 lb.
Wheelbase	118 ¹ / ₂ in.	100 in.	100 in.
Tread, front	58 in.	54 in.	54 in.
Tread, rear	58 ³ / ₄ in.	54 in.	54 in.
Height, over-all	60.25 in.	61.90 in.	61.90 in.
Width, over-all	74.875 in.	69.38 in.	69.38 in.
Length, over-all	211 ¹ / ₈ in.	177 ² / ₃₂ in.	176 ² / ₃₂ in.
Road clearance	8 in.	7 ¹ / ₂ in.	7 ¹ / ₂ in.

INTERIOR DIMENSIONS

Front seat width	63.18 in.	57.38 in.	57.38 in.
Rear seat width	63.12 in.	56.75 in.	56.75 in.
Headroom, front	35.69 in.	35.41 in.	35.41 in.
Headroom, rear	33.69 in.	33.10 in.	33.10 in.
Legroom, front	45.31 in.	43.44 in.	43.44 in.
Legroom, rear	39.56 in.	37.18 in.	37.18 in.

CAPACITIES

Oil	5 qt.	5 qt.	4 qt.
Water	13 qt.	9 qt.	10.8 qt.
Gasoline	17 gal.	13 gal.	13 gal.

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8" TILTING ARBOR SAW

A new Shopmaster tool at a new low price. Durable construction of rugged cast aluminum alloy with large table working surface. Has visible and convenient operating mechanism. It's an excellent all-around tool for the new hobbyists' workshop.

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MASSIVE CAST CONSTRUCTION

SIMPLIFIED TILTING CONTROLS

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	 <p>BELT AND DISC SANDER</p>	 <p>10" SWING WOOD TURNING LATHE</p>	 <p>12" TILTING TABLE BAND SAW</p>	 <p>10" TILTING ARBOR SAW</p>	

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Thrilling speed

Great stamina

It's got EVERYTHING

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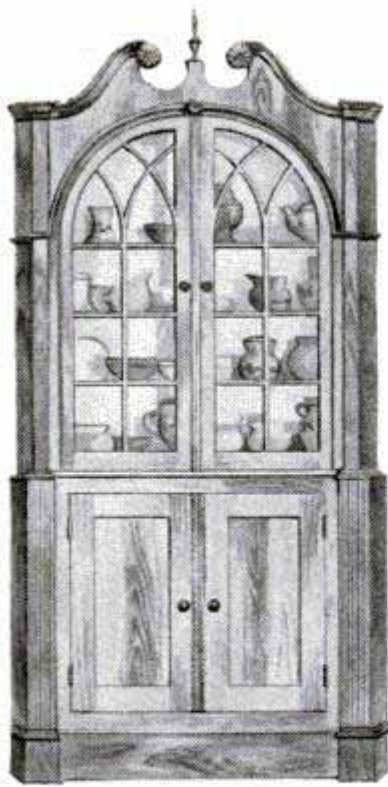
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WESTERN PINES*

Craftsmen of today choose the mellow, rich woods of the Western Pines for fine furniture and cabinetwork that will be cherished treasures in years to come!

When you make this handsome pine cupboard, for instance, you will find these straight-grained, soft-textured woods remarkably responsive, easy-to-work, cutting to clean edges and contours, shaping easily on the turning lathe. Waxed, then rubbed to a shiny sheen, every inch will glow with lasting loveliness!

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FREE IDEA PACKET NO. 540

contains helpful how-to-do-it suggestions and furniture work plans, including one for the cupboard illustrated.† Also a copy of the colorful booklet, "Enchanting Homes of Western Pines," with 71 illustrations. Write today to WESTERN PINE ASSOCIATION, Dept. 540-N, Yeon Building, Portland 4, Oregon.

†This cupboard from *The Cabinetmaker's Treasury*, published by The Macmillan Company.

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* PONDEROSA PINE
* SUGAR PINE

ler-built cars, Packard, Hudson, Nash, Mercury and Lincoln. Ford makes its own Gemmer-design gears under arrangement with Gemmer.

Carter carburetors are standard on all Kaiser cars. Carter also is used in Studebaker Champions, some Cadillacs, Hudson, Nash, Oldsmobile, Packard, Willys, Plymouth, DeSoto, Chrysler, Pontiac and Buick.

Other units such as speedometers, rear axles, shock absorbers, radiators, body hardware, batteries, plugs, springs, frames, bumpers, fan belts, universal joints and other items are supplied to Kaiser by specialists in their respective fields and many of them supply all or some units for most of the other car makers. ★ ★ ★

Owners Report on the Henry J

(Continued from page 90)

little farther from the steering column."—Three Rivers, Mich., accountant.

"Rear window is not high enough for rear-view mirror."—Ashtabula, Ohio, truck driver.

"The body should be about 18 inches longer, without an increase in wheelbase, for more room between front and rear seats."—Kankakee, Ill., farmer. (Owners of all makes of small cars register this complaint, as do owners of many club coupes in larger cars.)

"Kaiser should have brought out the present better-finished Henry J at first. Many formed a bad opinion of the first cars because of lack of refinement and needed accessories that now are available. It's a great car and far better than most people think."—Atlanta, Ga., bus driver.

But most replies were favorable.

An Astoria, Ore., Navy employee wrote: "This car surprises everyone by the room and power it has. I believe people under-rate it. I've owned two and will buy a new one when it comes out next year."

A Detroit plumbing contractor was one of several who said, "The Henry J makes an excellent second car in the family. I use mine for business purposes."

"Room in the Henry J is fantastic. Three can ride in the front seat in comfort. I feel relaxed and not cramped on many long trips I take. Economy is fine, engine smooth. I'd like rear windows that open."—Glendale, Calif., salesman.

A Mesa, Ariz., insurance agent, a Dallas, Tex., golf professional and an Aurora, Ill., serviceman were among those who said that water leaks in under doors and around the windshield and rear glass.

A Worcester, Mass., man wrote: "I drive heavy trucks for a living and don't care to

(Continued to page 232)

Want the greatest Christmas ever?

COME RIGHT OUT AND ASK YOUR FAMILY FOR THE

DELTA SHOP

...DOES 98% OF HOME-SHOP JOBS

Here's a one-motor combination shop that makes sense—the four most-used regular Delta Homecraft tools in a unit that takes only a 3-foot square—built around a husky 8" circular saw with tilting blade. Plus a big-capacity 4" jointer, versatile 11" drill press, sturdy disc sander. Not a group of attachments, no time-wasting setting-up and adjusting. Ready to work! Nothing to compare with it—for big value, small size and best of all, LOOK... only **\$209.95*** including the steel stand.

Later, if you have more room for a bigger shop, it's easy to separate your Deltashop into individual tools. Or you can build the DELTASHOP tool-by-tool as your funds permit.

*Motor and motor accessories extra.



Another
ROCKWELL
Product

OR MAYBE YOUR SHOP NEEDS ONE OF THESE FINE TOOLS...

DELTA Homecraft 11" LATHE

for the expert who loves turning. Make furniture,



lamps, toys, hundreds of excellent projects.

\$57.25

DELTA Homecraft 10" BAND SAW

for inside and outside curve cuts, and for cutting stock too thick for the circular saw. For hardwood, too—and plastics, light metals.



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DELTA Homecraft 16" SCROLL SAW

Do intricate patterns and delicate cutting like marquetry, fine fret work, inlays, veneers, jig saw puzzles. A wonderful tool for starting your youngster's shop training.



\$37.95

Special!

A DELTASHOP GIFT CERTIFICATE

Here's the ideal way to present this ideal gift for any man—get an attractive DELTASHOP Gift Certificate Box from any Delta dealer.



HAPPY NEWS FOR A MODEST CHRISTMAS BUDGET...

GIVE A DOWN-PAYMENT—What gift so appropriate for a family that watches the dimes, as a down-payment on a DELTASHOP! Delta dealers have an easy-payment plan, actually the tool soon pays for itself.

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There's a Delta Power Tool for Your Job.

do much driving on my day off, but this little car really is a pleasure to drive around in traffic. I don't need a heavy eight-cylinder job to shop or drive back and forth to work."

"It is a small car, yet large enough to hold a family with four children," wrote a New York City telephone repairman. A Eugene, Ore., truck operator commented, "I like the way the rear seat lays down because I have four small children and when they get tired they can lie down."

"The Henry J is a fine family car, giving ample comfort with a minimum of the luxury items which never were needed in the operation of a car," said a Johns Island, S. C., rural mail carrier.

"Easiest car to handle I've ever driven. Wonderful in traffic and easy to park. Can beat 9 out of every 10 cars in getaway from traffic lights. It's really a Model A for economy."—Denver, Colo., contractor.

"A 13-gallon gas tank seemed a joke to me when I bought the car. Now I find it ample and once for a test I filled the tank and drove until the tank ran dry at 332 miles. I can't travel 220 miles on a tankful with a larger car I own. My kids like our Henry J better than the big car."—Denver, Colo., salesman.

One interesting response from quite a few owners, including a Cambridge,

Mass., teacher and a Yonkers, N. Y., insurance man, was the wish that Kaiser would build the Henry J as a convertible. A San Antonio, Tex., Air Force officer wrote, "It is a rugged little car and will deliver excellent performance. I am an auto fan and wish that K-F would put out a real sports car built on the Henry J wheelbase—just don't let the price get out of hand." (K-F recently announced it would build 1000 sports cars on the Henry J chassis, using a glass-fiber body.)

One controversial issue in connection with the Henry J—that of its resale value—was discussed by some owners. A Dayton, Ohio, machinist wrote, "The cost of operation over the period of a year will more than make up the difference in the resale of the car." An Indianapolis carpenter said, "Henry J owners should be assured that the resale value will justify their investment, contrary to popular criticism that the dealers don't give a satisfactory allowance when purchasing a Henry J."

A woman's reaction came from an Ontario, Ore., beauty operator, who said, "I like my Henry J very much. It's one car in which I don't have to sit on a pillow to see out when driving."

A South Boston, Mass., truck driver thinks that Kaiser-Frazer should check up

(Continued to page 268)

DO IT TODAY! SWITCH TO

MILD

KENTUCKY CLUB



"Look! Another man switched to Kentucky Club—the thoroughbred of pipe tobaccos."

Notice how much better your pipe tastes—how much fresher your mouth feels when you switch to Kentucky Club.

Look for the blue tin with the picture of the red-coated rider. Send for free catalog showing fine pipes and how to get them at big savings. Mail Pouch Tobacco Co., Wheeling, West Va. Dept. 96





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**GIVE MILLERS FALLS
 TOOLS THIS CHRISTMAS**

A basic tool for every handyman. Millers Falls No. 77A Hand Drill. \$3.30



A beautiful new tool with unbreakable glossy red "Tenite" head and handle. No. 1950 Bit Brace. \$4.80



Makes light work of hundreds of jobs. Millers Falls amazing new No. 966 Sander-Polisher. \$37.50



Cuts Most Anything — most anywhere. Millers Falls No. 725 "Nest of Saws." \$2.95



Handiest way ever to bore small holes. No. 100 Automatic Drill. \$4.00



Passport to fun and a profitable hobby. Millers Falls No. 106 Carving Tool Set. \$4.60



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For men who like to do things fast. No. 29X Screw Driver with 4 attachments. \$3.80

At hardware stores everywhere, you'll find these and many other fine Millers Falls tools in colorful Christmas boxes. They're perfect gifts for the men and boys on your list. Wonderful, too, to receive yourself. Pick out the ones you'd like and drop a hint to your family. They'll appreciate the tip. Free circular on request.

*Prices slightly higher in the West
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MORE JOBS
EASIER — QUICKER
 You'll like the smooth, powerful, gear-driven, easy operating action of the 4½ or 6 H.P. WALKING MODEL with power turning clutch or the 8½ H.P. RIDING MODEL with automotive type differential. Our 2 and 3 H.P. Walking Models low as \$169. Attachments for plowing, sowing, cultivating, wood-sawing, snow-plowing, etc. Write for FREE Catalog New 1953 Models on Easy Terms — special Factory-To-You discount. **RED-E TRACTOR CO., Richfield 338, Wis.**

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Fully Guaranteed **BUY DIRECT** from Manufacturer and Save

*When winter winds begin to blow
 And the air is filled with rain or snow
 Streets are slippery, visibility is low*

Night driving made SAFE

LUMA-RIM, the brilliant reflective wheel trim, lets drivers of on-coming cars SEE YOU BEFORE IT IS TOO LATE, when crossing street, or roadway, or pulling away from curb at night. Precision die cut in the form of a circle, from the finest reflective material. Cemented to the flat portion of the wheel rim, will retain its bright red glow for years. Reflects light from any angle. Best insurance against being hit at night. Nationally advertised product of par excellence. Complete set **\$2.95** for four wheels, postpaid. Made for 15" and 16" rims. Order by tire size. © L-R Corp. 1952.

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 The Only Tool You Need Is A Screwdriver!

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- PROTECT IT FROM THE ELEMENTS

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ACTION PLIER No. 102
the mechanical hand

Grips like a vise
Cuts wire easily
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Give a Sargent Parallel-Action Plier for Christmas... the favorite tool of mechanics, sportsmen, farmers and handymen everywhere. Finished in bright Nickel and available in 4½", 5½", 6½" and 8" lengths, in special Christmas boxes at your hardware dealer. For further details, write Dept. 20M.



Builders Hardware
 and Fine Tools
 since 1864

Sargent and Company

New York • NEW HAVEN, CONN. • Chicago

Show this advertisement to your favorite Santa.

Flippy Rings the Bell

(Continued from page 77)

would give him the needle. Then the fish could be handled like a log. Today the needle is kept around only as a precaution. "We've found that sharks give up quickly after a short struggle on the hook," one Marineland explains.

Despite all their fancy equipment Marineland fishermen still rely on nets, rods and reels for much of their work. Big loggerhead turtles weighing more than 300 pounds are harpooned through the flipper by men in the dinghy who sneak up on them while they're snoozing on the surface.

When the men wanted some specimens of big gray porpoises which they'd seen chasing a school of fish up a near-by inlet, they stretched a net across the inlet mouth and waited for the tide to go out. As the porpoises headed seaward, a second net was dropped behind them and the two worked slowly together. Though two big fellows leaped 10 feet into the air to clear the net tops and escape, several others were trapped.

Incredible things have been caught in the big nets. One day as the skiff's winch began hoisting it, the net took off. For six hours the boat was pulled all over the ocean before that catch could be hauled in. In the center was a 1500-pound manta ray measuring a full 12 feet from wing tip to wing tip.

Rays are tough customers even in junior sizes. Everyone stands clear when a three or four-foot sting ray comes into the live well. As it passes through, one man must stand ready to perform the dangerous job of removing the poisonous barbs from its tail so it won't injure other specimens in the well—not to mention the people on deck.

A pigmy sperm whale once was sighted near a beach by fishermen who notified the studio. Marineland crews went out by sea and by land. The sea crew maneuvered the big fellow shoreward until he beached himself. Then with block and tackle he was hoisted aboard the truck and hauled off to the tanks.

Most of the small, brilliantly colored tropical reef fish in the oceanarium aren't native to near-by waters. They come from the Keys and the Bahama Islands, and so must be transported overland. To do this job the men have devised a rolling aquarium. Built on the back of a semitrailer, the rig consists of six removable canvas tanks that hang on a framework of racks. A built-in circulating and aerating system provides plenty of oxygen and moving water via

(Continued to page 236)

POWER HYDRAULICS for Snow Plows



HY-LO-JACK
does the job
FASTER - EASIER

- Lifts average snow plow in 3 to 10 seconds.
- 1,000 lbs. per square in. pressure
- Quick, easy installation on new or existing equipment.
- Complete kit form, including the pump, tank, hose lines, etc.

★ Write for Circular. See your Road Machinery, Jeep or Farm Equipment Dealer

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Quality Machinery since 1856
327 Front Ave., N. W., GRAND RAPIDS, MICH.

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TRUCKS



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TRACTORS

Mortite

KEEPS THE COLD OUT

SAVES FUEL AND MONEY

Cordlike and pliable, Mortite is the perfect weatherstripping. Goes on in a jiffy without tools or tacks. Keeps out wind, dust, dirt. Anyone can press it around windows, doors, transoms, baseboards. Weatherstrip a whole window for 29c—costs even less if you use the larger packages. Get Mortite at stores or write for circular. J. W. Mortell Co., 522 Burch St., Kankakee, Ill.



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FREE INSURANCE POLICY given with each used tire sold. We guarantee the amount of service you pay for.
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SPECIAL! Deduct 10% on orders for Two or More used tires
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Super Quality — Rugged Performance — 15 Months Insured Service	
600x16 \$4.55	670x15 \$5.25
650x15 4.95	670x16 5.35
650x16 5.45	700x15 5.40
700x16 5.55	700x16 5.55
710x15 5.45	820x15 6.45
760x15 5.95	820x17 4.75
Supreme Quality. Nothing Finer — 30 Months Insured Service	
450x20 5.95	450x21 6.25
600x16 5.65	650x15 5.75
650x16 5.85	670x15 5.95
700x16 7.75	700x15 5.75
750x16 12.50	710x15 6.50
550x17 5.75	760x15 6.95
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600x15 11.45	700x15 13.95
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SNOW TIRES
NO CHAIN PROBLEMS
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NEW TIRE GUARANTEE

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Speedy shipments on Mail Orders. Insurance Policy sent with each order. Deduct 10% on orders for 2 or more used tires. Send CHECK or MONEY ORDER. No COD's.

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For that man among men who works with his hands. He's always wanted power tools, but he's been too unselfish to buy them for himself. Give him a PET Power Tool for Christmas!

Mirror finished 1/4" drill
Pistol grip, trigger switch, lock with instant release. Model 1950-HM. In gift box, **\$19.95**



Gold-tone finished 1/4" drill. This will make him whistle! Tops in looks and performance. Model 1950-HB. In gift box, **\$20.95**

Chromium and satin finished 1/4" drill. High quality, yet low in price. Pistol grip, trigger lock. Model 77-HC. In gift box, **\$14.95**



High-luster finished Zip-Sawer Jr. Converts any 1/4" drill into a portable saw. Rips, cross-cuts, trims. Model ZP-1. In gift box, **\$7.95**

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Favorite of "DO-IT-YOURSELFERS"

Look for the PET Christmas Tree Display at your dealer's!

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hoses and tubes that run along the framing.

There are plenty of problems involved in maintaining the big fish bowl and its pernickety inhabitants. One of the toughest customers was a giant manta ray that refused to eat. Finally, under the direction of the late Arthur MacBride, ichthyologist curator of the studio, the men wedged open his two-foot mouth with studding timbers while one brave fellow thrust his arm in—up to the shoulder—to jam great handfuls of fish down his gullet.

That wasn't the end of it. The ray never got used to captivity. He flopped ceaselessly around the tank's bottom perimeter day and night. The porpoises, who sleep in fitful 15 to 30-second intervals near the surface, were so nervous they didn't get any sleep. They finally moved to the center of the tank and adjusted themselves to new sleeping grounds, while the ray kept making his rounds until he finally expired of sheer nervous exhaustion.

Another problem fish was the 400-pound black grouper, hauled up from the deep off St. Augustine. Accustomed to tremendous pressures of the ocean bottom, he swelled like a balloon when he hit the thin upper waters. By the time he reached the studio he was so full of air he bobbed on the surface like a cork.

Ichthyologist MacBride solved this one

by climbing into a diving suit, submerging beneath the ugly fish and puncturing its air sac with a hypodermic needle. It's been in perfect health ever since.

Perpetual problem children, but most fascinating of all the specimens are the porpoises. These uninhibited deep-sea extroverts have an impossible sense of humor. For years a gannet named Gabby inhabited the edge of the circular tank for the scraps he could filch at feeding time. Now and then, floating truculently on the surface, he'd let out a hoarse croak and bounce several feet skyward without moving a wing. Cause of this phenomenon was not Gabby, but one of the porpoises who periodically sneaked up under him and gave him a flip with the tail.

The big fellows also occasionally snatch a feather from a pelican's tail and carry it down to the water inlet where they let it go, watch it soar off with the current, chase it and repeat the performance. A rubber inner tube from a motor scooter is a favorite plaything. Several other porpoises play catch with the customers, flipping the ring back to people who'll toss it to them from the balcony. Their aim is hot, too.

The porpoise's playful attitude has its drawbacks in the tanks. One porpoise had a queer habit of upending a 300-pound

(Continued to page 264)

UNCLE WALTER

IT SMELLS GRAND



SNIFF A WHIFF —
IT SMELLS RIGHT JOLLY!

IT PACKS RIGHT



CUT TO PACK JUST RIGHT, BY GOLLY!

IT SMOKES SWEET



A MERRY SMOKE — *Sir Walter Raleigh!*

IT CAN'T BITE!



SIR WALTER RALEIGH'S BLEND OF CHOICE KENTUCKY BURLEYS IS EXTRA-AGED TO GUARD AGAINST TONGUE BITE. THE LARGE SIZE CANISTER OF SIR WALTER RALEIGH — IN A BEAUTIFUL YULETIDE PACKAGE — MAKES THE PERFECT CHRISTMAS GIFT!

Just in Time for Xmas Giving!



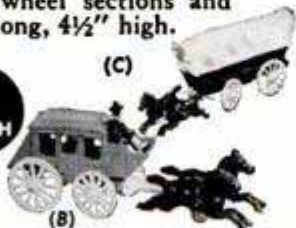
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Authentic Wild West scale models that will be cherished by youngsters, treasured by collectors of Americana; also desired as distinctive decorative touch! Constructed in cast iron . . . made to be handed down from generation to generation!

Buckboard (A) has green body, flaming red wheels. Stagecoach (B) has red body, yellow wheels. Covered Wagon (C) deep blue, white canvas cover, yellow wheels. Ebony black horses. Detachable front wheel sections and drivers. About 3 lbs., 12" long, 4 1/2" high.

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MODEL #30-78 With set screw accurately fixing position of the slide



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The following models have the famous M-Z-B cam lock which guarantees fixed and never shifting setting when pressure lock is released.

- #30-61 Chrome Steel .001" & 1/128" \$14.00
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 - #30-62 Stainless Steel .001" & 1/128" \$16.50
 - #30-65 Stainless Steel .001" & 1/20mm \$16.50
- Leather cases supplied free of charge with each Caliper. You pay postage on C.O.D. Money back guarantee. Other models up to 12" available. Send for our catalog of fine imported pliers.

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Can You Run a Local Dunbrik-Dunstone Plant?

More local plants are needed. You can be one of a national chain. Simple, compact equipment. Moderate investment. 100%—150% mark-up on basic costs. Broad protection and liberal co-operation.

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Tie in with today's demand for smart, colorful, low-cost masonry for homes and other buildings. Dunbrik-Dunstone has beauty, strength, modernity. Easily America's finest masonry, with tremendous appeal to building owners.

Yet costs less than lumber because locally manufactured from local materials by local labor for local consumption.

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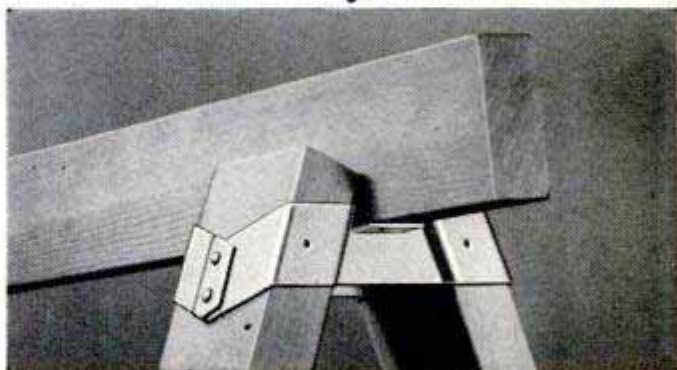
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SAWHORSES FAST!



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ONLY \$1.50 PAIR (one pair makes up one Sawhorse).

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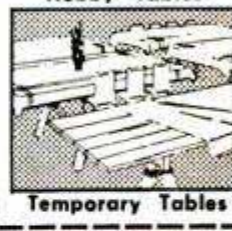
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I enclose \$_____ in check or money order.

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They Built Him a Farm in a Day

(Continued from page 122)

The house was pegged as a \$19,000 job, but under such fast-moving circumstances it probably would cost several thousand more. Here, everything was donated—from land to lumber to groceries in the cupboards and on the shelves.

All labor was voluntary. A large delegation of workers came from the air base at Moses Lake, and not all were buck privates, either. At one time a brigadier general, three colonels, one lieutenant colonel and a major were toting lumber. The general, H. W. Bowman, who was a farm boy long before he became commander of the base, wound up milking a donated cow.

At 4 a.m., 70 pieces of heavy equipment and 34 tractors started churning across the land that had gone back to the wild after wheat crops failed on it 30 years ago. Giant levelers came first, then disks, harrows, fertilizing equipment and seeders.

But all this was just part of the big show. The house intrigued most visitors. Paul Kirk, Seattle architect, was chairman of the committee which designed it.

"Notice the fireplace," he says. "It's in the dining room—not the living room. In the winter, a farmer comes in cold from chores. An open fire makes the meals more pleasant. That was true of the pioneer cabin a hundred years ago. And the fireplace can be seen from the kitchen. A farm wife spends most of her time in the kitchen, and likes to look at an open fire, too.

"Another thing—the farmer doesn't like to shuck off his work clothes in the evening, so he sits in the dining room instead of the living room. You can't move the farmer—at least not in his habits—so we moved the fireplace. The living room is the wife's plush part of the house—a place that can be kept in order for entertaining visitors."

The Dunn home has two bathrooms. One is near the back door of the house. When the dusty or muddy farmer comes into the house, he doesn't have to track up the whole place getting to his bathroom.

Many homes built today have 35 percent of their space more or less wasted in halls. The Dunn home has only 15 percent in halls.

Built on a concrete slab, the house allows for easy access to the outside. The slab-floor construction also makes for economy.

In exterior design, the house with its "butterfly" roof and large picture windows has the modern touch. One-story with no basement, the building is sprawling, ranch-like and has expandability for the years to come.

(Continued to page 240)

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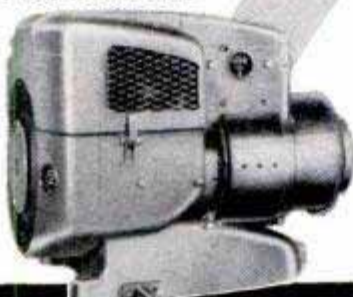
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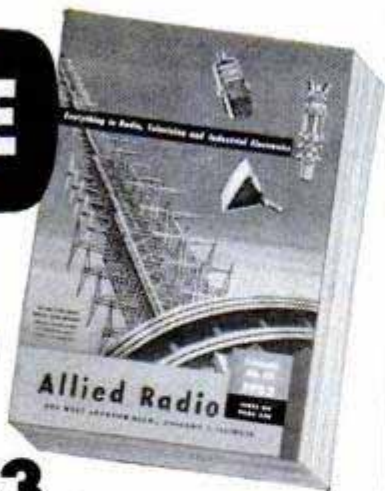
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Too often yard layout and landscaping are done as an afterthought. Not so on the Dunn farm. The house was first located according to the prevailing winds and to take advantage of the view. The front door of the house faces the parking lot, but the driveway is downwind to help keep dust out of the house. The play yard for the children was placed so that it can be seen from the kitchen window.

The barnyard litter is not seen from the house—a fence takes care of that. The sheds have the same colors as the house and blend with it, rather than detract from it.

Soil tests had been run and it was known just what the land needed. That was more than the first settlers knew. When dry-land wheat crops, after seven healthy years, suddenly refused to grow, the farmers figured it was just due to lack of rain. They were short on water, all right, but also on nitrogen.

"The native vegetation in these parts is mostly cheat grass," explains D. M. Harris, former county extension agent in the basin. "There's no lush growth such as that on virgin soil of the coast to return nitrogen. And where there are excessive heat and insufficient moisture, nitrogen escapes in the form of gas. What little nitrogen there was in the basin's virgin soil the early wheat farmers took out in seven years. To grow a decent crop on arid soils such as we have here, a man should fertilize the land every year."

The livestock of the early settlers didn't do so well, either. The farmers failed to recognize that it is necessary to put minerals in the soil to increase minerals in plants to increase minerals in animals.

Fertilizer was put on the Dunn farm that first day in three modern forms—pellets, powder and gas. The injection into the soil of NH_3 (anhydrous ammonia) is a new gift of science to ailing soil. The gas—81 percent nitrogen—is derived from a cracking process with the use of natural gas and electricity. It is shot six to eight inches beneath the surface.

Sprinkler irrigation was provided for 30 acres and natural flow for 50. It was determined that the gravelly soil condition of 30 acres would be more productive under the sprinkler system. Actually the farm covers 120 acres, but only 80 were considered valuable for crop production. The remaining 40 acres have been set aside for pasture.

Crops planted consisted of alfalfa, 15 acres; Kenland red clover, with oats as a companion crop, 12; legume-grass pasture, 6; red Mexican chili beans, 31; potatoes,

(Continued to page 242)

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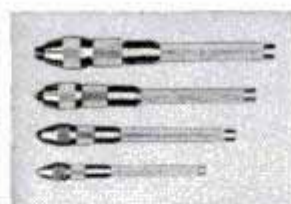
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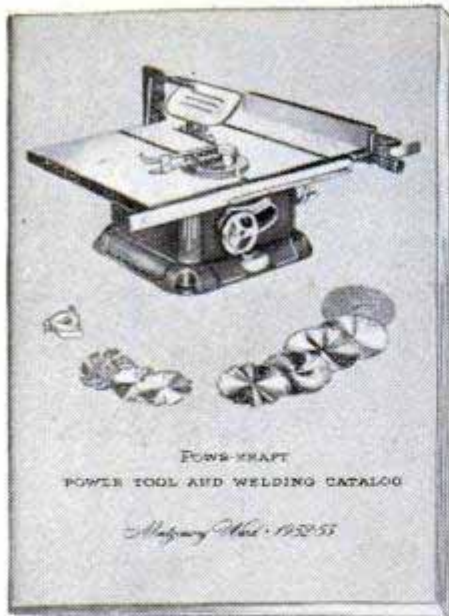
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10; corn, 5. Beans, corn and potatoes were selected as "cash crops" to give Don quick operating revenue. The rest are soil-building crops planned to fit a rotation pattern.

"U. S. Department of Agriculture officials tell me I should gross \$12,500 this year," said Dunn. "Doesn't hardly seem possible. Still, the experts figured prices conservatively."

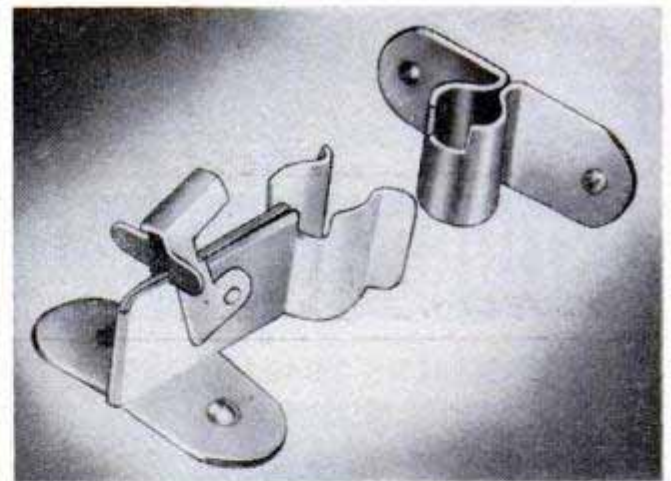
John L. Toevs, chief of the land development branch for the Bureau of Reclamation, adds: "For years this land, without irrigation water, was good only for grazing cattle and sheep. As grazing land, it returned five or six cents an acre. As crop land, the returns will run better than \$150 an acre."

The transformation was completed at 10 p.m.—a total of 22 hours. What did old-timers in the area think about it?

"Just short of a miracle," said Paul Donaldson of Ephrata, who homesteaded at Moses Lake in 1905. "Took a good man three days to grub sagebrush with a hoe off just one acre in the old days. And to build a shack—just a frame shell, mind you—a week or more."

Most 1952 settlers in the basin, however, have not had Don's luck. Several of his new neighbors are building homes by their lonesome. But strangely enough, on the big day they were over helping Don. ★ ★ ★

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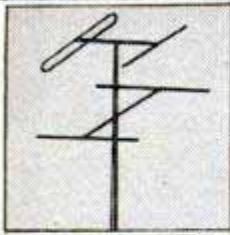
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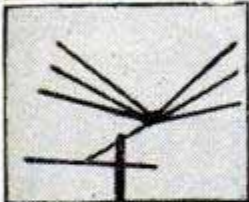
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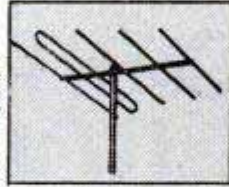


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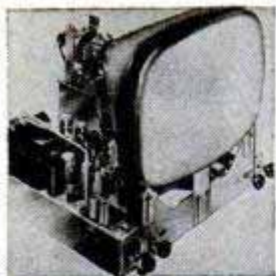
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They Make Candy by the Ton

(Continued from page 85)

candies and packaging materials to workers throughout the plant.

The machine that really revolutionized candymaking was the big "mogul," an assembly line that turns out everything from cream centers for chocolates to chewy little Santas for the Christmas trade. To see how it works, watch it turn out a holiday candy.

Sugar and corn syrup, egg white and fruit flavors first must be blended into liquid candy in a 1000-pound steam cooker. At that moment the mogul snatches up large trays and fills them with a soft starch paste. Now a die descends into the starch, casting as many as 720 little Santalike depressions in each tray as it marches past. Farther down the line each tray pauses a fleeting moment beneath 120 little spigots that release liquid candy into the individual molds. If Santa is to have a white beard and a fur collar, white candy drops first, filling the bottom design of the mold. Farther on, the trays pause again and red candy pours in to fill the depression. The machine automatically stacks the candy-filled trays, which are whisked away to huge drying caverns.

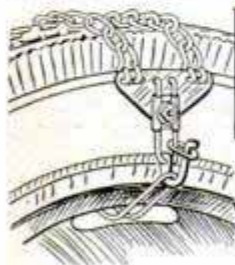
Perhaps 24 hours later the trays are wheeled out again, snatched up once more by the mogul, and flipped end over end. Candy and starch cascade out. The starch is drawn away by vacuum, the tray marches on for another load, the candy is deposited on a belt and moves off for its final polish. The mighty mogul can turn out more than 5,000,000 little Santas in an eight-hour day, enough to please a good many expectant tots come Christmas morn.

Bill Melody, vice-president and factory manager, is the man who supervises the vastly complicated array of equipment at Brach's. From him, candymaking sounds simple.

"Sugar and glucose are the basic ingredients of virtually every candy," explains Melody. "You just add confectioner's starch to make gum work such as jellybeans and gum drops. You add milk to make caramels. You vacuum the basic mixture for hard candies. You beat it to produce chocolate centers. You table it and cut it into slabs to make fudge."

Naturally it isn't that simple. Economical production is the real secret of today's candymaking. Yesterday the itinerant candymaker wandered from city to city, selling secret recipes to local confectioners. "Today," says Melody, "I imagine we could duplicate just about any candy on the face of the earth here in our lab. But we still

(Continued to page 246)



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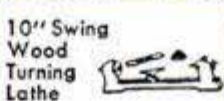
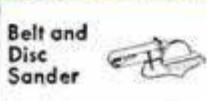
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DECEMBER 1952



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You'll save time and money with this big, new catalog. Contains everything wood craftsmen needs. Shows 32 rare and fancy woods in color...43 veneer designs...275 scroll patterns...multicolor inlays, overlays, bandings...all kinds of tools, machinery, cabinet hardware, ornaments, mouldings...and pages of valuable tips, ideas, information, instruction. Send for your copy NOW. Only 15c—refundable on your first order.

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Crest \$3 *Finest Medico ever made.
Exquisite Burgundy Finish*

MEDICO V. F. Q. — \$2 *With NEW NYLON BIT.
Exclusive! Guaranteed Bite-Proof!
Odorless! Tasteless! Cushion Bite!*

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* When filter turns brown—in Medico Pipes or Cigarette Holders—throw it away, with nicotine, juices, flakes, tars it has trapped. Insert a fresh filter for cooler, cleaner and dryer smoking. Imported Briar.



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Wide variety of styles and sizes.
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NEW
DART
RULE**

with
"clear vision" design
the
perfect gift



6 ft. 8 ft. 10 ft.
\$1.25 \$1.50 \$1.75

DART MFG. CO. MASON, MICHIGAN

might not know the secret of manipulating it in a large mass, or might not solve the mechanical problem of producing it at an attractive price."

There's one place that the art of the old-time candymaker still shows up. It's in the manufacture of cut-rock, the candy "with a picture in the middle."

Shelby Young has been a "sugarhead," a hard-candy artist, for 42 years. His work begins after the batch has been cooked up and dumped on a table. When the candy arrives it is a shimmering green, and Young and his assistant "swing the batch" by looping it over the arms of a big mechanical puller. The four arms of the machine pull the candy into a smooth, velvety mass, changing the color from green to white.

Young may decide at this point to place two crossed American flags, occupying less than a quarter inch of space, in the center of the candy. He slices off part of the snow-white candy, then further divides the slice into smaller batches, some of which he colors red and blue. Next he stretches each batch into a long thin strip and cuts up the strips.

Now he's ready to "draw" his picture. Very carefully he places the red, white and blue strips on the rolled-out layer of white candy. The seemingly impossible part of the job is that, although he is working lengthwise on the mass of candy, the finished flags will appear in cross section. It's as though an artist painted a picture that could be viewed from the edge of the canvas. Within three minutes Young has completed his picture and wrapped it in blankets of white and red candy.

He rolls this 300-pound "log" onto a canvas litter and, with the help of his assistant, carries it over to the spinning machine. Here another man takes over, pulling it until one end of the log is a "rope" about a half inch in diameter. This he feeds into his machine, which pushes the rope through cutting blades. The knives chop it off into pieces about a half inch long. There, in the center of each piece, appear two American flags, their staffs crossed, 26 stripes a hair-line wide, two vivid but infinitesimal fields, and even a suggestion of stars on each field.

By now Young and his fellow workers have turned out the last of their Christmas candies and are working into another season, for the candy industry must work well ahead of the demand. The sharp, haunting flavor of a Christmas cane may soon be giving a good many adults an aftertaste of their own childhood. At the very moment they are savoring the cane and its memories, the candymakers will be turning out billions of Easter eggs in their pot-licker's paradise. ★ ★ ★

FOR EASIER SCRATCH-FREE SANDING USE DREMEL STRAIGHT-LINE ACTION SANDERS

Christmas Gift Idea!

Here's a gift the whole family can enjoy and really use. Give the handyman of the house a Dremel heavy-duty Model 2000—a professional tool for sanding dry-walls; refinishing woodwork, furniture, paneling; polishing furniture, cars, etc. Dremel Model "A" is a family favorite for polishing, buffing, dozens of household duties and hobby projects; also a relaxing massager. For gifts that will really be used and appreciated, give Dremel Electric Sanders.



Only Dremel Offers All These Features:

WORLD'S FINEST FINISHING SANDER — Patented straight-line (with-the-grain) action duplicates craftsmen's hand-sanding motion . . . the only way to be sure of super-smooth, scratch-free finishes . . . no gouging, no cross-grain swirls or scratches.

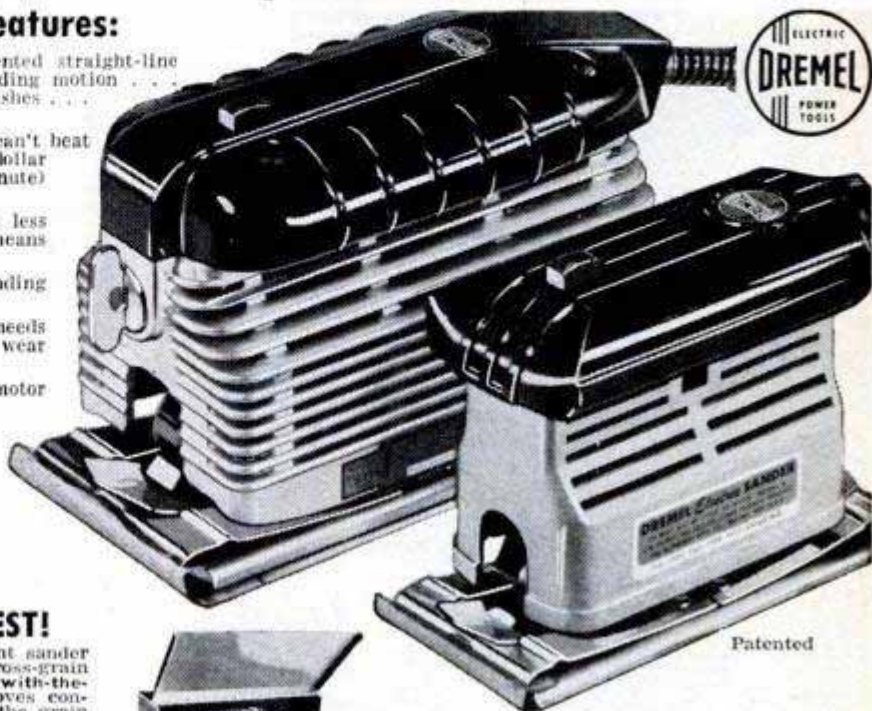
MORE SANDING SURFACE PER DOLLAR — You can't beat a Dremel for work! Largest sanding pad surface per dollar cost. Faster action (14,400 working strokes per minute) . . . more than three times as fast as most sanders!

EASY, ONE-HAND OPERATION — Light weight; less tiring for vertical or overhead sanding; higher speed means less down-pressure required for effective sanding.

SANDS INTO CORNERS — Rectangular, over-size sanding pad permits sanding into corners, other tight places.

TROUBLE-FREE USE — Only 2 moving parts; never needs oiling. No armatures, brushes, gears or bearings to wear out and replace.

POWERFUL — High-speed lifetime reciprocating motor (110 v. 60 cycle AC).



Patented



FREE SANDING GUIDE

A handy, 16-page "How-to-do-it" booklet containing helpful hints on sanding and refinishing procedures packed FREE with each Dremel Sander. Extra copies, 25¢.

MAKE THIS SIMPLE TEST!

Sand a piece of wood, by hand, using the four different sander motions illustrated below. Note how the slightest cross-grain action produces scratches and swirls . . . how sanding with-the-grain leaves a scratch-free, satin finish. This test proves conclusively why professional craftsmen always sand with the grain of the wood . . . never cross grain. YOU BE THE JUDGE! If you are not 100% convinced that Dremel straight-line action is the finest, most effective sanding method known, we sincerely don't want you to buy.



A "must" for sanding dry-wall joints. Fast—cuts refinishing time in half. Sands right into tight corners. Prepares furniture for repainting.

MODEL 2000

Heavy-duty model; 21 sq. in. (3 1/4" x 7") sanding base. Price includes sturdy steel storage case (left) with handy carrying handle; 25 asst'd. abrasives; 1 sheepskin pad. **\$24.50**

MODEL "A"

Household and hobby model (above, right); 12 sq. in. (2 3/4" x 5 3/4") sanding base. Price includes 6 abrasives; 1 sheepskin pad; 1 felt pad. **\$14.85**

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DREMEL Electric MOTO-TOOL



FASTEST, MOST POWERFUL TOOL IN ITS CLASS —APPROX. 27,000 R.P.M.

Most practical tool a man can own—more powerful than any similar tool you can buy. Works well in wood, plastics, and metal. For home maintenance jobs you'll wonder how you got along without it. For model making it's a must. And for general shop operations it saves time and money. Compare it, try it, buy it. You be the judge. **Check These Important Features:** Oilless sealed bearings • Dynamically balanced armature • Shockproof, Bakelite housing • Dust-filtered air cooling system • Sturdy 110-120 V., A.C.-D.C. motor • Wt. only 13 oz. • A precision tool widely used in industry for many years.



KIT NO. 2 Includes Model 2 Moto-Tool and 23 Accessories (High-Speed Steel Cutters, Grinding Wheels, Polishers). Packed in sturdy hard-wood case. **\$23.50**

KIT NO. 1 Includes Model 1 Moto-Tool and 34 Accessories (Steel Cutters, Grinding Wheels, Polishers, etc.). Packed in attractive lacquer-finished wood case. **\$17.50**

MOTO-TOOL NO. 2 Offers more convenience and long life features for the money than any other hand grinder. Thousands of satisfied users. Moto-Tool No. 2 (With 1 emery wheel point) **\$16.50**



SEE YOUR LOCAL DEALER: Dremel Tools are sold at better dealers everywhere. If your dealer can't supply, order direct on a five-day trial, money-back guarantee. Remit in full, and we will ship post-paid. Or, send only \$2.00 now, pay postman balance plus postage and C.O.D. fee.

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Dept. 112-M

RACINE, WISCONSIN

**Now! Paint 7 inches
in one stroke**



**NEW
FLEET WING**

WALL COATER

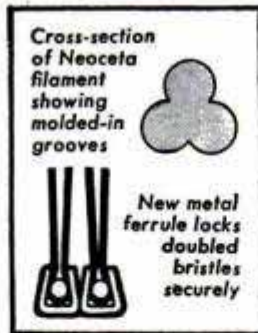
made by

Pittsburgh Plate Glass Co.

**ONLY
\$3.69**
with pan

This new brush from the Pittsburgh Plate Glass Co., covers a full 7" with each stroke! And what a smooth, even finish you get on walls and ceilings—thanks to Pittsburgh's new wonder-bristle, NEOCETA—developed especially for painting.

What's more, the Fleet Wing features a new type of paint brush construction (see right). That's why it's so lightweight... easy to handle... why you can paint for hours without any drip or splatter. See this—and other Pittsburgh brushes—at your paint dealer's! Or, write for information to: Pittsburgh Plate Glass Co., Brush Div., Dept. P-12, 3221 Frederick Ave., Baltimore 29, Maryland.



COMPLETELY DIFFERENT CONSTRUCTION utilizes doubled filaments of NEOCETA, bound in metal ferrules, to produce rows of four bristles each. Molded-in grooves in each filament provide above average paint carrying capacity.

There's a Pittsburgh brush for every home and industrial use

**PAINT & VARNISH BRUSHES
POWER-DRIVEN BRUSHES**



PITTSBURGH BRUSHES

BRUSHES • PAINTS • GLASS • CHEMICALS • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

The Magic of Silent Sound

(Continued from page 69)

canyon where its penetrating screech is dissipated among the surrounding hills.

A pair of 700-horsepower aircraft engines compresses the air that is driven through the siren's chopper wheel, which is spun by a third power plant. Attached to the siren is an 80-foot wave guide tube, inside of which are microphones that measure such phenomena as standing waves and turbulence. With this noisemaker the research people are testing new kinds of sound-abatement devices, among other things. There's a suggestion that new attenuators have been developed that would rob a jet engine of much of its roar and at the same time increase its power.

Meanwhile, at the upper end of the sound spectrum, practical applications are resulting from the many years of research during which high-frequency sound was little more than a scientific curiosity.

Tiny ultrasonic drills are being used by jewelers to drill square holes, or holes of any shape desired, through metal, ceramics, or even precious stones. Ultrasound is used in hastening some chemical processes, in degreasing and in other jobs in which vibrations are a help.

At Lockheed Aircraft Company, engineers have devised a "sonodizer" or ultrasonic soldering iron that cleans the oxide coating from a metal while the metal is in contact with the molten solder, allowing a bond to take place before the surface re-oxidizes. Metals soldered with this device include stainless steel, chromium plate, various types of aluminum and even metalized phenolic plastics.

Ultrasonic washing machines vibrate dirt particles from clothes, doing a better job than conventional machines. High-frequency waves in the audible range trap smoke particles, reducing the soot and dirt that escape from industrial plants.

There are two fields in which ultrasonics is becoming very important. In Europe, physicians have been using the high-frequency sound waves in treating painful diseases of the joints, neuralgic conditions and other ills. Enthusiastic reports have been made and American medical men are now studying the same field. They are moving with caution because of a feeling that more research should be done to learn if there are any possible injurious side effects to the treatments.

The other field in which ultrasonics is growing rapidly is that of inspecting metals for interior flaws. A beam of high-frequency sound behaves something like radar

(Continued to page 250)

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Available for Immediate Delivery — Large Stock — Many Sizes from 350 Watts to 25 KVA



Item #183 — 3000 to 4000 WATT GENERATOR SET — FEATURES —
Power for your home or business. Simply connect to power panel or house circuit. • Constant voltage regardless of load. • Push button start or stop. • Easily made full automatic start or stop. **SPECIFICATIONS —** Sizes 19"x30"x48". Steel skids, weatherproof housing, requires no building. Wt. 725 lbs. • Hercules 4-cyl. 10 HP gasoline engine. Load governor. Oil filter. Quiet muffler. 6-volt starter, generator • Hobart 115 volt, 60 cycle, 3000 to 4000-watt generator. Furnishes either single or three-phase power, 2 or 3 wire. • Panel contains oil gauge, voltmeter, ammeter, circuit breaker, voltage regulator, start button. Today's cost over \$1200.00. **SALE PRICE, 465.00**
F.O.B. Chicago.

Item #334—Power unit PE-77D is a compact electric generating set consisting of a 1-cylinder, 4 starting (rope) Briggs & Stratton gasoline engine, directly connected to a d-c self-exciting generator. The engine is rated 1.3 horsepower at 2650 revolutions per minute and operates 5 hours on one gallon of gas. The generator is rated 0.35 KW, 250/350 watts, 115 volts, 2.2 amperes direct current. Plug in to double receptacle for easy connection. **F.O.B. Chicago... 115.00**



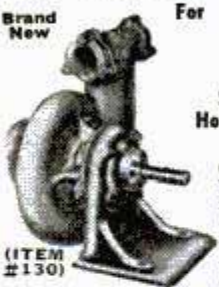
LOGAN AIR CYLINDER Item #350 — Double acting pneumatic cylinder, 6" bore, 6" stroke, 1 1/2" shaft. Adjustable cushions at both ends. Flange mounting at shaft end. Overall length closed 18". Ideal for use in 125 PSI systems. Shipping weight 40 lbs. **F.O.B. Chicago... 39.50**



LOGAN 4-Way, Foot Operated AIR VALVE, Item #59. Model 6520—Ideal for operating air vices, presses, air machinery, and other double acting pneumatic devices. Heavy cast construction. Standard 1/2" pipe thread ports. Overall dimensions 8 1/2" x 5 3/4" x 7 1/2". Gov't. Acquisition cost \$42.00. Shipping weight 28 lbs. An outstanding buy. **F.O.B. Chicago... 15.00**

Item #16C—Double acting hydraulic cylinder, 1 1/2" bore, 20" stroke. Will lift 1760 lbs. with 1000 PSI line pressure. Weight 8 lbs. A \$55.00 value. Now only **16.95**

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Converted for high volume commercial, home, and industrial use. Standard 2 1/2" pipe thread inlet, twin 1 1/2" pipe thread outlets. Ball bearing supported 3/4" shaft. Easy priming. Rotation, counter-clockwise facing shaft. Gov't. acq. cost \$145.00 Complete with full instructions. Ship. wt. 35 lbs. **F.O.B. Chicago... 39.50**

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Item #301
Automatic shutoff; Push button self-start; 2 qt. gasoline tank in base; Ammeter; Generator cut-out; Concealed coil, etc.; Speed and charging rate control; Attractive orange finish; Weight, 93 lbs.; Length, 15 1/2"; Width, 11 3/4"; Height, 14 3/4". **F.O.B. Chicago... 89.00**

Item #300 — Model C18 — 3 KW — 110 Volts D.C. This mighty mite develops 3 KW — 28.5 amps. D.C. Standard Delco generator direct coupled to a Model ZEP Briggs and Stratton 1 cylinder, 5-7 HP, air cooled, rope starting gas engine. Instruments include voltage control rheostat and voltmeter. Wt. 275 lbs. **F.O.B. Chicago... 295.00**

Tiny Tim Battery Charger
Item #301 — Model 125 to charge 6 and 12 volt batteries—12 volts—300 Watts; Heavy Duty Generator; Automatic shutoff; Push button self-start; 2 qt. gasoline tank in base; Ammeter; Generator cut-out; Concealed coil, etc.; Speed and charging rate control; Attractive orange finish; Weight, 93 lbs.; Length, 15 1/2"; Width, 11 3/4"; Height, 14 3/4". **F.O.B. Chicago... 89.00**

Item #178—350 watt—110 volt —60 cycle A.C. direct coupled to 1 cylinder Mideo engine. Shpg. wt. 116 lbs. **F.O.B. Chicago... 125.00**

Item #201—PE 95-G—10 KW—110/220 Volt 60 Cycle A.C. Single Phase. Totally enclosed. Omni generator direct coupled to Willys Jeep, 4 cylinder, water cooled engine, push button start. Instrument panel with engine and generator instruments, circuit breaker, controls, etc. Uses 6 volt car battery. (Battery not incl.) Skid mounted. Ship. wt. 150 lbs. **F.O.B. Chicago... 1295.00**

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Large supply of labor-saving, economical hydraulic equipment in many types and sizes. Use these positive, highly efficient smooth pressure hydraulics on presses, arbors, lifts, loaders, power control, positioning, brakes, plastic dies, auto frame alignment, etc.

Item #6—Double action hydraulic cylinder. 3" bore, 24" stroke, will lift 7070 lbs. with 1000 PSI line pressure. Steel barrel, 1 1/4" stainless steel shaft. Ship. wt. 26 lbs. **F.O.B. Chicago... 28.00**

Item #1036—Double acting hydraulic cylinder, 3" bore, 36" stroke, 1/2" pipe thread ports, 1" solid steel shaft. Overall length closed 49", clevis mounting at base and shaft. **FEATURES —** Cup & Chevron Packing • All Welded Construction • Precision Ground and Honed Construction • 1/4" Seamless Steel Tubing Cylinder Case. Weight (net) 57 1/2 lbs. **F.O.B. Chicago... 50.00**

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500	3535
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Item #29KJ — Gear Type Hydraulic Pump. Ideal in industrial applications and for operating all hydraulically powered farm implements including loaders, stackers, swathers, plows, etc. Delivers 1000 PSI (may be set at lower PSI if desired). 12 GPM at 400 RPM. Maximum operating speed 800 RPM—rotation counter clockwise. Has built-in relief valve, permanent or torque bar mounting, 1" diameter shaft, 3/4" pipe tap inlet, 1/2" pipe tap outlet. Shipping weight, 22 lbs. **F.O.B. Chicago... 45.50**

Item #126 — Four-way, open center control valve with built in adjustable relief valve. Factory set at 1000 P.S.I., spring loaded neutral position, for use with one double acting cylinder. In neutral position cylinder is locked and pump unloaded. Fully balanced plunger type, smooth, positive, easy operation. Can be used as single unit or mounted in series or any combinations desired. Has 3/4" pipe thread inlet and outlet, 1/2" pipe thread cylinder ports. Newly manufactured to our specifications. Shipping weight 8 1/4 lbs. An outstanding buy! **F.O.B. Chicago... 21.50**



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(ITEM #115) WITH FINGERTIP CONTROL

USE FOR: • Reamer Drives • Midget Cars • Feed Mills • Canning Machines • Conveyors • Lathes • Milling Machines • Motor Boats • Cream Separators • Garden Tractors • Pumps



Variable output speeds from 0 to input speed available by moving control handle. Locking die. Locking handle maintains setting. Use input power of 1/2 to 1 1/2 H.P. This Westinghouse-Oil Gear Unit consists of a variable displacement hydraulic pump feeding a fixed displacement hydraulic motor. Adjustable relief valves set at factory for 100 inch pounds of torque may be reset up to 180 inch pounds. Independent reverse control allows full output power and speed selection in either direction of rotation. Shafts measure 5/8" diam., include keyway. Input rotation is counter-clockwise facing shaft. Recommended input speed not to exceed 750 R.P.M. Over-all dimensions, 7 1/2" x 7 1/2" x 11 1/2". Gov't acquisition cost, \$428.00. Ship. wt. 31 lbs. Complete with 2 qts. of oil and full instructions. **F.O.B. Chicago... 54.50**

NEW MODEL 353—DUAL RANGE ARC WELDER

For Stationary or Portable Use
HEAVY DUTY RANGE TO 250 AMPS.

New 'Magic Terminal' for Low Current 30 to 100 Amps.



Ideal for
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• FACTORY
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Welds Anything
From Auto Fenders
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These precision engineered D.C. Arc Welders contain the highest quality War Surplus aircraft components built to exacting government specifications. They are light in weight, have oversized lifetime grease-sealed ball bearings, air cooled commutator dial type rheostat for easy pin-point control, a high-low rheostat switch, reactor coil for even arc and the new 'MAGIC TERMINAL' low current welding range for welding lighter materials. Designed for many years of trouble-free service. Run welder from drive pulley or power take off of a tractor or Jeep, 7 1/2 HP electric motor or 10 HP gas engine at 2500 R.P.M. Uses two V belts or flat belt. Continuous output rating 200 amps. Intermittent welding rating 250 amps, 30 volts. This sensational price includes double V or flat belt pulley and complete operating instructions. Shipping weight 107 lbs. 350.00 value. **Item #65. Now only... 119.50** **F.O.B. Chicago**

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and is reflected back from all surfaces, as between metal and air. Thus the front and rear surfaces of a metal bar, as well as any voids between the surfaces, are revealed.

Ultrasonic inspection of metals is faster and simpler than X-ray inspection and can penetrate to depths far beyond the scope of most X-ray machines. Until recently, however, ultrasonic inspection was limited to simple shapes such as solid bars or axles. This was because the transducer head that contains the quartz crystal had to be held in flat contact with the metal, since sound waves of extremely high frequency do not travel through air.

Today a new technique devised by Donald C. Erdman of Electro Circuits, Inc., has changed all that. By placing both the transducer and the part to be inspected under water, Erdman can examine even a complicated shape and detect at once on a cathode-ray tube, the size, location and depth of any interior flaws. Douglas Aircraft Company is inspecting all castings and forgings by this method.

One of Erdman's latest developments is a transducer head that is coupled to a solid stream of water. This allows metal to be inspected for flaws without immersion. The combination transducer and water jet will be able to examine every inch of the welds of an oil-storage tank or pipe line and detect all weak spots. This is only one of the new uses to which ultrasound is being put as an inspection technique. ★ ★ ★

Lathering Cup Fits on Tube



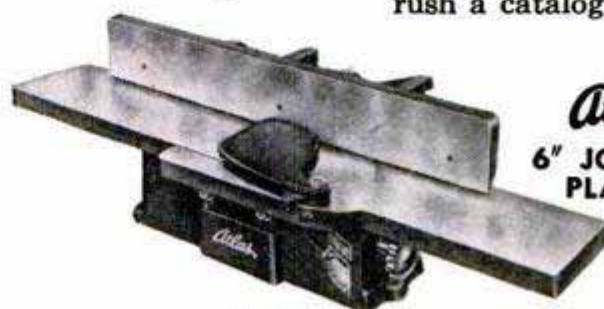
Convenient to use, an attachment for a tube of shaving cream provides a cup for "whipping up" plentiful lather from a minute quantity of cream. The cup has a universal rubber fixture to fit all tubes. The cup also acts as a stand for storing.

Atlas **FINEST QUALITY TOOLS**

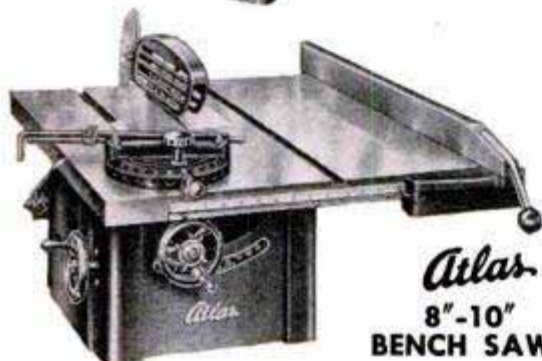
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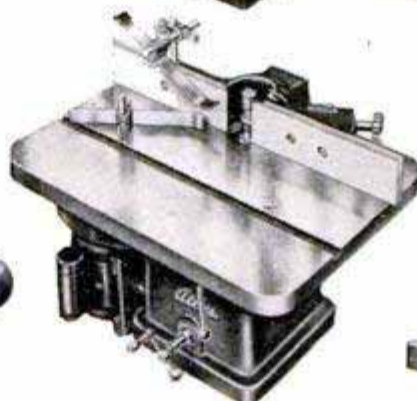
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10" FLOOR
SAWS



Atlas
6" JOINTER-
PLANER



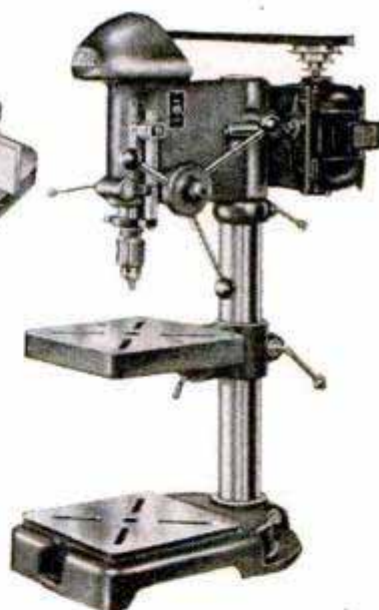
Atlas
8"-10"
BENCH SAWS



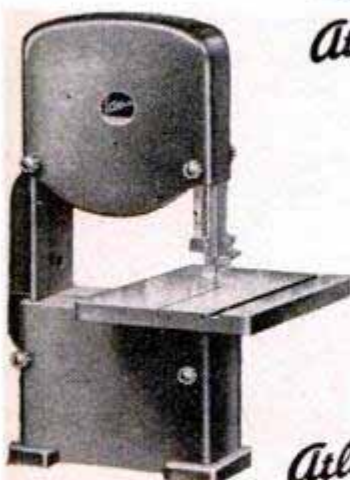
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SHAPER



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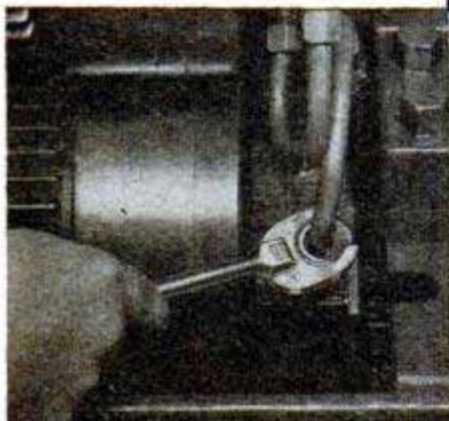
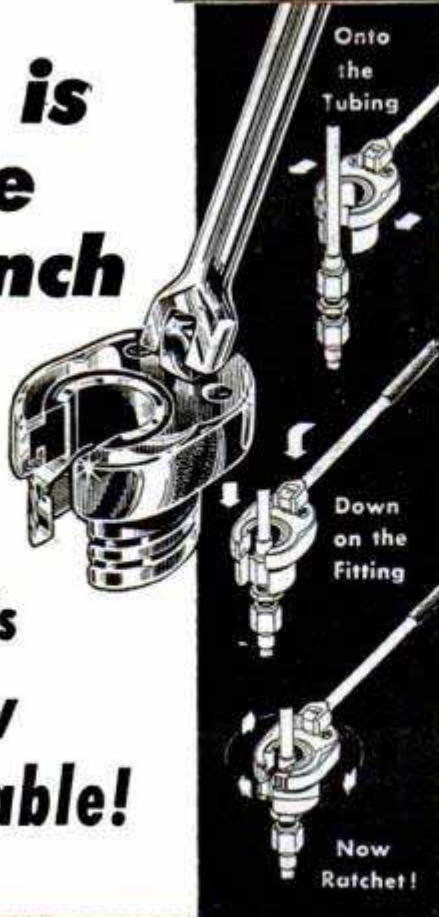
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TUBING APPLIANCE CO.

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Playing Safe with Atomic Rays

(Continued from page 140)

new glass will also be used in peepholes in atomic installations.

Unlike Joe, some workers—especially scientists conducting experiments—must actually see every detail of what is going on behind the walls. To take care of this need, Argonne developed a three-dimensional-television technique. Ordinary television suffices in the most routine experiments, but in some highly intricate studies it falls short. With three-dimensional, or stereotelevision, the operator can transport his hands and eyes to a remote point and carry out manipulations normally and naturally. It maintains the combination of manual dexterity and depth perception.

With the "master slave" manipulator developed by atomic researchers, almost any operation can be performed that human hands can do—while the scientist is shielded from a quick trip to the hospital by those thick, concrete walls. The scientist merely takes hold of a couple of handles which are connected to mechanical hands inside a radioactively hot room. Since these hands are "slaved" to the master handles, they move just as the scientist moves his own hands.

And now the men of unusual mechanical know-how have gone one step further. They have developed an electrically operated, push-button slave manipulator. A technician, trying the device for the first time, grinned: "Look, ma! No hands!"

Operators who work with the mechanical hands day in and day out get so that they can do tricks with them—pointing and even wagging a "finger." But, though they may become casual, they don't become careless. They know fully the deadly wallop that can be packed in radiation.

A superhot job was coming up. A laboratory "cave" was to be used for testing uranium specimens that had been irradiated in a reactor. The specimens were not only intense gamma-radiators, but they also contained plutonium, one of the most dangerous substances, medically speaking, ever manufactured by man. It comes by its name honestly, for Plutonia is a place anciently regarded as an entrance to infernal regions.

The workers, not desiring to toy with any infernal possibilities, first rolled out the seven-ton concrete door of the cave on railroad tracks. Then, they carefully went over every inch of the cave with detecting devices to be sure no contaminating radiation from previous jobs had been left around.

Next, new equipment was laid out. And this equipment had to be placed not only so

(Continued to page 254)

SURPLUS MACHINE SHOP TOOLS AT PRICES YOU CAN AFFORD



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SET 30 selected H. S. Straight Shank Drills from 1/8" to 1/4", lengths up to 7". \$15 value, only... **\$2.98**

SET 100 HIGH SPEED DRILLS: 1/4" down, 19H 30 new std. H. S. Drills - 70 slightly used sharp drills, lengths up to 7". \$30 value. PPD. **ONLY \$7.98**

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SET 10 of above, 36H PPD. **\$4.95**
Sets 35H and 36H will fit any 1/4" drill.

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1/2" to 1-3/16" WITH 1/2" SHANKS!
5 Drills for less than the price of one new Drill!

SET 5 different size H. S. Drills
32H 1/2" to 1-3/16"..... **\$7.95**

SET 10 different size H. S. 33H Drills 1/2" to 1-3/16"..... **\$14.50**
These new and used H. S. precision Drills with 1/2" shanks can be used in a 1/2" elec. drill or a 1/2" capacity lathe or drill press.

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SET 9H 15 Different Size High Speed Morse Taper Shank Drills up to 9/16" with No. 1 and 2 tapers. New and used. \$50 value. Priced at only..... **\$6.49**

SET 20 Different Size High Speed Morse 10H Taper Shank Drills from 1/2" to 1". New and used. \$70 value. Priced at only..... **\$12.95**

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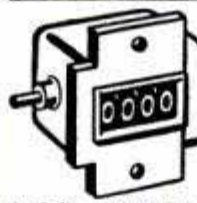
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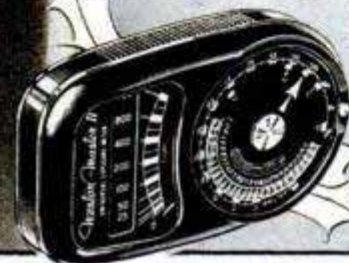
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that it could be easily handled by the slave manipulator, but so that the mechanical hands could reach any piece of equipment accidentally dropped. Crevices or blind spots had to be eliminated.

Some of the apparatus was enclosed in a clear-plastic case, known as a "dry box." Where instruments passed into this case, rubber bellows were attached to prevent the escape of dust. Plutonium-bearing uranium had to be sawed in the case, and the dust would be heavy.

With everything set up, the scientists were still not satisfied until they had conducted a dry run with a dummy specimen. Then the real stuff was rolled in—specimens encased in a heavy lead pot. The massive door to the cave was wheeled back in place, the man at the master slave manipulator peered through his three-foot window, picked up a mirror inside the cave with one mechanical hand and a pair of tongs with the other, extracted a uranium specimen, and set about his routine studies.

When an atomic bomb is set off in Nevada's wastelands, mobile testing units fan out to points within a radius of 500 miles. Typical report after a 1952 bomb blast: During a six-hour period when readings were highest in areas 200 to 500 miles away, a man would have received a total exposure of about 1/10 the amount of radiation he would get during the fraction of a second necessary for a chest X ray.

All of which goes to prove that distance is still the best safeguard from harm when an atomic bomb goes off.

Doctors know pretty well what happens in the human body when it is overexposed to radiation, but they are still looking for a first-rate cure.

Considered highly important is the post-war medical discovery that there is a substance in the spleen and other parts of mice that seems to prevent many deaths after overexposure—of mice. Unanswered yet is the question of just how effective the substance would be on human beings.

This mystery substance has also been found recently in other animal materials, such as marrow. Dr. Charles L. Dunham of the Atomic Energy Commission said there is hope for finding great quantities of the substance in the nation's slaughterhouses. Or, once it is isolated and analyzed, it may be manufactured synthetically.

Meanwhile, all the precautions being taken to prevent overexposure are worth every last million they cost. ★★★

☞ Farmers in the U. S. own more trucks than any other group in the world with a total of 2,300,000, according to the Automobile Manufacturers Association.



"New" living room . . . with permanently beautiful Weldwood paneling on walls and squares of Striated Weldtex on ceilings.



Weldwood paneling helps to give this multi-purpose "family-room" permanent beauty . . . for interior Weldwood Plywood is guaranteed for the life of a building.



Weldwood paneling on walls and repeated colors keep bedroom in harmony with other rooms on the first floor.

They built a **New home** inside an **Old house**

... with the aid of Weldwood® Plywood

THE George Montgomerys loved their old farmstead in Harrison County, Missouri. It had been their home for 25 happy years.

But . . . they sometimes wondered whether the bad features of the old homestead outweighed the good ones . . . cracked plaster, protruding chimneys, skimpy closets (and the *lack* of them). Would it be better to build a *new* home with the inner beauty and conveniences they so much wanted?

The Montgomerys chose to build . . . *not* a new house . . . but a *new home* INSIDE their old house.

They decided Weldwood Plywood was the perfect solution for the walls. Because it is genuine wood paneling it is beautifully decorative, permanent, crackless.

The living room, bedroom and family walls were covered with rich-looking Weldwood birch panels and squares of distinctive Striated Weldtex® on the ceilings.

Panels in the living room are of Weldwood Plankweld®, the edge-grooved, pre-finished panel that is proving such a favorite with discriminating home owners. (They're so easily and quickly installed by the man of the family.)

The Montgomerys (and their friends) are delighted with the beauty and livability that Weld-



Mr. and Mrs. George Montgomery, of Pattonsburg, Missouri . . . happy in their "new-old" home.

wood Plywood gives to their "new" home.

"And," enthused Mrs. Montgomery, "since Weldwood beauty is said to increase with age, I guess that my major interior decorating problems are also settled . . . *for life!*"

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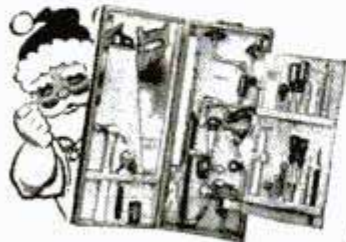
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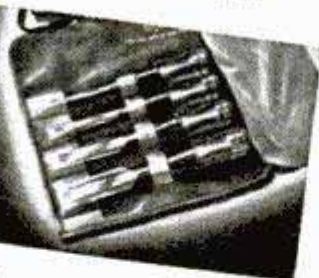
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We're Blasting Holes in the Iron Curtain

(Continued from page 99)

relay stations in Tangier, Munich, Salonika, Ceylon, Hawaii, Manila and England bounce them in fan-shaped patterns that blanket the whole Soviet-dominated part of the globe and much of the rest of it. Some programs are rebroadcast via medium wave over 100 Latin American stations, and about 120 stations in Western Europe.

Besides Voice of America, Radio Free Europe, a privately financed outfit, began in July, 1950, to blast the trumpets of democracy to all who dare listen behind the Iron Curtain. Using a network of 11 stations, more than 1000 hours of hot dope is lobbed into Soviet satellite countries every week, via big transmitters in the Frankfurt, Munich and Lisbon areas. One half-mile-long antenna not only magnifies the power of transmitters, but can pin-point verbal bombshells with accuracy.

Unhampered by the touchy diplomatic problems that beset the State Department's Voice of America, RFE doesn't have to pull punches. Recently, citizens of Red-controlled Bratislava in Czechoslovakia were tipped off to a snake in their midst:

"Hello, Bratislava! Radio Free Europe calls the citizens of Bratislava! In a moment you will hear names of Bolshevik informers and agents of police. In the office of the National Reconstruction Fund is employed one Comrade Absolonova. We are warning you against this person as emphatically as possible. She is a dangerous agent of the communist police. Her task is to recruit for the State Security Police new agents and informers among young people. . . ."

In words of one syllable, the announcer revealed the woman's techniques. So damaging was the effect that Comrade Absolonova no longer does business in Bratislava. There are many other examples like this one.

Radio Free Europe gets information from many sources, including anticommunists who escape, and also through the mails. Despite communist censorship, plenty of mail gets through to "Box 62-20" in Munich, RFE's mailing address which is continually publicized via radio.

Although a nuisance most of the time, the bouncing characteristic of short waves sometimes can be useful. By calculating the bounce between earth and ionosphere, Voice engineers at the Salonika transmitter, for instance, can make the signal plop right down on Moscow in a checkerboard pattern that irritates the Politburo. The

(Continued to page 258)

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\$15.50 Instruction included. Rated 200 Amps. 28 Volts. 2500 R.P.M. Ship. Wt. approx. 50 lbs. Stock No. 707.

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 CONVERTS TO ARC WELDER 200-250 AMP.
 OR LIGHT PLANT CAP. LOAD 5000 WATTS

Stock No. 711 D. C. Generator R-1 Jack & Heinz, rated 300 Amp. 30 Volts. Gov't cost \$300.00. Instruction for converting to welder or light plant incl. Also instructions and diagram for converting the R-1 or P-1 generator to Combination Welder **\$25.50** and Light Plant included.

Carbon Pile Generator Voltage Regulator For use with 24 or 32 Volt D.C. Generators. Also recommended for the P-1 and R-1 type generators in "build your own" **\$6.95** Light plant. Postpaid.

R-21 HEAVY DUTY RHEOSTAT Brand New for regulating voltage on ELECTRIC WELDERS, model trains, electric blankets, lights, control photoflood lamps, etc. Rated 16-32-ohms. Size 3 1/2" x 2 1/2" postpaid. **\$6.95**

WEAVER HYDRAULIC HAND PUMP New With Built in Check & relief valve. For oil or Hydraulic Fluid. Rated 1000 P.S.I. **\$12.95** postpaid \$75.00 Value.

VALUABLE GEARS BARGAIN SPEED REDUCER. 10-1 ratio 90 degree angle 1/2" splined shaft with 3 mounting holes rated 2 H.P. **\$5.95** postpaid

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CUNO OIL FILTER New. Aircraft type filters without cartridge replacement. Turn handle & cartridge is clean. 3/8" inlet & outlet ports **\$4.95** postpaid instructions incl.

Send CHECK OR M. ORDER. PRICES F.O.B. KCMO EXCEPT when marked POSTPAID U.S.A.

ELECTRIC MOTORS
 Stock No. 700 1/2 HP. 27 VDC R.P.M. 4000. Shaft ext. 2 1/4", variable speed, applicable for 110V. A.C. by simple rearranging armature brush leads. Instruction incl. **\$5.95**
 Stock No. 4949 is 1/4 H.P. 24 V. D.C. 2000 R.P.M. Mfg. by Pesco applicable for 115 V. A.C. Instructions incl. Base mounted. **\$3.50**
DELCO MOTOR 6 Volt DC handles 8" fan blade. Shaft is 1/2" in dia., 1 1/2" long. Size 5"x3" two mounting studs. 1200-2000 RPM New **\$2.35** (add 50 cents postage)

ECLIPSE MOTOR & GEAR UNIT
 Brand New including 24V. D.C. Motor. Gear ratio 4:1, can be adapted for 2:1, 40:1 & 20:1. Ideal GARAGE DOOR OPENER, HOIST, PUMP JACK, HAY-LIFT, LAWN MOWER DRIVE, DRIVE FOR POST DRILL, etc. Gear unit applicable for 110 A.C. Diagrams & instructions incl. Gov't cost \$221.00. Wt. 23 lbs. **\$9.95** f.o.b. KCMO.

BEAM ROTATOR MOTOR
 Brand New with instructions for use on 110V. 60 cycles. Powerful geared motor for TV aerials, ham. FM, etc. Light weight, rugged. For ventilating louvers, furnace dampers, and check drafts. **\$7.95** \$35.00 value.

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PESCO CENTRIFUGAL HEAVY DUTY PUMP Including built in motor. Applicable for 24 V. D.C./A.C. or 110 V. A.C. The motor is explosion proof constructed for gasoline fuel, oils, water, fuel booster, etc. 3/4" hose connection. Rated capacity 400 G.P.H. Instructions incl. Gov't cost \$172.00 **\$9.95** Stock #659

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Stratopower Constant Displacement Pump
 For operating Hydraulic cylinders, hydraulic motors on tractors, Bulldozers, Construction machinery, Lift trucks. For fuel or oil transfer, etc. Delivers up to 400 G.P.H. at 3750 R.P.M. Rated 1250 to 1400 P.S.I. 3750 to 4500 R.P.M. HAS BUILT IN RELIEF AT HEAD. \$100.00 value. Engineering data and instr. **\$15.50** incl. Stock #37. Wt. 8 lbs.

HYDRAULIC CYLINDERS Stock No. 512 Double action hydraulic cylinder 2 1/2" Bore, 4" Stroke, Dia. 3/4" shaft including built in Hydraulic control valve which may be operated with rod or lever. Clevis mounting. Overall length shaft retracted 14". **\$75.00** f.o.b. value. Wt. 9 lbs. **\$8.95** KC, Mo.

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- FORMS
- SHEARS
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RFE's transmitter near Lisbon is aimed to take two bounces off the ionosphere, one off the Mediterranean and then spray itself all over the Russian satellite countries on the other side.

Biggest radio problem for the West's broadcasters is the Russian "jam session." Over an estimated 1250 stations, all beamed as closely as possible to same frequencies as the Voice, BBC, RFE and other Western radio, the Reds continually broadcast the greatest barricade of pure noise ever created in the history of man.

The best way for the Russians to clobber a broadcast would be to build a station of equal power right next door to the one they're after. Since they can't do this, they build one of equal power at the same distance from the target area. Another stunt, used in Moscow, is to blanket an area with a whole battery of low-power transmitters, all belching their raucous chatter at once. This is "saturation" jamming.

Besides jamming, the Reds have contrived other stunts to foil us. Radio sets sent in for repairs to communist-controlled shops have their short-wave bands removed before going back to the owners. And in some areas, all radios are wired to central receivers, manned by commies, of course, who select programs that the people may hear.

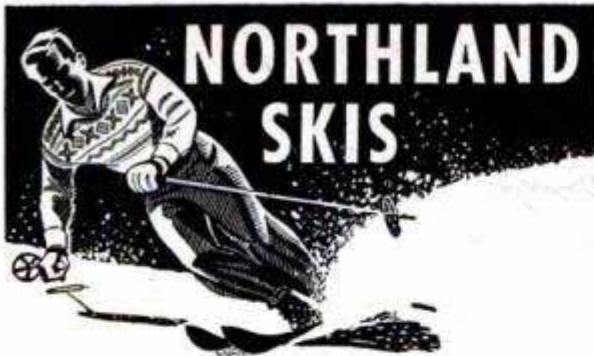
What are we doing about this massive counterattack? Relay stations continually switch frequencies on their medium waves and aim their short-wave broadcasts at new targets. Whenever this happens, a big Russian jamming transmitter must be torn down, relocated and start its operations from scratch. With the *Courier* and her sisters moving from place to place around the periphery of Europe, it's going to be tougher than ever for the jammers to jump often enough and fast enough to keep our voice from being heard.

Beauty of the *Courier* is that she can sit in a harbor and hit three targets at once in wide concentric circles—medium wave covering near-by areas, one short wave planting its programs beyond it and the other skipping off the ionosphere.

Appropriations for two more ships even more powerful than the *Courier* already have been made, according to news reports. With a whole fleet of jack-rabbit super-transmitters spattering the straight side of the news into Red territory from all directions, Russia's jammers will be spread pretty thin.

Right now, without Operation Vagabond, monitoring reports indicate that 25 percent of Voice broadcasts get through to Moscow, where jamming is roughest. Sixty to eighty

(Continued to page 260)



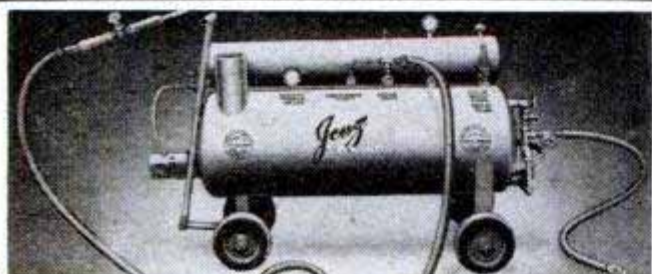
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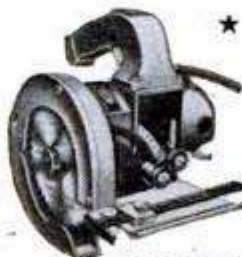
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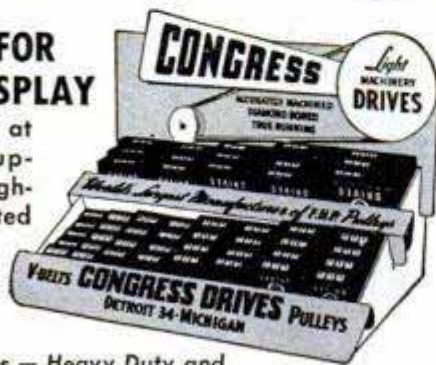
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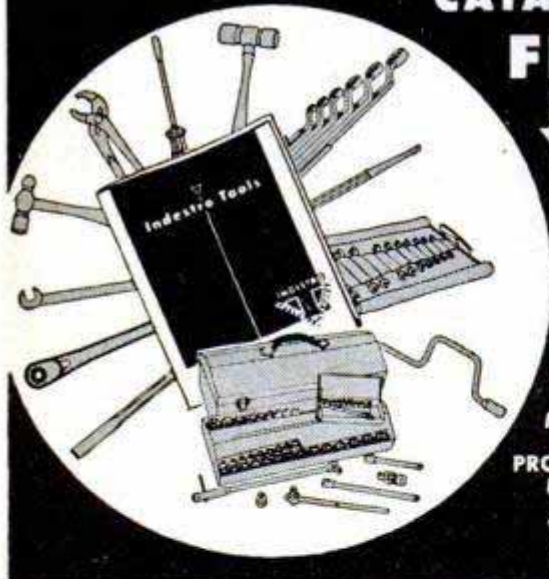
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percent get through elsewhere. Such evidence spurs our engineers to even greater efforts to outwit Russian countermeasures. For nearly a year, crews of men have been crawling like spiders across 10 gigantic wire webs they are weaving on six sites between New York and San Francisco. Each net, strung for a distance of two city blocks between a pair of small Eiffel towers rearing some 290 feet skyward, is a "curtain antenna," capable of blasting short-wave programs through interference. They increase signal strength some 14 times.

Another stunt is to beam signals by slow Morse code, which can be heard through any jamming. It's slow enough so that anyone with a Boy Scout handbook can translate the signal.

A new gadget called a "heterodyne filter" is going into all the Voice's relay bases. The little filter knocks down some jamming noises without cutting down on the program signal as did the former crystal filters.

How are we getting around Russia's fiendish "wired radio" circuits? Right now, in the Red sector of Berlin, Western-minded citizens can stick an ear through the Iron Curtain by picking up the phone and dialing a certain number. Tape recordings of newscasts made by RIAS (Radio in American Sector) automatically greet them.

And there are other ways of getting word to the enslaved people. At six a.m. one August morning in 1951, the people of Red-dominated Czechoslovakia looked up to find their sky full of strange balloons, slowly descending on their woods, in their village streets and back yards. Soon after, thousands of leaflets fell from the clouds announcing that Operation Winds of Freedom was under way.

The stunt was pulled by the Crusade for Freedom, the United States citizens' group which raises funds for RFE. Plastic pillow-shaped balloons, about five feet square, carried a payload of 200 single-sheet messages sealed in a pocket. Hydrogen gas, slowly leaking through the transparent plastic, allowed the pillows to come to earth after specific flying time, determined by the amount of gas in them. Thus, RFE engineers, gauging wind speed, could aim them at specific targets.

Other round, synthetic-rubber balloons, about five feet in diameter, each carried 2200 sheets of messages loose inside the bag. Carried eastward by prevailing winds, they would rise until they burst, permitting the leaflets to flutter down over many square miles. One balloon shower hit the fair grounds at Prague. Leaflets were

(Continued to page 262)

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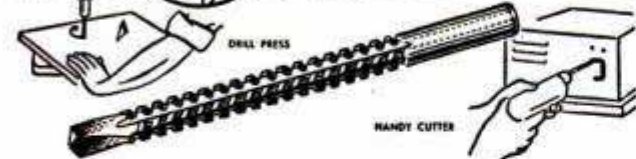


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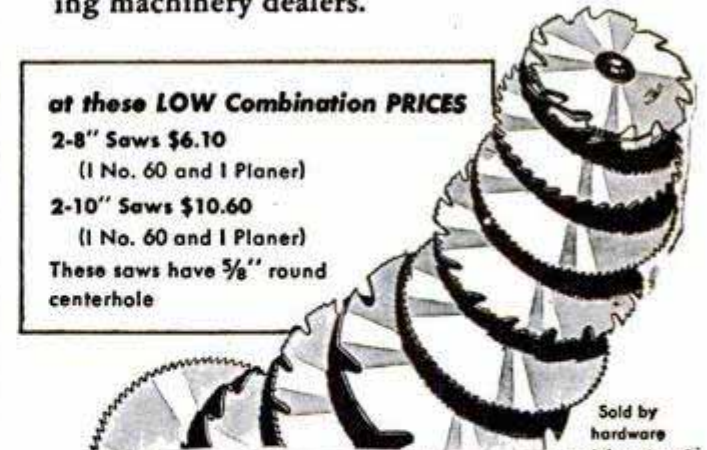
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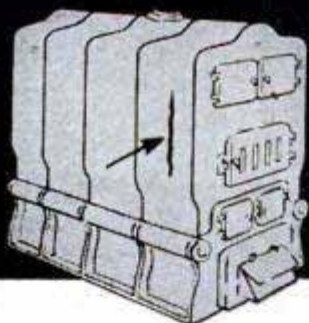


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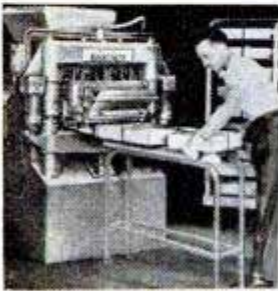
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trunkback turtle with his snout and shoving him back and forth from wall to wall, just for laughs. Divers, who usually submerge to scrub down the oceanarium walls, are constantly on the alert for Algy, a young porpoise who likes to poke their helmets with his snout or nibble at their heels with his teeth.

Once in a while a porpoise does himself in with his antics—like the one that picked on a shark. Every few times around the porpoise would dive on the shark and playfully jam the shark's head into the sandy bottom. Finally the shark caught his tormentor napping. The porpoise was found on the surface one morning, his stomach ripped open from end to end.

Scientists have long suspected that the porpoise is pretty smart. One porpoise brain was found to be bigger than man's, and had many convolutions. At Marine Studios, several experiments are under way to find out just how smart he is.

F. Glenn Wood, Jr., curator of the studios, listens with an underwater microphone to the animals "talking" to each other. He's learned that the silence of the deep isn't so silent at all—especially around porpoises, who chatter constantly in the depths. They whistle through their blowholes, make a noise like a Bronx cheer, bark like dogs, cry like babies, yelp like puppies, creak like an old gate and snap their jaws together with a shot that sounds like a firecracker.

Most interesting experiment of all, though, is Flippy. When caught in a nearby estuary, he was just about two years old, six feet long and weighed 150 pounds. Today, two years later, he's half again that size. Under the charge of Adolph Frohn, a famous animal trainer, he's been proving beyond doubt that porpoises are smart.

Frohn began by teaching him to take food gently from his hand. Gradually, via hand signals which the porpoise discerned quickly, he learned to barrel-roll and retrieve a stick thrown into the water. In a short time he was swimming through a hand-held loop under the water.

Teaching the animal to jump out of the water and hurdle an object took some time. At first, coaxed with a promise of mullet, he found he had to jump over a fish net stretched across the pool to get his reward. Later a rope replaced it. Then Frohn built a six-foot hoop suspended over the water and the porpoise leaped through it. Today, at a gesture from his trainer, Flippy goes through a three-foot hoop held about three feet above the water and breaks through a paper mask that covers it.

It was tough teaching the unique pupil

(Continued to page 266)

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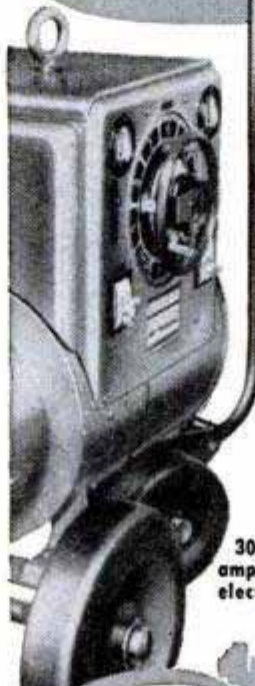
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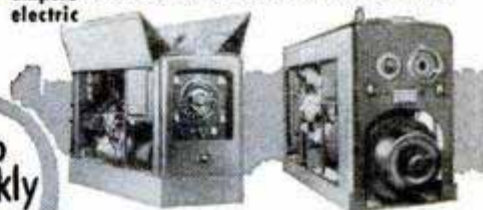


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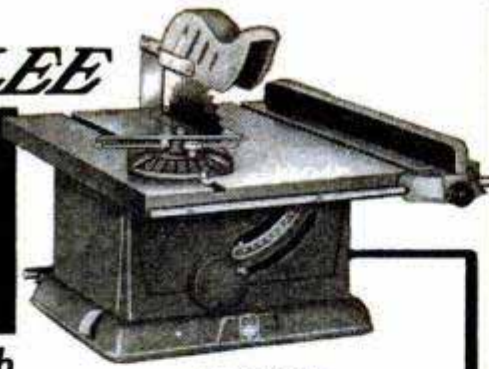
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to ring his own dinner bell. But now, at a command (and often without it), he leaps from the water, grasps a ball suspended from a pole and gently tugs it with his teeth. The ball is connected to the bell.

Last year, the porpoise was moved from his tank to a big lagoon, where Frohn put a harness on him. With a few months of intensive training Flippy had learned to pull the surfboard on which a girl, a dog, or both would ride.

Flippy's tutelage is going even further. Right now the trainer is teaching him to obey voice command alone. Two tiny holes behind every porpoise's eyes carry sound to his brain.

"Catch!" shouts Frohn. Flippy stands on his tail and backs off across the pool, waiting for the trainer to toss a ball, which he catches on the fly and returns to his owner's hand.

When someone remarked that if the porpoise got any smarter he'd soon be talking, the trainer answered: "He does talk, but we're too dumb to know what he's saying."

And, in a way, that sums up the mission of all the keepers of this deep-sea zoo—to help fathom and translate the language of the unexplored deep and its inhabitants, about which so little is known. ★ ★ ★



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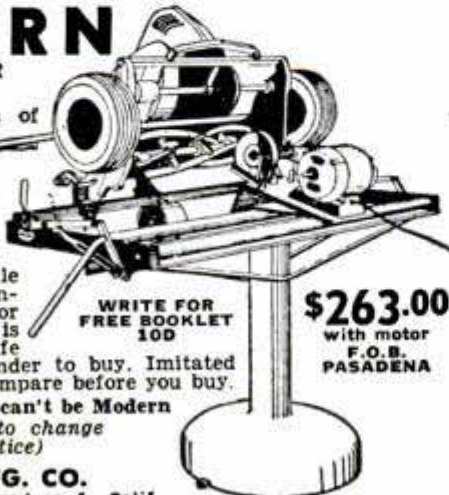
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on its dealers in regard to service. His shift jammed between first and second and his dealer couldn't repair it; he did so himself. Furthermore, in cleaning the car he found that the windshield had been sealed for leaks in two places with chewing gum.

“The Henry J is exceptionally easy to handle in the city or on the highway and has excellent visibility,” wrote a Medford, Ore., lumberman. “It is a comfortable car to drive (I am 6 feet 1 inch in height). The 100-inch wheelbase makes it easy to park parallel to the curb and also makes it an easy car to handle in mountain driving.”

In the opinion of an Evansville, Ind., aircraft worker, “It is an economical and stylishly designed small car. However, if the new models could be so constructed as to eliminate rattling, rumbling sounds and to keep the front wheels in alignment, I would be more satisfied.”

The very smallness of the Henry J is a decided advantage in the minds of many owners, such as a Berkeley, Calif., photocopier who wrote, “If I had wanted a tank I'd have bought a tank.”

Wrote a Greenwich, Conn., beautician, “The back window is large enough but on too much of a slant to give good visibility. Otherwise, the car is perfect.”

“The Henry J is the most underrated car in America to those who have never driven or ridden in one. I've ‘converted’ hundreds of skeptics who were ‘knockers.’ A ride will surprise anyone. If the Henry J were built by one of the Big Three, they couldn't build enough,” Los Angeles mechanic.

“The Henry J is a dream to handle. Brakes are fine, roadability excellent, easy ride. Remarkable performance and economy that surprises all.”—Pomona, Calif., farmer. (Sixty-three percent of owners said roadability is excellent, 36 percent said good and 1 percent said unsatisfactory.)

Since I first tested the Henry J from Detroit to Los Angeles about two years ago I've driven one about 8000 miles. My opinion of this remarkable little car has not lessened and has, in fact, become more favorable. In that test I noted little evidence of “small car” feeling in driving it and 78 percent of the owners reporting feel the same way; 74 percent liked the 100-inch wheelbase and only 2 percent disliked it. Ninety-one percent said they got the gas mileage they expected, or near it. Most remarkable, however, is that 87 percent of the reporting Henry J owners said the car was good or excellent, 12 percent said average and only 1 percent said it was poor—a remarkable tribute from owners. Surprisingly, more owners (51 percent) had the four-cylinder rather than the six-cylinder models. ★ ★ ★

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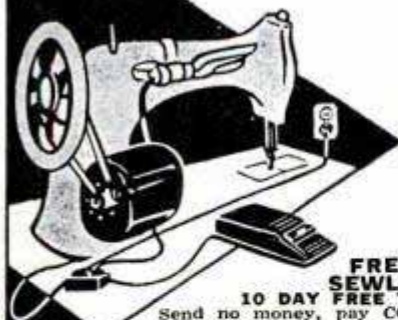
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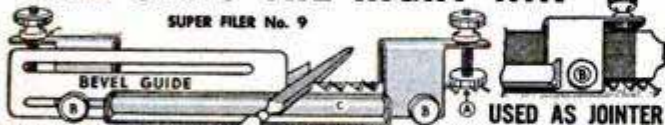


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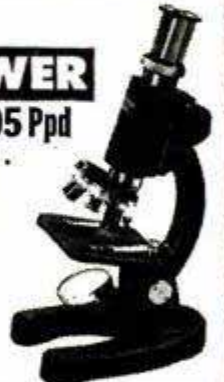
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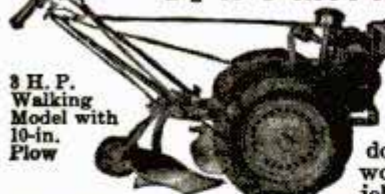
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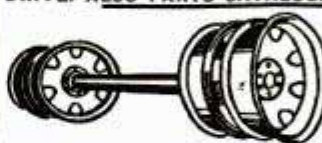
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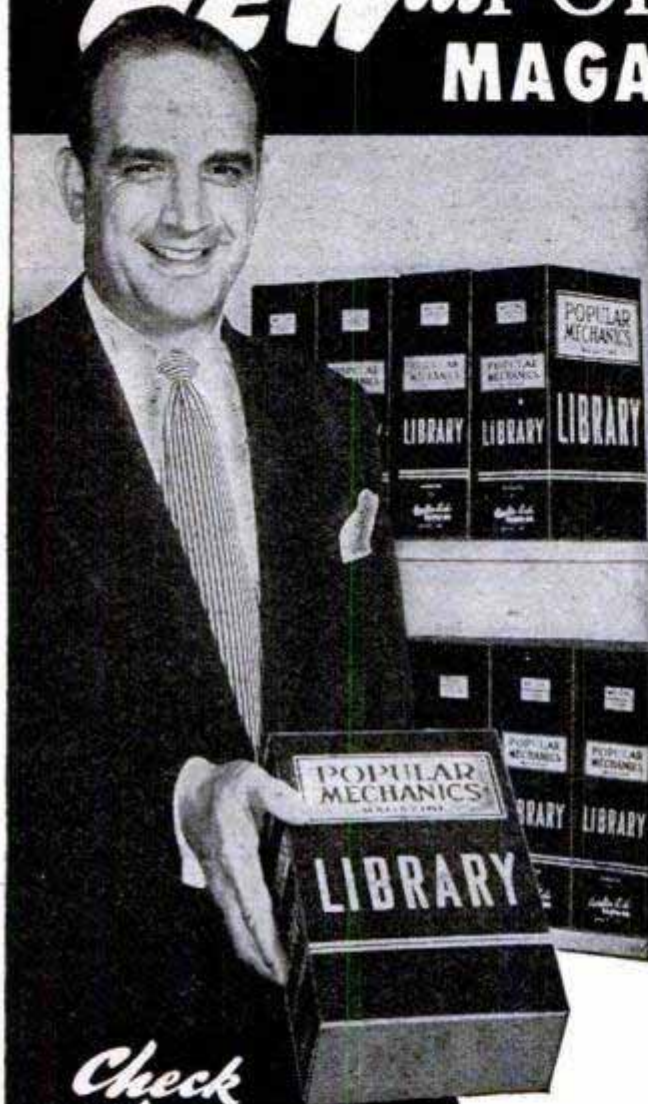
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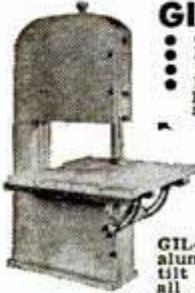


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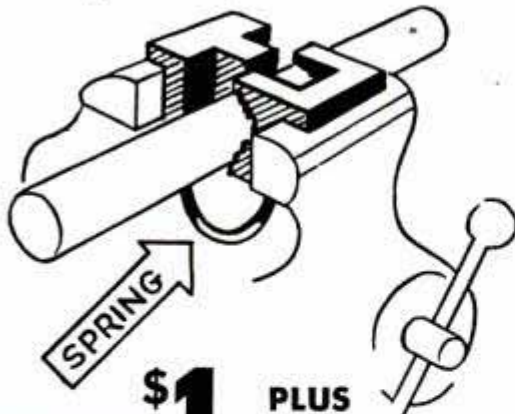
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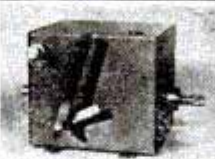


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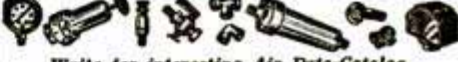
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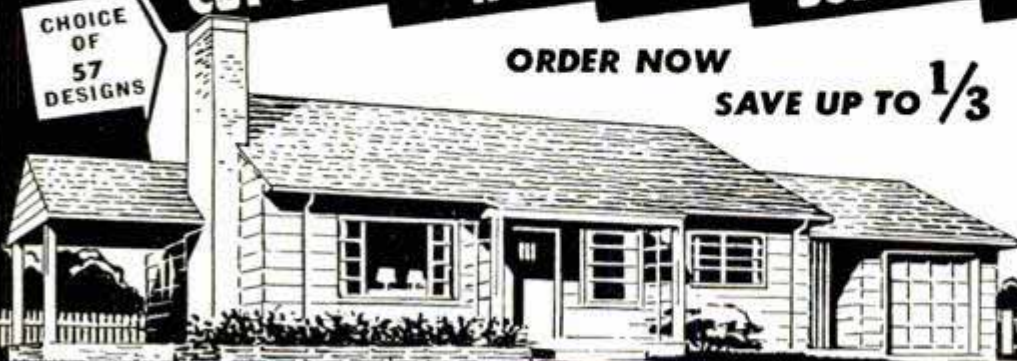
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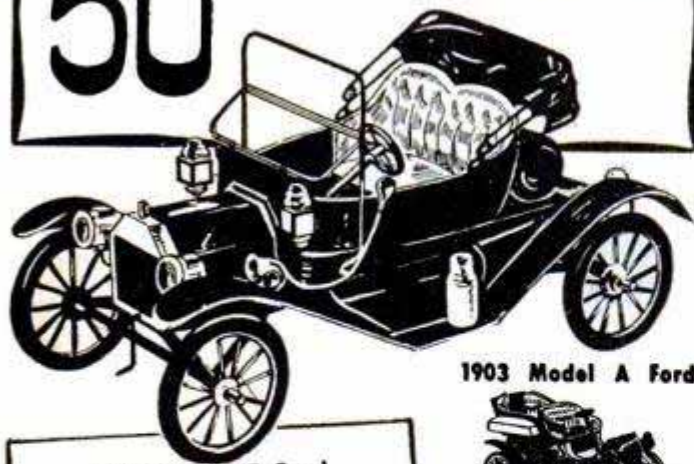
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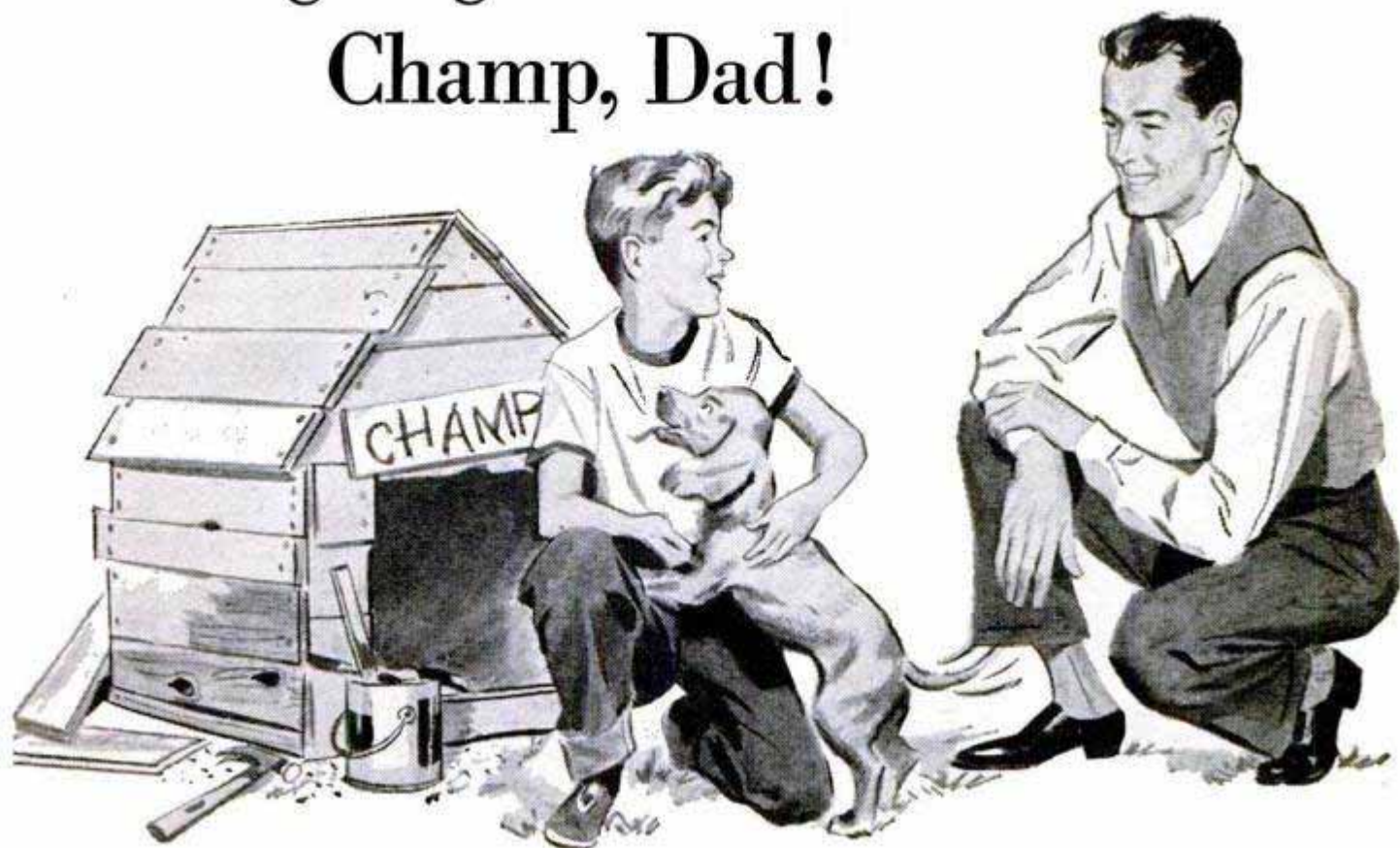
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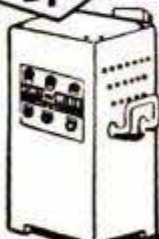
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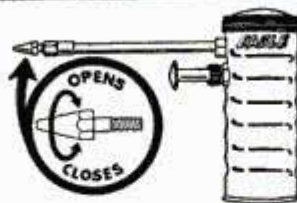
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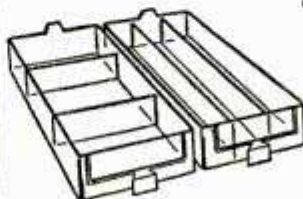
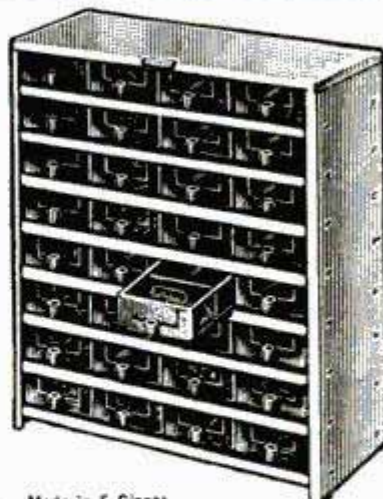
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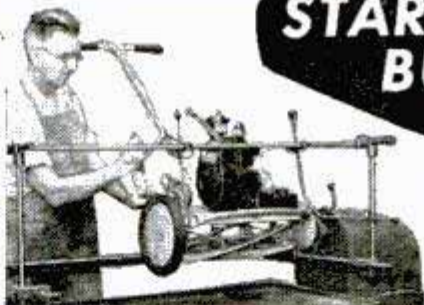
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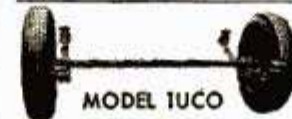
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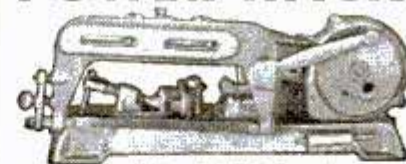
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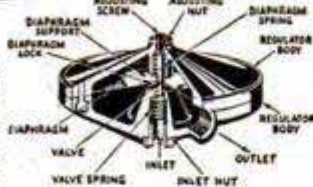
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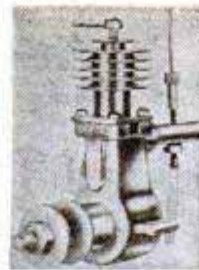
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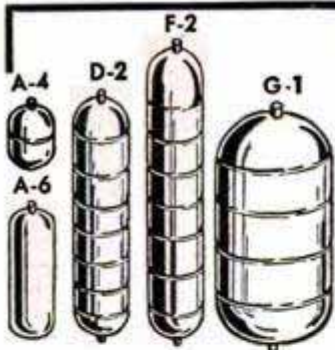


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400-Horsepower Chrysler V8 Hits 170 M.P.H.

(Continued from page 101)

replaced the dual type used in production engines; valve timing was modified to keep intake and exhaust valves open longer; a streamlined exhaust manifold replaced the production type; pistons were projected slightly into the combustion chamber.

It has been declared by Pres. L. L. Colbert of Chrysler Corporation that this company has no desire to enter into a speed-horsepower race. He expresses the hope that such a race may be averted. But with

SPECIFICATIONS

CHRYSLER FIREPOWER INDIANAPOLIS ENGINE

Horsepower: More than 400 @ 5200 r.p.m.
Block: Standard Chrysler FirePower
Head: Standard except for larger ports
Bore and stroke: Standard, 3 1/16-in. bore; 3 5/8-in. stroke
Displacement: Standard, 331 cu. in.
Crankshaft: Standard forging, improved alloy
Connecting rods: Standard design, strengthened
Engine bearings: Standard, commercial, Dodge truck
Rocker arms and push rods: Standard
Tappets: Mechanical Camshaft: Modified
Pistons: Standard, with domed head
Gaskets: Standard Ignition: Magneto
Oil supply: Dry sump
Clutch and transmission: Meyer & Drake
Rear-axle ratio: 3.03 to 1 Chassis: Kurtis-Kraft

this ultimate hemispherical combustion chamber engine, it is obvious that we fear no challenge. Already we have demonstrated that we can go far beyond anything ever before attempted for passenger-car service and we are confident that we have by no means reached the limit of this power plant's possibilities.

It should be understood that higher horsepower for the mere sake of higher speed is not the objective of Chrysler Corporation engineers. The top speed of cars equipped with the FirePower engine is not so much greater than that of comparable displacement cars of an earlier date. We have instead used the potential of the new engine to attain vastly improved low and cruising-speed performance, economy, sturdiness and dependability.

The maximum-torque figure, which is the engineer's index of normal-speed performance, is 16 percent higher in the new engine than in the 135-horsepower straight eight that preceded it, and it is attained at higher engine speed, giving far greater acceleration in the highway cruising range.

There is no question that such agility at normal cruising speeds is a real contribution to road safety. A car which can accelerate swiftly from 40 to say 50 or 60 miles an hour is a car that can whisk itself from impending trouble that would bring disaster to a car of lesser capacity. ★ ★ ★

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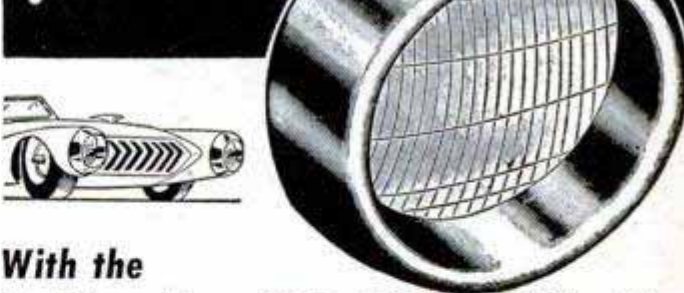
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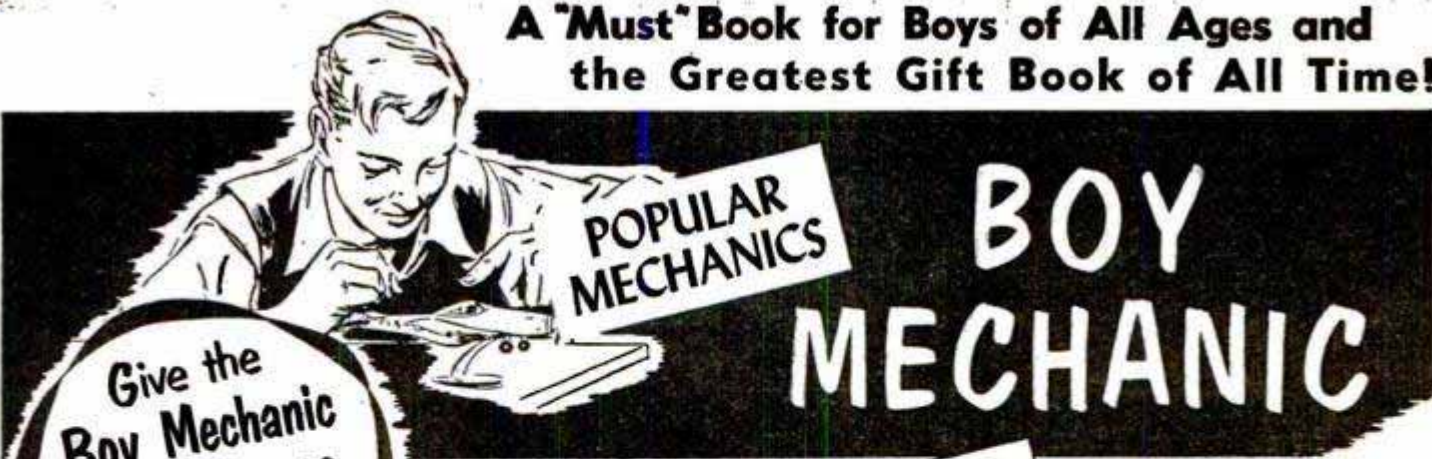


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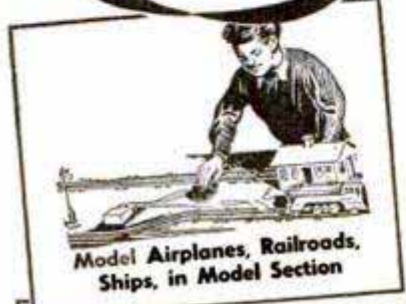
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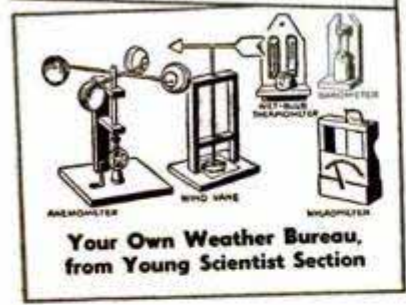
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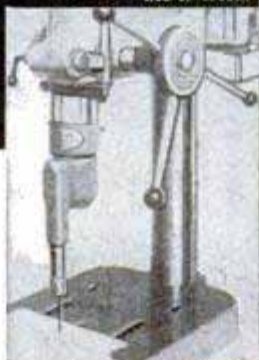
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3 ton (Item 208A) Wt. 15 lbs..... **\$9.45**
5 ton (Item 208B) Wt. 17 lbs..... **\$11.45**

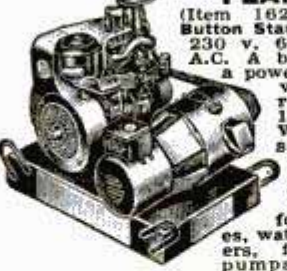


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HI-LINE 6000 WATT PLANT

(Item 182) Push Button Start, 115-230 V. 60 cycle A.C. A brute of a power plant with a rugged 13 hp. Wisconsin engine. Plenty of electricity for ranges, water heaters, pumps, machinery, etc. Affords both 110 and 220 volts. Ideal where heavy current is needed. Wt. 590 lbs. Easily worth \$995.00. With self generator and control box only built driven. Use your own engine or tractor. (Item 183) Factory price. **\$345.00**



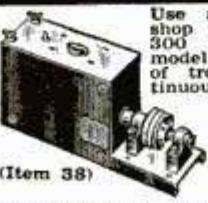
PORTABLE LIGHT PLANTS

350 watts—115 v. D.C. powered by a sturdy, easy-starting 1 1/2 hp. Briggs engine. Perfect for lights, radios, razors, etc. in cabins or trailers. Use standard light bulbs. Built-in control box with plug-in receptacle—just plug in. Weights only 65 lbs. Item 273. Reg. price \$199.50. A terrific value at..... **\$99.75**



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Use as portable or shop welder. Up to 300 amps. Senior model. Made for years of trouble-free, continuous service. Will handle light or heavy jobs. Easily welds up to 3/4" plate using 1/4" rods. Built-in air cooling system. Arc is easy to strike and hold, because of specially designed arc stabilizer. Hi-lo switch and dial control gives wide range of welding heats. Run welder at 2600 rpm. with tractor, jeep or 15 hp. gas engine, or 7 hp. elec. motor. Complete with instructions, guar. and double V belt or flat pulley. You can pay more, but you can't buy a better welder. Wt. 110 lbs. **\$99.75**



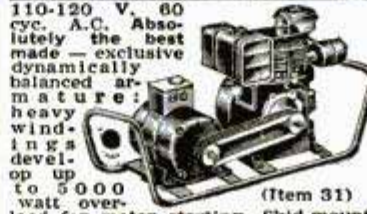
DUAL CONTROL MODE—same as above but with built-in dual rheostat for low heat soldering. **\$119.50**
WELDING KIT. Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at..... **\$10.50**
Write for prices and information on A.C. Arc Welders.

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500-700 watts—115 v.—60 cyc. A.C. Powered by a rugged 2 hp. easy-starting Briggs gas engine. No wiring necessary, just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for Civil Defense, Fire Depts., trailers and camps. Complete with Voltmeter and built-in winding to charge 6 v. auto batteries. Item 24. Wt. 85 lbs. Fully Guaranteed. Be Prepared if war or storm knocks out power lines. **\$143.50**
Reg. \$275 value.....
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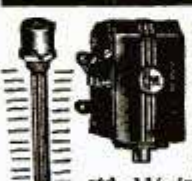
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(Item 76) Immersion type 115 v. AC — 1250 watts. Convert your present tank to modern automatic hot water heater. Long life Westinghouse or Chromalox element screws into std. 1 1/4 in. opening in tank. Adjustable thermostat keeps water at desired temp. Can also be used in washing machine or tub. Wt. 8 lbs. Heater element and thermostat regularly \$49.50. Special..... **\$14.95**
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With 1 1/2 hp. motor (Reg. \$199.50)..... **\$119.50**
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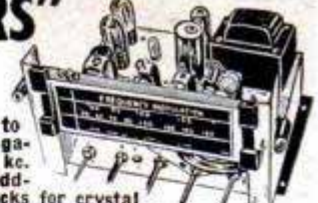
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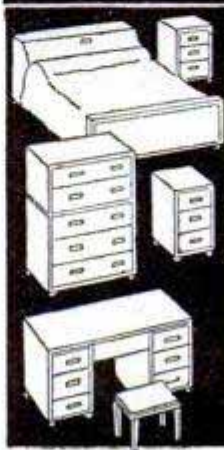


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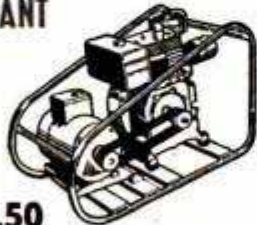
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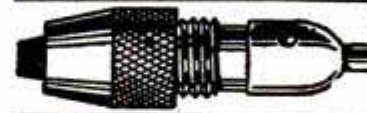
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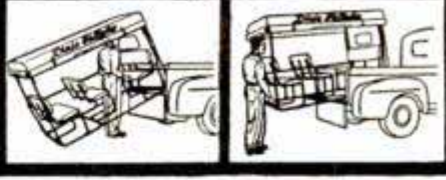
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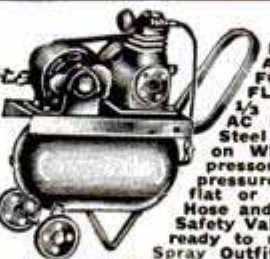
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ALL NEW MOTORS WITH ONE YEAR FACTORY GUARANTEE
 All are 110 V. or 110/220 V. 60 cy. 1 ph. A.C. Motors.
 Write for FAN CIRCULAR: Listing Sides, Guards, Motors, ALL SIZES: Attic, Window or Room Cooler

C. MARSHALL SALES
 3546 W. Fullerton Ave., Dept. P-12 Chicago 47

PORTABLE AIR COMPRESSORS
 NEW LOW PRICE 1/2 H.P. AIR COMPRESSOR OUTFIT FOR SPRAYING, TIRE INFLATION, ETC.
 1/2 H.P. Heavy Duty 110-V. AC Motor—9x18 in. Stainless Steel 300 lb. test Tank mounted on Wheels, with handle. Compressor 2x1 1/4 in. 2.8 CFM—pressure to 100 lbs. Spray Gun, flat or round Spray, Quart Cup, Hose and Tire Chuck, Check Valve, Safety Valve, Completely Assembled, ready to run.
 Spray Outfit with 1/2 HP, 110-V AC Motor #A33 . . . \$67.50
 SAVE \$10.00—1/2 HP Outfit K.D. you assemble #K33 . . . \$57.50
EXTRA HEAVY DUTY 1/2 HP AUTOMATIC AIR UNIT
 Heavy Duty Repulsion Induction 1/2 HP AC Motor. Starts and Stops any desired pressure 50-150 lbs. Big Stainless Steel Tank 12x24 in.—500 lb. test. Precision 1/2 HP Air Compressor, 3 CFM, 150 lbs. Ball Bearing Rubber Tired Wheels, DeLux equipped Safety Valves, Check Valves, Auto Pressure Switch, Off Valve, Hose, Tire Chuck, Gauge Heavy Duty Repulsion Induction 1/2 HP, 110/220-V. 1 ph. AC Motor. Assembled Unit #A55 . . . \$97.50
 SAVE \$10.00—K.D. you assemble. Parts #K55 \$87.50
 ABOVE OUTFITS SHIPPED F.O.B. CHICAGO
 #275—Air Compressor Only, 1/2-1/2 HP, ppd. \$19.75
 #22—Quart Spray Gun, 15 ft. Hose & Tire Chuck . . . ppd. \$10.50
 Automatic Pressure Switch . . . ppd. \$5.50



Volume Blowers for Heating, Ventilating, Exhausting

Blowers for forced drafts, heating boosters, exhausters, coolers, dryers and dust collectors. 110 volt A.C. 50/60 cycle motors.
 #Midget Blower: 5 CFM 2 in. Wheel . . . \$ 6.95
 #75 CFM Blower: Postpaid . . . \$ 9.75
 #150 CFM Blower: 4 inch Wheel . . . \$18.50
 #250 CFM Blower: 5 inch Wheel . . . \$22.50
 #600 CFM Blower: 6 inch Wheel . . . \$38.50
 #1000 CFM Blwr: 8 inch Wheel . . . \$52.00
 #1500 CFM Blwr: 9 inch Wheel . . . \$72.00
 *These Blowers with Motors shipped Post Paid. Larger sizes are F.O.B.



PALLEY BARGAINS

SAVE UP TO 85% ON WAR SURPLUS

ORDER BY MAIL!

2-WAY INTERCOM PHONES

Install this set of desk telephones for perfect, two-way communication between any two points up to 100 ft. This handsome set comes in a blue enamel finish. Has 2 phones, wire and simple hookup instructions. Operates on ordinary flashlight batteries. Here is the ideal set for use room to room, garage to house, barn to house, darkroom to outside, office to office or shop. Stock is limited! **ORDER TODAY! 750**

RADIO MIX

Ideal for 'ham' operators, experimenting, etc. Mix contains: Headset, mike, button, trans. wire, insulators, switches, condensers, rheostats, terminals, jump cable, etc. **249**

RADIO HEADSET

HS-30U - Two magnetic type receivers in watertight brass case. Soft rubber inserts in each receiver to fit into wearers' ear. Pliable steel head band. Ideal for communications, divers, workers in noisy compartments, etc. **NEW. 329**

COMPLETE UNIT

MAKE YOUR OWN POWER UNIT

Here's a unit PACKED WITH BRUTE FORCE! Does all these hard, heavy jobs that ordinary Power Tools cannot handle. Easily made from a vacuum cleaner type motor, a gear reduction drive and a few homemade parts. Can be used for turning large nuts & bolts, digging post holes, drilling large holes in wood or metal, driving power tools, & machinery, lifting, pulling, pushing, or any job where a slow speed with high take-off is required. **YOU CAN'T STALL IT!** Lightweight, easy to handle. Has 1000's of uses in the home, garage, shop, factory. We supply complete instructions.



MOTOR 325



GEAR BOX NEW 1295 USED 675

3 SPEED TRANSMISSION



Converts a high speed, low power input into low speed, high power take-off. Has 2 take-off shafts at 4 to 1 and 16 to 1 ratios. Gear box has a worm drive, bronze gears and a throw-out clutch. Will operate in either forward or reverse directions. Adaptable to many uses on power machinery. **1995**



90° TRANSMISSION

Has 1 1/2 to 1 gear reduction through bevel gears. Pre-lubricated bearings in dust proof housing. - A Positive lever control clutch. Size: 7" x 6". - 3/4" take-off shaft. **395**

PRESSURE TANKS



G-1 Type - Stainless Steel, shatterproof & rustless. Has reinforcing ribs and is pressure tested up to 400 PSI. Has high safety factor. Both ends have 1/4" pipe ports. Ideal for use as a buoy, drinking water supply, underwater fishing, diving, painting, cooking, or spraying. G-1 - 12 1/2" x 2" ONLY **1095** D-2 Tank - 500 cu. in. cap. **395** A-4 Tank - 104 cu. in. cap. **195**

AMAZING BERNZ-O-MATIC TORCH

It makes the old "blow-torch" obsolete. Here is a self-contained fuel & burner unit that does a job where intense heat from a concentrated flame is necessary. It is absolutely SAFE! (ICC approved). Has a replaceable fuel cylinder of high quality steel. PENCIL FLAME Type - with 10 hour cylinder and (1) burner unit **ONLY 695** EXTRA FUEL CYLINDERS. **195**

HAMMER-PUNCH

Designed for use by blacksmith, foundry, metal shop, etc. Made of forged steel with tapered punch tip. Has Hammer head for pounding or striking. Punch is 5/16" dia. Weight: 1-1/2 pounds. Complete with hardwood handle. **69¢**

RADIO ANTENNA REEL

For tuning beam antenna, opening and closing doors, etc. Powered by 1/8 HP, 24V, GE motor, engaged to a gear reduction only when electrical contact is made. Operates in either direction. Ideal for an auxiliary power take-off. Has 150 RPM at take-off. **NEW 875 USED 675**

RIGHT ANGLE SPINDLE DRIVE or GEAR BOX

Has 19-3/4" stroke at 1 to 1 ratio. 7/8" input and take-off shafts may be shortened if desired. Input shaft has universal joint. Has a threaded mount stud with tapered roller bearing adaptable to swivel mount. **795**

ELECTRIC ACTUATOR

Fast Linear Actuator - Has hundreds of uses for any mechanical device needing controlled two way action. Will open, close, raise or lower doors, windows, gates, etc. Has a 8500 RPM, 1/8 HP series wound motor. Operates on 24V DC current. Gives 4-1/2" stroke in 13 1/2 secs. Compression and tension loads up to 750 lbs. Has adjustable micro switch for limits of travel. Overall length retracted is 11 inches. **795**

EASTMAN ACTUATOR

Has a 1/8 HP, 24V, DC, 10,000 RPM motor & push-pull actuator. Actuator has a 4" travel through a reduction gear box. Has adjustable limit switches and forward and reversing reversing relays. Overall length extended, 20"; retracted 15 1/2". **1295**

GEAR HEAD MOTORS

Heavy duty, G.E. motor. 2 HP, 24V, DC, 125 amp, reversible motor to drive a reduction gear unit giving 36 to 1 ratio at take-off. Unit will operate on 6 or 12 volts. 36 to 1 G.E. (306 shaft RPM) **1095** 28 to 1 Eclipse (137 shaft RPM) **EACH** 30 to 1 Eclipse (110 shaft RPM)

GHM-529 Gear HEAD MOTOR

- Gear 24 volt DC, 7.6 amp, series wound reversible motor with overload clutch. Motor turns 11,000 RPM driving thru a 11 to 1 gear reduction box which turns the final take-off shaft 1000 RPM. Adjustable limit switches control limit of travel. Take-off shaft adapts to flex or rigid drive. Size: 10" x 4". **995**

FIRE EXTINGUISHER

Kiddle Lux - CO2 Type. Built to Gov't specifications. Has heavy, shatter-proof case. Recent hydrostatic test. Reconditioned and fully charged. **LIKE NEW!** All are **READY FOR INSTANT USE!** 3 1/2 lb. size with Swing Nozzle **\$14.95** 7 1/2 lb. size with Horn **21.75** 10 lb. size with new Squeeze Grip Handle & 3 1/2 ft. flex hose with Horn **27.75** 15 lb. size with Wheel Control **35.75** 15 lb. size with Squeeze Grip Handle, 4 ft. flex hose, Plastic Horn **39.95**

MAKE YOUR OWN HYDRAULIC REMOTE CONTROL

The ideal remote control for hundreds of uses such as throttle controls, engine & motor controls, switches, machinery, on large & small boats, in shop or factory, etc. Eliminates messy cables, pulleys, wire & rope connections. Gives positive, full range, instant action. Kit has two No. 3 Hydraulic Cylinders, shut-off valves, bleed valves and all fittings. The two cylinders are connected by tubing (any length) and filled with oil. When Master is moved the Slave responds equally in movement and pressure. Master may be used with many slaves by simple adaptation. Hydraulic Copper tubing for use with above unit **18¢ run ft.** Complete assembly instructions furnished with each kit. **KIT ONLY 1795**

GADGET MIXES

RADIO MIX - Rivets, Spacers, Bolts, Screws, Gears, Wheel Bearings, Springs and Clamps. **19**
BEARING MIX - Approx. 20 Needle, Ball & Roller bearings. New and Used. Sizes: 1/2" to 4". Some cost **159** Gov't \$10 apiece. 5 lbs. **ONLY**
FILE MIX - 10 assorted Files. 4" to 12". Includes Vixens, Half Rounds, Mills, Bastards, etc. in seconds and used but good condition. One vixen alone is worth our price for the entire mix. **99¢**

32 POSITION SWITCH

Was used as a bomb selector switch. Has 32 separate contact points through 1 common lead. Ideal for use in radio, experimental work, electronics, shops, factories, etc. - Has 32 post, Amphenol connector plug. Uses 12-24 volts current. In all metal case. **395**

AGASTAT-TIME DELAY RELAY

A 24 volt solenoid is held from a fraction of a sec. to 15 seconds by a Time Delay mechanism. When coil is energized it operates a double pole, single throw relay switch. Can be used on electric locks; animated signs, labs, etc. Fully adjustable by set. **225**

230 PAGE CATALOG

1000's of ITEMS! Fully illustrated! For THE MECHANIC, SPORTSMAN, HOBBYIST, HOME OWNER, etc. War Surplus - Factory Closeouts and General Merchandise Values! Save on Hardware, Hand & Power Tools, Gadgets, Sports Equipment, Hydraulics, etc. **SEND 25¢ for HANDLING & MAILING.**

WESTINGHOUSE AIR COMPRESSOR

1000's now in use for spraying, inflating, air tools, in garages, laboratories, shops & on trucks, tractors, jeeps, etc. Lightweight but powerful. Operates on 1/2 HP, gas or electric motor. Runs in either direction. Delivers approx. 3.27 CFM at 600 RPM or 6.54 CFM at 1200 RPM. Has 2" bore, 1-1/2" stroke. We also have available motors, tanks & fittings to adapt this unit. **2395**

LEATHER BELT KITS

Made of bark tanned, top grain cowhide. Designed to wear on your belt. So convenient and handy to carry your small tools. Sturdy and durable - reinforced with rivets. For use by mechanics, technicians, etc. "A" - ELECTRICIAN'S KIT - 7 Pocket. Equipped for tools, tape pencil, etc. **349** "B" - RADIO & TV REPAIRMAN'S KIT Has one large and two small pockets. **279**

PIANO HINGE

1 1/2" x 5 3/8" Cad. Plated Steel **.589** 1 3/4" x 7 1/2" Aluminum **1.29** 3 1/2" x 5 1/4" Stainless Steel **1.98**

AIRCRAFT CABLE

Rust resistant, alloyed steel. Extra flexible. Pre-formed, 7 x 19 strand. On reels. 1/16" - 4 1/2 ft. (7x7) 7/32" - 11 1/2 ft. 5/64" - 5 ft. (6x7) 1/4" - 12 1/2 ft. 3/32" - 5 1/2 ft. (7x7) 9/32" - 15 ft. 1/8" - 7 ft. 7x19 5/16" - 16 1/2 ft. 5/32" - 7 1/2 ft. 3/8" - 18 ft. 3/16" - 10 1/2 ft. 1/2" - 20 ft. Stainless Steel Cable - Pre-Formed 1/16" - 7 ft. 5/32" - 20 ft. 1/8" - 18 ft. 3/16" - 23 ft. Bronze Cable - Not Pre-Formed 1/16" - 5 ft. 5/16" - 23 ft. 1/4" - 17 ft. 1/2" - 38 ft.

ELECT. GYRO

50,000 RPM Motor is an integral part of balance wheel. Has double-end shaft to drive precision tools or machinery at precise, controlled speeds. Ball bearing mounted. High or low voltage. Ideal for experimental work, labs, hobbyists, technicians, etc. **495**

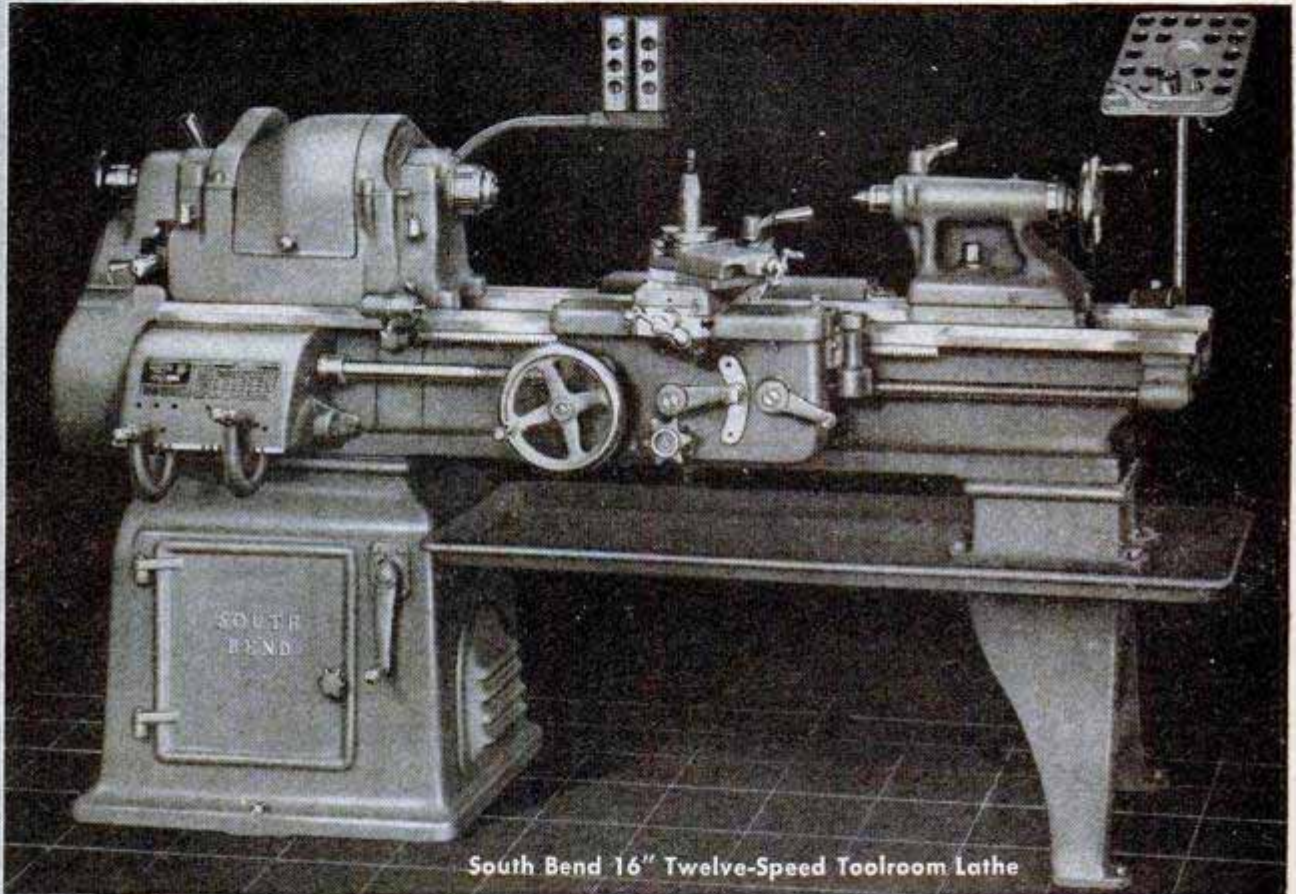
PALLEY SUPPLY CO. 2263 EAST VERNON AVENUE DEPT. PM-12 LOS ANGELES 58, CALIF.

Cuts Machining Time

SOUTH BEND 12 SPEED LATHE

The wide range of spindle speeds on this new lathe cuts machining time because the operator quickly selects the right speed for each operation. Push-button control provides a fast change from any high speed to the corresponding low speed. This versatility is further increased by 48 choices of longi-

tudinal and cross feeds which insure maximum efficiency on every job. Also, you will find that its accuracy and ease of operation make your tough jobs easy. Send the coupon for complete information about this new lathe.



South Bend 16" Twelve-Speed Toolroom Lathe

SPECIFICATIONS

Spindle Speeds (approx.) Direct: high range 300, 550, 945; low range 150, 278, 475. Back gear drive: High range 32, 70, 118; low range 20, 33, 60.

Spindle Bore — 1 $\frac{3}{8}$ ".

Swing over bed and saddle wings — 16 $\frac{1}{4}$ ".

Swing over saddle cross slide — 9 $\frac{5}{8}$ ".

Distance between centers — 33 $\frac{1}{4}$ ", 45 $\frac{1}{4}$ ", 57 $\frac{1}{4}$ ", 81 $\frac{1}{4}$ ", 105 $\frac{1}{4}$ ".

Collet Capacity — 1" maximum.

Longitudinal Feeds — 48 R.H. of L.H., .0015" to .0841".

Cross Feeds — 48, .0006" to .0315".

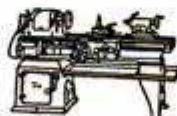
Thread Pitches — 48, 4 to 224 per inch.

SEND INFORMATION CHECKED:

TOOLS & ATTACHMENTS



9" and 10" BENCH LATHES



10" to 16-24" FLOOR LATHES



$\frac{1}{2}$ " and 1" Collet TURRET LATHES



14" DRILL PRESSES



7" BENCH SHAPERS

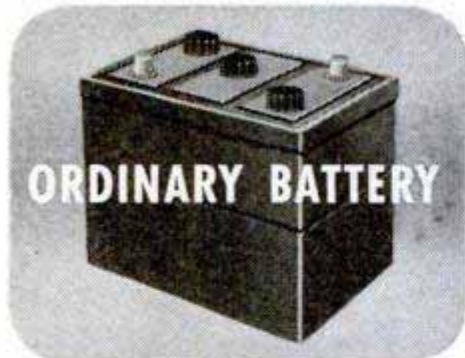
Name _____ Company _____

Street _____ City & State _____

Building Better Tools Since 1906 • SOUTH BEND LATHE • South Bend 22, Indiana

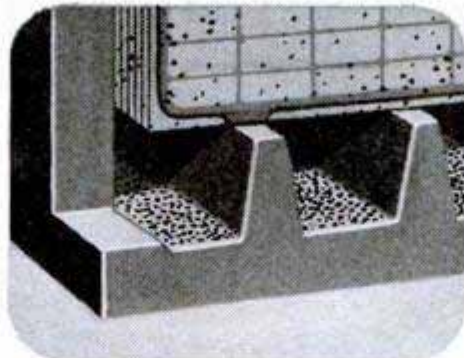


Which battery do you want in your car?

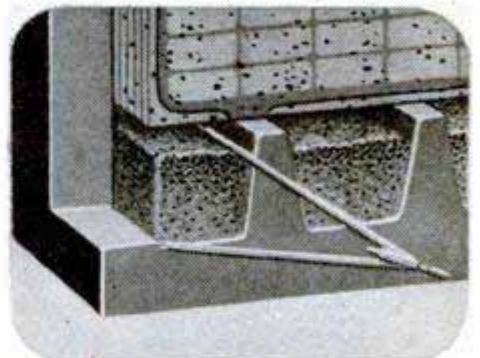


ORDINARY BATTERY

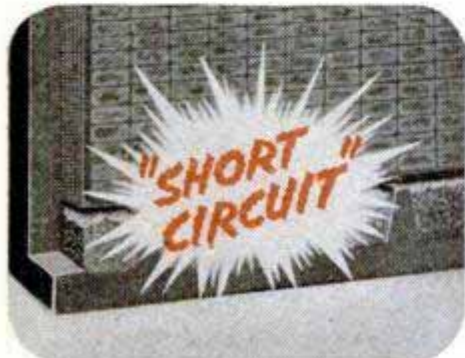
1. In ordinary batteries, small particles keep flaking off positive plates . . .



2. so ordinary design batteries must have large sediment wells at bottom of case to hold these particles.



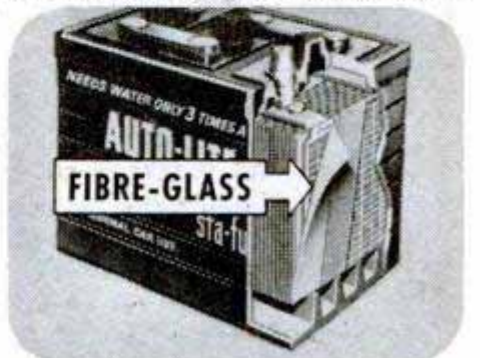
3. Even these sediment wells in ordinary batteries aren't big enough to hold flaking particles from positive plates . . .



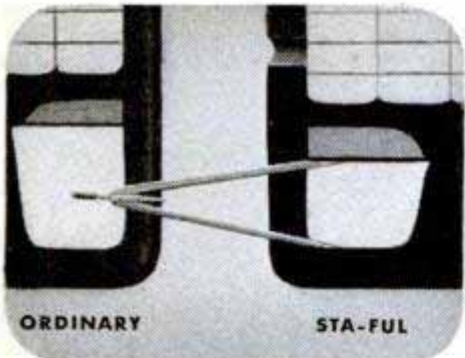
4. so particles pile up and short circuit plates, causing failure.



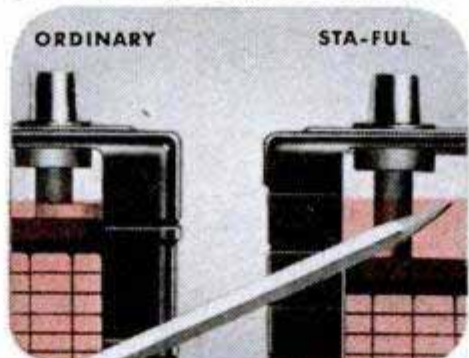
5. But in the Auto-Lite "Sta-ful" Battery, every positive plate has a Fibre-glass retaining mat protecting it . . .



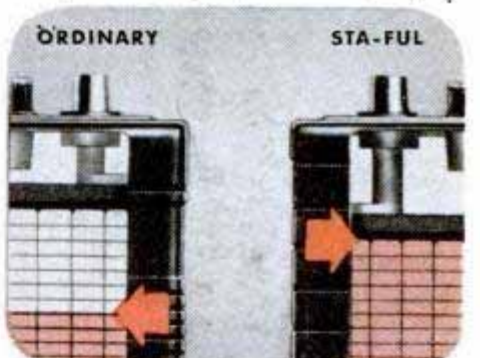
6. to hold the active materials in place to reduce shedding and flaking.



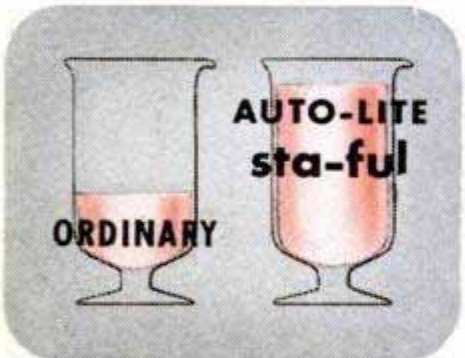
7. Side-by-side view shows that the Auto-Lite "Sta-ful" Battery doesn't need the extra space at bottom that ordinary design batteries do. So extra space . . .



8. in "Sta-ful" Battery is moved to top where it holds more electrolyte, giving room for over 3 times the liquid reserve in the "Sta-ful" as in ordinary batteries.



9. Here's proof of performance! Equal water evaporation shows how the Auto-Lite "Sta-ful" extra reserve keeps plates covered and active.



10. That's why "Sta-ful" needs water only 3 times a year in normal car use. Auto-Lite "Sta-ful" Batteries give longer life, too, in tests conducted according to minimum life cycle standards.

AUTO-LITE BATTERY CORPORATION
Toledo 1 Ohio



AUTO-LITE

sta-ful

*...needs water
only 3 times a year*

IN NORMAL CAR USE

WITH **PRESTONE** BRAND ANTI-FREEZE

**You're
SET**

Just put "Prestone" anti-freeze in and forget it till spring! No "boil-away" worries... no repair bills—its special inhibitors give the world's best protection against rust, clogging and foaming.

**You're
SAFE**

High compression engines and efficient car-heaters make non-evaporating anti-freeze more important now than ever. There's not one drop of boil-away alcohol or methanol in "Prestone" anti-freeze.

**You're
SURE**

With "Prestone" brand anti-freeze in your car, you're sure you've bought the best. It's America's No. 1 brand. No other anti-freeze gives your car the same complete protection. It's guaranteed!

No other anti-freeze gives your car the same complete protection



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\$100
PER QUART,
IN QT. CANS

One shot lasts all winter

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