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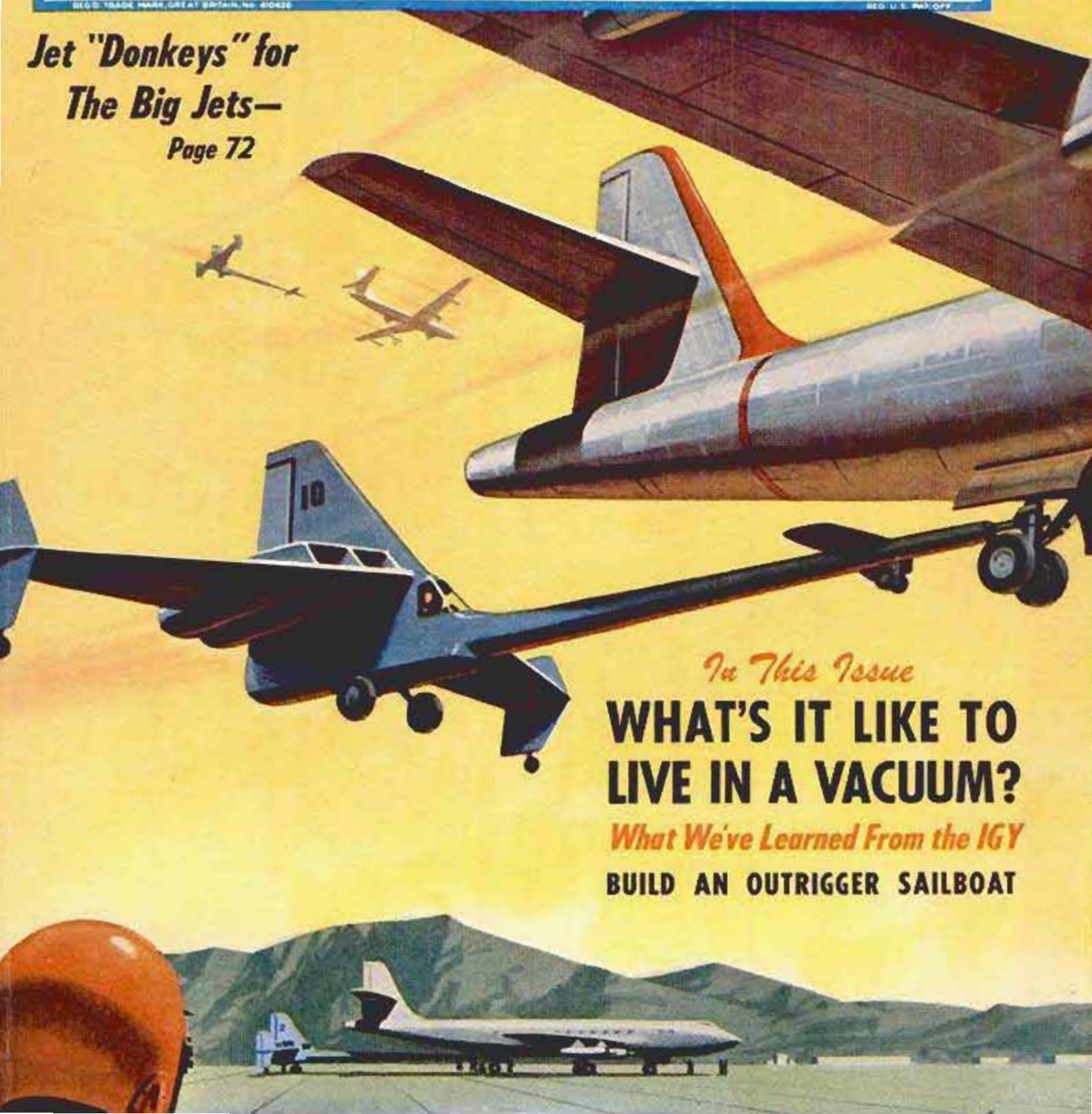
MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

REG. TRADE MARK, GREAT BRITAIN, No. 810432

REG. U.S. PAT. OFF.

*Jet "Donkeys" for
The Big Jets—
Page 72*



In This Issue

**WHAT'S IT LIKE TO
LIVE IN A VACUUM?**

What We've Learned From the IGY

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Guide

T-3

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AC

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AC  THE ELECTRONICS DIVISION OF GENERAL MOTORS

This One





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Next Month...

TOUCHY BUSINESS, jockeying the mighty Atlas onto the launching pad! The July issue will focus on missiles. "Count-down!" is the exciting story of what takes place inside the blockhouse, and "Report From Canaveral" is an eye-witness impression of one of the most important spots on earth





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ACROSS THE DESK



To the Editor:

What's new about Sputnik?

What's original in comic books?

This woodcut, "The Humbugiana Rocket—Warranted to Go 40 Miles a Minute" appeared in "The Comic Almanack" in 1835. It is from the collection of Alene Lowe



White, librarian of Western Reserve Historical Society, Cleveland. She has 1200 American almanacs, one of the largest known collections.

The first American almanac was printed by Cambridge Press of Harvard College 19 years after the Mayflower made port. The idea was centuries older, probably originating in Arabia, associated with astrology. It came to Europe about 1150. Roger Bacon wrote one in England in 1272—in Latin! Early American almanacs were illustrated by such artists as Paul Revere and Benjamin West.

"The Humbugiana" gives us male fashions of the 1830s, reefer, tight breeches, gaiters, cheroot smoking, windblown hair cut in reverse, flying cape. Ah there, Superman—"40 miles a minute"!

Marie Kirkwood,
Cleveland Heights, Ohio.

☆☆☆

Satellite With a Built-in Beep

Four years ago Thomas Good and Martin Sample started a science club at Altadena, Calif. Not long ago Tom, now 12 and a seventh grader at Elliot Junior High School, and Martin, 13 and an eighth grader, won recognition at a school-awards ceremony sponsored by the Pasadena chapter of the California Professional Engineers. Their project: a satellite model. Reports Mr. R. W. Good, father of Thomas, "I did not know my son had built a satellite until completed."

(Continued to page 8)

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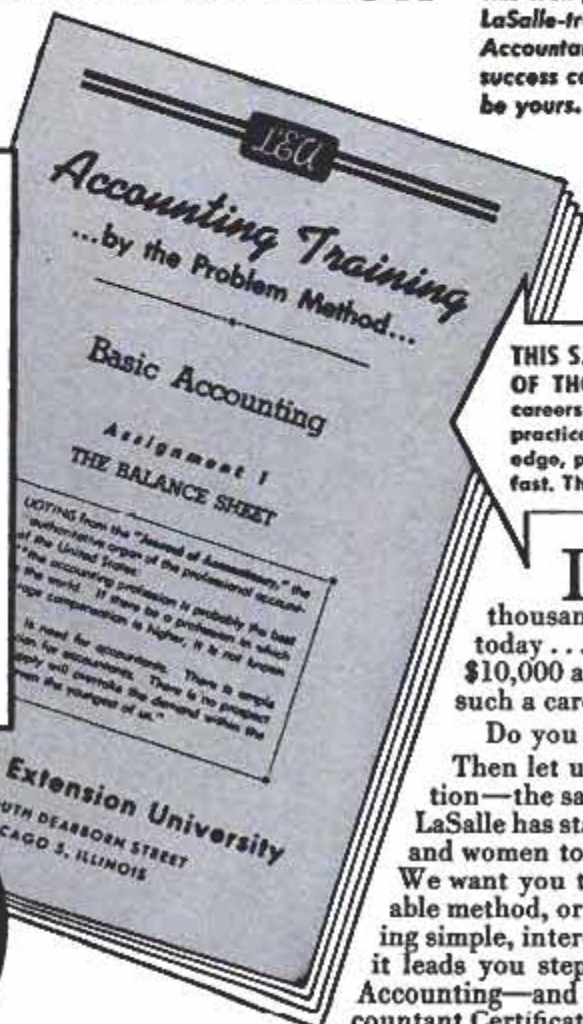


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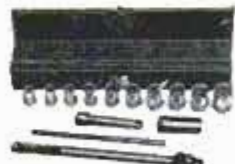


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(Continued from page 6)

The boys haven't dispatched it into the upper air, but they did have it under construction before Russia's first Sputnik took off. Right now they are working on improvements and accuracy and planning a background that will explain the functions and working of a real satellite and how it is placed in orbit.

Young Tom wrote this explanation of the picture:

"This is a model of an artificial earth satellite. The sphere is 8 inches in diameter



and is made out of plastic. It contains a radio transmitter that beeps. It also has an audio beep. The transmitter is run off two batteries, one a 67½ volt, the other a 1½ volt. The transmitter is homemade. The transmitter antenna is made out of brass. The satellite took about 2½ months to build, from November 1957 to January 1958. Work was done mostly on week ends and Christmas vacation."

☆☆☆

Correction

The photographs on page 84 of the April issue were supplied by the Fairchild Camera & Instrument Corporation, not as credited by the Servo Corporation of America, a leading designer and manufacturer of infrared reconnaissance and other weapons systems.

☆☆☆

To the Editor:

Please send me two sets of the "Significant Sixteen" (February 1958) car reprints.

(Continued to page 14)

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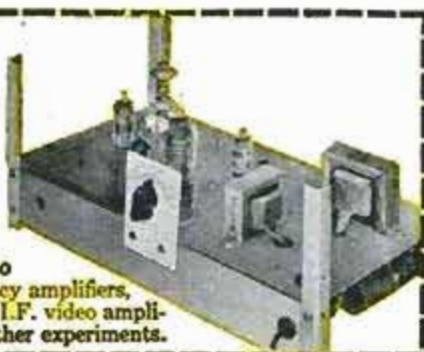


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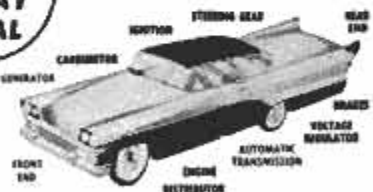
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(Continued from page 8)

I regret your article did not elaborate more on the Chrysler Airflow features, such as four-way adjustable (manual) front seat, integral body frame, washable acoustical headlining, color harmonized interior and exterior, overdrive transmission and most important relocation of masses, i.e. engine over front axle, passengers between axles for low ride. . . .

The Airflow coupe with its beautifully tapered rear end (spare tire was inside a separate deck lid) was not ugly, but few sold—possibly because of the depression. . . . We had one, a real pleasure to drive, quiet, solid and restful. Surprising was its performance despite its weight. Overdrive made that possible. I beat other boys in 1934 Ford coupes both from a standing start and top speed. I could even beat them at top speed while staying in second overdrive!

My father, O. H. Clark, was chief body engineer from 1924 through the Airflow till he retired in 1946.

Bruce E. Clark,
Ann Arbor, Mich.



Jet Liner, Soviet Version

From Airman 2/c William Sneiderman of the 1400th Supply Squadron comes this



photograph of one of Russia's jet airliners, photographed by Sneiderman several weeks ago at Keflavik, Iceland.



To the Editor:

We, here on the staff of the VW Autoist, have read your article, "Will Success Spoil Volkswagen?" (Feb. 1958) with a great deal of interest. It is extremely refreshing to come upon a piece presenting so many new facts on a subject about which thousands of words have been written.

Many of us in the VW Club of America are on our second or third VW and would resent anything drastic originating in Wolfsburg that might change the little car we've become so fond of, except perhaps along the lines of the Karmann Ghia.

We congratulate you on an excellent bit

(Continued to page 28)

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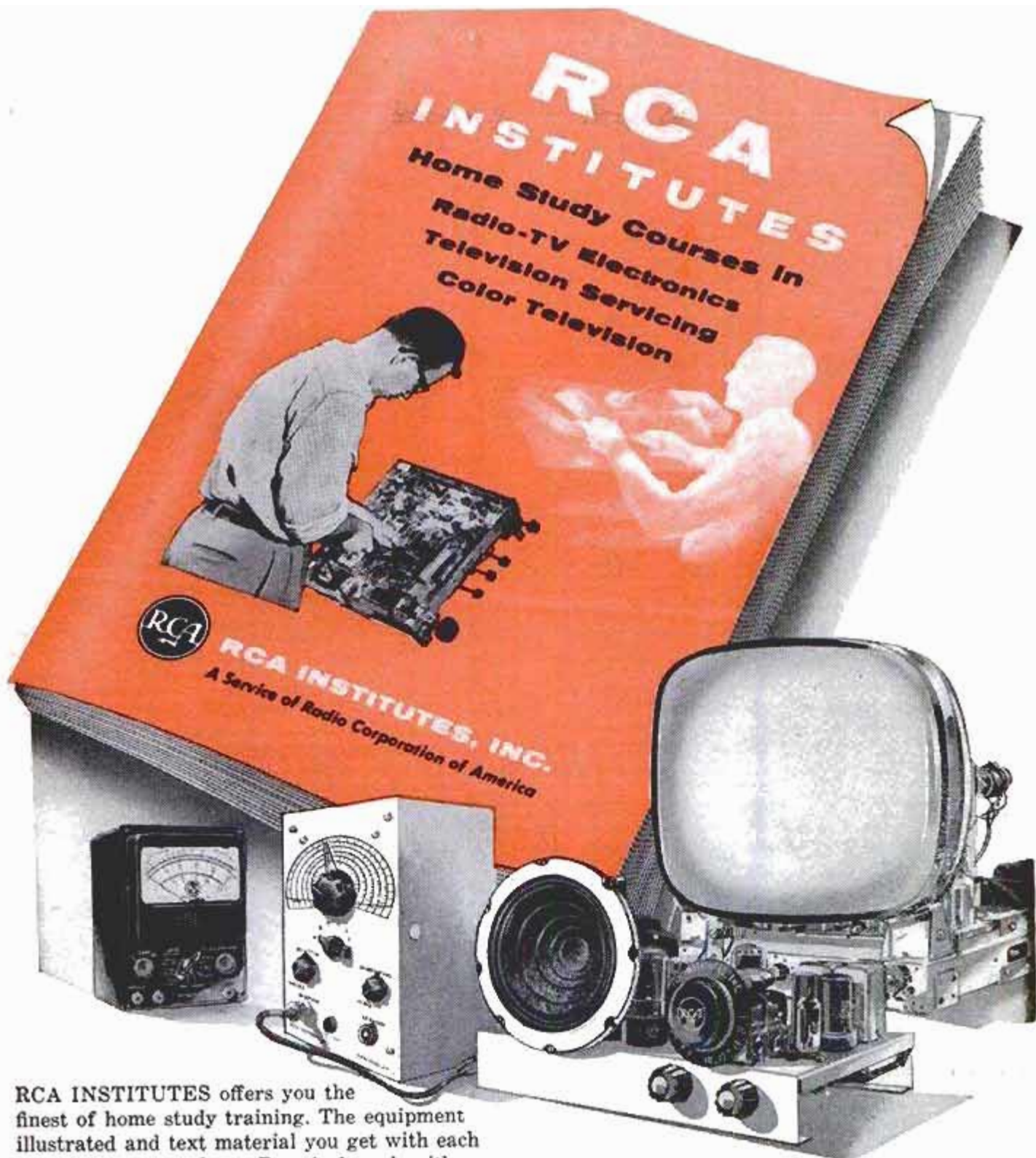


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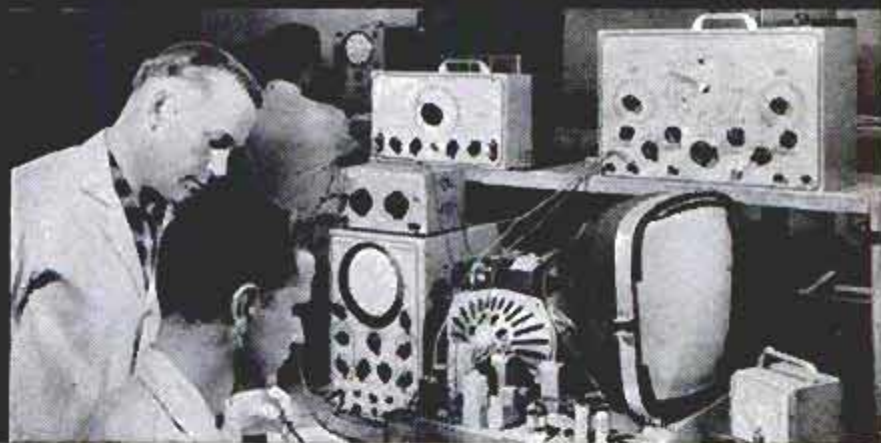
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(Continued from page 14)
of writing and look forward to seeing more pieces like this.

Frank W. Coggins,
Makeup Editor,
The VW Autoist,
Leonia, N. J.

☆☆☆

"Lady Godiva" in PM Costume

From Bridgeport, Conn., a reader of PM sends this photograph with the explanation: "In your October issue you featured Halloween costumes for children. The



horse that was illustrated gave me an idea. I went to my women's club party as Lady Godiva. I won first prize as most original—thanks to you."

☆☆☆

To the Editor:

The following letter came to us from the author of "Cruising Down the River" (March 1958) after he saw his story in our Spanish language edition, *Mecanica Popular*:

Thank you very much for the Spanish edition of *Popular Mechanics*.

Aside from the pleasure it gave us, the magazine served a constructive purpose. We have long been in a quandary over a name for the boat. My preference was to name it after one of the old mountain men of this region—Manuel Lisa, Lucien Fontenelle, Pierre Chouteau, Jedediah Smith

(Continued to page 30)

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(Continued from page 28)

or the like. But their place in history is so important and the boat is so trivial that the matter of proportion restrained me. At the same time, the craft has served too faithfully to, with propriety, give it a cute name. We note that the Spanish edition refers to the boat as a casa flotante. This seems just right. Casa Flotante it is.

Ralph J. Smith,
The World-Herald,
Omaha, Neb.

☆☆☆

To the Editor:

I am in a hospital. Last Saturday I observed an empty (electric light) socket in a shower bath. I assume someone had screwed out the burned-out bulb. What if (someone) ran his finger into an empty socket—the electricity might run through him and up the water spray and down the pipe into the ground. . . . I would be glad to see a warning published.

George Lierle,
Jacksonville, Ill.

Any exposed electric lamp or socket in a shower stall sounds dangerous to us.

—Editor.

☆☆☆

To the Editor:

Our House of Texture was indeed "One of the" if not "The" sensation of our 1957 home show. We truly want to thank your staff of *Popular Mechanics* for making this plan of the most interesting house I have known available to us. (PM Big Family House, page 161, October 1956). We feel that the response and acceptance of this house was greater than any we have ever shown. About 50 percent of the people came back to our house the second time to study the arrangement. We showed our home to a paid attendance of 18,699 people, and also to nonpaying visitors, such as high school classes, etc. Thank you very much for the cooperation and interest shown.

Vernon L. Mudd, Tulsa, Okla.,
Past president, Tulsa Home Builders Association and the Oklahoma State Home Builders Association, former member of the Executive Committee of the National Association of Home Builders.

☆☆☆

To the Editor:

I should like to say that your story ("Will Success Spoil Volkswagen," PM, Feb. 1958) is tremendously interesting and thorough. It is quite a change to read something totally different from the usual everyday stories and I can assure you that the critical approach in particular has been read over here with the greatest attention.

Frank Novotny, Press Dept.
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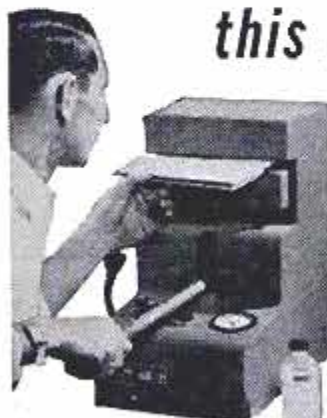
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These words have significant meaning at this time of year when thousands of students are graduating from high schools all over the country. Graduation is an important occasion in everyone's life, but primarily it is a time for making decisions about the future—decisions which could very well affect the entire life of the graduate.

The years of study and education leading to graduation were a period of preparation to help you recognize and meet your responsibilities confidently and capably. All other things considered, the greatest responsibility you now have is **yourself; your future and what you intend doing with it.** Behind you is a basic high school education which is the very least a person must have to even consider succeeding today. Ahead of you is a choice, and there is no better time to make your decision than now.



Your Future—What Will It Hold?

This is a question to which you've probably given considerable thought. There is no doubt that the future contains exciting opportunities in every field of work! Our rapidly expanding population with its demands for housing and the products and services of life, our growing industry, increased production and sales, and the leadership the United States must maintain on the world scene in every field of endeavor will require the utmost in ability and talents from you and thousands of other young people like you in the years ahead. Yours is a technical age which is advancing at breakneck speed and you will be the architects of it.

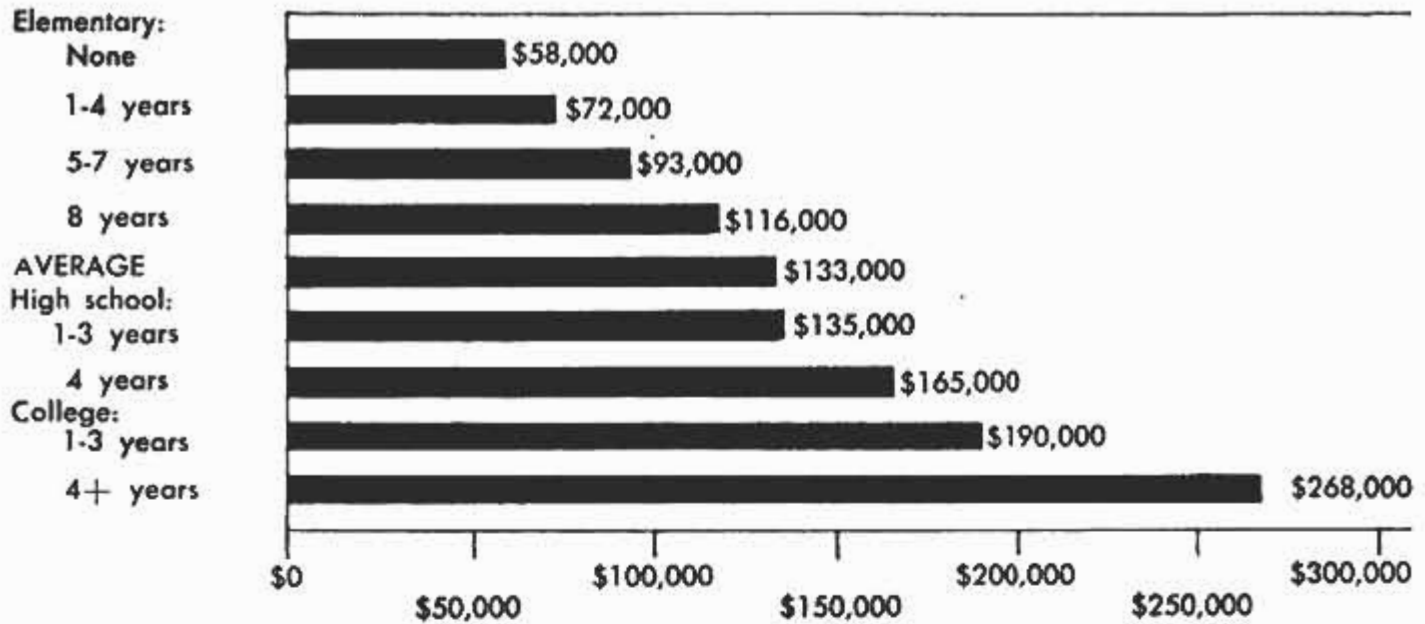
Keep one thing in mind though, no matter what opportunities lie ahead, the future for you depends largely on what you make of it. **There is only one sure way to achieve success in business or in society, to achieve financial rewards, or to grow culturally as an individual and that is through knowledge developed out of higher education.**

Life itself, as well as every industrial, business, scientific, sales and distribution process on which we depend is growing more complex. Today, more understanding and more competencies are needed by everyone for success as a worker, family member, and as a citizen. The rapid advance of our science and technology is setting a standard of higher qualifications of knowledge and ability required of all employees on the job.

Today, a high school diploma is the minimum educational standard for employment in most clerical positions or in apprenticeships for many skilled trades. Those who do not complete high school will discover it is almost impossible to compete for jobs above the manual-labor or semi-skilled level.

In most skilled trades, all professions and business careers, an education beyond high school is absolutely required. Today employers are asking—"What do you know?" They are demanding initiative, efficiency, sound education, clear

ESTIMATED "LIFE-TIME" INCOME FOR MEN WITH DIFFERENT AMOUNTS OF EDUCATION



thinking, imagination, and judgement based on the ability to analyze and to think intelligently and logically.

Emphasis is being placed on education because the pace of business and the use of complicated, expensive equipment require a high level of intelligence to manage and control our processes of research, product development, manufacturing, and sales. The facts about education and the prime importance of getting as much of it as possible before considering applying for a job are as simple as this . . . if you are well educated (and we mean beyond high school) there are no limits to which you can climb in business or a profession . . . if you stop your education with your high school diploma, chances are in the years ahead you will not progress much beyond a mediocre job and salary.

School administrators, businessmen, engineers, and scientists are urging people today to continue in school. They encourage high school graduates to go on to college if it's possible. If college is out of the question, they advise attending technical, trade or vocational schools in your spare time. Correspondence courses are an excellent way to continue your education at home, and they will make you more capable in your job if you find you must go to work now.

What Direction Will You Take?

Will you accept "that job" being offered to you now for a salary that looks promising today? How will that salary and position look five or ten years from now when the promotions are being given to men with more education?

Sooner or later you will undoubtedly have to enter the Armed Forces. But consider this first. The Armed Services are becoming increasingly technical in nature, and are very interested in obtaining educated men for technical work and as officer material. You stand a much better chance

for promotion and responsibility with some technical training or advanced education before you enlist.

Before you make any decisions regarding the future, we urge you to consider the wisdom of continuing your education. To do so is to your complete advantage, for knowledge is power. With it you find it easier to get a better job; you will be promoted faster; you will be prepared to get somewhere in the Armed Forces; you will have a foundation for professional training; you will have a fuller, richer, more satisfactory life; and you will make more money.

Income is tied directly to education and experience. The chart on this page proves this very well. The more education you have at your command, the more money you can expect to make throughout your lifetime.

Education and knowledge are your most important resource of power. They are a lifetime investment; a lasting source of experience which will never fail you. Now is the time to develop knowledge through education—not later—but now while you are still in the learning process.

Popular Mechanics urges you to continue your instruction by every means available. Go to college if you can. Or go to trade schools where you can develop a skill through professional training. Correspondence courses can broaden your education and equip you to enter the business and industrial world with confidence and ability. Vocational schools are excellent for learning a business or profession. Consider one of the fine technical schools from which have come some of our country's leading engineers and technicians. Write to the schools of your choice. They will be glad to provide career guidance information.

Education is your key to future security, employment and job success. Make your decision today to continue in school for after all it's your future!

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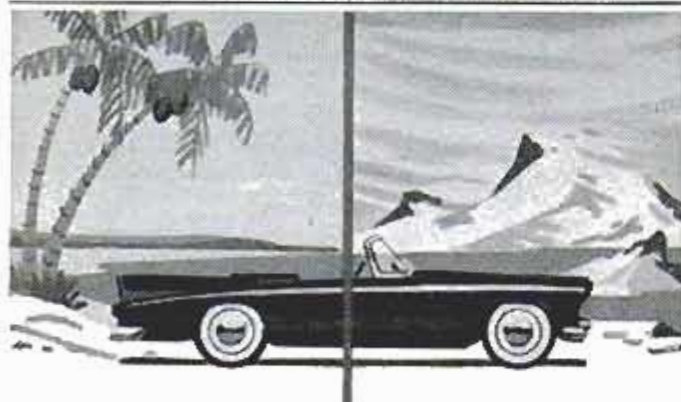
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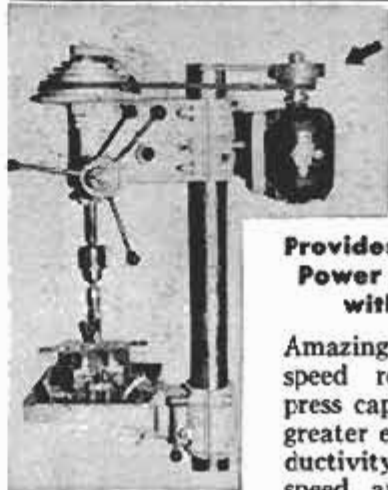
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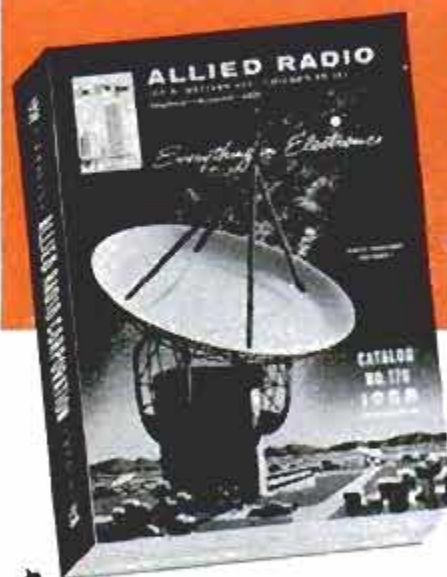
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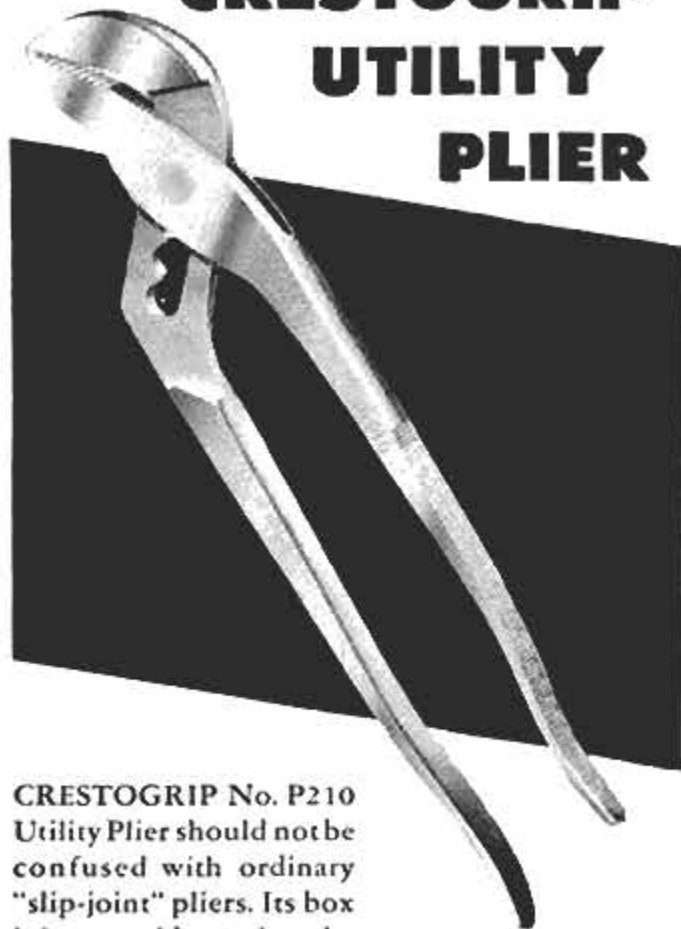
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Hydrogen in Hollow Conductors Cools Big Generator

Electric generators, like airplanes and missiles, have a "heat barrier" problem. Heat that develops in the copper conductors around the rotor limits the amount of electricity that can be produced. Engineers at Westinghouse Electric Corporation have helped solve the problem by developing an "inner cooled" generator in which the conductors are hollow. Hydrogen gas is forced through the hollow spaces at high velocity to carry away the heat. The new inner-cooled generators can produce twice as much electricity as the best generators of several years ago. In fact, one giant inner-cooled generator being built at East Pittsburgh will have a greater capacity than entire power stations of 10 years ago.

NOW TRY PUSH-BUTTON ALUMINUM PAINTING IN COLORS

Users call it a
decorative marvel—
New **BROMA TOUCH 'N TONE**
Colored Aluminum Spray



A good many home-handy people are excited (if the mail is any indication) about a new paint discovery—spray-on colored aluminum. Everybody is calling it a decorating marvel that's actually fun to use. The giant size package of new Broma *Touch 'n Tone* is stirring up a sensation in the do-it-yourself set. Made with Alcoa® Aluminum Pigment by Master Bronze Powder Co., Calumet City, Illinois, *Touch 'n Tone* is available in beautiful metallic shades of blue, green, gold and silver.

Try it and you'll say it's no trick now to refinish those "hard-to-paint" treasures—an old ice cream parlor chair, for example. Everything takes on new life and sparkle with Colored Aluminum—lamps, trays, baskets, frames, garden furniture and tools, appliances, vases, knickknacks—it's a long list.

Dealers have *Touch 'n Tone* on their counters or can get it. It's identified by the Alcoa label.

ALCOA does not make paint, but Alcoa Aluminum Pigments are used in most high-quality brands. Available in either spray cans or conventional containers, brands like Broma *Touch 'n Tone* are at dealers everywhere.

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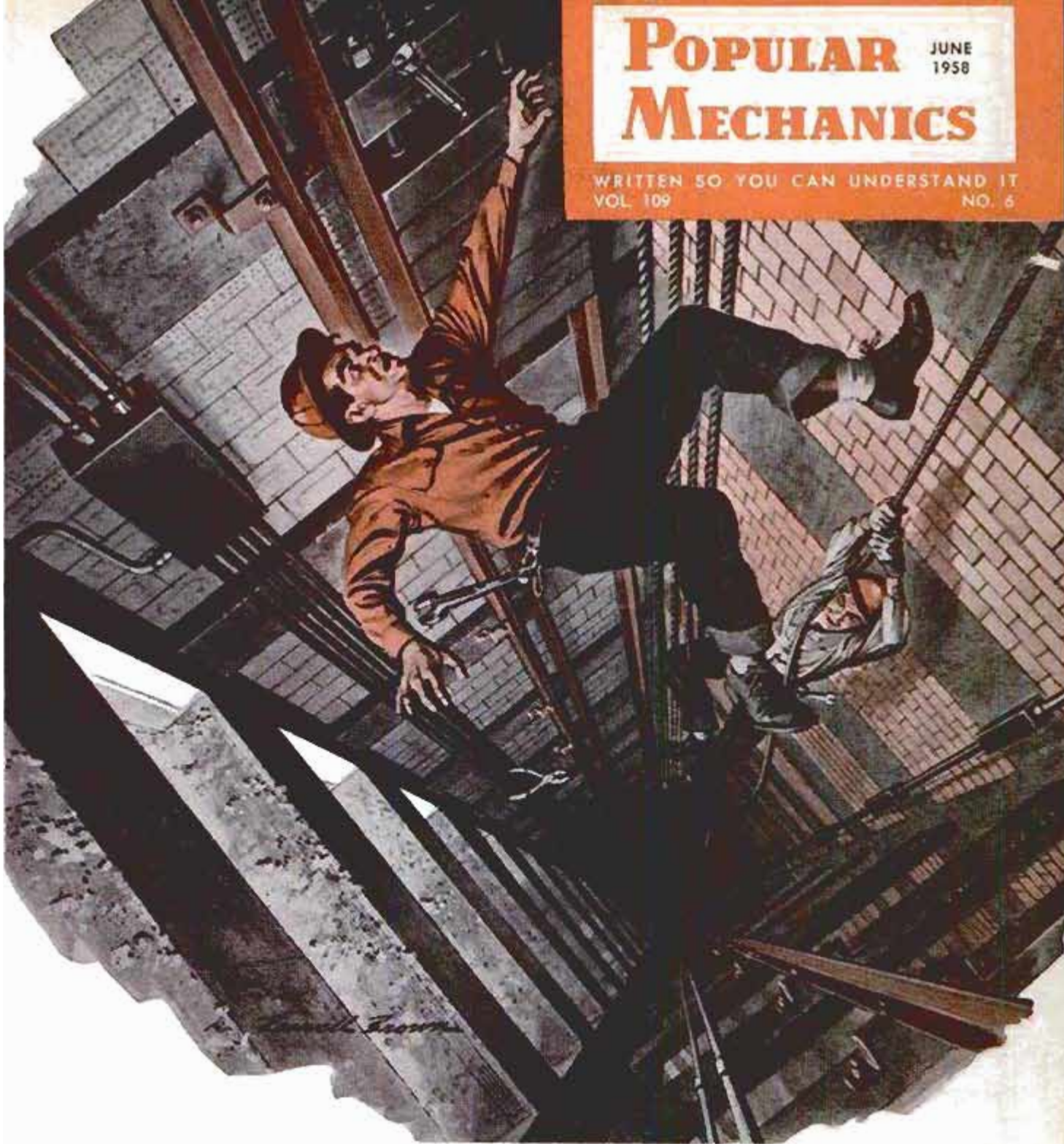


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PERFECT CIRCLE  **PISTON RINGS**



When two workmen tumbled into an elevator shaft, they saved their lives by grabbing the nearby cables

THINK FAST!

By Murray T. Pringle *208 HIGHLAND AVE.
BUFFALO 22, N.Y.*

ON A MILD winter day last year, two men were at work on a New York City building. They were 21 floors up when they slipped and fell. One of them saved himself with a trapezoidal maneuver. The other fell and slid 21 stories to the bottom, but walked away alive.

The pair, William Vessialiades, 35, and Donald McKeon, 23, were installing cables

in the elevator shaft of a building under construction when one of the cables suddenly whiplashed away from them. Vessialiades was jerked forward against McKeon. Both men spilled into the shaft.

McKeon grabbed one of the fixed cables and swung himself to safety on a lower floor. Vessialiades fell past his buddy, but managed to wrap his legs around a cable



Gas-station attendant locked in washroom by bandits, climbed on-to sink when he overheard gunmen discussing plans to shoot him

and slow his fall. Then he got his hands on a second cable and eased himself the rest of the way down. His only injuries were leg and thigh lacerations.

A miracle? No, just a matter of quick thinking—and actions to match.

In Chicago, 35-year-old Jerry Rubert, part-owner of a gas station, was held up and robbed by three armed men. After taking his wallet and the contents of the cash register, the thugs locked their victim in the washroom. As they prepared to leave, Jerry could hear their voices through the frosted glass door.

"That guy saw our faces," said one of the gunmen. "He could finger us for this job. Maybe we better kill him."

"Go ahead," the others replied.

Jerry Rubert's heart pounded wildly as he saw a man's shadow approach the frosted glass. He cast a wild glance about the tiny, windowless cubicle. He was trapped; what could he do?

Shots Rip Through Door

A moment later three shots crashed through the door and the bandits fled. But when police arrived, they found the gas station owner unscathed. A miracle? No, just quick thinking on Jerry Rubert's part. He had climbed atop the washbasin seconds before the bandit's bullets had ripped through the door. Had he been standing on the floor at the time, police said, he might have been killed.

Quick thinking had saved that man's life. How fast could *you* think in such a crisis? On your ability to make split-second and intelligent decisions in time of crisis may one day depend your life or that of a loved one.

Every year newspapers print numerous stories of men and women who were suddenly faced with a crisis, and, because they failed to meet the emergency properly, perished or stood helplessly by and watched others suffer injury or death. A man loses control of his car, runs up on the sidewalk and kills three little girls on their way home from school. A small fire breaks out in a second-story apartment and a hysterical



While flames raged through Cocoanut Grove night club in Boston, a dozen patrons were led to safety in the refrigerator room

housewife leaps from the window and is critically injured.

Such tragedies need never happen. Psychologists point out that anyone of average intelligence can learn to be mentally fast on his feet. And in today's world, quick thinking pays off in more ways than one. Its most rewarding feature, naturally, is the ability to sidestep trouble or get out of a jam almost as quickly as you get into it. Or you may be on the scene when disaster befalls others, and your mental agility may be instrumental in saving lives.

Trained to react. According to Dr. Herbert Stack, director of the New York University Center for Safety Education, those are the key words to remember in meeting and coping with any emergency.

"Prepare yourself *now* for any future crisis," Dr. Stack advises. "Waiting until you are face to face with one may be too late. Imagine yourself or loved ones in some peril and decide how you would remove them or yourself from that danger."

In this way, Dr. Stack points out, you will have mentally armed yourself with "prepared decisions" so that in the event, at some future date, the imaginary emergency should become a crisis in fact, you could react almost automatically and do the right things at the right time.

This was true in both the case of the elevator workers and their "high-wire act" and the gas-station attendant who outwitted his would-be killer.

"Whenever we go on a job," explained

Panic was blamed for high death toll, 491 victims, in the Cocoanut Grove disaster in Boston in 1946

This is the flame-gutted interior of Cocoanut Grove where hundreds seeking entertainment found death





Australian cattleman bitten by deadly tiger snake had no knife to open the wound. He loaded his rifle, pressed muzzle against the snake bite and fired

Brooklyn, N. Y., firemen pour water onto flaming building skeleton minutes after rescue of workmen



Donald McKeon, one of the cable installers, "we always look to see what we can grab in case anything goes wrong. That's why I had the cables in mind, and grabbed for them when I fell."

Said Jerry Rubert, the gas station attendant: "I've often wondered what I'd do if I ever got held up. Now I know!"

These men survived the crises that confronted them because they had, as Dr. Stack suggests, mentally armed themselves with "prepared decisions."

Crises of Everyday Life

It is unlikely that you will ever be faced with a crisis like that which confronted Jerry Rubert, but there are certain dangers which can and do strike thousands of average people every year. A panel of leading doctors and psychologists was asked to select several of the most common crises of everyday life. These are their choices together with a few suggestions for successfully coping with them.

Gas leaks and the resultant explosions have caused death and injury to thousands of persons. How many times have we read of some householder smelling escaping gas and going down cellar to look for the leak—with a lighted match? These people allow panic and confusion to banish calm and reason and the result is another unnecessary accident.

The American Gas Association offers these suggestions to be placed in your mental "prepared decisions" file:

1. At the first sign of any high concentration of gas, get yourself and family out

Here are some of the men who rode concrete bucket to safety from 13th floor after flames trapped them





Fast thinking by crane operator saved 10 men trapped by blazing wood forms on building. He swung 165-foot boom to 13th floor for rescue

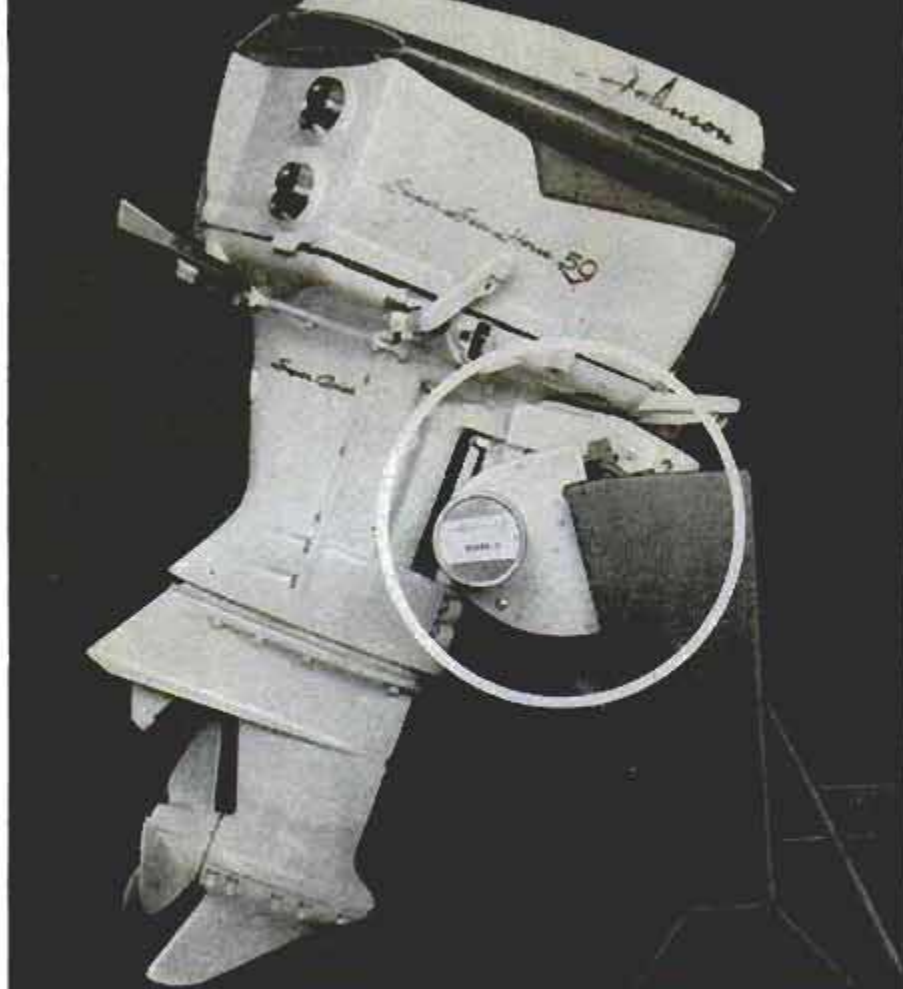
of the house immediately. Then phone the gas company or police—from a neighbor's house or pay phone.

2. If you suspect a neighbor's home as being the source of escaping gas, *do not* investigate by ringing the doorbell, switching on the light, using a match or even a small flashlight. Any of these acts could touch off an explosion. It has happened.

Going out tonight? A movie? A political rally? A nightclub? Watch yourself! For you never know when panic may rear its lethal head, and what started out as an evening's fun can be instantly transformed

(Continued to page 234)





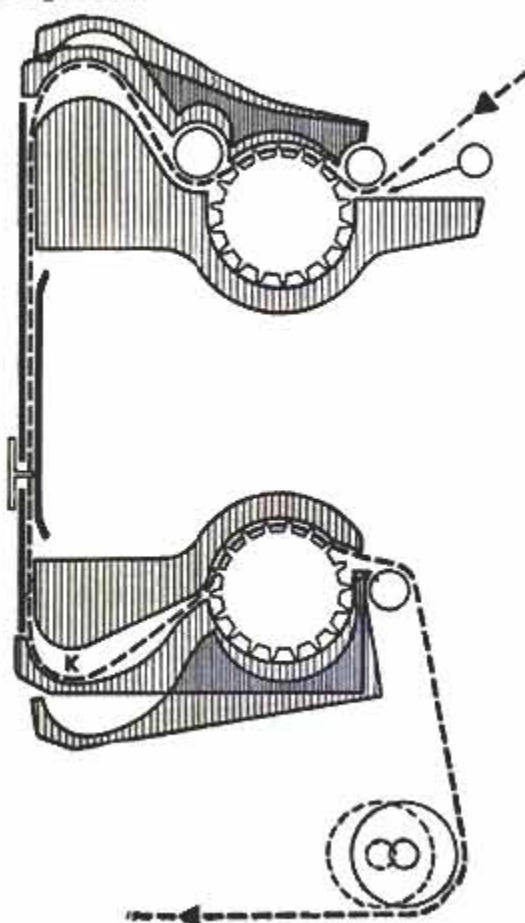
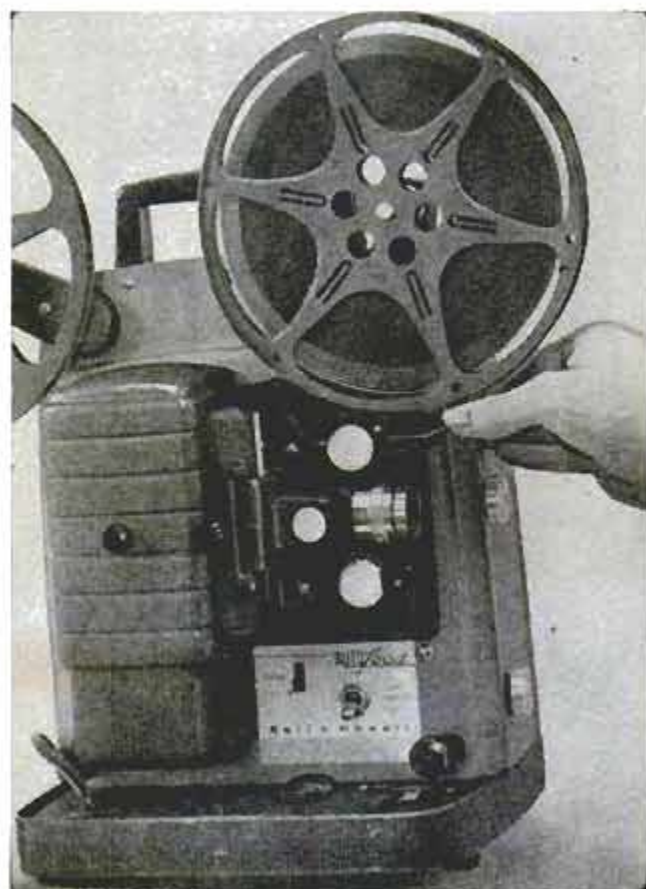
Powered Lift Tilts Motor

As outboard motors grow larger and larger, they become more difficult to raise and lower. A new lifting mechanism, mounted on the outside of the transom, permits the boater to adjust the tilt angle and operate the motor in any position at the flick of a remote switch. The lift is powered by an electric motor. It replaces one clamp bracket and can be installed in 15 minutes. Built into the unit is a hydraulic shock absorber to prevent damage to the motor and transom when the motor kicks up or returns down under full power. The unit permits the boater to raise the motor quickly.

Automatic Threader Feeds Movie Film Through Projector

Eliminating much fuss and fumbling, a new movie projector has an automatic-threading mechanism. The operator simply feeds the end of the film into a channel.

The projector takes over from there, threading the film automatically. Then the operator hooks the end of the film on the take-up reel.



RUMORS PERSIST that the 1959 cars will be longer, wider and fancier.

It's hard to believe that any business as big, as ubiquitous, as the auto industry could be wrong, so it must be that the public still wants bigger cars.

But there are people (and this observer is one) who sense that the public's taste has changed. If 1959 cars are bigger, more expensive, with more spectacular tailfins and taillights, it will be another big year for American Motors and foreign cars.

However, by 1960, things will be different. Sales of the naturalized imports (Vauxhall, Opel and British Fords) are expected to increase for only two years. They serve the very important purpose of holding the showroom door open while their American parents prepare the domestic economy cars.

The Battle Begins

Chevrolet's activities at Willow Run airport (site of the ill-fated Kaiser-Frazer operation and the new Hydra-Matic plant) is believed to be the beginning of its small-car factory. The die will be cast this month. The point-of-no-return is said to be June—until then the small-car project could be stopped if the market changed. After June, Chevrolet and Ford will be committed and the battle begins in earnest.

From 1960 on, American Motors will have to sell more than compactness. Its battle against the giants will then begin.

The 1959 Rambler will be virtually unchanged from this year's highly successful model. Trim changes on the rear fenders will eliminate the squarish look of the current tailfins. There will be no sheet-metal changes as AM wants to save money for the coming battle with the big boys.

It may bring out a station wagon in its American line in 1959, but if sales continue good without it, plans may be shelved.

All 1959 General Motors cars will be longer, wider and flashier. All will continue with the prosperous, loaf-of-bread, well-rounded styling of the current Chevrolet. No fins in sight. Chevrolet will be bigger, too, but is expected to retain some models of the current size for those who refuse to go along with the big-car trend.

Ford is said to be going all out for tailfins in 1959—a reversal of Edsel-Mercury styling trend. Apparently, the public has proved to Ford that it still wants tailfins. Bigger and flashier than any yet seen off an Air Force runway, these fins start just behind the windshield, flaring outward and upward gracefully. Taillights are bigger than ever and as bright as a police-car flasher. (Soon we will need two dimmer switches—one to dim headlights, the other to dim taillights.)



By Art Railton

Chrysler is making trim and front-end changes, but basic bodies are retained as plans call for all-new designs in 1960.

Studebaker's Plans

Studebaker-Packard plans a "different type of car" for 1959, to be out late in November. Wheelbase is believed to be under 108 inches. Two engines will be offered, a Six and a V8, both revived from previous Studebaker engines that featured small displacement, low horsepower, excellent economy. Several bodies will be offered, including a wagon.

It is expected to be the shortest U. S. car, being under 180 inches over-all. It will have no tailfins, but it won't be as plain as the Scotsman (which, incidentally, it will replace). Price is to be under \$1800.

Most sheet metal is to be new, although some current pieces are retained. But you won't recognize it as a Studebaker, so different will it be.

Bearing the Champion name, it will replace all current Studebakers (and, probably, will mean the end of the Packard too, except in the Hawk line).

Did you notice the results of the annual Mobilgas economy run? The Chrysler New Yorker got more miles per gallon than any other car, beating out even the Ford Six and Chevrolet Six. It did it with an actual 21.0 miles per gallon. These results make it clear that the main thing an economy run proves is the skill of the drivers. Just don't buy a New Yorker and expect 21 m.p.g.!

This reporter spent a few days at the imported-car show in New York and was amazed. Not by the cars—they were neither new nor amazing. What amazed him was the people. They were, for the most part, normal, working people (many with families along) who were, apparently for the first time, seriously interested in buying a foreign car. The beret-wearers were in the minority. Detroit sent some of its marketing experts to the show—it would be interesting to learn what they reported back to their companies.



Jet "Donkeys" for the Jets

By Richard F. Dempewolff

BIG JET FIGHTERS and bombers are running out of runway. Wafer-thin delta wings, built for supersonic speeds in the thin air along the rim of outer space, must fight down the runway to build the speed it takes to get them airborne. The 150,000-pound B-58 Hustler, using all the thrust she can muster (64,000 pounds from four jets) needs plenty of run. Newer high-flying ships will need more. Even military fields don't all have two-mile runways, and geography doesn't always provide flat terrain in places where airfields are needed.

One solution, dreamed up by All American Engineering in Wilmington, Del., is a jet "donkey plane" that will hook on to the belly of a bomber and provide it with a "kick in the pants." Boosting the ship down the runway and into the air, in much less distance due to 10,000 to 12,000 pounds of additional thrust and the extra lift provided by its own wings, the donkey will ride with the bomber until the mother ship is at safe speed and altitude. Then it will detach and circle back to base. Robert B. Cotton, vice-president of All American, sees no reason why small fleets of pusher jets couldn't launch whole squadrons of supersonic high-fliers with speedy dis-

patch. "So far," he says, "it's just a drawing-board idea, but the concept is a practical one, stemming from actual experiments with our big rubber-tired, four-jet cars."

On test tracks at Georgetown, Del., and at the Naval Air Station in Lakehurst, N. J., the "hot rods" Cotton refers to have been roaring at 200 miles per hour for more than a year. "The Navy wanted to develop and test new, more powerful arresting gear that would stand up under the walloping impact of the newer, bigger carrier jets," he explains. "To do the job without wrecking a lot of expensive airplanes every time an experimental arresting gear failed, we were given the job of developing a big car, powered by turbojet aircraft engines. This vehicle would shove a dead load (equal to the weight of a big carrier plane) down a track at 200 knots, simulating the landing speed of a carrier jet. The car would brake to a stop while the load, on wheels, rolled free to snag the gear."

Today you can see the rocketing red monsters doing just that. The "cars" look like gigantic squatting bugs—if you can picture a bug 20 feet square. A typical one houses four surplus Allison J33 turbojets with a total thrust of 28,000 pounds. These



As soon as the big plane gathers a safe speed and altitude, the jet "donkey" breaks away and flies back to the field for another launching

are rigged in a chassis of steel tubing and cloaked in aluminum streamlining to give the vehicle the appearance of the center section of a flying wing. It rides on four aircraft wheels with rubber tires, and requires no driver to guide it. In assembling the equipment for a run, the car is secured, by means of steel "slippers," to a guide rail running down the center of the track. Riding ahead of the jet pusher is the dead load—a wheeled platform of steel plates and girders weighing from 10,000 to 60,000 pounds. After fueling, the jet pusher is hitched to a hold-back device, and everyone heads for cover.

Halfway down the track a crew in a blockhouse checks the gauges on a remote-control panel. At the "track clear" signal, switches are thrown. With booming roars, the jets ignite. Inside the blockhouse, dials come alive. The monitor scans tail-pipe temperatures, r.p.m., fuel flow. When everything checks out, the remote control switch is thrown, dropping the hold-back hook. Connections pop free as the car moves away, functioning now on fuel and electrical circuits contained in its own rumbling core.

Jet roar rising to a scream, the pusher thunders down the track, jamming its load ahead of it at a 200-knot clip. Near the end of the course, the car trips a trigger, automatically cutting the engines. The flange on the rail widens. With a screech of hot steel and a puff of blue smoke, the "slippers" jam against the flaring rail, jerking the car to a halt. The dead load hurtles on alone, down the concrete strip until the "tail hook" with



which it is equipped snags a test-arresting gear cable that is stretched across the track. A ribbon of dust whips into the air as a 25-ton behemoth twangs the cable, stretching it out against water-squeezing pistons that are designed to absorb the energy and stop the load within 150 feet.

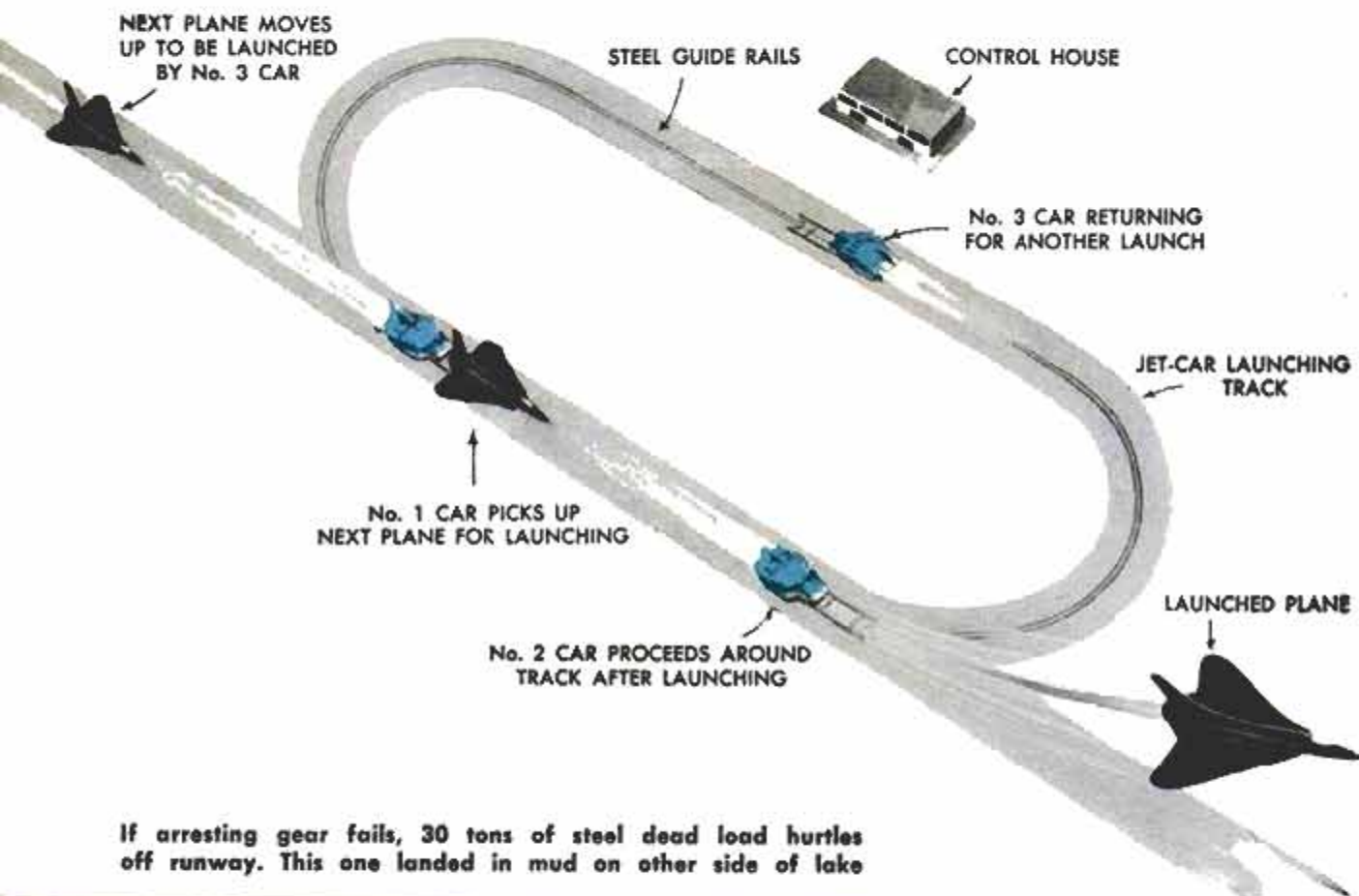
What happens if the cable lets go? That's the reason for the blockhouse. At All American's test track in Georgetown, the strip ends near a lake. Many a runaway dead load has plunged into the water. One

Capable of ramming dead load at 200 knots, this four-engine jet car may launch bombers from very short runways





At 200 knots, slippers behind the experimental test car jam against flare in rail, stopping car as load rolls on



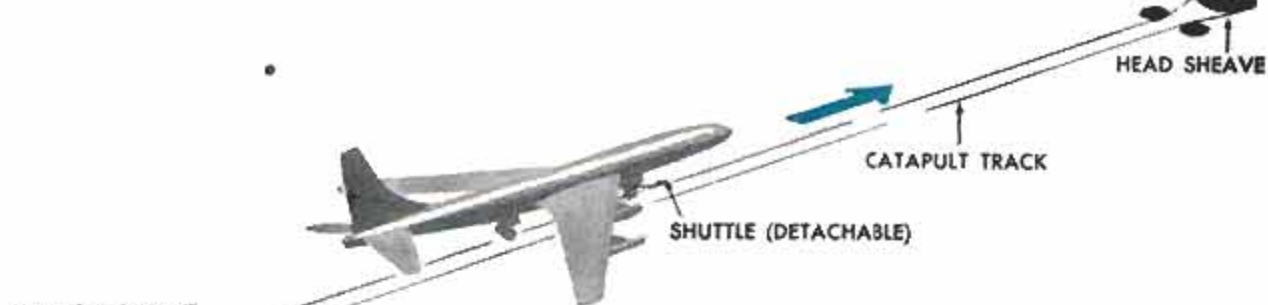
If arresting gear fails, 30 tons of steel dead load hurtles off runway. This one landed in mud on other side of lake



went clear across the lake and half buried itself in the mud on the other side. "No one is allowed anywhere near the strip during a run," explains one engineer. "A failure on one side of a cable could send that 25 tons of steel on wheels pinwheeling wildly in almost any direction."

On one occasion a car threw a turbine blade, filling the air with shrapnel. Since then the hot rods have acquired a shell of armor plate.

The speed and power developed by the hot rods, plus their economy (they are made largely of surplus engines and parts) made them obvious candidates for a

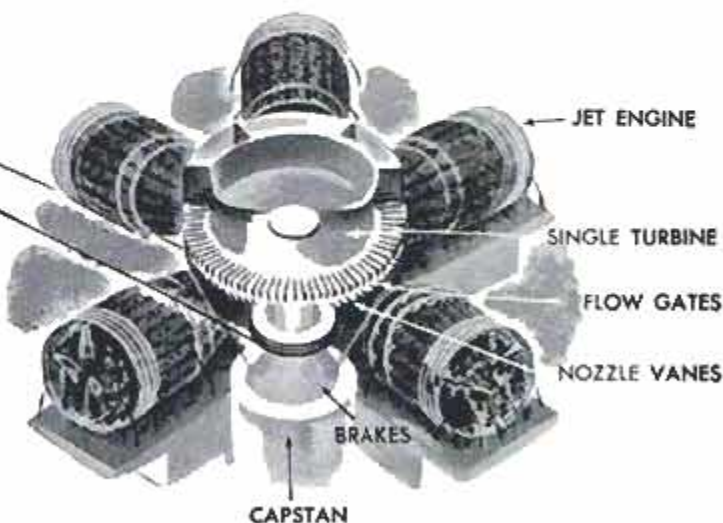


Simplified drawing of six-jet catapult engine, which powers launching cable to which jet bombers and tankers are attached for high-speed take-offs

host of other high-powered applications.

The car has excited so much interest as a vehicle for solving launching and arresting problems for tomorrow's planes that the Navy is now completing a \$35,500,000 launching-and-recovery laboratory at Lakehurst, where jet red hot rods will be among the star performers. Five jet-car tracks, varying from one to two miles long, spread across the fields like ribs in a fan. These will be used for testing. Beside them lies a two-mile runway bordered by subterranean chambers housing catapults and arresting equipment for "live runs."

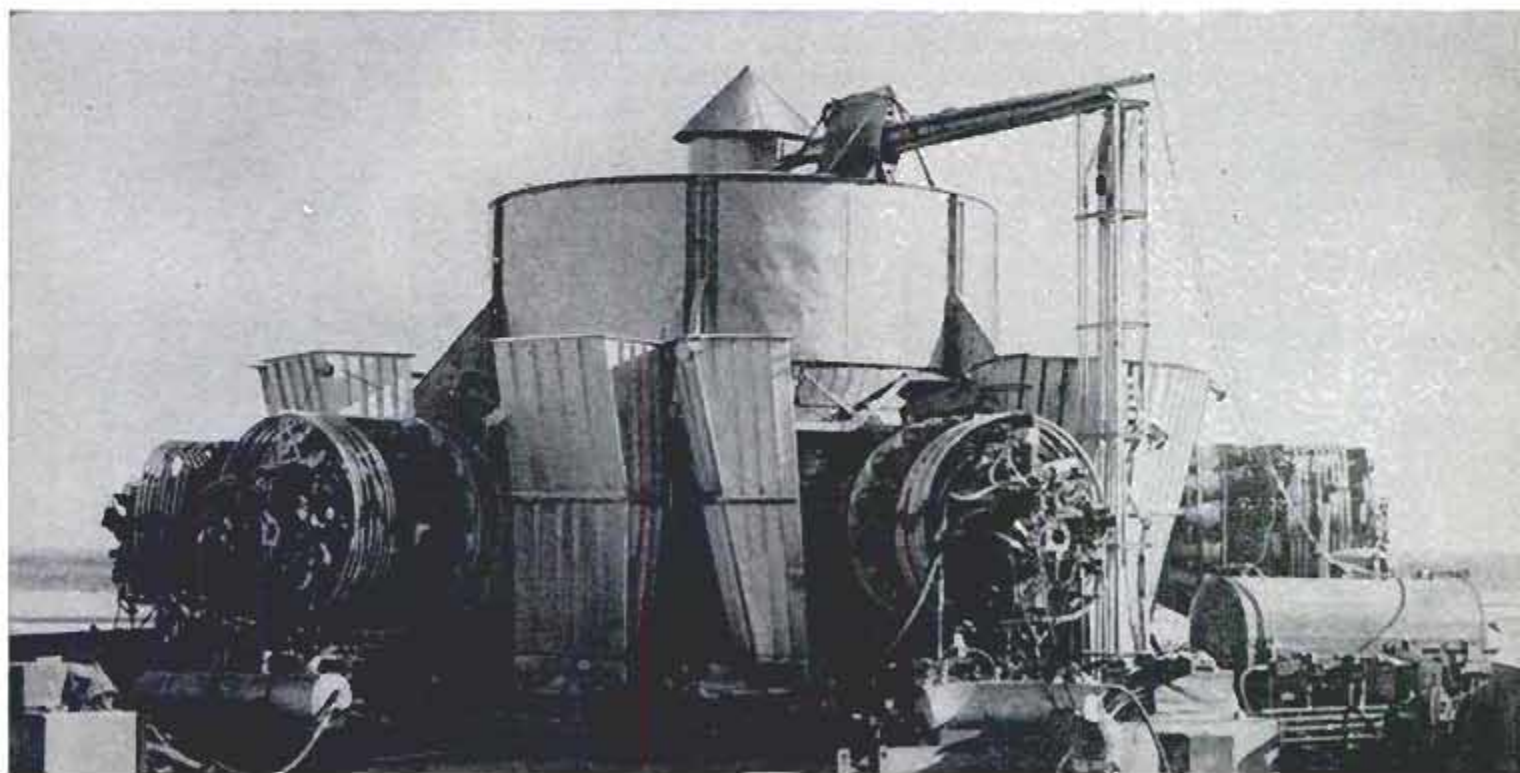
Beyond this strip is a mile-long oval known as the Short Field Installation. On it, a special fleet of jet cars will be used in a development program for launching big

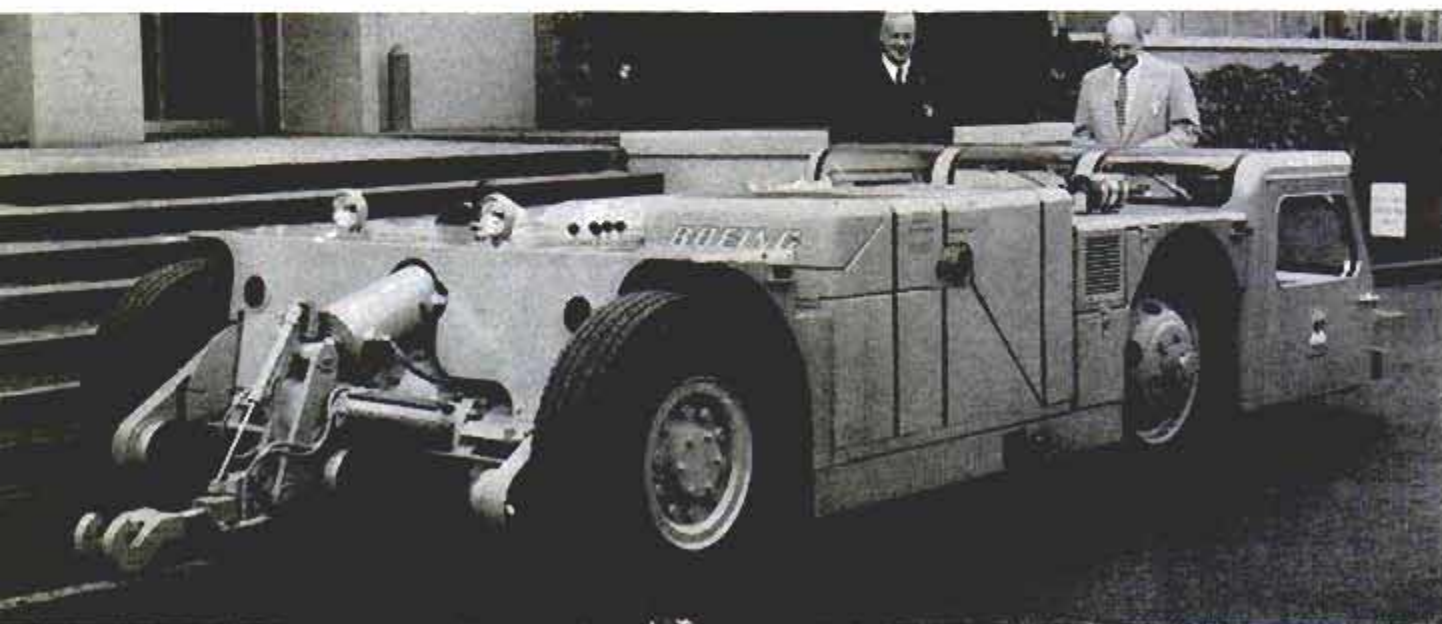


planes. The cars, riding a continuous course, will shove planes ahead of them, rapidly accelerating them to flying speed. When the plane is airborne, the car will continue around the course to launch another. According to Navy engineer Joseph Terry, the cars could provide the answer to a rapid-cycling shore-based launching facility. Two or more cars would operate on the track simultaneously. These hot rods would probably be lower-slung, with

(Continued to page 258)

A close-up view of launcher. Its 50,000 horsepower are transmitted to cable without gears or clutches





Rollers on Tug Move Big Jet Planes Around Airport

Big jet aircraft are now maneuvered on the ground by a trucklike vehicle that fits underneath the front of the plane. The Turbo-Tug is coupled to the plane, and the

drive rollers at the rear of the tug are brought into contact with the craft's tires. Traction is provided by the plane's weight riding on its own landing gear.

Foam-Plastic Mattress Tailored to Fit Wagons

Tailored to fit neatly around fender wells, a foam plastic pad gives complete comfort to children in the rear of station wagons. It is covered with washable plastic fabric and is about half as heavy as conventional padding. One version of the mattress is made in two sections so it can be used double when the rear seat is occupied.

Nylon-Rubber "Muscle" Moves Paralyzed Hands

Use of paralyzed hands is made possible by an artificial "muscle" made of nylon fiber woven around a length of rubber tubing. A metal harness fits over the fingers, which are controlled by the flow of compressed carbon dioxide gas in and out of the tube. A simple switch operates the muscle.



Is this the biggest truck in the world? It is being used to haul dirt for the Oahe Dam on the Missouri River at Pierre, S. D. The total weight of the truck when loaded is 200 tons, and the body holds 80 cubic yards — equal to half the basement excavation of the average home. At full height, the box is as high as a four-story building.

World's Biggest Truck? It Holds 80 Cubic Yards



U. S. Army Engineers photo

English Traffic Cop Controls Streets With TV Cameras

In Durham, England, police officers can control traffic on the streets in any kind of weather without leaving the snug comfort of an enclosed booth. Small television cameras are mounted on posts at the ap-

proaches to two bridges and the pictures of passing trucks and cars are transmitted to receiving sets in the booth. Also in the booth are controls which operate three sets of traffic signals in the televised area.





Smoke pours from tires as California state trooper puts test car in a panic stop from 60 miles per hour

Final-Exam Day For Patrol Cars

By Ewart Thomas

OKAY, I'M CHICKEN, slow down!" The tires were screaming and I had to yell at the highway-patrol officer at the wheel. "Can't slow down here," he shouted back at me. "Have to hit this turn just right, otherwise we'll go through that empty grandstand! Hold on to that door!"

A few seconds ago I'd been pushed against the door while the car howled its way through a long left turn, now the force was reversed. I hung onto the window ledge with both hands to avoid being thrown against the driver. In the rear seat another observer was literally stuck against the left side of the car from the sideways acceleration.

We skated through the corner. A long straightaway was in front of us. "One of the cars lost a front wheel here yesterday," the officer yelled. "Doing 110 miles per hour but it didn't flip! Good driver!" I glanced at the calibrated speedometer. The needle was flickering just past the 110 miles per hour mark.

Then we slowed to 60 and the driver jammed down the brake pedal, squealing to a panic stop in a cloud of burning rubber.

Officers of the California Highway Patrol ordinarily don't drive this way, but this was a special occasion. For two days, at the International Motor Raceway at Riverside, Calif., a test team of six officers manhandled five different makes of 1958 automobiles.

The purpose of the grueling, punishing tests was to learn whether the cars came

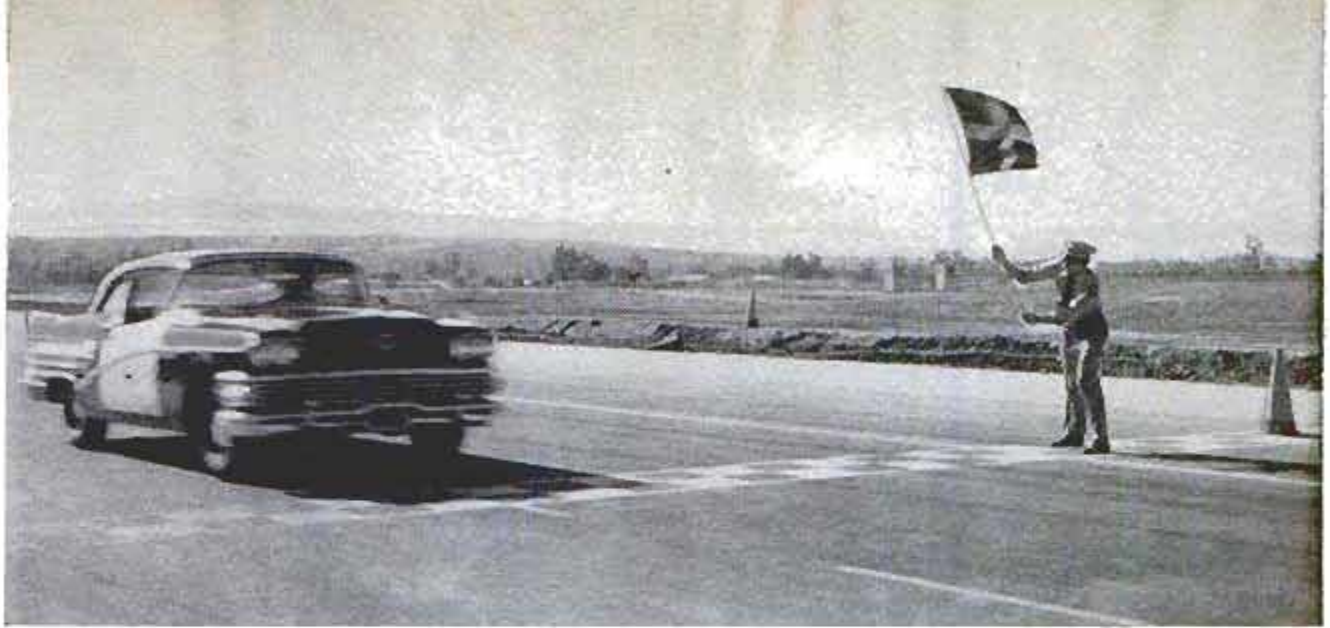
up to California's tough requirements for a highway-patrol car. The state would be buying some 500 new automobiles in the next few months to replace patrol cars that were being retired at 75,000 miles. Only vehicles that met the stringent specifications would be considered.

Performance-wise, the cars had to do at least 110 miles per hour through an electric timing trap and had to accelerate to 75 miles per hour from a standing start within a quarter of a mile. Stopping characteristics had to be excellent. The brake tests included three panic stops from 60 miles per hour, at quarter-mile intervals, to determine stopping distance and ability to hold a straight course. Brake fade was tested by making numerous brake applications from 60 miles per hour.

Cars Are Stock Models

The test cars were strictly stock automobiles with no special equipment except that special brake linings were permitted if the linings were generally available, and except that 15-inch wheels were specified instead of the new 14-inch wheels. The larger wheels permitted better cooling for the brakes and provided higher road clearance. Tires were specified as six-ply nylon cord.

The cars had to be of not less than 122 inches wheelbase, not less than 3800 pounds empty weight, equipped with automatic transmission and powered with a V-8 overhead-valve engine of not less than 350-



One officer uses signal flag to tell driver he's entering timing trap. Cars had to do 110 miles per hour

cubic-inch displacement. Other requirements included two safety belts, speedometer calibrated to within two miles per hour throughout its speed range, full-circumference horn ring, and installation of siren, spotlights, and an alternator for operating a two-way radio.

Aside from the formal tests, the highway patrol test team was also to judge each car on the basis of roadability and cornering. For this they used the entire track. Some of the drivers drove their stock cars to within a few seconds of the qualifying time that had been established for special road-race automobiles.

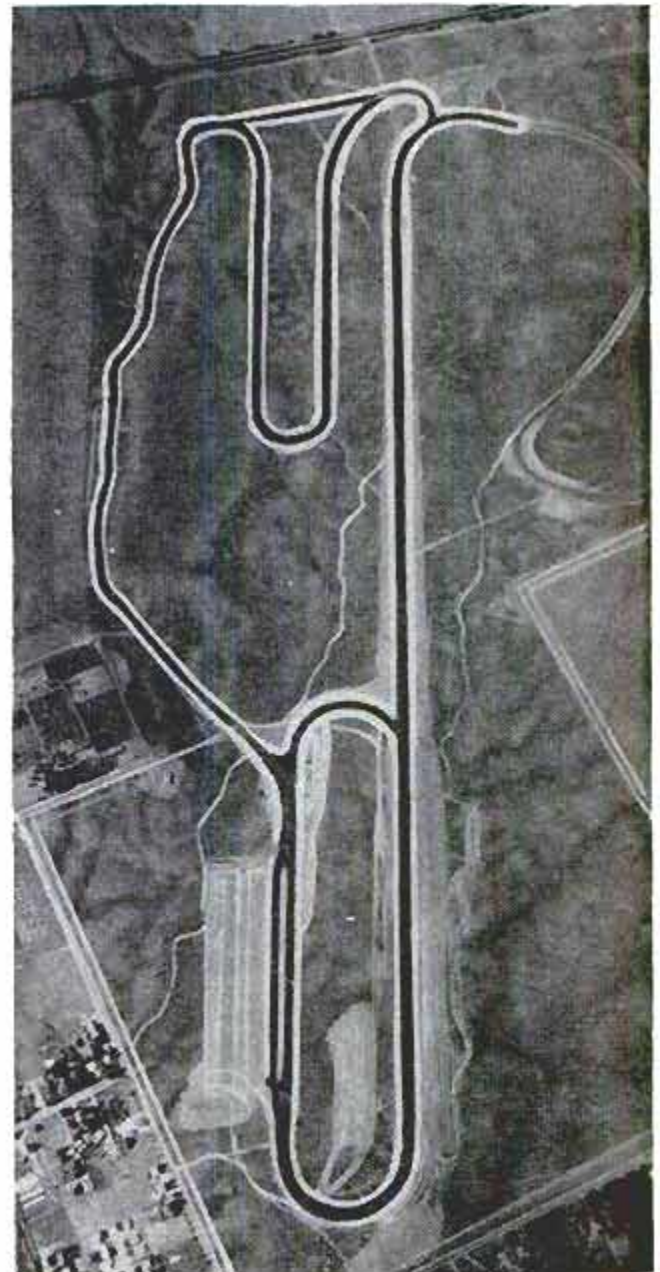
Tires Scream on Curve

Standing at the edge of the course during the highway patrol tests, you'd get a glimpse of a car charging down the pavement wide open, then its tires would begin to scream as it entered the curve. It would begin to drift, its rear end almost breaking loose, while the driver used his throttle to help his steering. Jamming on the brakes at this point would have been an invitation to disaster. None of the cars rolled over, though two cars spun out on one corner when their heavy-footed drivers went into the sharp turn a little too fast.

In addition to the track trials the test included driving the cars from the patrol headquarters at Sacramento to the track and return, a round-trip distance of 1000 miles. The drivers switched cars every half hour or so, each driver judging each car in mountain, desert and thick traffic conditions.

Results of the annual test for a new fleet of cars are never published by the highway patrol. The final selection is based on two things: Recommendations of the test team based on the performance of the cars, and the price that is quoted to the state by the factories. ★ ★ ★

Aerial view of the 3.3-mile paved road-race course where California Highway Patrol team tested 1958 stock cars. Track, designed as ultimate test for both cars and drivers, has two straightaways, one partly downhill, between dips, climbs and high-speed turns





Components of TV receiver are installed in vacuum chamber, where tubes work well with glass covers removed

What's It Like to Live

where a feather bounces, and once you start somersaulting, you never stop?

Man's body would explode inside chamber without armored suit. Chamber simulates conditions a million miles from earth



NOW THAT SCIENTISTS are turning theories about space flight into actual facts they are encountering problems they never had to solve before.

One of the problems is how to keep a satellite on an even keel. Suppose you weighed nothing at all and were strapped in a chair that was rotating 20 revolutions per minute. How would you feel?

The space scientists really don't know, but they suspect you wouldn't be very happy. Yet these are the conditions you could expect if you were shot aloft in a satellite today.

Stanford University reports that Sputnik I was spinning at 15 revolutions per minute while it was in orbit, and that Sputnik II turned or tumbled at 20 revolutions per minute. Explorer I appeared to have a flat spinning motion.

A satellite is unstable because there is nothing in space to stop it, once it starts to turn. The final



Door of chamber rolls aside. Pumps in chamber remove all but one of every 18,000 molecules of air inside

in a Vacuum—

By Thomas E. Stimson, Jr.

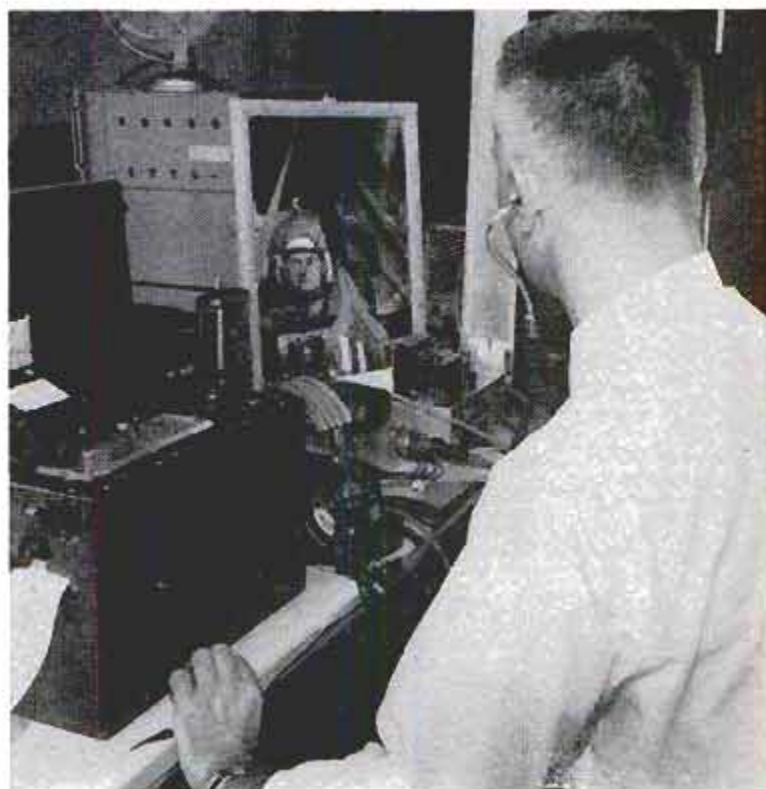
thrust of its rocket motor may impart a tumbling action to it, and even the impact of meteoritic dust or possibly the pressure of solar radiation could start it spinning.

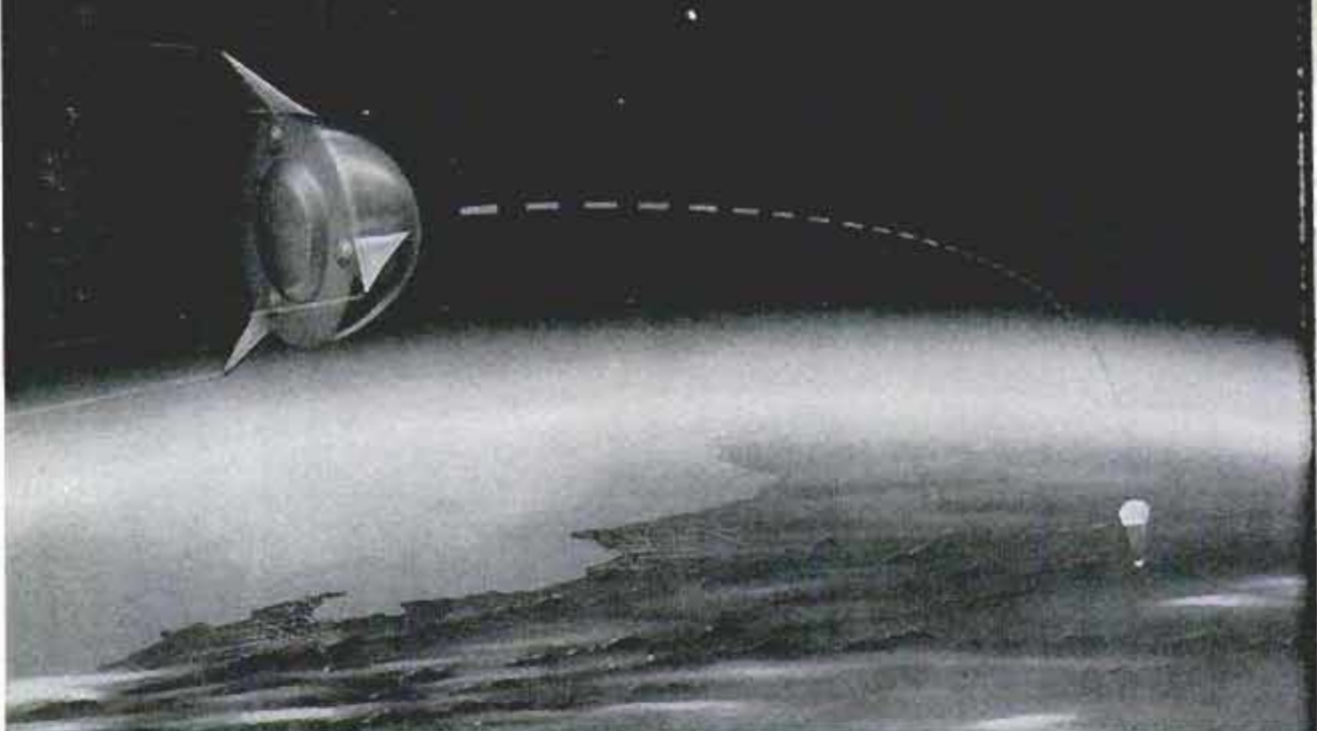
Dr. R. E. Roberson of North American Aviation's Autometrics Division says any motion of interior machinery, such as the winding of film in a camera, creates enough torque to tip a satellite. He says the force used to move a telephone dial would overturn a half-ton vehicle in 1½ minutes.

"What is needed is a device that senses the attitude of the satellite in relation to the earth and then operates controls that will keep the satellite right side up and steady," Dr. Roberson says.

"A pendulum is a good sensing device because it can tell you which way is down. But a pendulum depends on the force of gravity and this is hardly present in a satellite. The pendulum would try

Medical technician watches via mirror as a test pilot sits in infrared-heated cockpit in study of effects of re-entry heat





One conception of space vehicle is manned nose cone of rocket. "High drag" shape would parachute to earth

to revolve in a circle instead of swinging back and forth. It would be useless. Some kind of inertial sensing device may work, or possibly an infrared scanner that uses the earth's horizon as a reference.

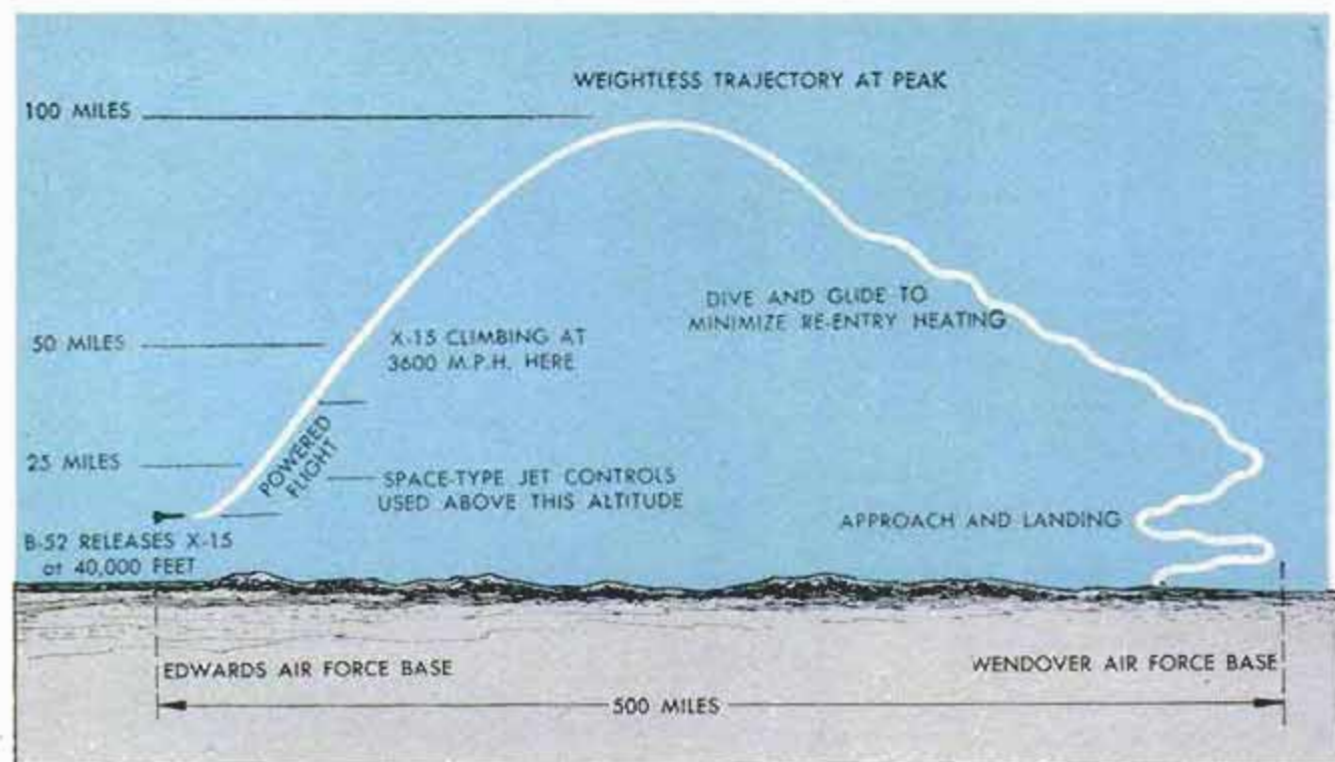
Jets Will Prevent Tumbling

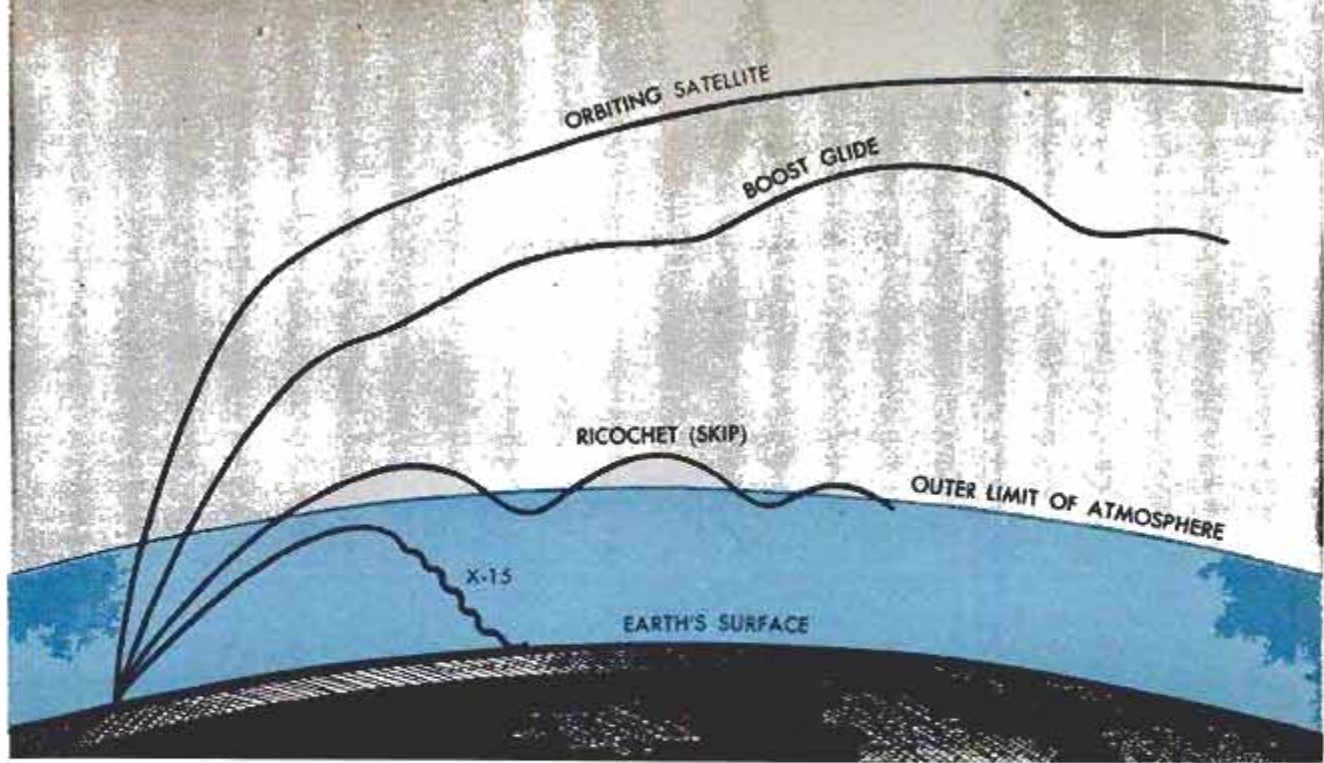
"Connected to the sensor would be a torque machine that would apply torque as needed to keep the satellite in a steady condition. One way of creating torque is to vary the speeds of two gyroscopic flywheels in the vehicle. Another way is to use small jets for the control of roll, pitch and yaw."

Jet control seems the most practical at present. The jet system will be used to prevent the new X-15 from tumbling wildly when it climbs out to the edge of the atmosphere. This new North American research aircraft is designed to fly faster than 3600 miles per hour and to climb to altitudes in excess of 100 miles above the earth. Rocket-propelled, it actually resembles a rocket that has been fitted with tail surfaces and a stubby wing. It has a jettisonable cockpit and a heat-resistant skin, probably of stainless steel.

For its first flight the X-15 is scheduled to be carried to 40,000 feet under the fuse-

Diagram shows anticipated flight of the X-15 research aircraft designed to climb to altitude of 100 miles





Here are trajectories of the X-15 rocket craft and various other space vehicles that have been proposed

lage of an eight-jet B-52 bomber. There it will be released. Immediately after it drops free from the mother plane, its pilot will blast his rocket motors and climb at a pre-selected angle into the sky. After his propellant is exhausted he will continue to shoot upward and at the peak of his climb will go into a ballistic trajectory, curving back toward the earth. For five long minutes or more he will be in a weightless state.

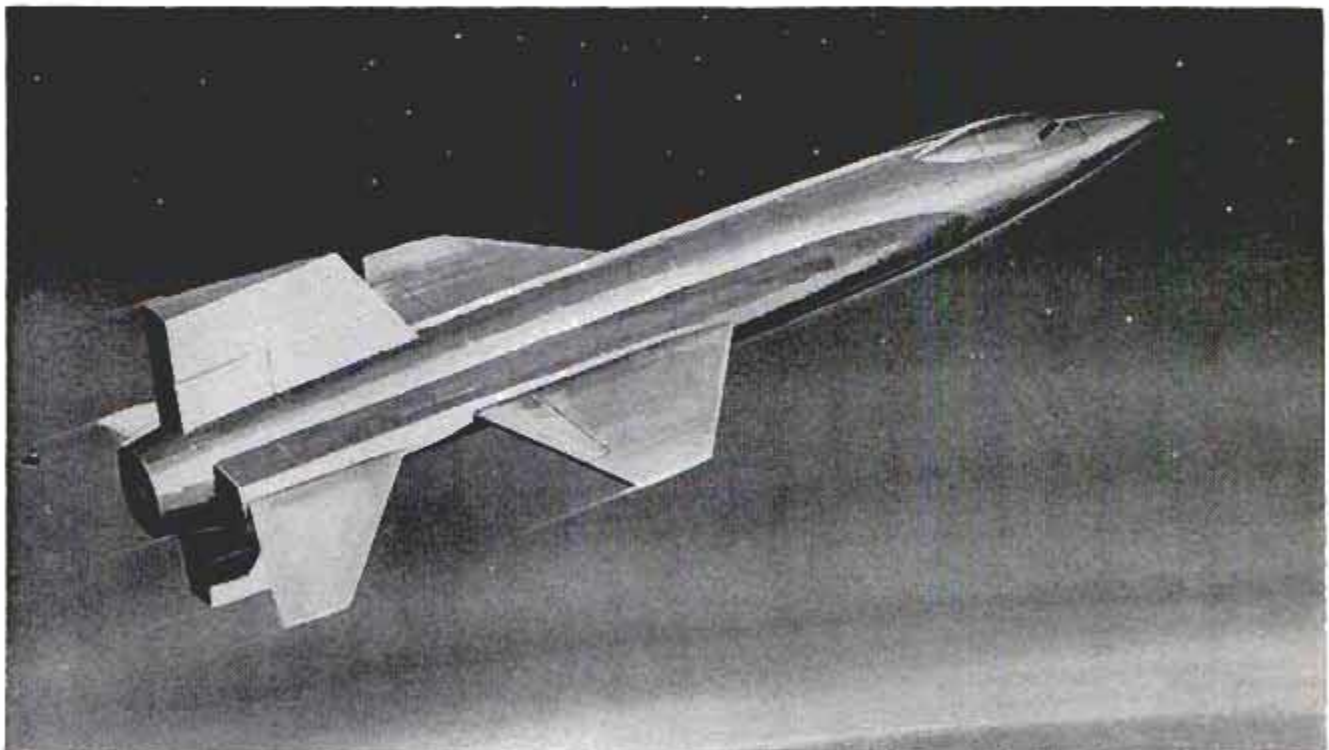
During much of the flight the craft's ordinary control surfaces will be useless and the pilot will use the reaction of small jets, possibly of compressed air, to maintain

control. Some of his instruments, too, will be useless. The Mach meter and altimeter that depend on air pressure will give false readings. The artificial horizon on the instrument panel won't work while the plane is weightless. Even the gyro compass, if installed, will be worthless.

Passing back into the atmosphere, the pilot will follow a re-entry pattern that was determined months in advance. He may descend in a flat glide with the object of losing some of his speed before he re-enters denser air. Or his flight plan may call for a series of short, steep dives, with

(Continued to page 252)

Artist's conception of the X-15, which will be carried to altitude of 40,000 feet by a B-52 jet bomber





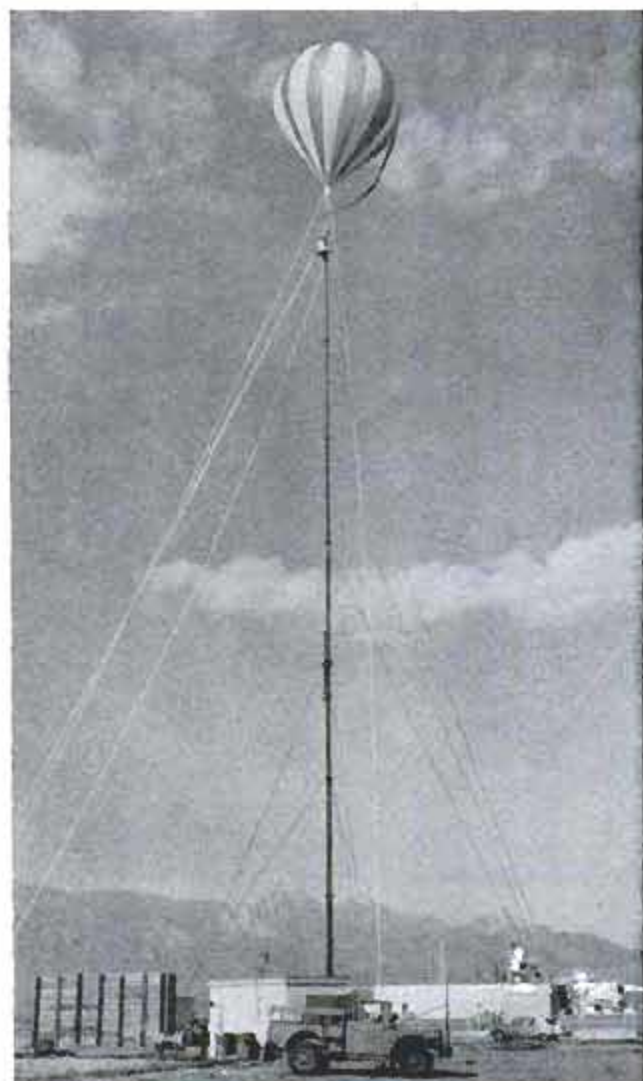
SKIER

Recently a little 10-year-old water skier skittered across the channel between the California mainland and Santa Catalina Island behind a driverless boat. Martha Ann Williams was demonstrating a remote-control unit which she held in her hand and used to steer the boat. When the box was upside down, the boat held a preset course. When she turned the box over, she could steer by tilting it right or left.

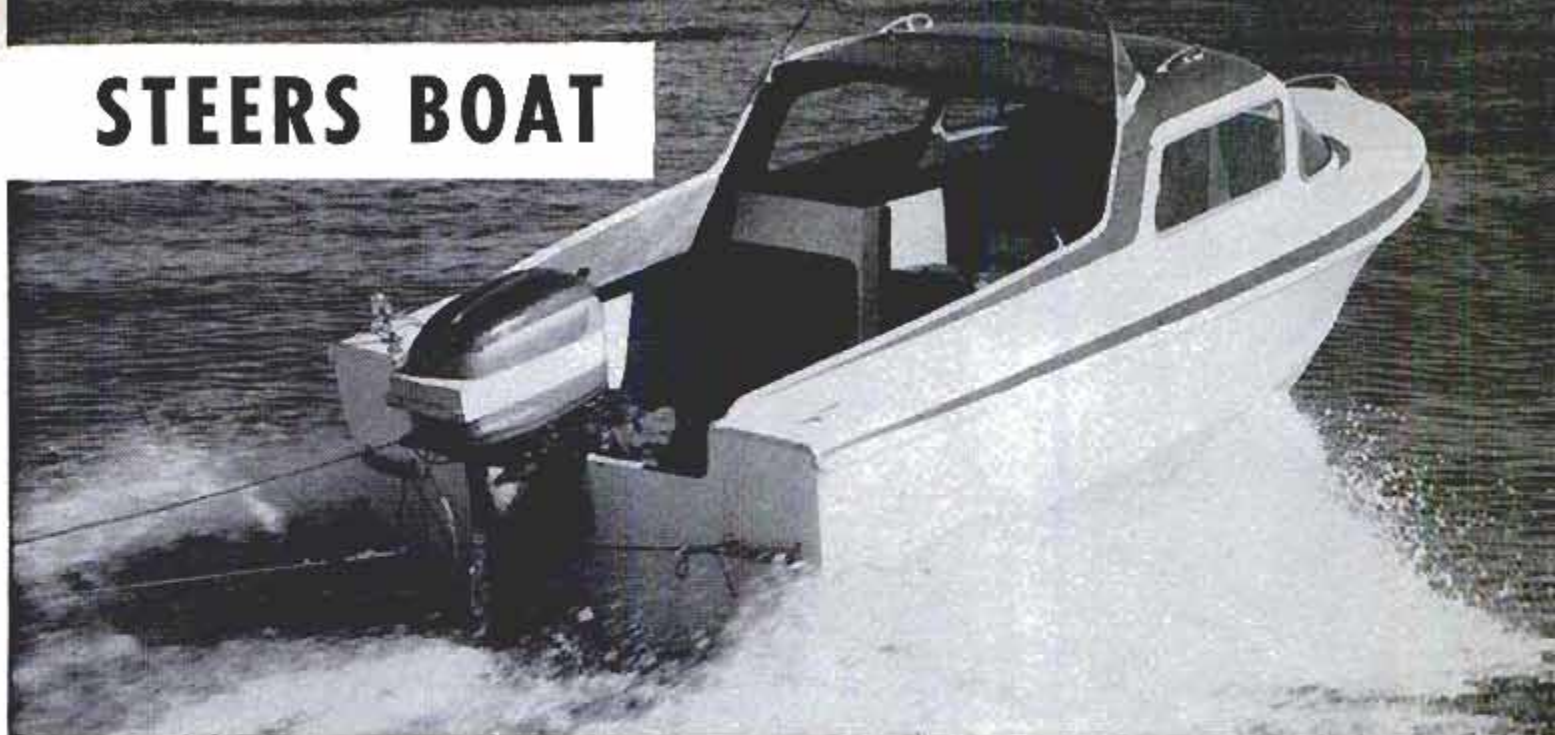
Giant Weather Balloon Used to Raise Repairman to Tower Top

When an anemometer was damaged atop a 135-foot tower at White Sands Proving Ground, N. Mex., a weather balloon was used in replacing it. The idea to use the balloon in the extraordinary role was con-

ceived when a plan to employ a portable scaffolding to reach the tower's top was discarded as too costly and time-consuming. Operation Balloon worked perfectly and saved an estimated 900 man-hours.



STEERS BOAT



California School Building Shaped Like Giant Doughnut

Children who attend the Vista Mar School at Daly City, Calif., should get a "well rounded" education. The 13 classrooms and two kindergartens of the new structure are arranged in a circle. The

open space in the center of the circle will be developed as a landscaped play area. A smaller round building, to be connected to the main structure by a covered breezeway, will serve as a multipurpose room.





In the casting shop, a synthetic-rubber sawfish is prepared for painting and for installation of its bill

Undersea Puppet Show

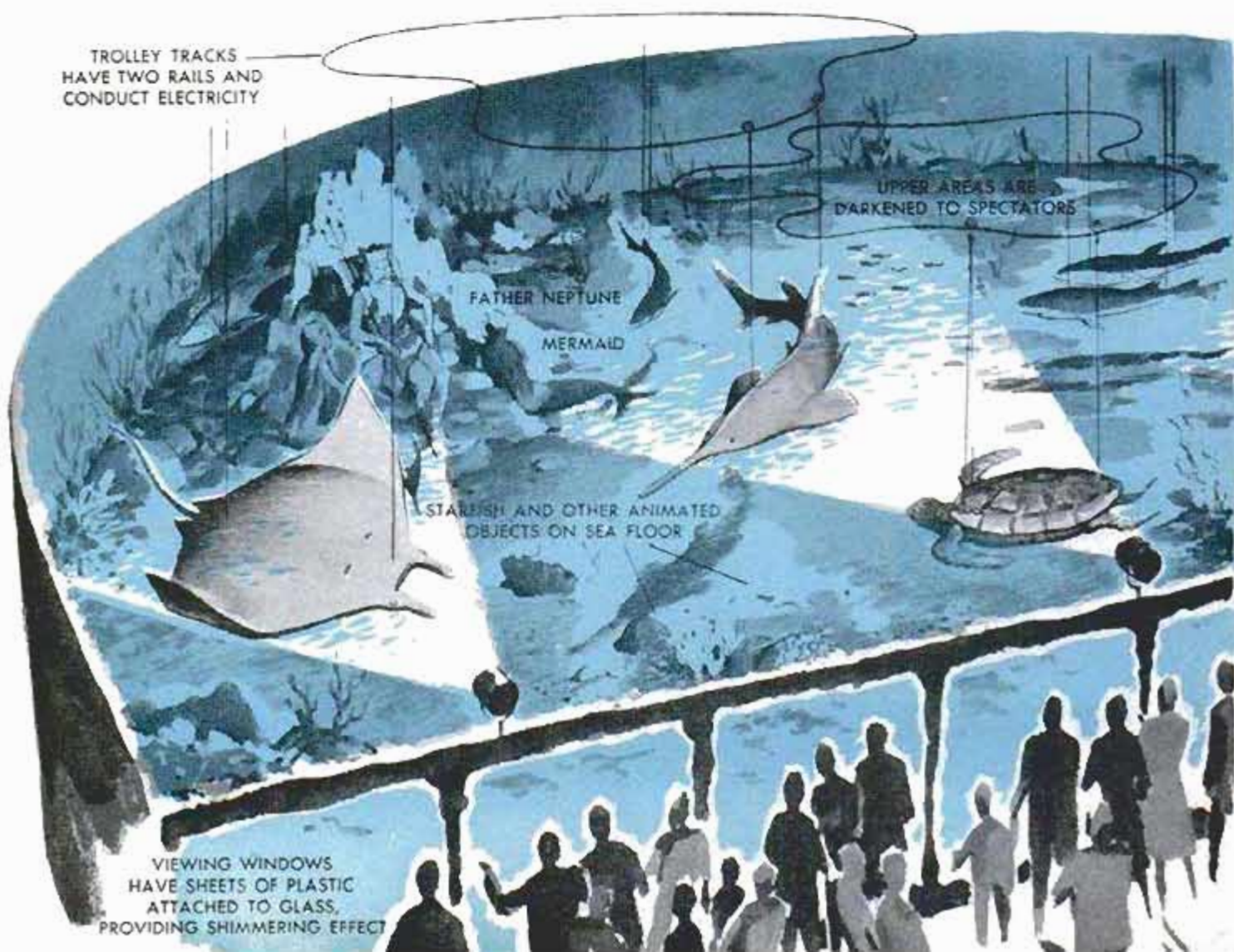
TROLLEY TRACKS
HAVE TWO RAILS AND
CONDUCT ELECTRICITY

UPPER AREAS ARE
DARKENED TO SPECTATORS

FATHER NEPTUNE
MERMAID

STARFISH AND OTHER ANIMATED
OBJECTS ON SEA FLOOR

VIEWING WINDOWS
HAVE SHEETS OF PLASTIC
ATTACHED TO GLASS,
PROVIDING SHIMMERING EFFECT



A MARINE PUPPET show in which "invisible" wires from overhead trolleys impart natural motions to lifelike sharks and other sea creatures is one of the attractions at an Ocean Park, Calif., pleasure pier opening July 1.

Spectators descend in an elevator that simulates a ride to the bottom of the ocean, then walk through a tunnel built in imitation of a sea cave. En route they gaze through glass-and-plastic windows on "Neptune's Kingdom," a shimmering submarine seascape in which starfish appear to crawl across the sand, sharks swim past their view and stalks of giant kelp wave slowly overhead.

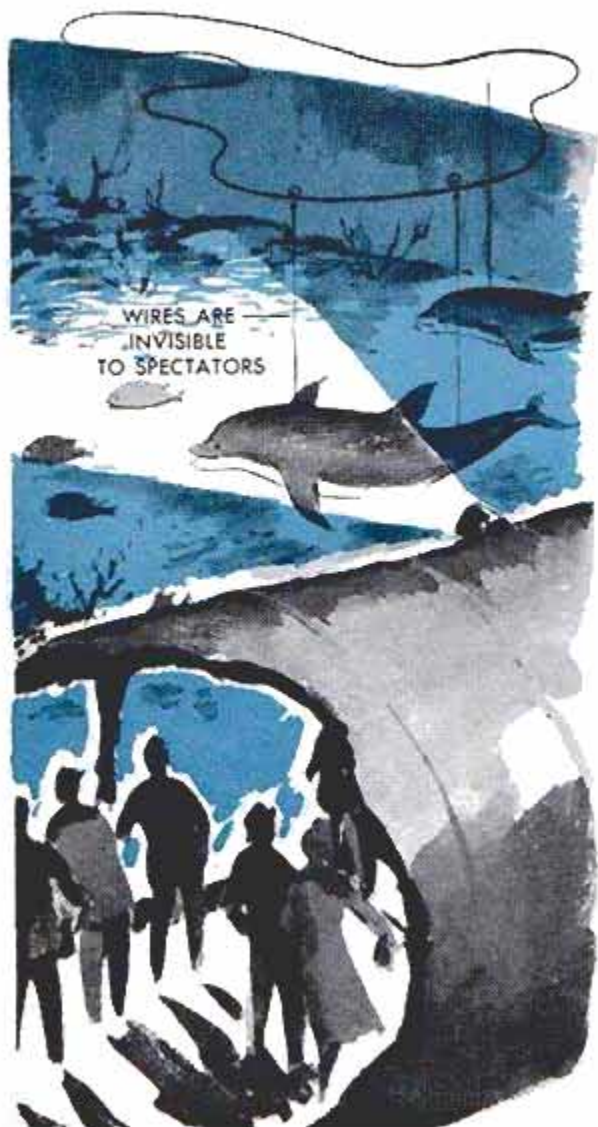
The scene is actually a giant illusion for which motion-picture techniques were used to create realistic sea creatures from synthetic sponge rubber, and coral and other sea growths from plaster. Some of the large fish are animated by means of small electric motors inside their bodies, the current for which is carried by the fine wires that support them to the trolleys overhead. ★ ★ ★



An internal electric motor lends sinuous motions to the body of this big moray eel, composed of rubberlike sponge plastic



Above is a turtle with its upper shell removed, showing the body's mechanical organs. Below, motions of a manta ray and giant turtle are tested. The manta's movements are created in its wing tips by puppet wires leading from the trolley. The turtle's head and flippers are moved by internal motors





Boat With Rake Cleans Reservoir

Although in most places water is used for cleaning, the people in Israel's Southern Negev region clean the water. An unusual type of boat, with a big rake attached to the front, cruises over the reservoirs, clearing debris and other foreign matter from the surface. The reservoirs contain water that is used for irrigation in the semi-desert region of Israel.



Round Boat Spins Like Top

"Just for a lark" Bill Fehr of Vancouver, B. C., built a round boat that will spin like a top on its finless, keelless hull. The "lark" cost Fehr about \$2500 but he may convert the vessel into a marine carnival ride for children at Vancouver's beaches. The hull, 20 feet in diameter, draws only seven inches of water. With a $7\frac{1}{2}$ -horsepower outboard pulling from a well at the "bow," the craft will do five knots. It is fully equipped with a stove, galley, bunks and a separate engine room. Passengers ride on top deck.



Last Steam Engine Also Is Last Word

Germany's last steam locomotive has been put into service. A superheated-steam, three-cylinder engine, it has 2500 horsepower, a speed of 90 miles per hour, and produces its own electric light. Boiler, cab, tender and frames are all welded. The cab is enclosed and has elastic upholstered seats. Some 7400 steam locomotives are still in use in Germany.



TV-Type Zoom Lens for Action Closeups in Home Movies

Owners of 16-millimeter home-movie cameras can now buy fast zoom lenses which give the TV sportscast effect of moving in on the action. Turning the zoom handle changes the focal length of the lens from wide-angle (17 millimeters) through normal to telephoto (68 millimeters). And the cameraman can continue shooting film while switching from long shots to closeups. At a baseball game, for example, the

scene can open with a wide-angle view of the playing field, then zoom in on the pitcher for a closeup of his windup. The telephoto image is almost three-times larger than the image obtained at normal-lens setting. A reflex view finder shows exactly what the lens sees at all times and eliminates the problems of parallax. A new design ends the need to increase exposures when the focal length is increased.

Mobile Control Tower Is Fully Equipped for Emergency Operations

If the control tower at the Pensacola Naval Air Station were to be knocked out, its functions could be taken over by a mobile unit. Designed and built by Navy men, the mobile control tower has at arm's reach all the equipment a runway control officer needs. A centrally located swivel chair gives him 360-degree visibility and mounts throttle-type microphone control, writing

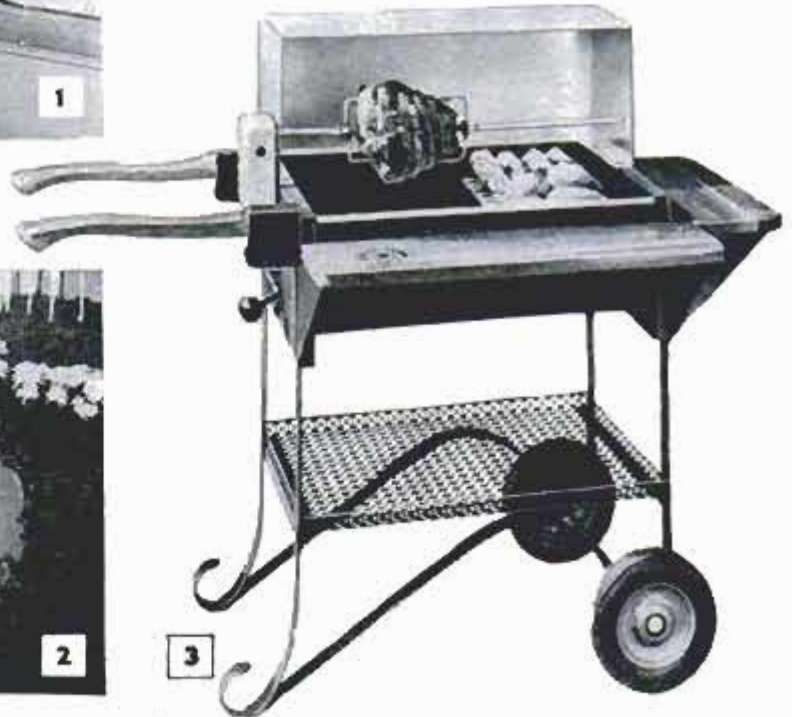
arm and lamp. Shielded lighting enables the unit to be used for both day and night operations. Electrical service is supplied by a 28-volt aircraft generator adapted to the main power supply. Besides being electrically heated and air-conditioned, the tower has a sink, a water cooler, a 50-gallon hot-water supply, VHF and UHF transceivers and UHF-DF steer equipment.



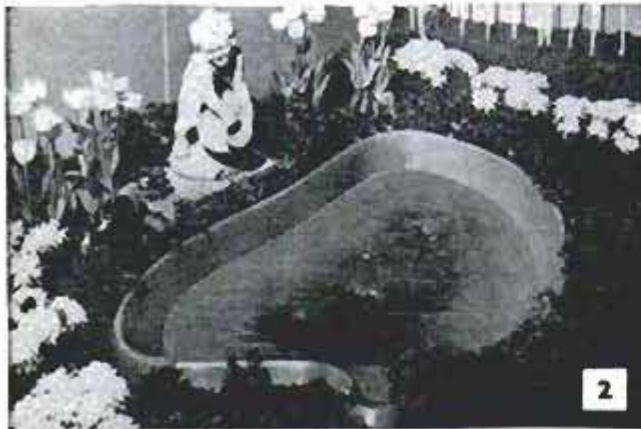


WHAT'S NEW FOR Your Home

1. PORTABLE DISHWASHER with double-rotary washer-spinner action washes and rinses service for family of five. It weighs 11 pounds, is attached to water faucet and is designed for liquid detergents
Chico General Prod. Corp., 525 Market St., San Francisco, Calif.

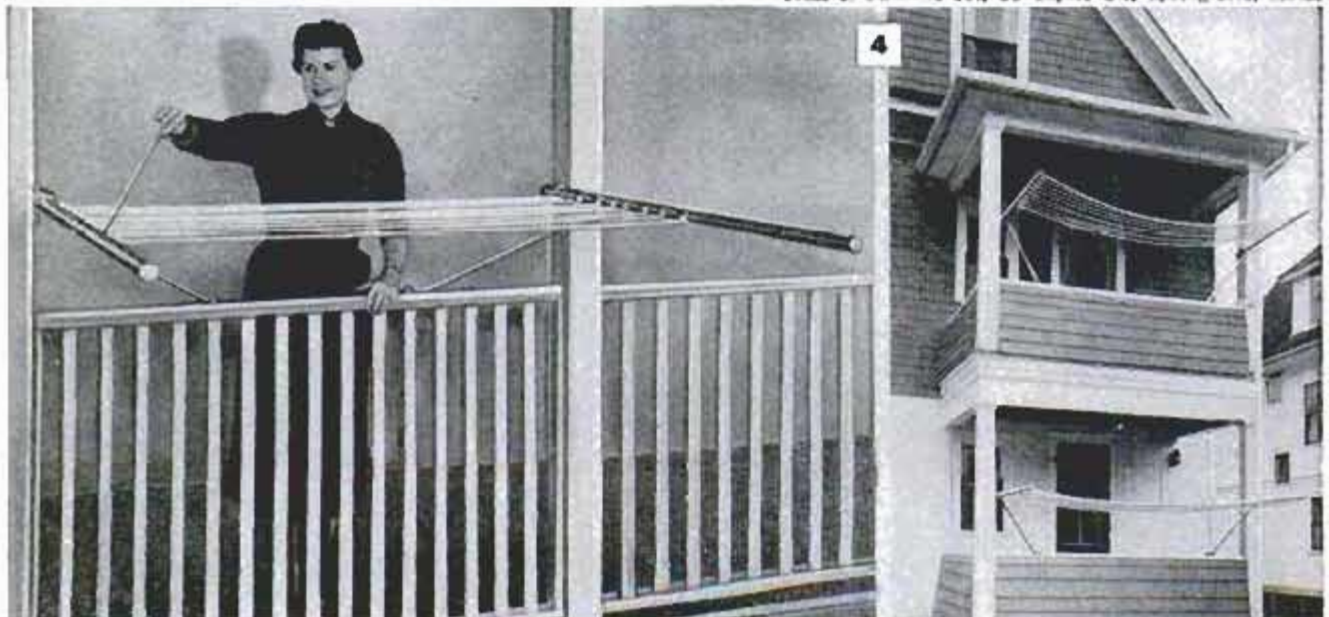


3. BARBECUE WAGON has two-piece cast-aluminum grill with cooking area of 21 by 15 inches. Lever-operated grill-raiser controls charring effectively
George Henry Co., Morton Grove, Ill.



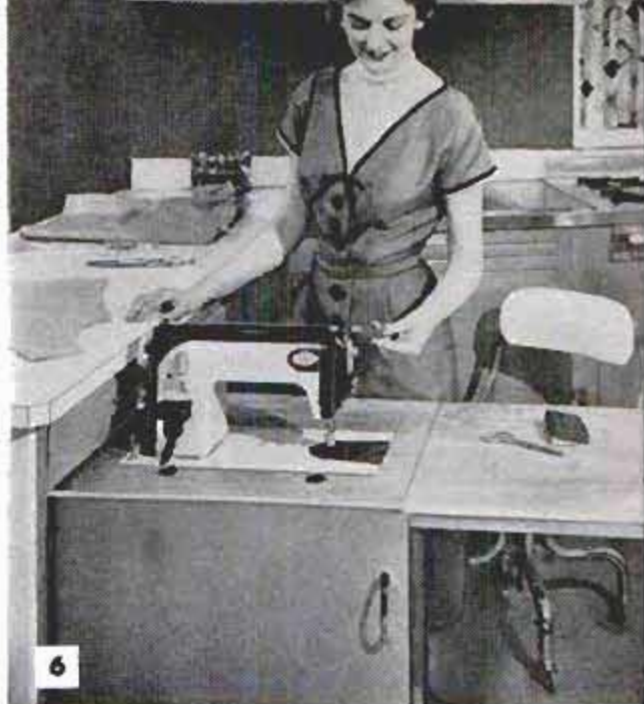
2. GARDEN POOL for lilies, aquatics and goldfish can be installed in an hour. Made of glass fiber, it never needs painting and will not crack or rot
Perma Pool, Box 5584, Dept. PM-2, Washington 16, D.C.

4. CLOTHESLINE SUPPORTER keeps wash out of your way. It can accommodate at least 10 lines up to 16 feet in length, which are operated by a "push-out hook." All parts are finished to withstand years of exposure
John C. Michaud Co., 19 Taylor St., Springfield, Mass.





5. LIQUID RUG CLEANER shampoos all types of rugs by releasing liquid and scrubbing lather into fibers. Resultant coating, which prevents the dirt from re-adhering to fibers, is easily removed by vacuum
 Bissell Carpet Sweepers, Grand Rapids 2, Mich.



6. SEWING-MACHINE CABINET disappears behind door under kitchen counter when not in use. It includes a drop leaf and drawer and will fit any standard sewing machine. Cabinet's height is 36 inches
 Mutschler Brothers Co., Nappanee, Ind.

7. POWER-MOWER SULKY can make any rotary power grasscutter a "riding mower." Engine is controlled by a hand throttle, and propelling and braking are handled through car-type clutch and brake pedals
 Lazy Boy Lawn Mower Co., Inc., 301 W. 73rd St., Kansas City 14, Mo.



8. AUTOMATIC RE-LIGHTING CANDLE provides fun at parties by lighting again as soon as it is blown out. Its wick fits into a hole at the top of the candle. When used up, stub is removed for a new wick
 Star Magic Co., 3105 N. Holman, Portland 11, Ore.

9. TRUNDLE BED becomes davenport when bolsters are placed at back rail. It is turned into set of bunks by setting lower bed atop other. Exchange of low headboard and high footboard makes twins
 Franklin Shockley Co., Merchandise Mart, Chicago 54.



Wind Propels Land Yacht on Highways

Cruising down the highway in a vehicle that looks like a cross between a sailboat and a bicycle is the favorite sport of James Witham, of London. His "land yacht" was constructed from two cycle frames, some lengths of gas pipe and the steering gear from an old Spitfire airplane. The sail is attached to a mast on the front.

Startled British motorists pull over to watch James Witham breeze down the highway in his land yacht



Animals Carry Radio Sets to Record Their Heart Beats

Scientists can now record the heart pulsations of livestock with the aid of a 40-ounce frequency-modulated radio transmitter.

The farm animals can move around in pens or pastures with the battery-powered apparatus attached to their bodies.

Inspectors Ride in Comfort Through Stuttgart Water System

What may be the longest underground trip in the world takes two pipe inspectors through a 90-mile pipeline between Lake

Constance and Stuttgart, Germany. They ride in the three-foot pipe, part of the water system, on a "wheeled bobsled."





Floral Clock Keeps Time With 500-Pound Hands

Niagara Falls, Ont. claims the world's largest floral clock. Its hour hand measures 12 feet 6 inches, its minute hand 17 feet 6 inches. Each weighs 500 pounds. The clock's sweep hand, unique among floral timepieces, is 21 feet long and weighs 250 pounds. All hands are made of stainless-steel tubing. The works of the clock are placed in a small concrete room beneath the dial. They consist of a three-phase, two-horsepower, synchronous electric motor that drives a worm gear approximately two feet in diameter through an oil bath at a constant speed, marking time with extreme accuracy. The clock's floral face is altered twice a year.

To set floral clock, motor is disengaged and crank turned until hands on black dial are in position



Lockable Car-Plate Holder Ends Annual Changing Chore

License plates are changed in less than a minute when your car is equipped with a lockable plate holder. No tools are needed, just the key. There are no more skinned knuckles as a result of battling with rusty bolts. The holder comes in two parts, a gray back plate and a clear cover which is hinged at the bottom. Both are made of molded Tenite plastic, making them weatherproof and long lasting.



Prospectors relax at camp in Yukon Territory. This is a rugged life but it's one way to make a quick fortune



SCHOOL FOR

- Map Legend
- | | |
|----------|-----------|
| ○ GOLD | □ URANIUM |
| ● SILVER | ■ COAL |
| ▲ IRON | △ OIL |

WHEN KURT HEPPE RETIRED as a waiter at New York's Waldorf Astoria Hotel he knew it was time to make his dream come to life. The day he received his first social security check he headed for Canada to start again—as a prospector.

He found the provincial governments of Quebec and Ontario had fine prospecting schools in several cities, with tuition free in Ontario and a nominal charge of \$15 in Quebec. And for \$15 he could attend a school in Vancouver run by the British Columbia and Yukon Chamber of Mines. Heppe chose the intensive Laval University course at Quebec where in five weeks students receive the equivalent of more

than three full semesters of college geology.

Today, Heppe is one of 25,000 alumni of Canada's increasingly important schools for prospectors. He doesn't rate with the legendary dozen or so of Canada's great prospector-millionaires, such as Sir Harry Oakes (gold); Roy Barker (copper); J. P. Bickel (gold); Bob Jowsey (silver), or Bill Dowidowich (copper)—all honored alumni of the prospecting courses. But he does belong with hundreds who staked and sold fairly valuable claims. With the money Heppe made as a prospector he returned to New York and acquired several parcels of real estate.

Of Heppe's 30 classmates, who included



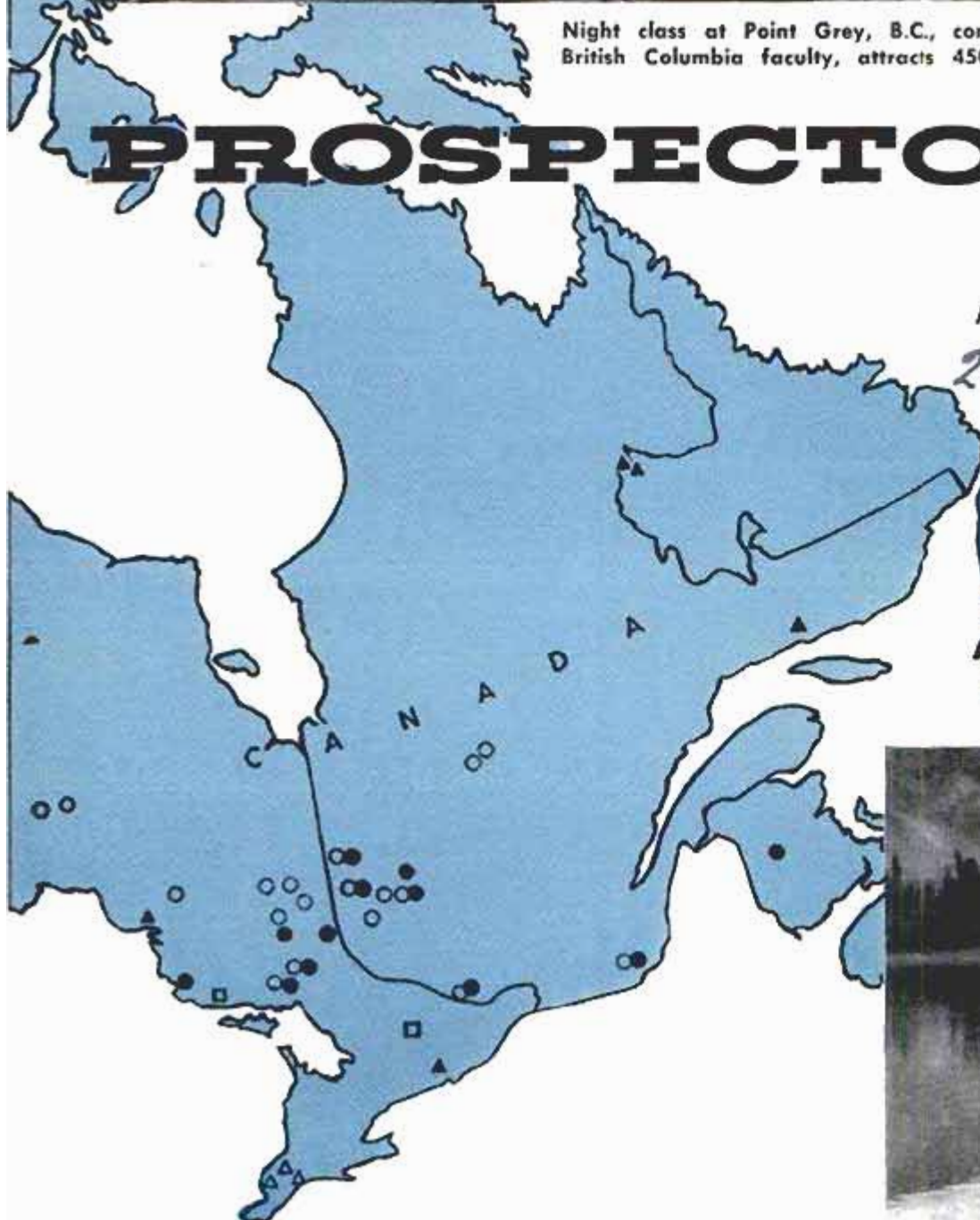
Night class at Point Grey, B.C., conducted by University of British Columbia faculty, attracts 450 prospective prospectors

PROSPECTORS

By

Murray Teigh Bloom

*22 Ramsey Rd
Great Neck
N.Y.*



Map of Canada shows location of principal mining areas. Some of recent major "finds" have been made by graduates of prospector schools

Alumnus of prospector school seeking gold 300 miles north of Fairbanks, Alaska, uses pan to trace vein from particles washed into stream



School children at Timagami, in northern Ontario, learn mineralogy along with reading, writing, arithmetic

farmers, lumber contractors, businessmen, textile workers and a genuine Austrian count, 15 became prospectors and three are still at it. One of them made an important iron-ore discovery in the undeveloped Ungava section of northeastern Quebec.

In 1946 when the course was started, Quebec's total mineral production was valued at only \$92,000,000. In the past decade the value has risen more than four-fold to \$385,000,000 and part of the increase is due to discoveries made by graduates of the courses in Montreal and Quebec. The \$100,000 the province has invested in these courses since 1946 has been more than repaid directly by a \$4,000,000 increase in mine taxes in a single year.

When a prospector of the old "gold rush" days ran across what looked like a promising find, he'd camp there and send out samples by boat or pack horse. It might be a month before he heard from the assay office that the find was worthless. Modern prospecting schools have changed all that. Today's graduates can usually tell right away whether a find is worth staking. As important, too, is the stress today's prospecting schools put on metals less glamor-

ous than gold, silver and uranium. They are taught the enormous value of minerals such as lead, zinc, nickel, copper, iron ore and titanium.

Sitting in on a prospecting class in Montreal, I saw students being taught how to apply simple tests to determine the kinds of minerals they might find. They had already spent hours learning to recognize hundreds of sample rocks. But in the field it isn't as easy to spot a mineral.

The Ol' Pocket Knife Still Helps

The prospector's pocket knife with one blade tip magnetized is a simple means of determining the presence of hematite, or iron ore. He heats his ore sample red hot and lets it cool. If it's iron ore it will be attracted to the magnetized blade. The modern prospector also takes with him an inexpensive kit consisting of a metal blow-pipe, a paraffin heating unit and a block of charcoal. Ore samples are heated on the block. From the color of the coating that appears on the charcoal, and other reactions, the metal in the ore can be identified.

A small package of white, powdery dimethyl glyoxime has also become a part of standard equipment for a Canadian prospector. He puts a little of it on some suspected nickel ore, spits on it and rubs. He's found nickel if the mixture turns pink.

For testing tungsten ore the prospector takes along a small, compact fluorescent lamp, which makes the ore glow in the dark. And, of course, no modern prospector would be found in the field without a small geiger counter for radioactive minerals. For samples that still baffle him, the prospector can turn to the province's geologists. In Quebec when the prospector gets his necessary \$10 miner's certificate — which gives him the

(Continued to page 212)

Tools for prospecting include large and medium-size pans, steel mortar and pestle, picks, chisels, chip samples and goggles



HE FURNISHED HIS HOME WITH WOOD SCRAPS



Photos by Joe Scheff

OTHERS MAY toss aside scraps of wood, but not Leo Traylor. A shop teacher at St. Petersburg, Fla., Traylor has furnished his entire home with beautiful furniture made from scrap lumber.

Hundreds of folks—many of them complete strangers to Traylor—have heard of his unusual furniture and stopped by for a look. From outside, the home doesn't look as though it would hold such treasures. It's a 20 by 50-foot building formerly used as an Army barracks. But as soon as the

visitor steps inside he realizes that this is indeed an unusual and colorful home.

The first sight the visitor sees is a large horseshoe-shaped breakfast bar in the middle of the living-dining area. The base of the multicolored bar is woven like a huge basket from 100 thin wood slats. Traylor picked up the scrap wood—gum, cherry, mahogany, walnut, sycamore and poplar—from the junk pile at a building-supply company, and ripped the slats himself. The stools, according to Traylor, were once

Round table, made from an old water tank, has a built-in Lazy Susan. Curved benches form another circle





"pieces of aromatic cedar which had been thrown away because they had holes in them." He simply filled the holes with cedar plugs.

One of the more unusual items in the room is a circular dining table complete with four curved benches which fit together to form another perfect circle. The table top is cypress "from an old water tank." In one corner of the room is a large coffee table Traylor "found in a lumberyard" as a three-inch slab of pecky cypress.

Novel TV Table

Need a suggestion for a unique television table? Traylor's is an old butcher block he "found in a field." And his hi-fi set has a cabinet made of maple and crotch mahogany, with a rosewood drawer front—pieces of wood he "just happened to have."

In one corner is a table lamp made of "odds and ends." Actually, the odds and ends are thin pieces of wood, roughly the size of medical tongue depressors. The stem of the lamp was threaded through holes in these slats. Traylor then applied glue between the slats, and gave them an attractive swirl to come up with a unique lamp base. The lampshade is made of mahogany and zebra-wood veneer, hand-laced with leather.

Next to the circular dining table is a hutch cupboard almost eight feet high. He wanted it to blend with the table so he made it of "redwood and Western cedar pieces on their way to the dump."

On the shelves of the cupboard are such unique items as white-ash dinner plates, a huge maple salad bowl, small teakwood salad bowls, ziricote bread-and-butter plates and maple napkin holders. The small salad bowls once rolled across the lawn of the St. Petersburg Lawn Bowling Club as bowling balls.

Many of the items in the living room are copied from the styles of long ago. For example, there's a gout stool of walnut upon which you can rest your weary legs, and a complete spinning wheel which he designed and built, using only an encyclopedia photo of an antique Scottish spinning wheel as a guide.

Spotted about the home are
(Continued to page 220)



Base of breakfast bar is made of wood strips woven like a basket. Fish net holding shells covers ceiling

Coffee table, covered with glass, is "shaped like a ham." The high gun case is made of solid mahogany





Drawing of the earth shows some of the important discoveries and tentative findings of IGY scientists

1. For the first time, research has proved that auroras occur simultaneously in both hemispheres
2. Evidence indicates there is a vast river of electrical current flowing around the magnetic equator
3. Cosmic rays vary so precisely with latitude that a latitude change of seven miles can be detected
4. About 10,000 feet below the Gulf Stream is a swift current of water running in opposite direction

5. Antarctica may be a group of islands buried under a blanket of ice much thicker than formerly believed
6. There probably are vast magnetic fields of unknown origin in outer space, never before suspected
7. Eerie "whistler" radio signals set off by thunderstorms in one hemisphere can be heard in the other
8. Russian Sputniks proved that man can hurl up artificial moons as tools to learn more about earth
9. Preliminary findings of Explorer I indicate that man, with proper equipment, can exist in outer space

What We've Learned From the IGY

By Clifford B. Hicks

FOR THE PAST 10 months, some 10,000 scientists from 67 nations have been working 'round the clock on the world's biggest and best-publicized research project. In ships, planes and on foot they have moved across the earth's surface from pole to pole, plumbed new depths of the ocean, sent balloons and rockets to record altitudes and fired satellites into whirling orbits around the globe. At this moment they are living in remote outposts from the depths of the Antarctic ice to the peak of Bolivia's Chacaltaya, towering 17,100 feet above the sea.

By now, even grade-school kids know what these scientists are doing: They are trying to find out more about this whirling, hurtling "space ship" upon which we live. In the 10 months since the International Geophysical Year began, IGY scientists have recorded millions of observations. What have they learned so far in their research studies? Here are just a few of their discoveries:

● The earth does not move through "empty" space. As a matter of fact, evidence indicates that it exists "inside" the sun, never leaving the corona, the fourth and outermost layer of the sun's gaseous atmosphere.

● There are indications that the earth's own atmosphere extends at least 8000 miles into space; scientists formerly believed it extended 250 to 500 miles at the most.

● Quite likely there are great and previously unsuspected magnetic fields in outer space.

● There may be an enormous "electrojet"—a vast river of electrical current—flowing around the earth at its magnetic equator.

● Auroras stage their eerily beautiful shows simultaneously in both hemispheres, as though controlled by a single gigantic switch.

● Some 10,000 feet below the Gulf Stream is a swift current of water running in the opposite direction.

● Antarctica may not be a single land mass, but a group of islands buried beneath an eternal blanket of ice three times the thickness previously believed.

These conclusions are only tentative. IGY research will continue to the end of this year, but an even bigger job will be correlating and interpreting information.

Centers of Information

"Data centers are now in operation," explains Hugh Odishaw, Executive Director of the U.S. National Committee for the IGY. "Information is flowing into the cen-

ters. This is expected to reach a peak in 1958, and will continue at this top rate through at least the first six months of 1959, to be followed by a 'clean up' period extending probably into the first quarter of 1960."

According to one estimate, it may be 1965 before all this information has been interpreted.

The earth is perhaps the most difficult scientific specimen ever studied. Too big to investigate in its entirety, it can only be examined piecemeal. So far, at least, man has been bound to its surface, unable to climb out into space for an over-all look. This reluctant specimen, earth, is a strange, misshapen mass, squashed in at its poles, bulging at its belly, pockmarked with grotesque warts and wrinkles, wobbling on its axis, its crust heaving up and down in great earth tides.

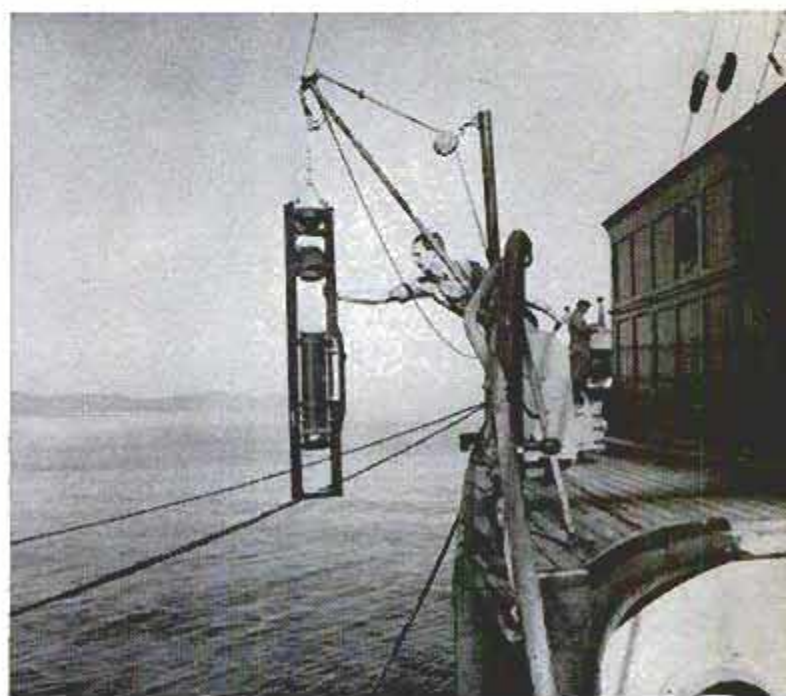
Old Globe Being Scrutinized

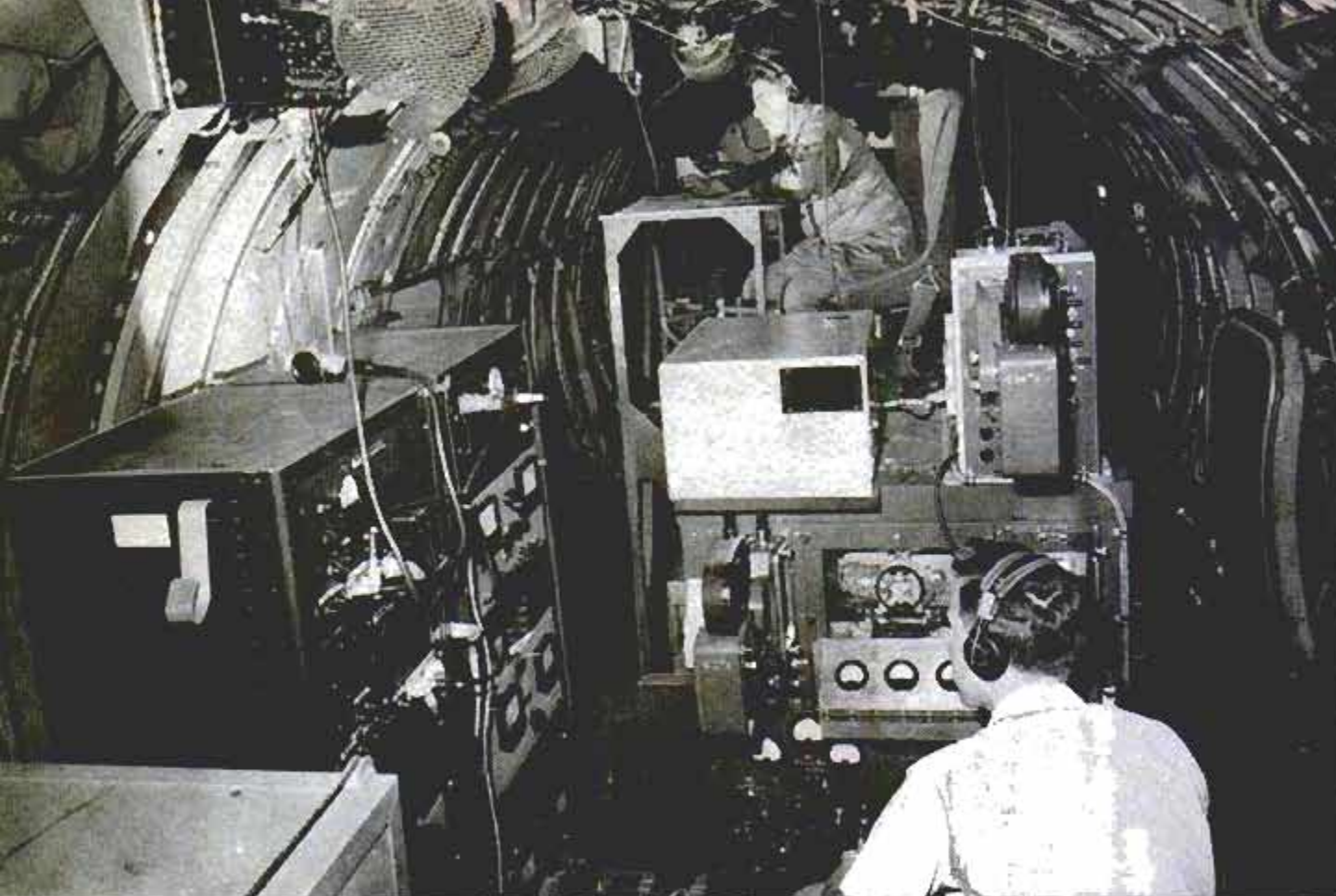
Despite the fact that man is bound by gravity to this strange specimen, he has developed techniques for studying the earth inward to its core and outward to the vastness of space. He touches off an earthquake and listens to its echo returning from the center of the earth. He sends up satellites and, by observing their erratic orbits, calculates the density of the upper atmosphere.

Odishaw recently described some of the discoveries of the first few months of IGY. Here they are, starting from the vastness of space and progressing inward toward the center of the earth:

Cosmic rays, as they pass through space toward the earth, apparently are deflected. A theory has been advanced that their strange trajectories are due to huge and

Oceanographer lowers a deep-sea camera to ocean floor, where it will take 200 exposures at intervals





Entire interior of aircraft was instrumented with IGY equipment for research on layers of the ionosphere

previously unsuspected fields of unknown origin, far out in space, which are somewhat similar to the magnetic field around the earth.

For the first time auroras have been studied concurrently in both hemispheres. Scientists of 49 countries have participated in this auroral research. Their observations not only show that auroras occur simultaneously in both hemispheres, but can be seen in tropical areas much oftener than

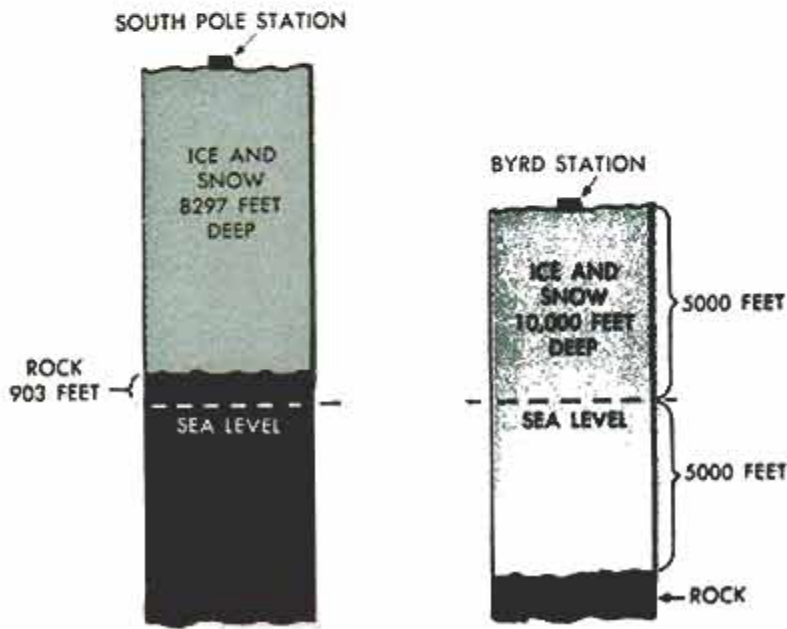
previously suspected. For example, since IGY began, three great auroras have been sighted in Havana, Cuba.

Sun Fires X Rays

In the first five months of the IGY, the United States alone sent up 81 research rockets. As a result of these rocket studies, scientists have discovered that the sun fires bursts of short and powerful X rays at the earth, which penetrate to within 30



Seismic recorder is used in Antarctica to determine thickness of the ice by bouncing sound waves off underlying rock. Diagram shows research indicating Antarctica may be group of islands





Instrument on Colorado mountaintop measures airglow, caused by a chemical process in the upper atmosphere

miles of the surface. Rocket investigations also show that there are more than 10,000,000 electrons per cubic inch at an altitude of 105 miles, a density much greater than previously believed.

Systematically flying and sailing cosmic-ray instruments around the world, scientists have pinned down the "cosmic-ray equator"—the line representing the minimum number of cosmic rays—and found that, strangely enough, it departs significantly from the earth's magnetic equator. Cosmic rays vary so greatly with latitude that scientists can detect a latitude change as small as seven miles merely by observing the frequency of the rays.

The "electrojet" is a great river of electric current girdling the equator. There are probably similar enormous electrical currents high above the magnetic poles. It has been suggested that someday man might tap these incredible electric currents as sources of power for space conquest.

The mysterious "whistlers" have come in for their share of research. Whistlers first were recognized as a natural phenomenon during World War I, when the German scientist Barkhausen set up radio equipment to try to eavesdrop on Allied military messages. Occasionally he heard an eerie, descending whistle of unknown origin. These ghostly sounds have baffled scientists for years.

Recent research indicates that a whistler is a radio signal touched off by a lightning

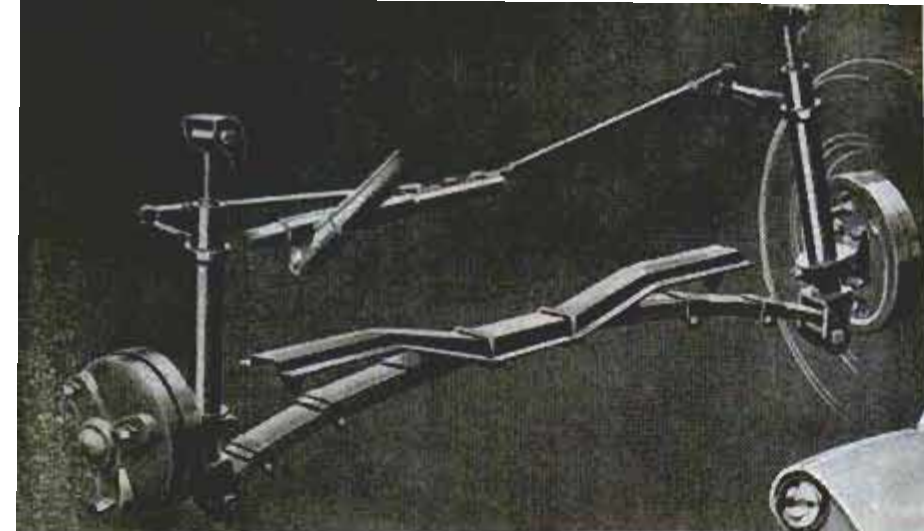
stroke. It has been theorized that the radio signal swings out into space for thousands of miles along the earth's magnetic lines, then curves back, striking the earth's surface at a corresponding point on the opposite hemisphere. To test the theory, whistlerlike signals recently were transmitted from Annapolis, Md. They were detected at Cape Horn, precisely at the opposite end of one of the earth's magnetic lines.

In addition to pinning down the nature of whistlers, this research reveals, somewhat to the surprise of scientists, that the ion density and concentration of molecules along the whistler paths is much greater than formerly believed. In other words, part of the earth's atmosphere must extend thousands of miles into what was believed to be empty space. Actually, of course, this atmosphere is so tenuous it represents only stray molecules, ions and electrons.

Record Low Temperature

Coming down to the surface of the earth: Antarctica, that coldest and most inaccessible of all areas, has been placed under planned study for the first time. Scientists of 12 nations are manning 50 different stations on the frozen wastes. One weather record has fallen. On September 17, 1957, a meteorologist at the South Pole station jotted down the lowest temperature ever recorded—a crackling —102.1 degrees F. Weathermen at the bottom of the world

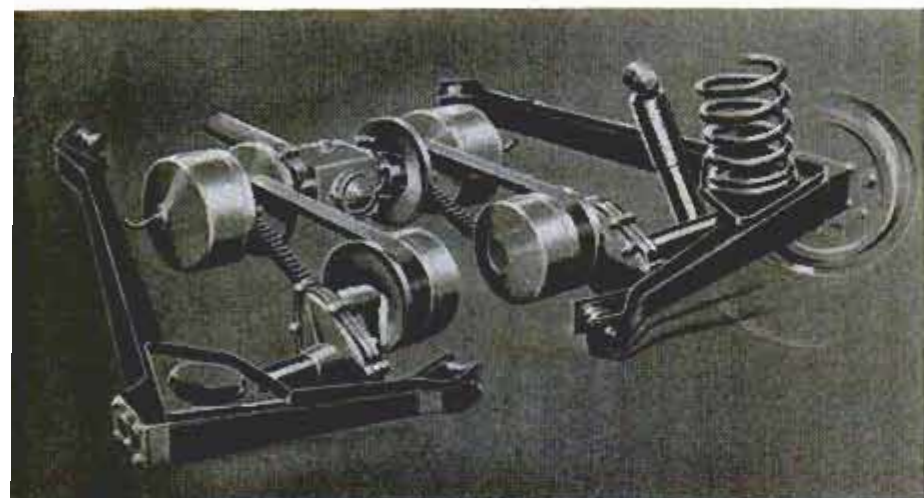
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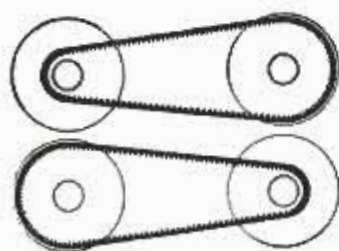
Front suspension has low-slung transverse leaf spring. Shocks and kingpins are combined. Turn-circle diameter: A tiny 28 feet



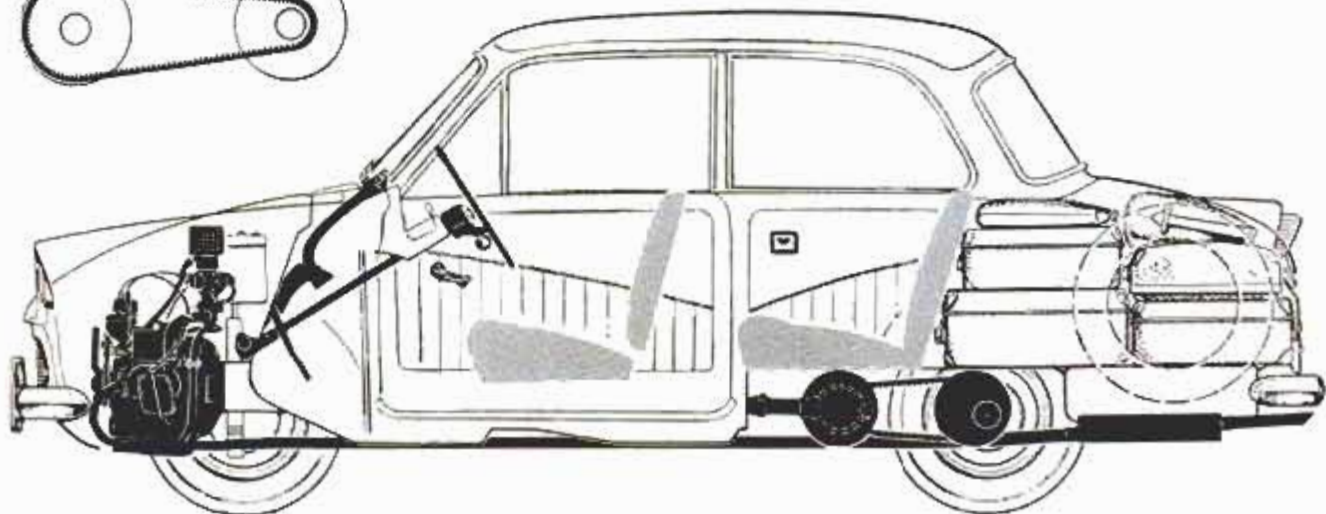
DUTCH ECONOMY CAR NEVER NEEDS GREASING



Four variable pulleys give automatic "gear changes." As the engine speed and vacuum change, pulley diameters change automatically. At start, front pulley is small, rear pulley large (top sketch below), opposite is true at speeds (bottom)



Below, engine sits forward of front axle. Entire transmission is under rear seat, eliminating front-floor hump. V-belts will last 50,000 miles, says factory

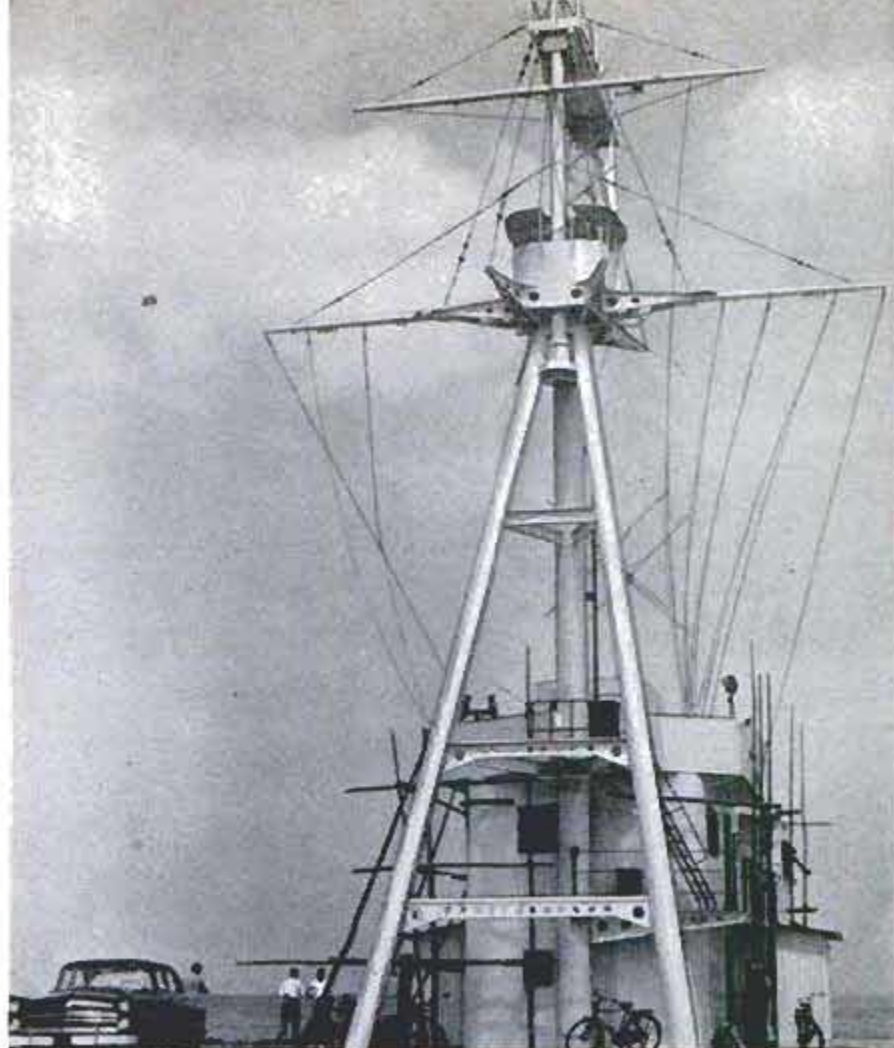


HOLLAND'S new small car, the DAF, demonstrates that the small car need not be merely a scaled-down (and thus expensive) big car. Here are some of its features:

- It never needs greasing. You simply add gasoline and once in a while change oil. It's air-cooled and has no water problems. All lubrication points are greased for life at the factory.
- It has a full-automatic transmission, no clutch pedal. The new transmission has four variable-speed pulleys and V-belt drive.
- It has rack-and-pinion steering. Front shocks act as kingpins.
- It has four-wheel independent suspension, locking differential.
- It seats four adults and has a trunk that holds six suitcases.
- Its two-cylinder, four-stroke engine gives a top speed of about 55 miles per hour, over 40 miles per gallon. Weight: 1268 pounds. Wheelbase: 81 inches. Price: \$1000.

Cruiser's Mast Serves Airport

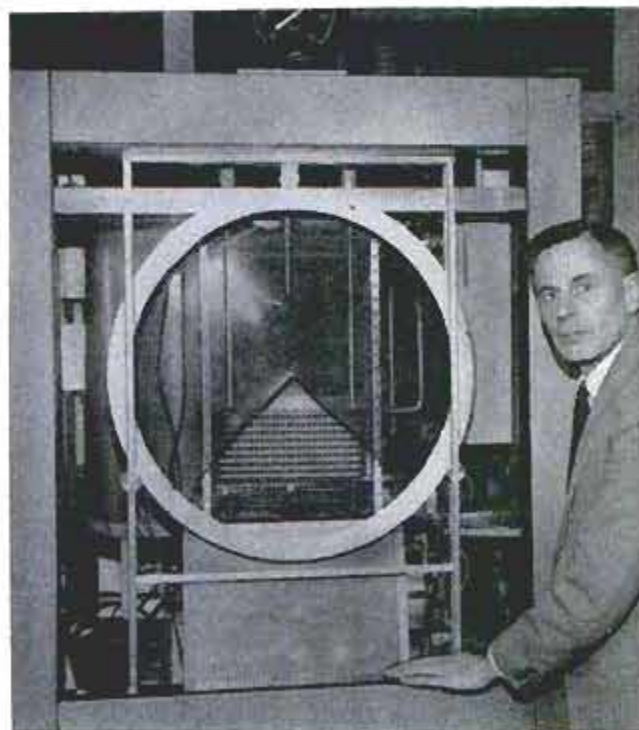
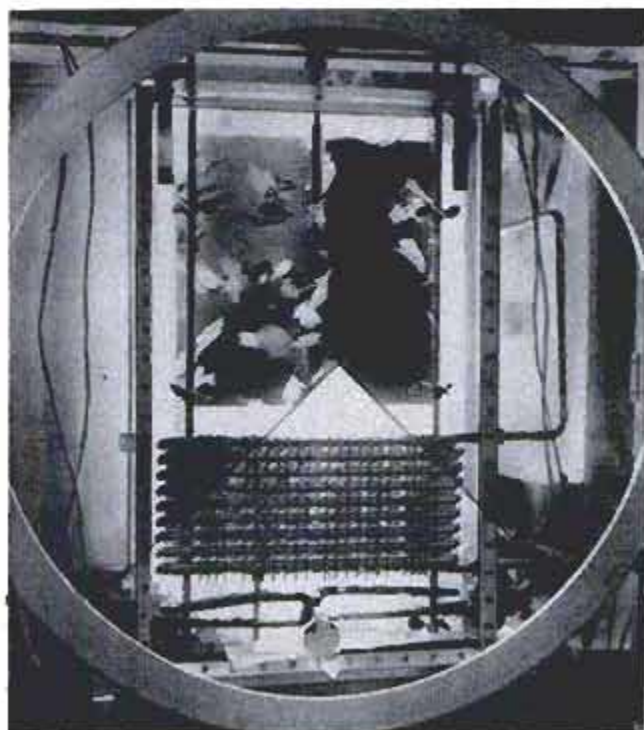
Passengers arriving at the helicopter airport of the Yokosuka Navy Base, in Yokosuka, Japan, may be startled by the sight of a tripod mast and deck-house on the airfield. They originally were on a Japanese cruiser which was sunk during World War II. The ship was raised after the war and the mast and bridge structure were removed and taken ashore. They now serve as the operations office and waiting room of the airport. The Yokosuka base was one of the biggest Japanese shipyards and naval centers in World War II. It now serves as the major Japanese naval base for the United States Navy.



Special Refrigerator Makes Snowflakes for Scientists

When scientists at Harvard University want a batch of snowflake crystals to study this summer, they can turn on a special refrigerator that creates a small snowstorm in five minutes. The inside of the icebox is supercooled by an antifreeze solution, then "seeded." Snowflakes form and grow rapidly into treelike patterns. Since these

ice crystals are similar to metal crystals formed in some castings, the Harvard icebox is a valuable research tool for metallurgists. Crystal formation determines, to a great extent, the toughness, strength and brittleness of a metal. The transparent water crystals may provide information in the study of metal quality.





Homemade steamboat's only deck is catwalk with helpful handrail above; "windows" except front are steel

Proud Hezzy West takes position at the wheel of the *Northwind* to steer out into the Anacostia Channel



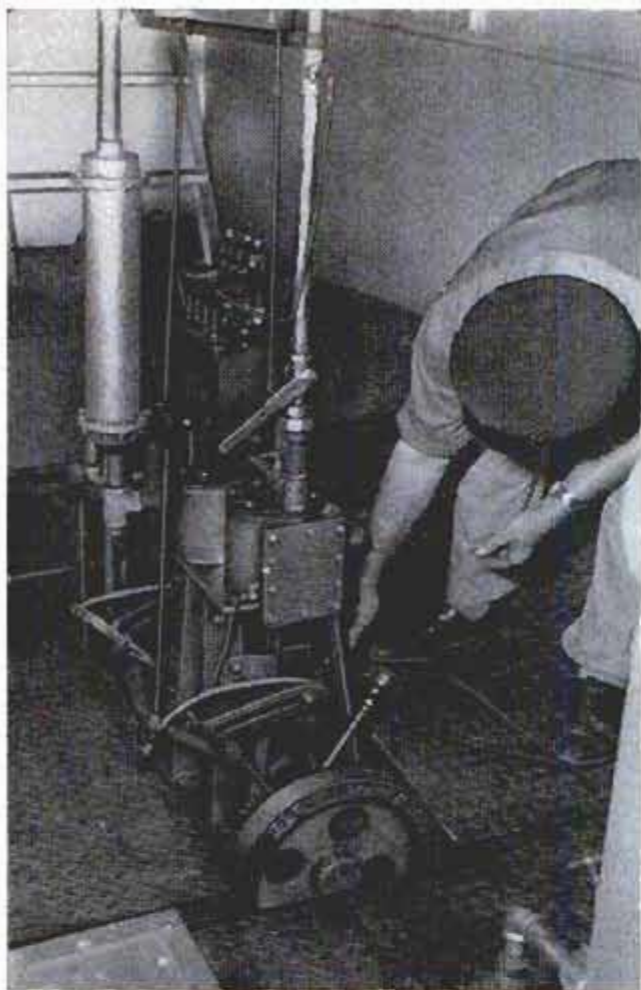
The Skipper Builds a Steamer

By Omer Henry

LIKE MANY ANOTHER MAN, Hezzy West wanted a boat. But with him, as time passed, the "want" grew to be an acute ache. Worse, Hezzy wanted a particular kind of craft—a steamboat.

Such a boat, he knew, was expensive. The few hundred dollars he had saved would hardly make the down payment on the kind of a boat he wanted. Therefore he decided to build the boat himself. A welder and machinist by trade, Hezzy had worked for years with steam engines and boats in the vicinity of his home, a suburb of Washington, D. C. He felt that he could build a satisfactory steamboat.

"I simply thought how I wanted her to



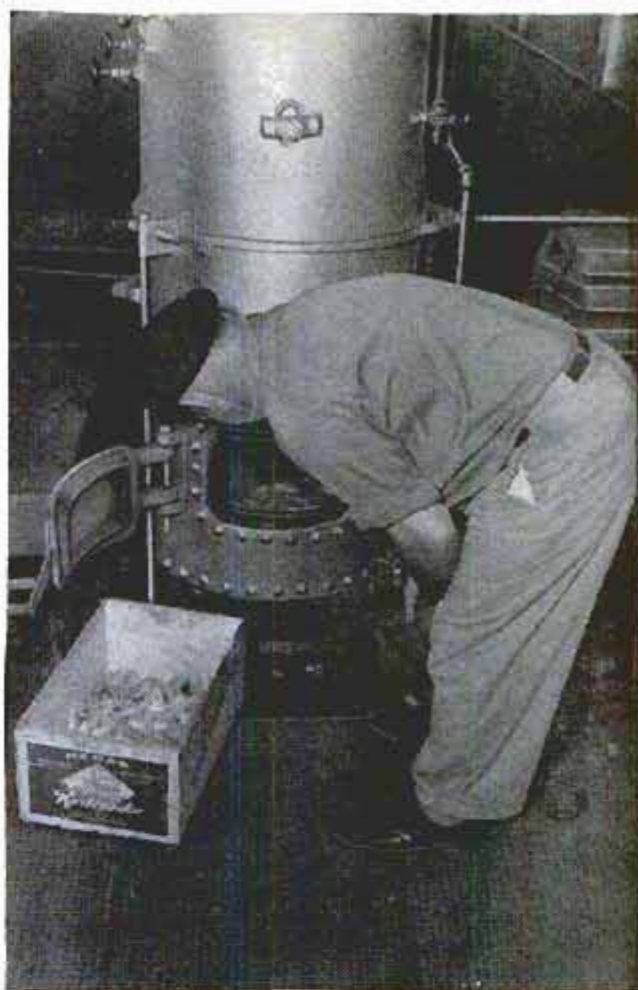
Skipper inspects the 32-horsepower steam engine he built. It has two cylinders made of heavy tubing

look," he says. "Then I laid the keel for a 30-footer, and I built her right up from there."

Not only did Hezzy build the steel hull, square cabin, smoke funnel and bilge pump; he also built the two steam engines. The larger of these, a two-cylinder affair which develops 32 horsepower, propels the boat. The smaller one drives the generator which supplies electricity.

The only part of the *Northwind*, as he calls his boat, that he did not build is the boiler. "There are two kinds of boilers," he explains. "The fire-tube in which fire goes through the tubes rather than around them, and the water-tube in which water goes through the tubes."

Of the *Northwind's* boiler, Hezzy says: "It's a vertical, fire-tube type. It holds about 125 gallons of water which is much more than a water-tube boiler of the same size would contain. That gives me far more even power than I would have with a



Hezzy kindles a fire in the fire-tube vertical boiler. When pressure rises to 90 pounds, he starts off

water-tube boiler of an equivalent size."

For fuel, the *Northwind* uses coal. "I can run her all summer," Hezzy says, "on half a ton of coal which costs me \$11."

With a 24-26 propeller, Hezzy is able to get 15 knots from the boat after he has built up steam, a process which takes about half an hour. The boat draws three feet four inches of water and has a nine-foot beam.

Although the *Northwind* is made of one-eighth-inch steel plate, Hezzy says she is lighter than a wooden boat the same size and the upkeep is "next to nothing."

"I wouldn't be afraid to take her across the Atlantic," he says.

What did she cost?

"Aside from my labor, she cost me just \$350 for materials."

And what is she worth?

"Not long ago," Hezzy says, "I sold another boat not as good for \$4100, but she's not for sale—not even for a cool five grand." ★ ★ ★

X Ray for Citrus Fruit Detects Frost Damage

Frost damage in citrus fruit can be detected by a special X-ray machine. The damage is measured by beaming X rays through fruit rotating on a platform. Char-

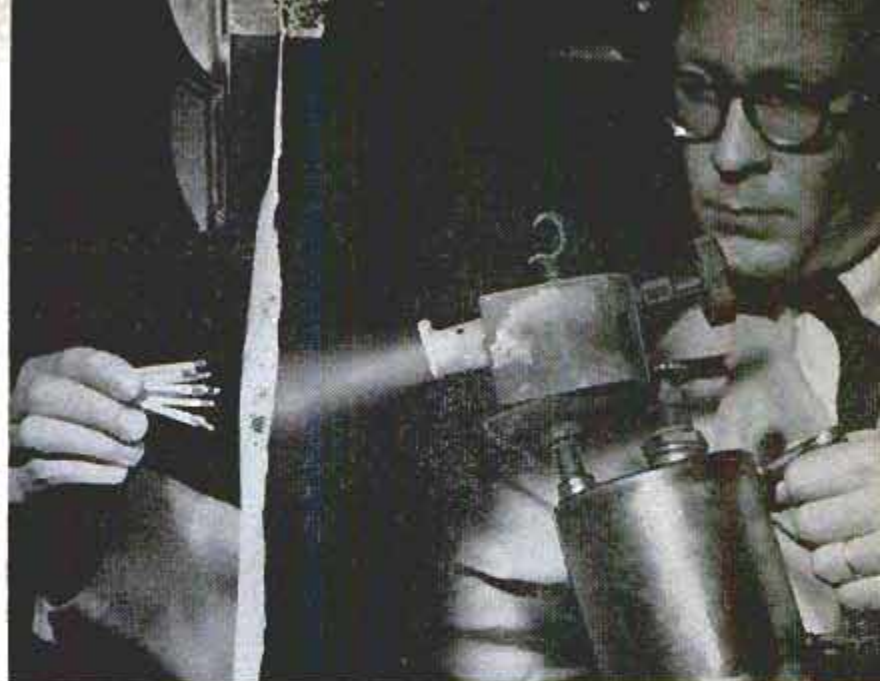
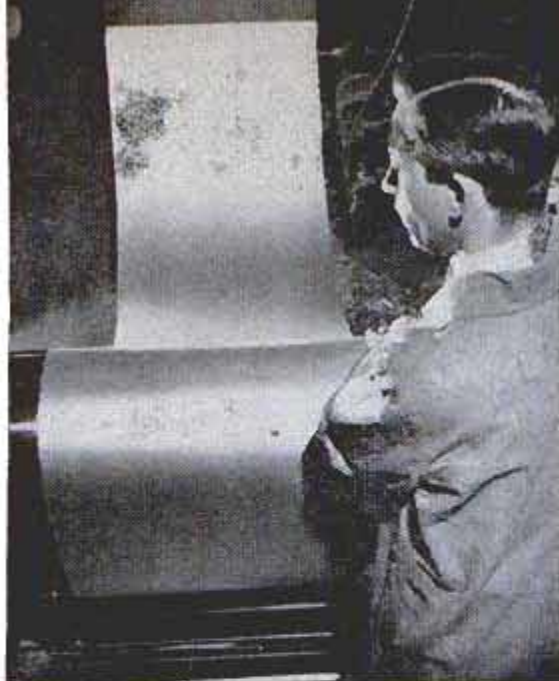
acteristics of frost damage are registered as a voltage reading. The unit, developed by engineers at the University of California at Los Angeles, functions on 110-volt wiring.



German Tourists Ride High On Double-Deck Rail Coaches

TRAVELERS between the German sea-ports of Bremen and Hamburg can now ride in deluxe double-deck coaches put into service by the German Federal Railway. The coaches have 150 seats each, compared to 75 for the conventional cars used on West German railways. However, the double-deck cars can accommodate 270 passengers each during periods of rush-hour traffic. The new coaches are air-conditioned and are illuminated by fluorescent lighting. The interior walls are finished with attractive polished oak. The cars can be heated with steam. The coaches are equipped with loudspeakers through which radio programs and music are piped and stations are announced.





Processed into continuous sheets up to a mile in length, "Mica Mat" can resist the heat of a blowtorch

Mica Proves Highly Heat-Resistant as Electrical Insulation

Mica, flattest of any material known to man, is produced in mat form by General Electric and used as electrical insulation. So heat-resistant that a $\frac{1}{1000}$ -inch thickness of it can block the blast of a blowtorch,

"Mica Mat" is processed from conventional mica, which is expanded by firing and by absorption of a liquid. Then it is ground into tiny platelets. What causes the particles of mica to stick together is a mystery.

Tiny German Helicopter

German predilection for small, compact vehicles has influenced a helicopter design. First it was the Volkswagen, then the Microbus. Now, citizens of the Bonn Republic who are interested in a fast, versatile means of travel are looking over the "Volks"-Copter. This tiny craft can seat three persons and cruise up to 100 miles per hour. It has a 105-horsepower rear-mounted engine to power its two-blade coaxial rotors. The "Volks"-Copter was designed by a former Messerschmitt engineer named Bode Franke, who estimates that his helicopter would sell for approximately \$15,475 if produced in quantity.

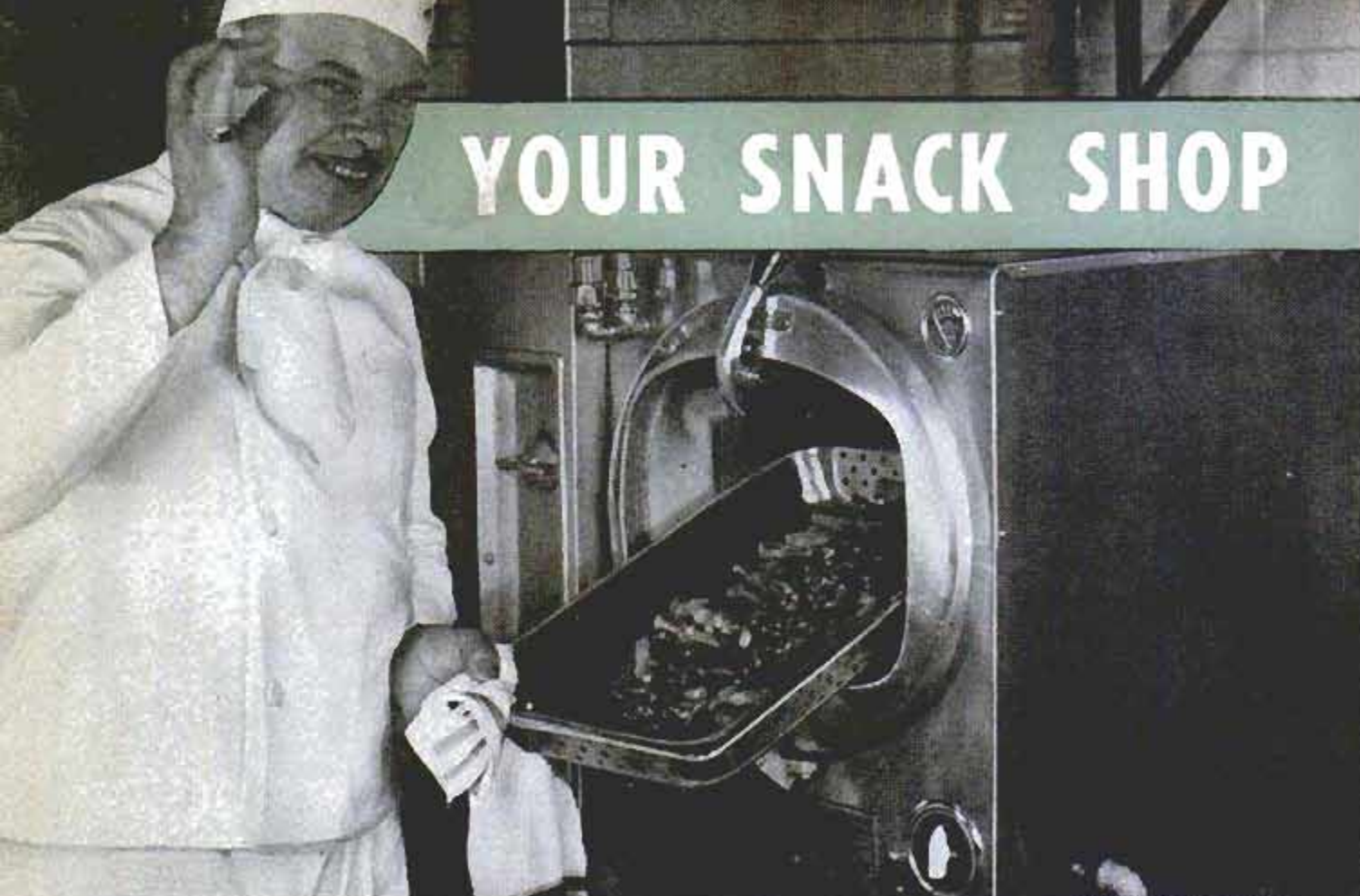


Pump Drops Trailer For Easier Boat Loading

To make boat loading and unloading easier, a hydraulic lift raises or lowers the rear end of a new trailer. In loading, the boat is winched onto the low-tipped frame. The boater then pumps a handle to pivot the frame back up to its traveling position. In unloading, pressure is released, lowering the rear end of the trailer.



YOUR SNACK SHOP



Market Forge Co., photo

There's no guesswork with this electrically operated steam-pressure cooker that shuts off automatically

Patty machine attached to hamburger grinder molds meat into patties from two to eight ounces, delivering them on individual papers. Peak: 4800 per hour

By James Joseph

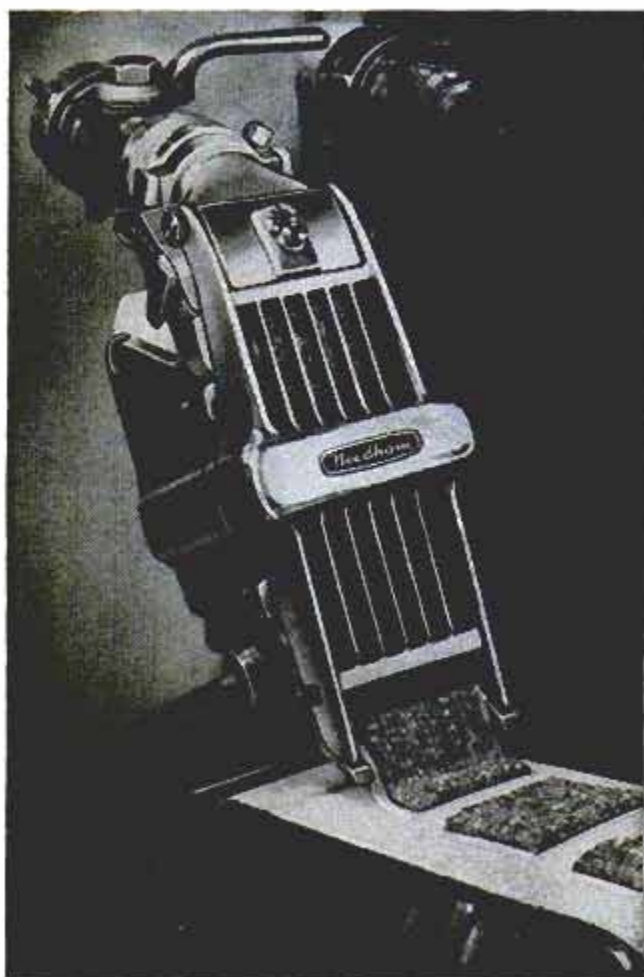
AN OLD-HAND CHEF, venturing out of retirement, recently spent but an hour in a restaurant's chromed and push-buttoned kitchen before turning in his white hat and apron for good.

"You don't need a cook," he snorted. "What you need is an electronics engineer!"

Like that old-timer, you have only to look behind (and under) the counter of your favorite hamburger place to eyewitness a revolution that's both gastronomic and electronic:

You order a two-minute egg and get it timed to a split-second by an ingenious device that dunks the yoker into a cauldron of water, hefts it out again precisely as ordered. A submerged immersion heater, as impervious to water as a marsh-bred mallard, keeps the cauldron boiling.

"Warm 'em a bit," you tell the waitress—and watch as she pops a plateful of rolls beneath a 1000-watt quartz lamp. Thirty seconds later the rolls are piping hot. Yet, miraculously, the plate's only warm to the touch (saving you, the patron, a blistered pinky). Secret of this warming inequality: The quartz lamp's infrared rays which, though absorbed by edibles (thus heating them), are reflected by the plate's ceramic whiteness (the reason most restaurant china is white).



IS GOING HIGH-HAT



Tempting food can be cooked in the open under battery of infrared lamps—luring customers to restaurant

More confounding is that Silex of hot chocolate, continuously agitated by a stainless-steel paddle. Search as you will, you can find no mechanical connection—no wires or couplings—between the paddle and whatever it is that keeps it spinning. Magic? No, it's merely magnetism *a la carte*: A motor-driven magnet, concealed just above the Silex, turns the paddle (doing electronically a chore once assigned the waitress).

Or maybe you've stared in disbelief as a chef thrust a carton of chili—fresh from the freezer—into the stainless steel maw of an electronic oven.

"He's going to burn it!" your wife winces. She means, of course, the paper container. Yet 30 seconds later the chili's steaming. What of its fragile container? The paper's not even singed. You've eye-witnessed cooking by microwave, a restaurant-tested miracle which, like many another nurtured in pay-as-you-leave places, will one day be as home-common as the stove you now use.

In microwave cooking, high-frequency "radar" beams (about 2450 megacycles) bombard the food, yet generate not a whit of heat in the oven itself. Nor do the rays—emanating from a magnetron similar to those powering radar—affect the container, whether it be aluminum, paper or porcelain. Instead, they concentrate singlemindedly upon what's to be broiled, boiled,

baked or basted. Water, in a paper cup, boils in 10 seconds. It takes but nine minutes to roast a three-pound chicken (compared to an hour and twenty minutes by less electronic means). A six-ounce potato is baked and ready for garnishing in 120 seconds (your wife's stove needs 45 minutes for the same job).

Skeptically, perhaps, you've run a forefinger under the menu's "Today's Special,"—a T-bone that's bill-of-fared at exactly 16 ounces. How, you wonder, can the restaurateur be brazen enough to advertise an entree of such precise weight, particularly when it's as unwieldy as steak? The answer: An electric exact-weight slicing machine which meticulously serves up beef (and even fish and chops) to within a fraction of an ounce, just as the menu describes it.

Maybe, Saturday-nighting it to a swank dinner place, you've been puzzled when the maitre d' hotel assigned you a table—without glancing up from his desk. Rather than scan the tables, his eyes were fixed on a central table-control board. For every table there was a light. When it flashed (a button pushed by the waitress), he knew the table was vacant and forthwith motioned you to a seat.

Your favorite restaurant? It's wired for electronics, piped with music, scientifically lighted (to lure appetite-appeal from every



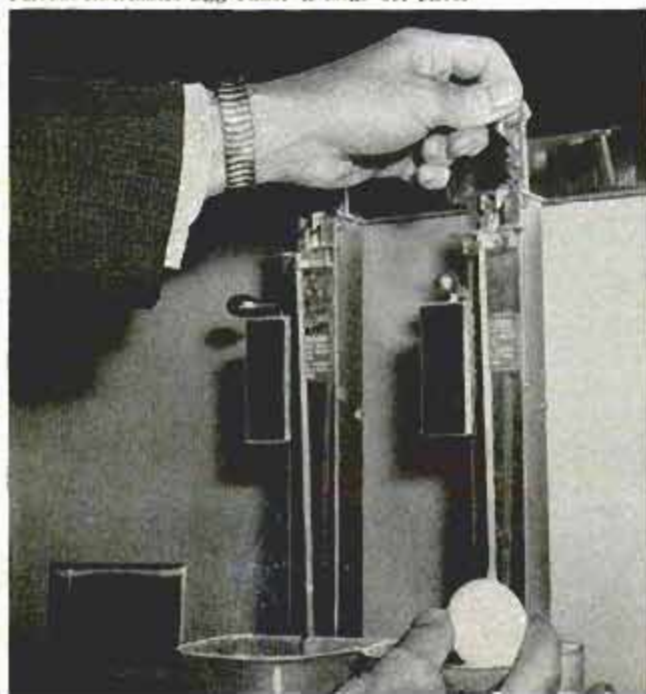
Chef stands before push-button console of electric griddle. In foreground are electric deep-fat fryers

delectable morsel), and geared to gadgets and push buttons.

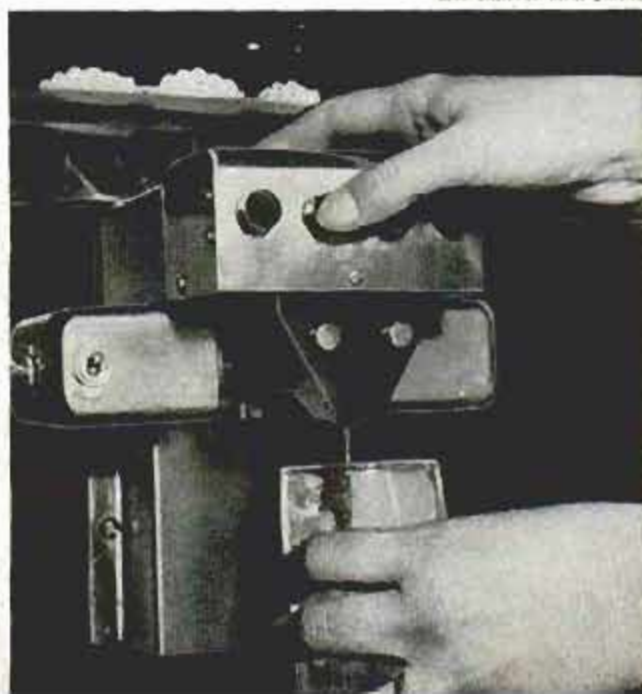
Electric eyes turn on water spigots when a waitress thrusts a glass into their beams. Whole loaves of bread disappear into countertop "lowerators", a slice at a time popping up as needed. Cups, glasses and plates do the same disappearing act. A

fountain man pushes a button to trigger an electric solenoid which, tapping concealed reservoirs of soda water and syrups, mixes and delivers any of four flavors, six fizzy ounces in exactly three seconds. The chef tosses a batch of raw spuds into the screw-conveyor of a deep-fat fryer, doesn't touch nor tend the french fries until they're

Operator adjusts regulator atop egg timer which has electric immersion heater to boil water in cooker
Perfect Automatic Egg-Timer & Mfg. Co. photo



This push-button machine dispenses exact quantities of four different drinks and keeps track of number
Bar-Master Inc. photo



dumped, ready to eat, on your plate. Day-old buns, rolls and muffins are chucked into an oven-like "freshener" which, bathing them in steam, turns them fresh as though baked this morning. Bread, dropped into a toaster, is automatically lowered on a miniature slice-wide elevator, the toasting cycle electronically timed and gauged.

But it's in the restaurant's kitchen—behind doors actuated by electric eyes—that the culinary revolution seethes strongest.

There, a light flashes on an electric oven, telling the baker that the oven has reached its dial-set temperature. Close by, a mechanical robot methodically fills 60 portion-size paper cups a minute with french dressing, catsup or mustard—condiments destined to nestle beside your hamburger.

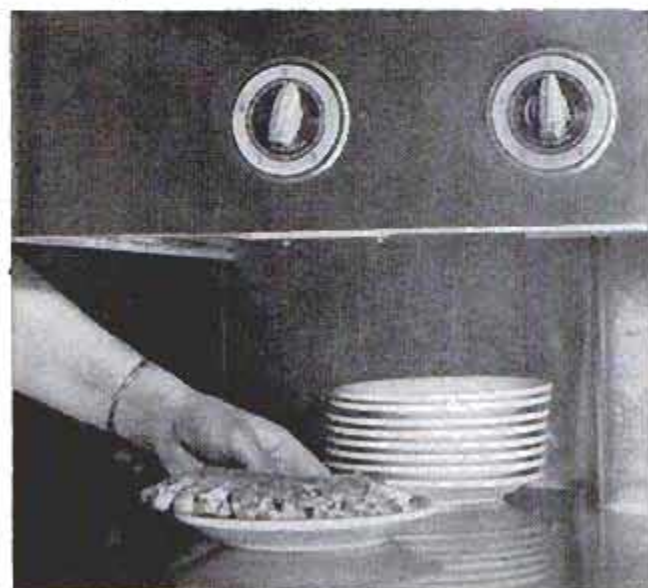
With a purposeful roar, a burnishing machine blasts a load of silverware (fresh from an automatic washer) with bouncing $\frac{1}{8}$ -inch diameter steel shot—quick-polishing knives, forks and spoons in minutes rather than the hours required when the chore was manual.

Near by, an electric high-compression cooker—its internal steam pressure 15 pounds to the square inch—turns out a 22-pound batch of peas in just 60 seconds (at least ten times faster than boiling atop a conventional range). What's more, this nearly waterless method preserves vitamins and minerals and that fresh-from-the-field taste and color.

In the kitchen's far corner stands a four-spit infrared barbecue, its 42 broiler-size chickens automatically rotated, its 9200 watts of deep-reaching heat basting the birds in their own succulent juices.

White-hatted, a cook flicks the controls of a stainless steel gadget that looks for all the world like a super-sized barber's clippers. Attached to an electric meat chopper,

Food is heated and plate only warmed (saving blistered fingers) under rays from quartz-lamp heater



the automaton extrudes 40 to 80 hamburger patties every minute, each precisely sized and shaped (a lightning-fast guillotine knife administers the coup de grace). With a turn of an adjustment, patty thickness can be varied between slim $\frac{1}{4}$ and hefty $\frac{3}{4}$ inch. Another control delivers burgers either square or rectangular (to fit the bun). Still another regulates patty weight (depending whether the restaurant features modest portions or those Bumstead half-pound giants).

In a sanitary sanctum all its own, rears a dishwashing machine fed by a conveyor—a conveyor that shuttles dirty dishes from table to kitchen before myopic flies even realize they've missed a meal. Atop the dishwasher is an engineer's brainchild: A device which injects a fractional drop of drying agent into the machine's rinsing chamber. The dishes, once rinsed, self-dry themselves. A miniature pump, its stroke constantly regulated by the flow of rinse water, injects the quick-dry chemical.

Your wife would appreciate the kitchen's automated shrimp-cleaner—a machine which cuts and deveins the pesky sea dwellers, turning fried and cocktail-sized shrimp into one of the restaurant's most profitable (and at the same time, most modestly priced) items.

Gadgetry? Not at all. For purposeful, indeed, is every pushbutton, solenoid and electric eye.

Some—like that magnetic hot-chocolate stirrer—are labor-savers, helping the restaurateur shave his considerable overhead. Others—the warm-spectrumed lights bathing booths and counters—are cunningly contrived to entice your appetite (by accentuating the brawny redness of your T-bone or the greenness of peas). For canny caterers to public appetites know that most

Dinner is cooked in seconds with this Radarange while reflective interior of the oven remains cool

Raytheon Mfg. Co. photo





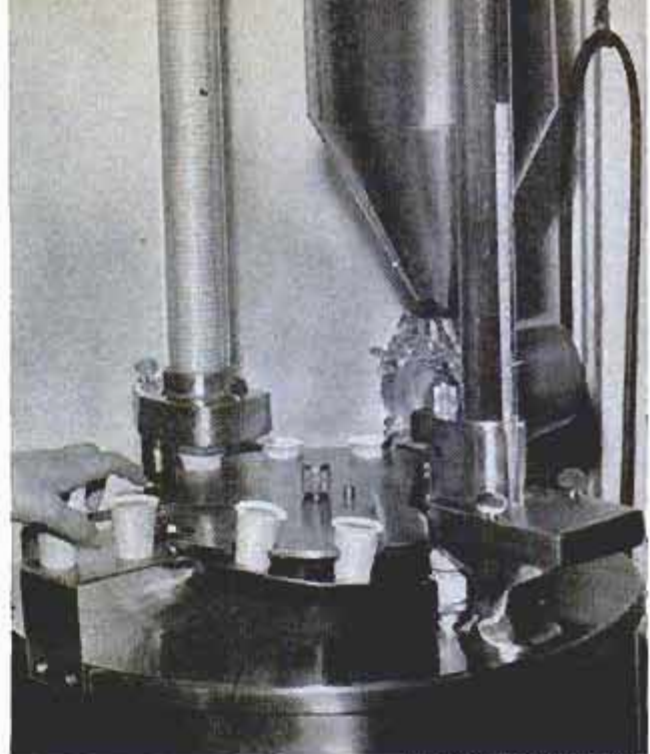
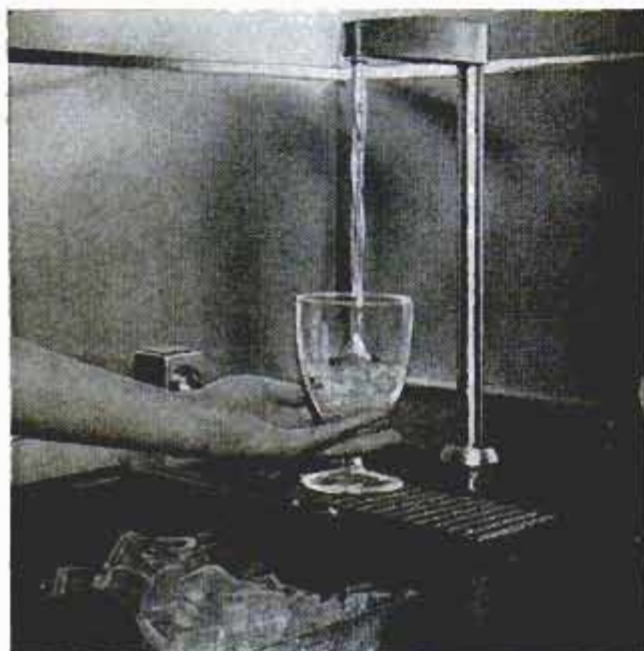
Krim-Ko Corp. photo
Motor-driven magnet in housing atop Silex turns stainless-steel paddles to agitate pot of chocolate

of us eat as much with our eyes as with our stomachs.

A few devices—for example, those infrared barbecues set up in full view of diners—are silent salesmen; they tempt you to take-home a whole chicken or roast. Or, like the prismatic-lensed lights which bring out the browns and golds in baked goods, they encourage you to order dessert though you'd told your wife but moments before, "Honey, I'm full up to here."

Concedes a Denver restaurateur, "In a retail store, the salesman can talk a customer into buying more than he wants. In the food business we let a guy's stomach and his eyes do the talking for us. Bathe a slice of pie in just the right light and

When waitress' arm breaks beam of electric eye the faucet is turned on; it shuts off when arm is moved



Dixie Cup Company photo
Paper cups for cream or condiment are automatically filled from two-gallon reservoir on rotating table

you'll sell all the pie man can bake. Build a fancy 'exhibition cooking' set-up, the chef doing his job in plain sight, and patrons' eyes suddenly become twice as large as their stomachs. Serve from one of those push-button warming carts—the kind you wheel right to the table—and before he realizes it, the eater-outer has added another buck to his bill, an inch to his waistline and 30-cents to our profits."

Nowhere, perhaps, does gadgetry more cajole the hungry to gorge—and spend—than at those drive-ins rigged with remote speakers, where you talk directly with the chef, telling him what you want.

"Electronics! It's wonderful!" beams a Chicago drive-in owner. "Why, we've increased order checks—per customer spending—fully 20 percent, rigging the place with speakers. People like to hear themselves talk. Besides, they're fascinated, ordering remotely like that. And the more they talk, the bigger the tab."

But most of the gadgets—particularly the more automated ones—are keyed to "portion control," a phrase new to restaurant-dom's complex vocabulary. Portion control—in essence—means getting the most from the least: More slices of ham from the hock, more patties from every pound of burger, more servings of peas from the kettle-full, more sodas from each reservoir of ice cream.

Portion control is cost accounting—accounting for every ounce of syrup in your soda, every slice of bread on your plate, every scoop of ice cream on your pie.

But portion control's corollary aim is standardization, difficult when it pertains

(Continued to page 228)



Rocket-Powered Bombs

ENORMOUS ROCKET-POWERED nuclear bombs that can be released many hundreds of miles short of their targets will soon be carried by Air Force bombers.

After releasing one of these bombs, an aircraft can turn and run for safety without coming within the range of anti-aircraft guided missiles that are defending the target.

Meanwhile, the bomb continues to fly straight ahead until its rocket propellant is exhausted, then plunges down into the target area.

One of the bombs, the supersonic "Hound Dog" guided airborne missile GAM-77, is being developed for use by the B-52G, the newest version of Strategic Air Command's long-range bomber.

The same weapon, or one similar to it,

may also be employed by the new B-58 and the forthcoming B-70, the chemically fueled bomber, formerly called the WS-110, that is designed to fly even faster than 2000 miles per hour.

The powered bombs are considered far more accurate than long-range ballistic missiles and may be equipped with electronic countermeasure equipment to confuse the homing systems of missiles that are fired against them.

Unpowered glide bombs also are undergoing intensive study and tests. In one series of tests, Convair is dropping a "pod" from its B-58 at supersonic speeds. Without power, this pod is reported to travel a distance of more than 20 miles before plummeting to earth after being released at Mach 2.



Airman appears small beside detachable pod carried by B-58. Pod gives plane nuclear-bomb capability





Caterpillar Tractor Co. photo

Sisal is an important export crop for Kenya. Here natives gather a bumper harvest on a 24,000-acre farm

*Reprinted
"PM Highlights"*

Around the world there's a battle on to put more acres under cultivation as

Farm Machines Race the Paper

By Rafe Gibbs

THE KENYA NATIVE, his dust-caked face cracked by a big grin, reached into the bag slung at his waist and produced a gleaming new carburetor. Handing it to the "boss man" of the farmstead, he said, "Tractor walk again."

And so it would—after being idle for 12

days while the native waited for the carburetor to come from Nairobi. It was an unimportant incident perhaps, but it told the story: Progress through mechanization and modern scientific methods—with setbacks.

"The world's farmers today are producing 20 percent more food and agricultural

Youngster watches as one of the 152,000 tractors in Africa turns the soil on a prosperous wheat farm

Caterpillar Tractor Co. photo





Australia: Mighty mechanical muscles push over a tree to clear the way for a road, opening up new land

products than 20 years ago," reports Wilhelm Anderson of the U. S. Department of Agriculture's Foreign Service. Then he adds: "The increase is nearly as great as the increase in the world's population."

The race between food production and the birth rate has not been won—not by a long way, particularly in the Far East. World population today stands at 2.7 billion—23 percent above prewar level, as compared with agriculture's 20 percent increase. But, for the first time in many years, economists are seeing real hope that the gap may be closed eventually.

In 1938-39, there were only 2.6 million tractors scattered around the world. Perhaps the word "scattered," however, would not apply to North America, because it had 1.7 million of those tractors. The Soviet Union had 500,000; Europe, 300,000, and all of the rest of the world only 100,000.

By 1955—the latest year for which international figures are available—the world total had made the astounding jump to 7.6 million, and this figure does not include the Soviet Union, which is not reporting. North and Central America had five million tractors; Europe, nearly two million; Oceania, 270,000; South America, 158,000; Africa, 152,000 and Asia, 70,000.

Several years ago, we were riding in a car with J. H. Tippet of Clarkston, Wash., one of the Northwest's biggest cattle producers, when we came upon a tractor

turning new pasture land at one of his ranches.

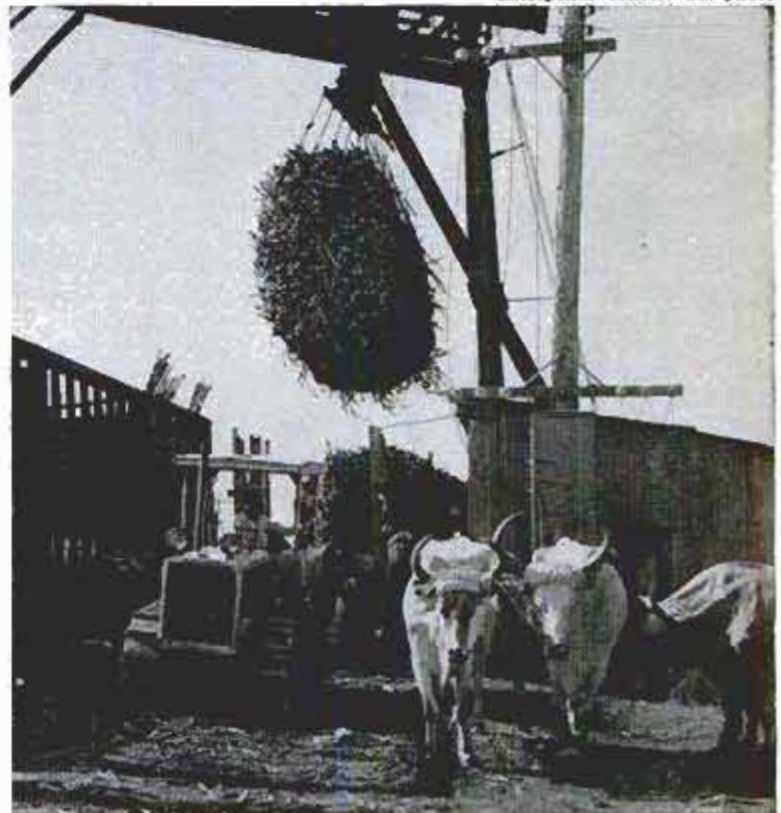
"That," said Tippet, pointing to the tractor, "is science's most important gift to the rancher."

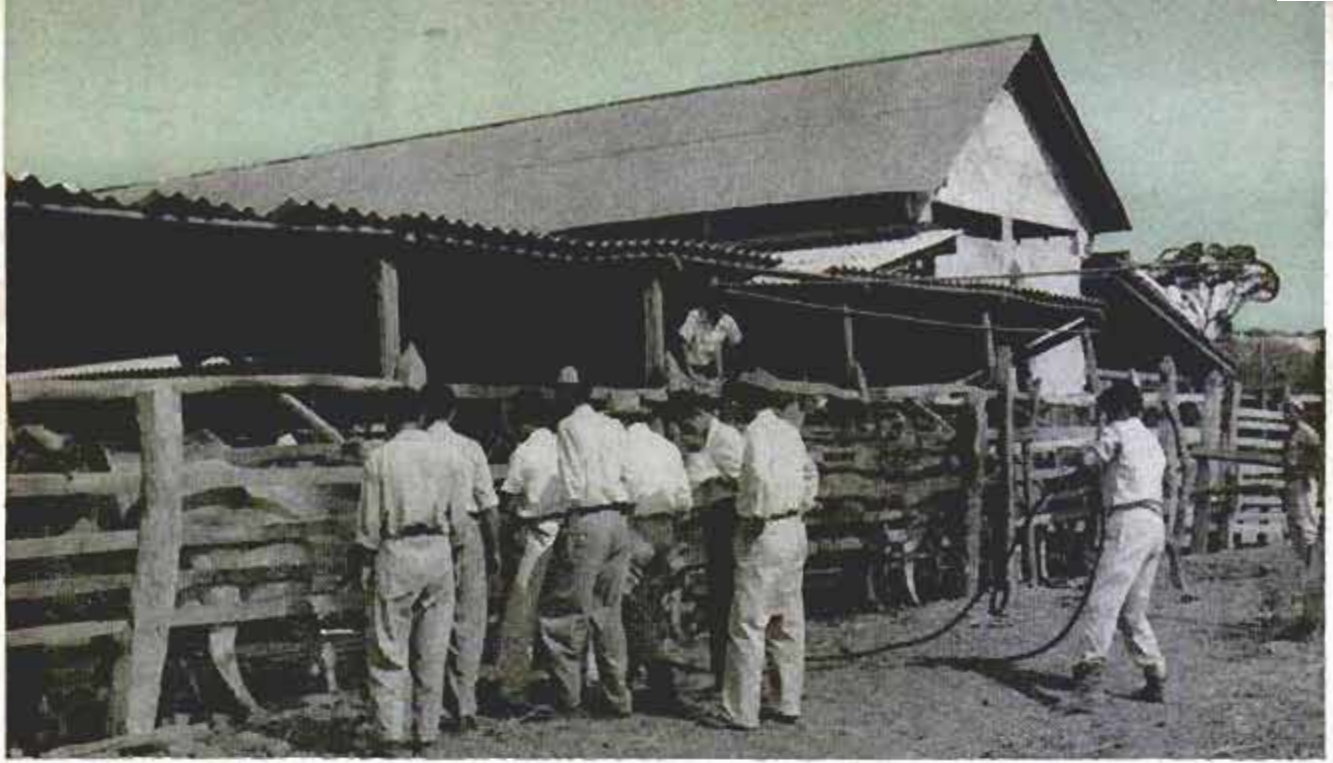
"Because it turned the horse out to pasture?"

"Well, it did that all right. But, more important, you can use it as a bulldozer—and build roads."

That fact is accounting for much of the

In Cuba, the new and the old—a crawler-type tractor and patient oxen—work side by side, handling loads of cane at a plantation
Caterpillar Tractor Co. photo





Ecuadorians learn from Point Four technician how spraying of cattle for parasites increases beef production



Huge land levelers all around the world are busy scraping millions of acres, preparing them for irrigation

Partly as a result of irrigation, Mexico has increased cotton production more than 5 times in 20 years
Caterpillar Tractor Co. photo





At the University of Idaho, young trees are packaged and readied to ship to South American countries



South American learns from his U.S. counterpart how modern poultry equipment can pay big dividends

booming agriculture output, particularly in such countries as Australia.

If a ghost rider out of Texas' past should prod his phantom cayuse today into the back-range country of Australia, he would think he was living again while cattle were dying—or at least growing mighty lean on the trail. He could sneeze from the dust of bawling herds, market-bound on their own power that was growing weaker between water holes. He could see cattle that had left the home range as good beef being sold at the end of the grueling overland trek for poor beef.

Australia Boosts Output

But, as new roads are built and trucks roll on them, this practice is gradually fading. As a result of this and other factors, Australia's farm output is 22 percent above the 1935-39 level.

Man without the machine today in some areas just barely lives. Take, for instance, this recent report to the United Nations by Felisberto C. De Camargo on Brazil's Amazon regions where tractor-tread marks would send the natives scurrying back into the jungles:

"Here in this enchanting paradise that is the New World, a large part of the people cannot obtain more than 1000 calories of food daily. The people are able to live, however, thanks to the calories they receive from the sun, which compensate for the calories that do not reach their bodies from food."

This situation, however, is not true of Brazil as a whole or of Latin America as a whole. Excluding Argentina, Latin America shows a rise in agricultural output since prewar days of nearly two thirds. Argentina's agricultural output has dropped in recent years because, shortly after the war, governmental policy favored industry over agriculture. This policy is now changing, and agricultural output in Argentina is

expected to increase to a great degree.

U. S. Foreign Agricultural Service reports show that the Dominican Republic, Colombia and Panama, all net importers of rice just after the war, now grow all their requirements. But what has happened in Mexico is probably most startling.

A wealthy Georgia cotton planter, touring a rural area of Mexico with his wife recently, commented to a Mexican guide, "You know, my wife figured she could pick up some information on early Aztec history, but maybe I can pick up some information on modern cotton raising."

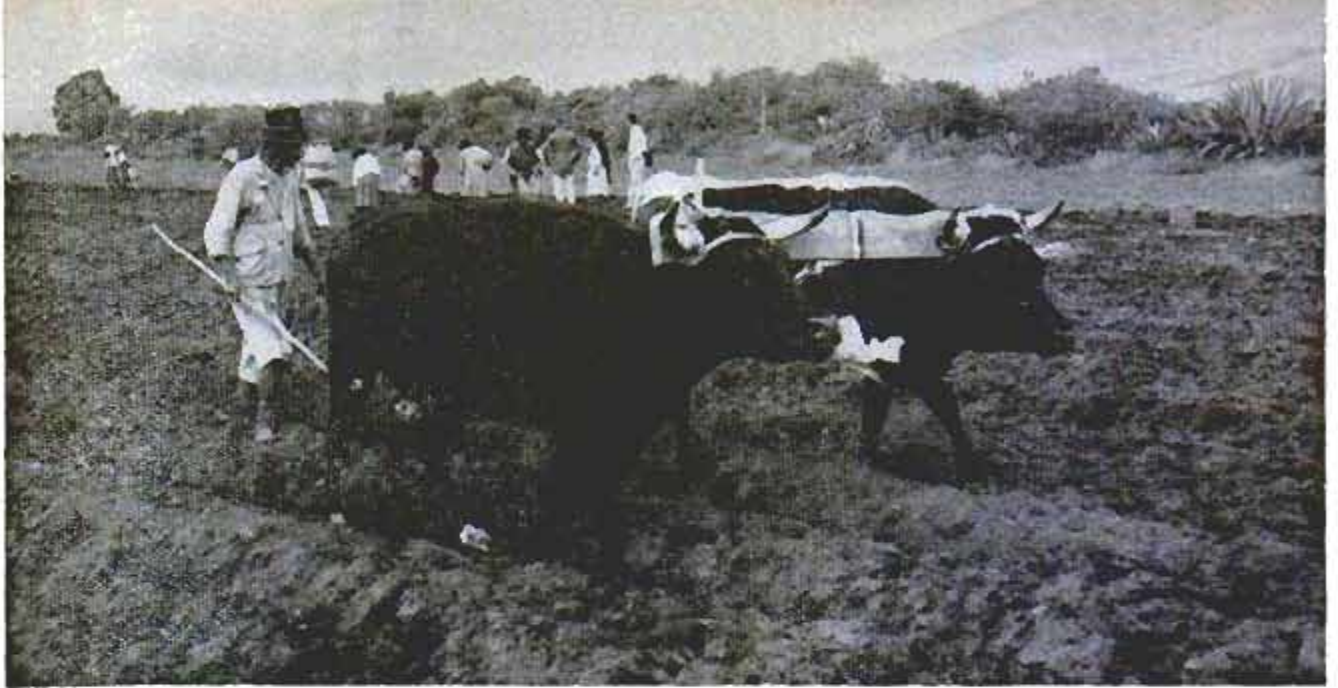
In the last 20 years, Mexico has increased cotton production more than five times, and Mexican cotton is now an important factor on the international market. Mexico's wheat crop for 1956—about 40 million bushels—was up 50 percent over that of 1947. Mexico used to import about 15 million bushels of wheat a year from the United States, but now United States imports have stopped almost entirely. Other crops, such as corn and livestock, are slated for big increases in the near future.

Machines and Irrigation

Mexico has machines. She also has extensive new irrigation developments. Twenty years ago, Mexico's irrigation projects were barely worth mentioning. Today, irrigated land totals 5.3 million acres. The new Miguel Hidalgo Dam project alone will add more than 500,000 irrigated acres.

Europe, too, has had some sensational developments. Take France. Like Mexico, she was long an importer of wheat, but in the postwar years she rose to fifth place among the world's wheat exporters. A slump was suffered in 1956, but France is now regaining this position.

Africa can also make its boasts. Example: Kenya produced nearly 425,000 bags of coffee in the 1955-56 crop season—nearly double that of the previous year. But even



Though South America is turning to modern farm equipment, oxen are still used to turn the soil in some areas

more significant in Kenya is the development of African-owned coffee acreage. In 1951, it totaled only 1725 acres. By 1955 it had increased to 7759, with nearly 30,000 licensed growers. Under the territory's expansion plan, the goal is 71,500 acres by 1968, surpassing the present European-owned coffee acreage of 59,000.

In Asia there is progress too, but in that great area with its masses of people it is more difficult to pinpoint the spectacular. And there is always China—vast, hungry China. Communist leaders are making speeches about how they are mechanizing the country's agriculture. Mechanization will no doubt come there—but slowly. Two-wheeled, double-shared plows and new water wheels have been put out in quantity. Tractors have been shipped in from Russia. But a village leader sadly shook his grey head after viewing a gov-

ernment tractor demonstration, and said:

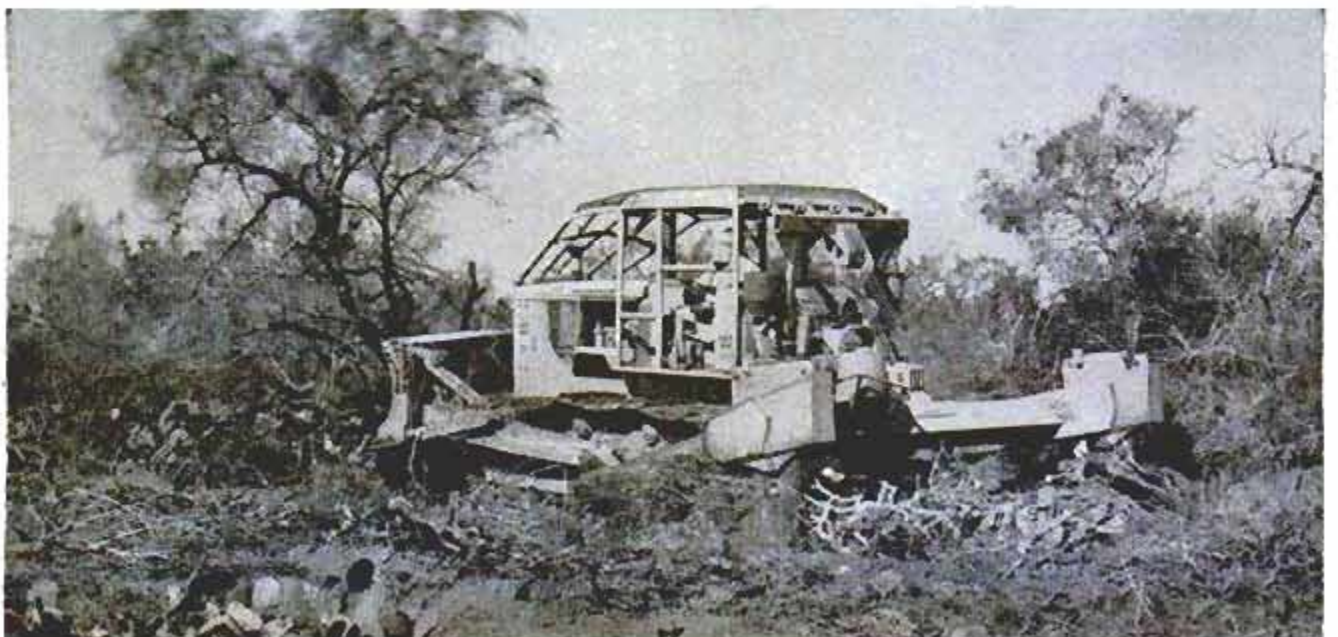
"It is wonderful. But so much of our land is fit only for humans to work—and they need the work so badly."

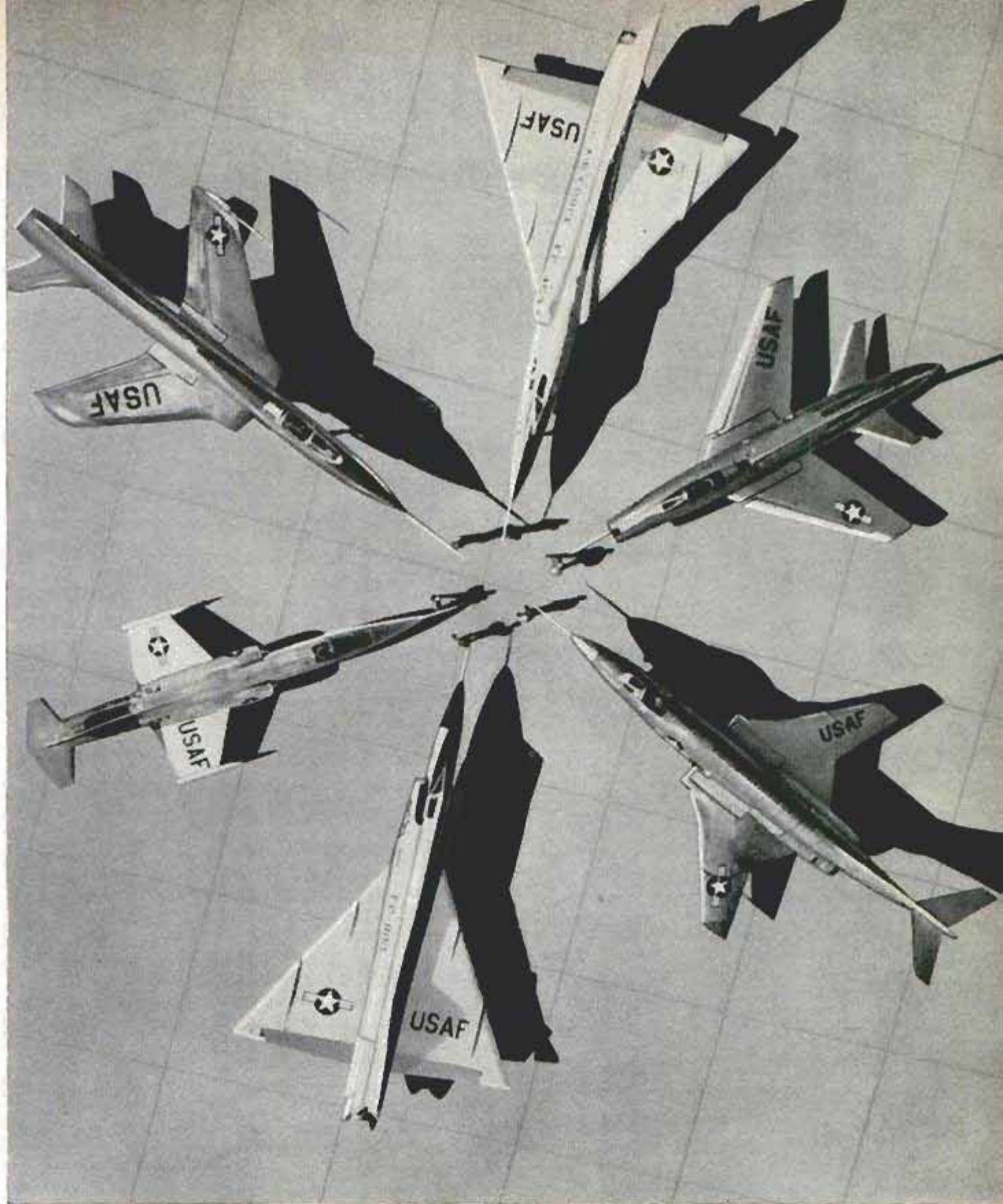
India has similar problems, but there more emphasis is being given to increased irrigation, fertilization and development of new land. By 1961, India plans to raise irrigated areas from 67 million to 88 million acres, boost the use of nitrogenous fertilizer from 685,000 short tons to 2 million, and conduct land reclamation and improvement projects on 3.5 million acres. India's goal for the next five years: a 28-percent increase in agricultural output.

The United States is responsible for much of the world development in agriculture by providing funds, equipment and know-how. The State Department's Point Four program has been effective. It is still

(Continued to page 232)

Huge tractor with root plow clears three acres of underbrush per hour on the famous King Ranch in Texas





OUR CENTURY FIGHTERS...

KNOW THEIR PROFILES?

SIX JET FIGHTERS of the USAF's Century Series are all capable of supersonic speeds. Clockwise from top: Convair F-106 Dagger, North American Super Sabre F-

100, McDonnell F-101 Voodoo, Convair F-102 Dart, Lockheed F-104 Starfighter and Republic F-105. Barely visible at the nose of each plane is its pilot.

Oldsmobile Owners Like and Dislike Its New, Chrome-Plated Personality



Oldsmobile owners praise its ease of handling and 71.6 percent will buy another Olds. Best-liked exterior styling feature is the flashy new chrome treatment (but see below also) and the entirely different—for Oldsmobile, that is—grille design.



Like most new-car owners these days, they complain about poor gas mileage, especially owners of the 88 series who apparently expected better economy than they get. The flashy chrome trim, a best-liked feature, also rates tops on the least-liked list.

MARGINAL NOTES BY
ART RAILTON,
PM's AUTOMOTIVE EDITOR

This is typical of new-car owners. First, you can't look at it enough. Later, you stop admiring its looks (probably stop washing it so often also) and think about its behavior.



HORN RING IS GONE, REPLACED BY A LONG BUTTON ON EACH SPOKE. ADVANTAGE SEEMS MOSTLY IN STYLING. BUTTONS MIGHT BE BETTER USED TO DIM LAMPS, ELIMINATING FOOT SWITCH.

For stop-watch data on the 88's acceleration, turn to page 126.

OLDSMOBILE is having a great year for itself. It is currently in fourth place in sales, right behind Ford, Chevrolet and Plymouth. If it continues its current rate of sales it may push into the top three.

What caused this upsurge? What do the people like most about their Oldsmobile? To find out, PM asked hundreds of 1958 Oldsmobile owners from coast to coast.

Although handling ease was rated first by all the Oldsmobile owners, it is apparent that the decision to buy Olds is influenced most by styling. A check was made of the best-liked features according to the newness of the car and among owners who have driven less than 2500 miles, exterior styling is the best-liked feature. Among owners who have driven their cars between 2500 and 4000 miles, exterior styling drops to third on the list and handling ease moves into first. The remainder of the owners (4000 miles or more) did not put styling in the top three at all, but mentioned handling ease, performance and riding comfort in that order.

Among all owners, though, handling ease is tops, followed by power and performance, with riding comfort third.

Best-Liked Features

The following quotations from owners describe the best-liked features in order of frequency of mention:

"I like how it maneuvers and its easy handling. Power steering and brakes are wonderful."—Virginia fleet owner.

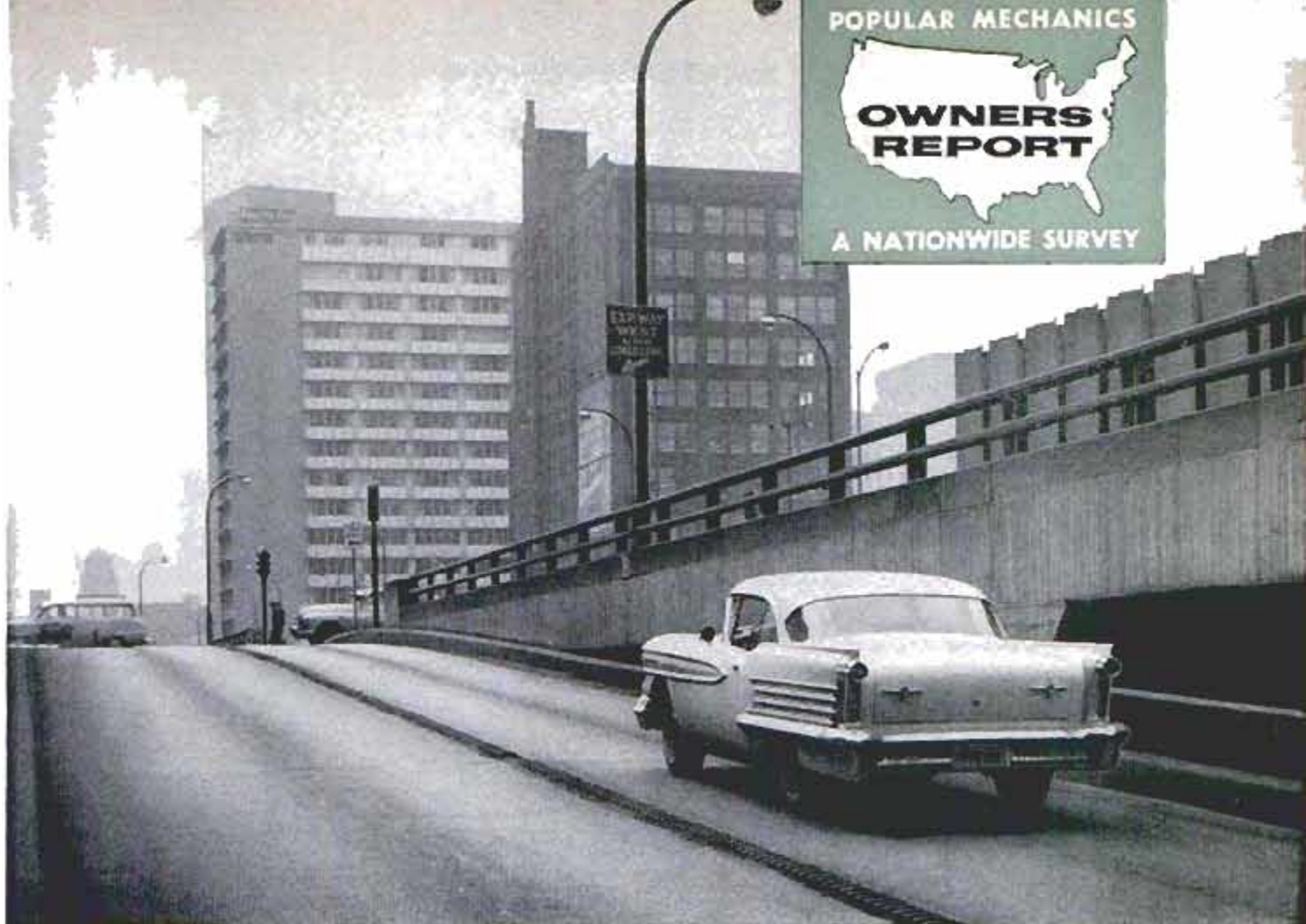
"It has excellent 'body feel.' It's a compact, comfortable driving vehicle."—Wisconsin clergyman.

"This car has good pickup, probably too much if you inadvertently press down on the accelerator too hard."—California meteorologist.

"Quick getaway and it can always deliver that spurt even on hills at 60 miles per hour."—Pennsylvania engineer.

OWNERS
REPORT

A NATIONWIDE SURVEY



"After working and riding on a bulldozer all day, I enjoy the pleasure of riding the Oldsmobile with its smoothness on curves and on the rough roads I travel."—West Virginia bulldozer operator.

"Heavy and rides good."—Kentucky sales manager.

"I did not care too much for the 1957 sectioned rear window or the crimp in the top, but the 1958 Olds is a dream car over all other models."—Virginia trucker.

"I like the body style and the prestige it puts you in. It gets the oohs and aahs wherever you go."—Ohio truck driver.

"Trouble-free operation of engine. I drive all over North America on vacations, usually with another woman, and have never been left stranded by motor trouble."—Illinois educational supervisor.

"Being a mechanic I appreciate the way the engine is arranged, the convenience in changing plugs, in changing oil and checking the battery."—Illinois service-station owner.

"The oil has been changed only once at 3000 miles and I haven't had to add any since (now 7500 miles). I drive about 35,000 miles a year over a lot of rough miles and Olds stands up best."—Texas rancher.

But Owners Complain Too

Almost a third (31.2 percent) of the Oldsmobile owners make no complaints at all about their cars. Of those who do complain, the most frequently mentioned item is poor gasoline economy.

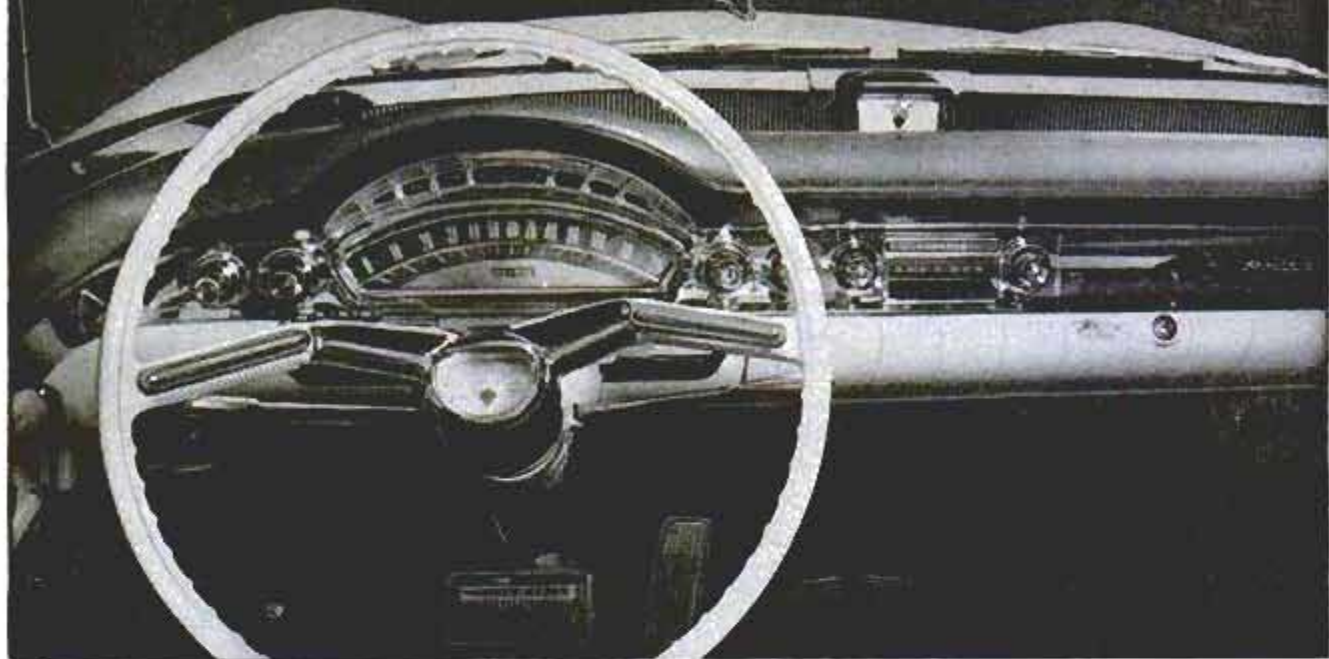
Among the top-priced Series 98 owners, poor workmanship was first on the complaint list. Among Dynamic 88 owners, 19.7 percent complained about gasoline economy, despite the fact that this model is claimed to be the economy car. This percentage is slightly higher than the percentage



OLDS HAS STYLED ITS DUAL HEADLIGHTS IN SUCH A WAY AS TO GIVE IT A "SQUINTING" LOOK FROM THE FRONT.

This is encouraging! Engines have been getting harder to work on. It's good to see a comment like this.

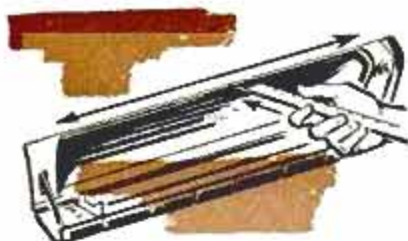
Gas is only a small part of the cost of running a car. The annual cost difference between 10 miles per gallon and 15 miles per gallon is about \$100 for 10,000 miles. Depreciation costs are many times that each year.



Dash has easily read speedometer and warning lights. Only faults are excessive brightwork and tiny gas gauge

One inevitable result of cars becoming so similar is that their faults are similar too. These complaints are virtually the same as those made by owners of other makes.

If he got 15 miles per gallon, he'd be happier, but only a few dollars richer at year's end.



OLDS HAS A VERY WIDE GLOVE COMPARTMENT, BUT IT ISN'T VERY DEEP, ESPECIALLY ON THE END NEAR THE DRIVER. GLOVE-BOXES ARE STILL AT THE MERCY OF THE STYLIST.

It's difficult to understand why people buy low and cramped hardtops and then complain about room. If they insist on being sporty, they should expect trouble getting in and out.

of the entire group that mentioned poor gas mileage (16.4 percent). Super 88 owners also listed poor gas mileage as the top complaint.

Other complaints in order of frequency are body noises and leaks, poor workmanship, transmission operation, difficulty of getting in and out, and a cramped rear seat. Here are some quotations to describe these points:

"Car has the 88 economy carburetor, but do not believe it to be of any value. I average 13.7 miles per gallon over-all."—Minnesota salesman.

"I drove 1975 miles and used 155.5 gallons of gas for an average of 12.7 miles per gallon on this 88. My 1955 Olds 88 averaged 16.9. This year's model was advertised to do better."—Indiana engineer.

"My Super 88 has been worked on five times for gas mileage and it gets worse every time. I wrote the factory about it. I get only 12 miles per gallon on trips."—North Carolina service-station operator.

"Body or windows leak when it rains. Rattles are hard to find and eliminate."—California physician.

"Production inspection seems to be poor. I paid \$4335 for this Super 88 to get a little more care in production, but didn't."—Pennsylvania salesman.

"Miserable workmanship in assembly. Hardly a screw that was tight, chrome is battered, rubber weatherstripping all loose as are switch mountings. Windows wouldn't operate easily."—California retired owner.

"At slow speeds (5 to 20) the transmission jumps in and out of different ranges. Not smooth. Creep is very bad."—Missouri geologist.

"Automatic transmission does not get into high gear soon enough. You just spin in lower gears in city driving."—Idaho manager.

"I have a four-door hardtop and there should be more room to get in and out of front and rear seats."—Pennsylvania truck driver.

"The only 'beef' I have is that the Olds sits too low and I knock my hat off getting in and out. I am a heavy person and can't sit in the rear seat of this two-door hardtop comfortably."—Pennsylvania driver.

Suggestions to the Industry

Each month we ask the owners if they approve of today's styling trends. The owners of the 1958 Oldsmobile voted approval overwhelmingly with 81.2 percent approving, 11.2



Irving S. Seligmann photo

Rarely has a car's personality changed so abruptly. Once almost trimless, Olds is now laden with decoration

percent disapproving and 7.6 percent of them still undecided.

We also ask them to make one suggestion to the industry as a whole—not simply to the manufacturer of the car they own. The two top suggestions (far out in front of all others) are “increase the gas mileage” (19.6 percent) and “reduce power” (14.4 percent).

“The big-car makers better start cutting down on operating costs. No one likes a small car, but many are forced to buy them.”—New York owner.

“Cut horsepower and give better gas mileage before we all go to foreign cars.”—North Dakota sales executive.

“All cars are being made too large. I'd prefer a shorter and narrower car that would be easier to park.”—Pennsylvania schoolteacher.

“I am a farmer. Our roads get ruts in winter and dusty in summer. A car with more clearance would be a good option for farmers. Also better sealing to keep out dust.”—Illinois farmer.

“Take it easy on mad-dash changes for change's sake only.”—Pennsylvania physician.

“Simplification rather than further complication of engine.”—Virginia school principal.

“Arrange easier entry and exit, perhaps by doors forming part of top.”—North Dakota salesman.

But some owners see no need for change. They like the cars just as they are and, in fact, want them more so!

“Avoid being influenced by this foreign-car fad. Keep them low and long and heavy. I travel to Europe a lot where I am forced to drive the foreign car. And it's mighty uncomfortable.”—Michigan writer.

“I have no suggestions. I leave this to the auto industry and think it is doing a good job.”—Indiana police sergeant.

More Best-Liked Features

“Good road car.”—Wisconsin owner.

“I like the beautiful combination of leather and fabric on the interior. I don't like the floor covering, so put rubber mats on it.”—Indiana housewife.

“Economical to own. I got 17.5 miles per gallon in this Super 88 on a long trip.”—Maryland farmer.

“Since it costs me only about \$800 a year to trade, I consider Olds the best value.”—Alabama auditor.

“Power heating and ventilating controls are what I like best.”—Indiana strip-mine worker.

“Good visibility.”—Texas oil marketer.



STYLISTS SEEM TO FEEL THAT GAS-TANK FILLER TUBES ARE INDECENT AND MUST BE HIDDEN. OLDSMOBILE HIDES IT IN THE LEFT TAIL-LIGHT ASSEMBLY.

This fellow is in the minority. The most-often-mentioned change requested by owners in PM surveys is to make cars more economical, easier to park and to enter and leave.

Olds has power assist for the heater. Press a button and a vacuum device opens the vents or changes the thermostat. Blower must run all the time heat is needed. Direct-heat feature excellent, warming the driver first. Test car had little heat adjustment, was either hot or cold, not good for a coolish day.



AN ENGINEER'S ANALYSIS

By DALE KELLY, SAE
Registered Professional Engineer

1958 OLDSMOBILE TEST DATA

MODEL TESTED: 1958 Oldsmobile Dynamic 88 four-door sedan with two-barrel carburetor, single exhaust, automatic transmission, power brakes and steering, air conditioning.

Rear-axle ratio: 3.23 to 1. Wheelbase: 122.5 inches. Tires: 9.00 by 14. Weight: 4406 pounds with gas tank half full (59 percent on front wheels, 41 percent on rear).

Mileage on car at time of test: 500 miles. Barometer: 28.82 inches. Temperature: 63 degrees F. Payload: 200 lb.

ACCELERATION TIME FROM STANDING START (in seconds)



Ignition timed for:	0 to 20	0 to 40	0 to 60	0 to 80	¼ mile
Regular gasoline.....	2.9	6.7	12.5	22.0	19.4
Premium gasoline.....	2.6	6.3	11.7	20.5	18.9
Super-premium gasoline.....	No appreciable improvement				

(All tests in Drive range. Gasoline had the following octane ratings by Research method: Regular 90; Premium 97, Super-premium 105.)

FUEL ECONOMY (miles per gallon)



Ignition timed for:	Steady 30 m.p.h.	Steady 50 m.p.h.	Steady 70 m.p.h.	Traffic Route
Regular gasoline.....	18.1	16.2	13.3	9.4
Premium gasoline.....	18.3	16.0	12.8	9.1

(In traffic test car makes 10 full stops per mile and is driven fast enough to average 15 miles per hour.)

Estimated average

ANNUAL GASOLINE BILL: \$232 for 10,000 miles

(Based on exclusive use of premium gas at 33 cents a gallon.)

SPEEDOMETER ERROR (miles per hour)



Speedometer reading.....	20	30	40	50	60	70	80
True speed.....	20	29	39	48	59	68	78

ODOMETER ERROR (miles traveled)

Odometer registered 107 miles for an actual distance of 100 miles



DRIVER'S VISION

Driver could see part of road 23 feet in front of car, full width of road 26.5 feet in front of car.



GROUND CLEARANCE (unloaded car)

Worst dip that could be crossed.....24-ft. radius
Worst hump that could be crossed.....18-ft. radius
Deepest rut that could be negotiated..... 7.5 in.
Curb clearance for door opening.....14 in.

MISCELLANEOUS

STEERING

Steering-wheel turns for 100-ft. circle.....0.85 turns
Curb-to-curb turn-circle diameter.....43 feet
Wall-to-wall turn-circle diameter.....46 feet
Steering-wheel turns, lock-to-lock.....4.2 turns

CENTER OF GRAVITY: 22.8 inches

TRUNK CAPACITY (see Observations)

9 cartons (one cubic foot each)

WATER RESISTANCE: Excellent

Splash-pan test: No leaks. Ignition, brakes unaffected.

High-pressure test: No leaks. Ignition, brakes unaffected.

OBSERVATIONS

The usual water-temperature indicator on the dashboard has been replaced by a pair of indicating lights which give no indication of faulty cooling unless the water temperature goes over 230 degrees or stays below 115 degrees.

This year, the opening ahead of the instrument panel has been closed off so small articles placed on the shelf cannot fall through to the floor as previously.

The glove compartment is exceptionally wide.

The long, high hood interferes with the driver's view of the road close to the front of the car.

There is no horn ring. Instead two buttons, one

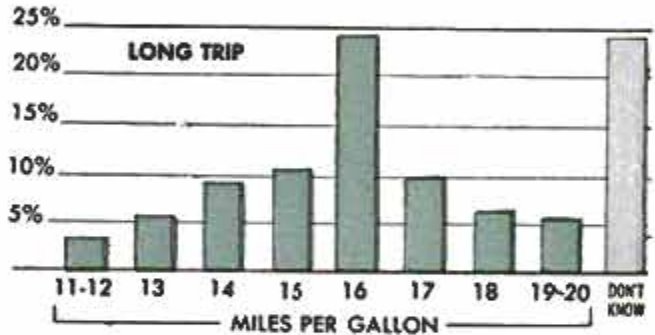
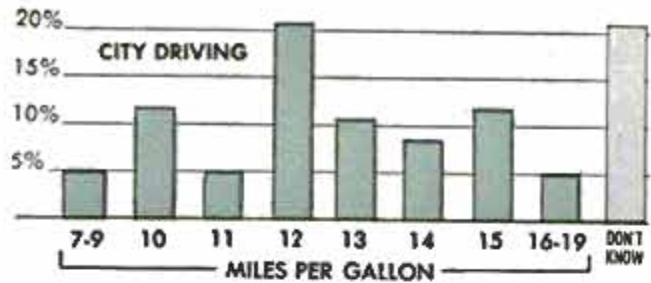
on each steering-wheel spoke, operate the horn. When driving straight ahead the buttons are easily operated. In a turn, however, you must grope for them or take your eyes off the road to see where they are. In this respect, a center horn button or a full horn ring would be better.

Ground clearance is good for a car of this size. Power-brake reserve vacuum was enough for three full applications with the engine dead.

It took 1½ gallons of gas in an empty tank to move the gas-gauge pointer off its stop and when the pointer was on Empty, there were almost three gallons in the tank.



Trunk has limited area of flat floor. The five cans of Dale Kelly's test gas cover entire flat portion. Right, graphs show gas-mileage claims of the owners



"Excellent starting in cold. Car stored outside at temperatures down to 20 below. Immediate starting."—New York sales engineer.

"Olds 88 has higher trade-in value."—North Carolina technical writer.

"Freedom from body noise."—Wisconsin engineer.

"We must say that the dealer has meant a great deal in our trading also. He has been an exceptionally good serviceman. That means a great deal."—Maryland contractor.

"All controls and instruments are conveniently located. I also like the new transistor radio, but wish there was a trip odometer."—Pennsylvania researcher.

And Other Complaints

"Carburetor flooded during first 1000 miles badly. After the 1000-mile checkup trouble continued. Still not completely corrected."—Minnesota engineer.

(Continued to page 238)



OLDS OFFERS A RADIO YOU CAN REMOVE AND USE SEPARATELY AS A PORTABLE. IT PLUGS INTO THE CAR'S ELECTRICAL AND SPEAKER SYSTEM AUTOMATICALLY.

HERE'S A SUMMARY OF OLDSMOBILE OWNERS' OPINIONS:

OVER-ALL RATING: Excellent 78.2% Average 18.9% Poor 2.9%

Best-liked features

Handling ease.....	52.0%
Power, performance.....	40.4%
Riding comfort.....	38.8%
Exterior styling.....	37.6%
V8 engine.....	10.0%
Sturdy body.....	9.6%
Roadability.....	7.2%

Most-frequent complaints

None at all.....	31.2%
Poor gas mileage.....	16.4%
Body noises, leaks.....	12.0%
Poor workmanship.....	9.6%
Auto. transmission.....	8.4%
Hard to get in, out.....	7.6%
Rear seat cramped.....	5.2%

Had engine trouble?

No trouble.....	82.0%
Some trouble.....	16.0%
Considerable trouble.....	2.0%

What was trouble?

Carburetor, choke.....	4.0%
Knock, pinging.....	2.8%
Rough idling.....	2.0%
All others.....	9.2%

Best-liked styling feature?

Chrome treatment.....	12.8%
-----------------------	-------

Headlights.....	9.6%
Grille.....	7.6%

Least-liked styling feature?

Chrome treatment.....	12.4%
Rear-fender styling.....	4.4%
Wrap-around wind-shield.....	4.4%

Best-liked interior feature?

Dashboard features.....	18.0%
Upholstery.....	13.2%
Foam headlining.....	12.0%

Least-liked interior feature?

Lack of room.....	6.4%
Small glovebox.....	4.0%
Upholstery.....	3.6%

How is dealer service?

Excellent.....	59.2%
Average.....	33.5%
Poor.....	7.3%

Would buy from him again?

Yes, would.....	54.0%
Undecided, no answer.....	37.2%
No, would not.....	8.8%

What make was traded?

Another Oldsmobile.....	66.4%
Buick or Cadillac.....	6.8%
Chevrolet or Pontiac.....	5.6%

Ford Motor Co. make.....	10.0%
Chrysler Corp. make.....	5.6%
All others.....	0.4%
No trade, no answer.....	5.2%

What make will buy next time?

Another Oldsmobile.....	71.6%
Cadillac or Buick.....	3.6%
Chevrolet or Pontiac.....	2.4%
Ford Motor Co. make.....	1.2%
Chrysler Corp. make.....	1.6%
All others.....	2.0%
Don't know, no answer.....	17.6%

Approve industry style trends?

Yes, approve.....	81.2%
No, do not approve.....	11.2%
No answer.....	7.6%

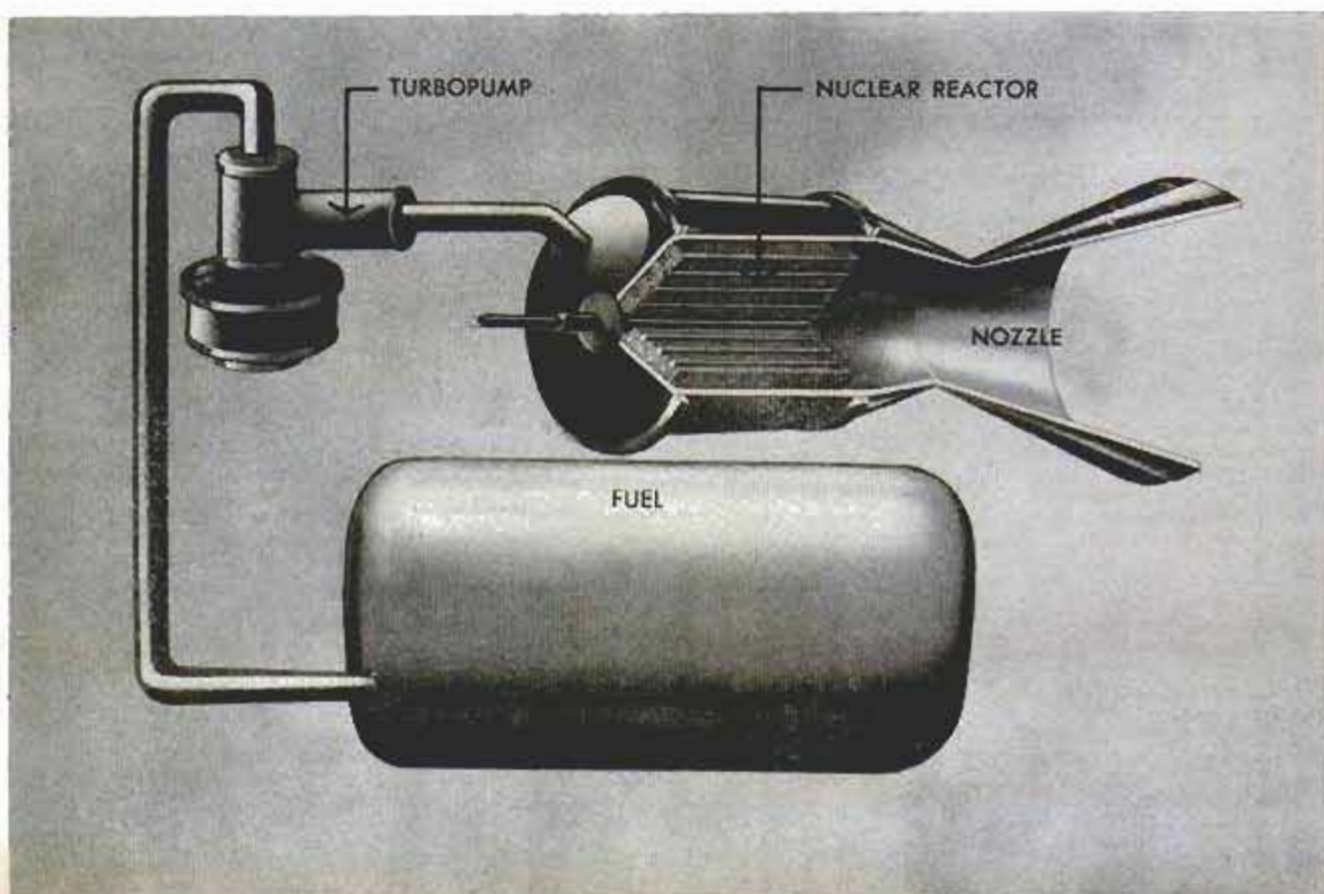
How can industry improve cars?

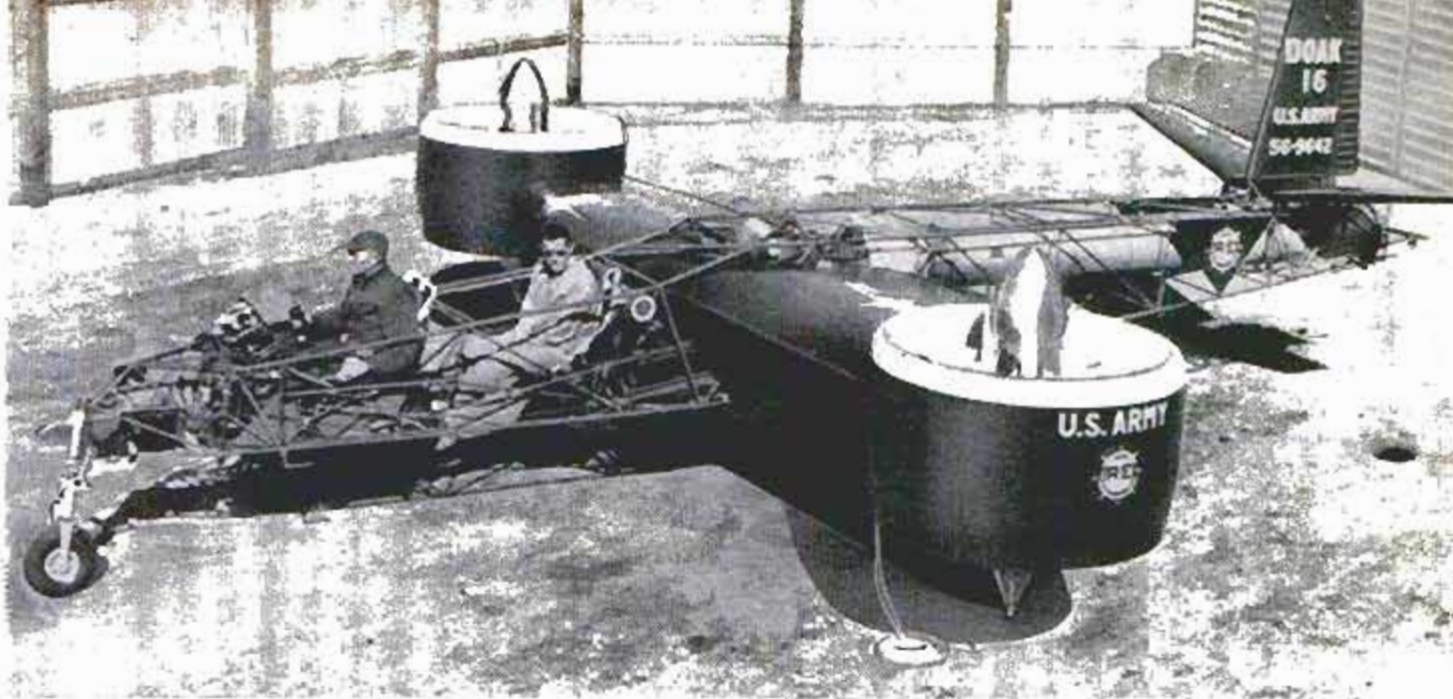
Increase gas mileage.....	19.6%
Reduce horsepower.....	14.4%
Improve body workmanship.....	6.8%
Make easier to get in, out.....	6.0%



Nuclear Fission To Power Rocket

THIS drawing-board conception of a nuclear rocket missile illustrates the enormous power of this missile. It is theoretically capable of hundred-fold increases over payloads of today's missiles and may make interplanetary travel possible with single rather than multistages. The missile's engine would use energy of nuclear fission to convert a working fluid into propulsive gases. The engine's reactor would provide almost limitless energy to convert the fluid. Expanding through the rocket nozzle, gases would attain great velocities and create propulsive thrust several times greater than that of current chemical rockets. A high-speed turbopump would pump the working fluid out of the fuel tank and into the reactor area while in flight.





Army's VTOL Craft Has Propellers at Wing Tips

Combining features of the conventional airplane and the helicopter, the Army's vertical take-off and landing research plane is shown with its ducted propellers in vertical position, ready for a helicopter-style take-off. When the plane is aloft, the propellers are rotated forward. Doak Aircraft Company designed the plane.

Helicopter Can Operate in Water in Emergency

Vertol Aircraft Corporation has combined fuselage-sealing with newly designed flotation gear to produce a helicopter that can operate like an amphibian in an emergency. The Vertol 44 can land in water at speeds up to 35 miles per hour and taxi at eight knots. The plane takes off from water as it would from a heliport.



From Palm Trees

LIKE MANY OTHER hobbyists, Carl Rahn of Miami, Fla., builds model boats. Only his are unusual because he uses materials from palm trees rather than from the nearest hobby shop.

He builds all kinds of boats—two and three-masted schooners, one and two-masted Chinese junks and sampans, Viking dragon craft, full-rigged clipper ships, as well as barks and brigantines.

Rahn has been building his palm-tree boats since 1954. He began his hobby by accident when he noticed that palm-tree spathes, or buds, have curving, hull-like lines. With a little shaping, he converts a spathe into a streamlined ship hull.

Unhampered by blueprints, Rahn does not try to make actual replicas of boats.

"Real sailors," he explains, "can undoubtedly pick nautical flaws in my ships. But I'm just a landlubber and do the best I can. I'm more interested in the artistic result than in exact measurements."

Usually, Rahn builds any type of ship that strikes his fancy, or that he sees

photographed. Once he even made one from a dictionary illustration. He's always looking for new designs, and copyrights them when they are finished.

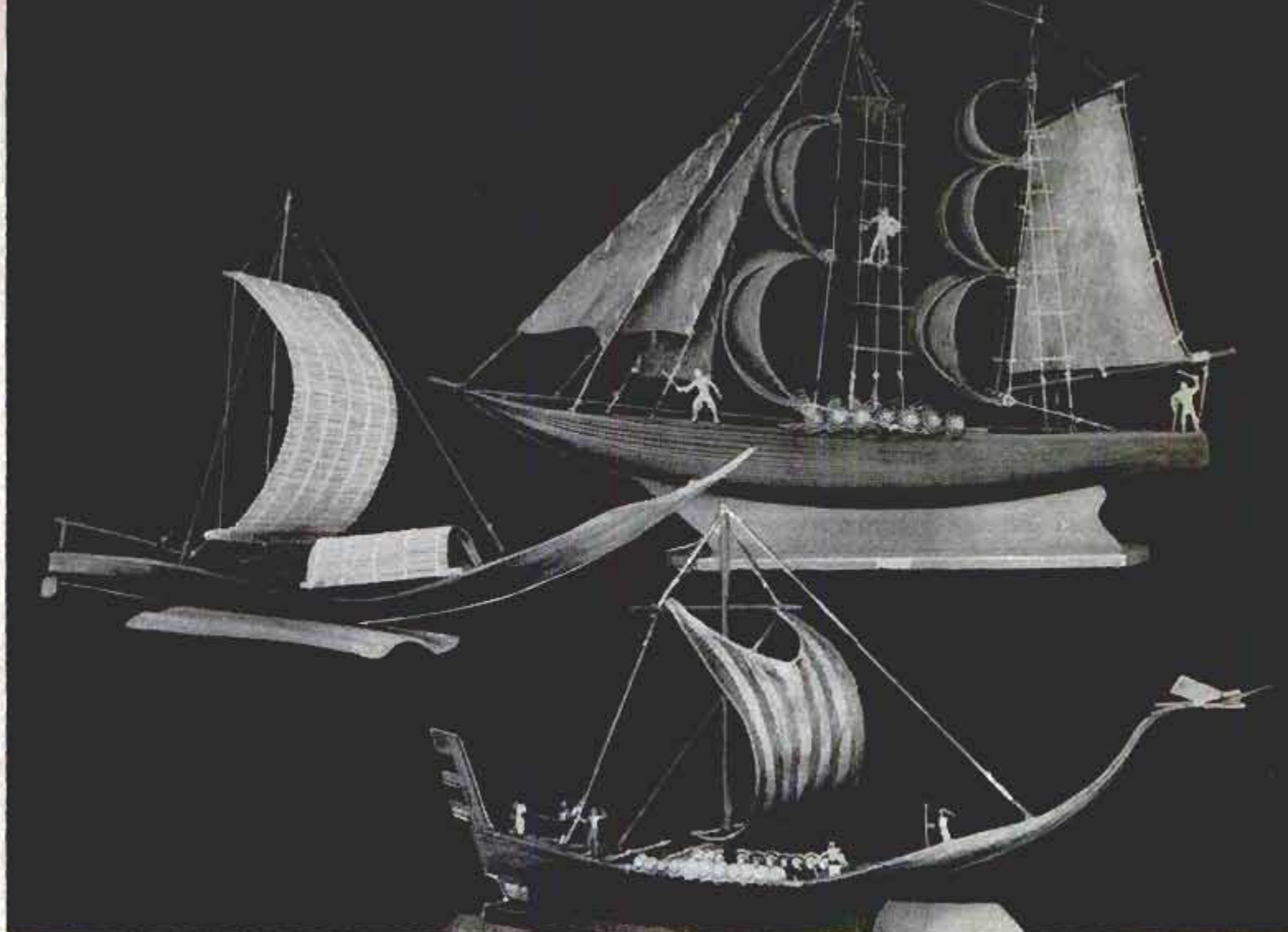
Rahn makes the shipmasts from Calcutta-bamboo fishing poles. Sails come from the burlaplike matting or fibers of the coconut-palm tree. Heavy cord is the rigging. He uses the spathes of two trees, the widely grown coconut and the *Cocos plumosa*, more commonly known as the queen palm. He finishes the spathe hulls with a wood preservative and several coats of varnish and shellac. He outfits each ship with miniature toy pirate or sailor crews.

Rahn, a retired electrician, builds a fleet of as many as 25 ships a year, some of them up to six feet in length. Most of them he takes back to his home town of Cleveland, Ohio, where he sells a few and gives the rest away to friends and to museums and schools.

A true hobbyist, Rahn uses his skill and ingenuity to build ships of beauty from the products of nature. ★ ★ ★



Carl Rahn with full-rigged clipper ship he built of materials from a palm tree. Hull is a tree spathe, or bud, sails are made of fibers from coconut palm

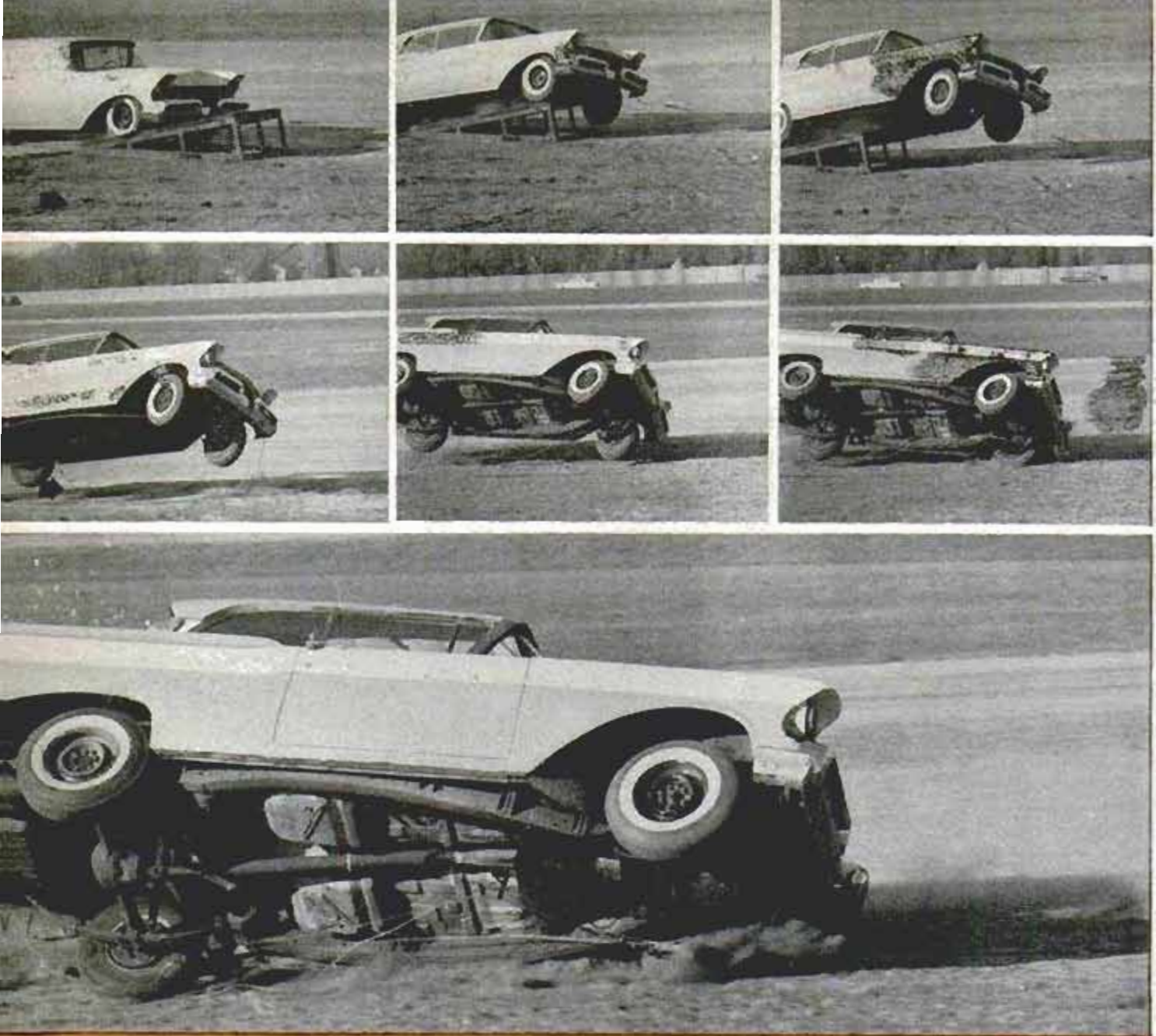


Other examples of Rahn's boats include (above left) a Chinese sampan; (above right) a brigantine, and a Viking dragon ship. Realism is added by crews of toy pirates and sailors. Rahn builds about 25 boats a year

Cutting spathes gave him the idea for his hobby when he noticed they resembled ship hulls

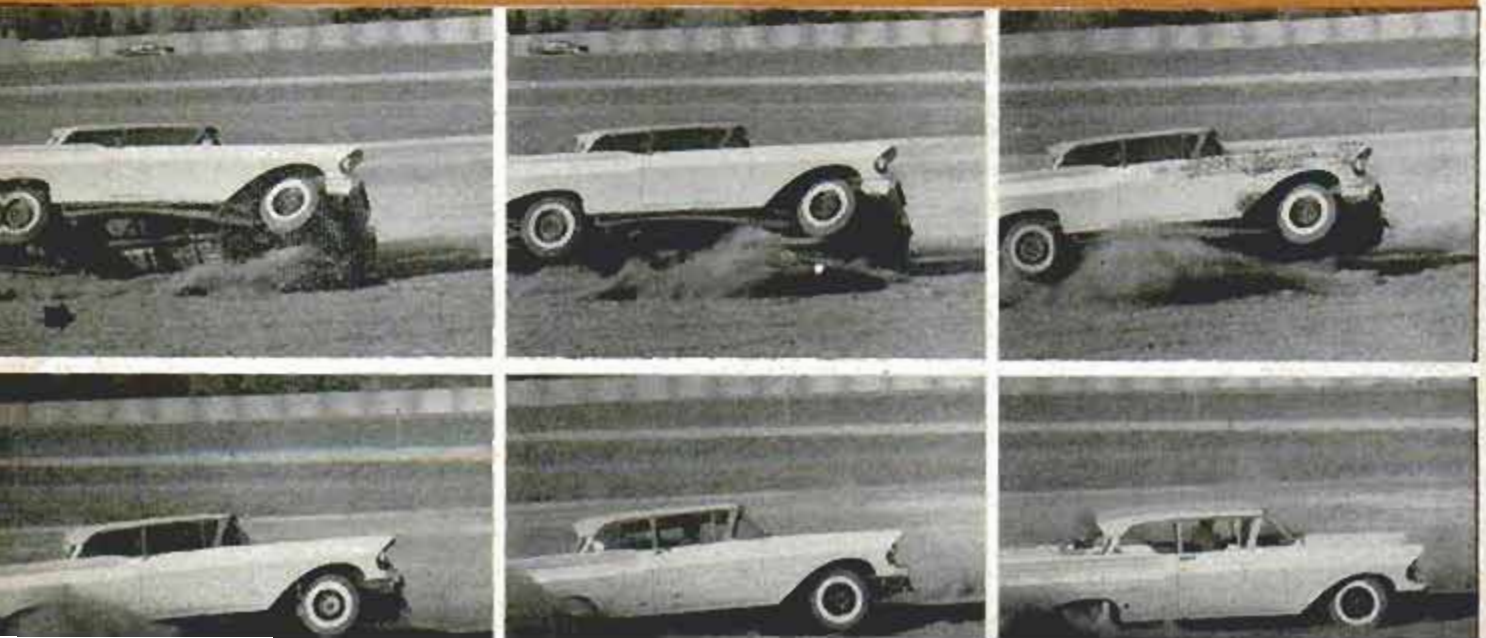
Rahn builds all types of boats. He does not try to make them true replicas, but stresses their artistic beauty





Up and NOT over!

Low cars are more stable, this test proves. Towed over a "flip" ramp, a 1958 Mercury (wearing 1957 sheet metal) was tossed high into the air and twisted. Landing on two wheels, it "tightroped" along before settling down safely with only a broken rear glass. The test "driver" is a dummy (a real dummy, that is)



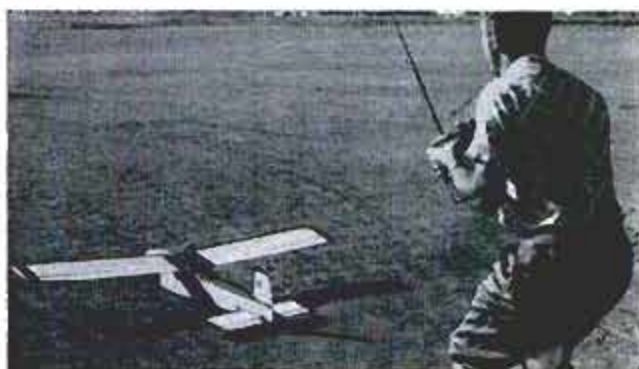


After fueling and starting the engine, owner uses radio to put model through any maneuver of full-size plane

Eight-Channel Control For Model

With a new eight-channel radio control, all the owner of a model airplane needs to do is start the engine. He uses the radio for taxiing, take-off, acrobatics and landing. The transmitter, with its collapsible antenna, is held in the hand. The transistorized receiver inside the plane weighs 21 ounces, complete with servo mechanisms. The range of the radio is approximately four miles, or about as far as the eye can see the model when it is flying at 1000 feet.

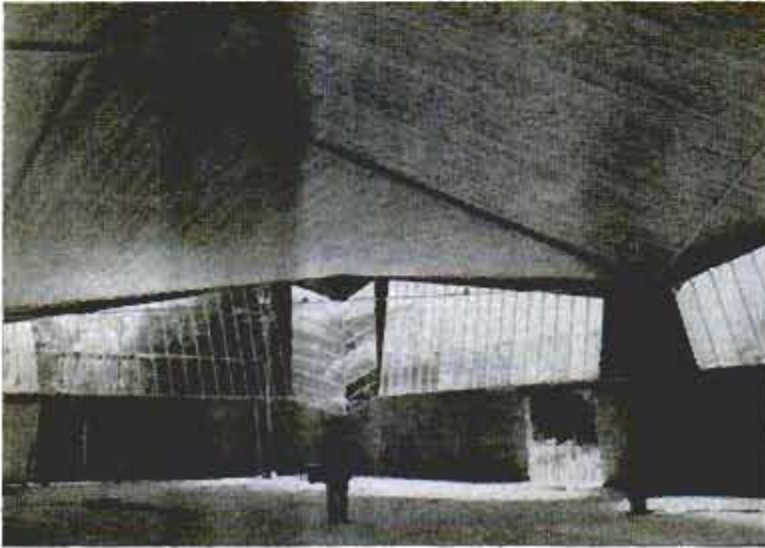
Hand-held transmitter has a collapsible antenna. Range of the radio control is about four miles



Operator advances throttle and plane begins take-off. Next radio will operate elevators to send up plane

Compact receiver fits inside fuselage, with servo mechanisms at rear. Six-oz. battery powers receiver





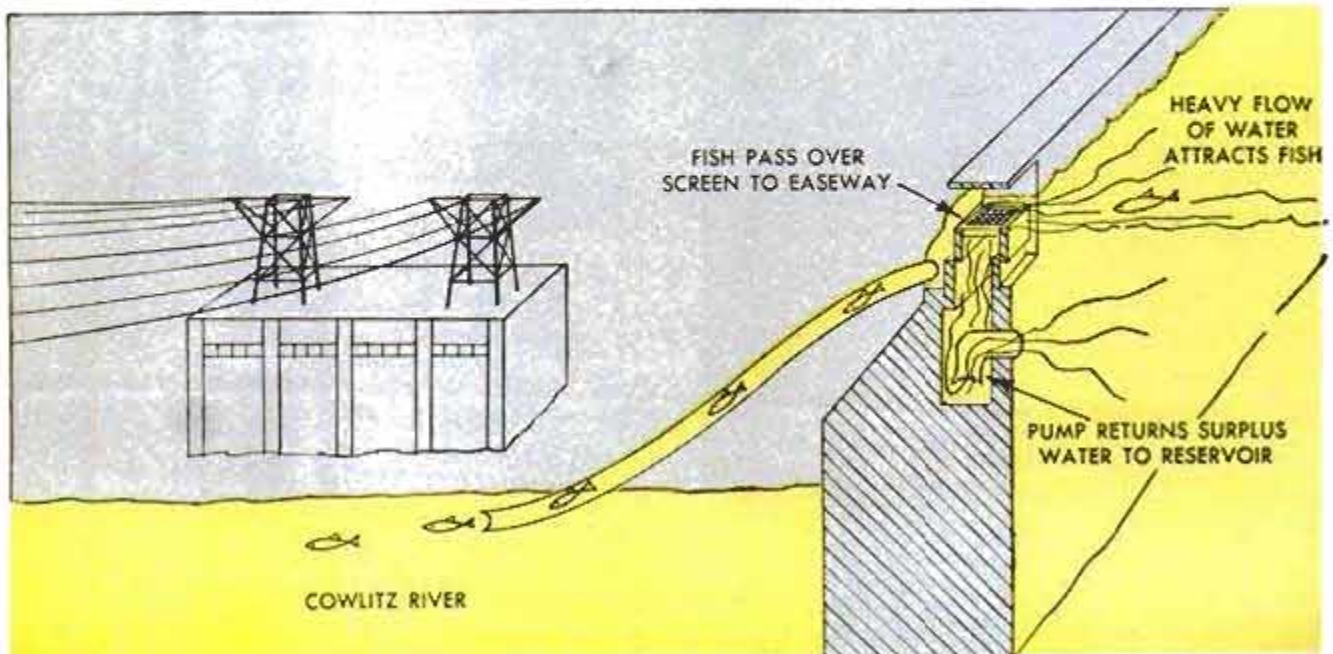
"Fly Away" Roof Cuts Building Cost

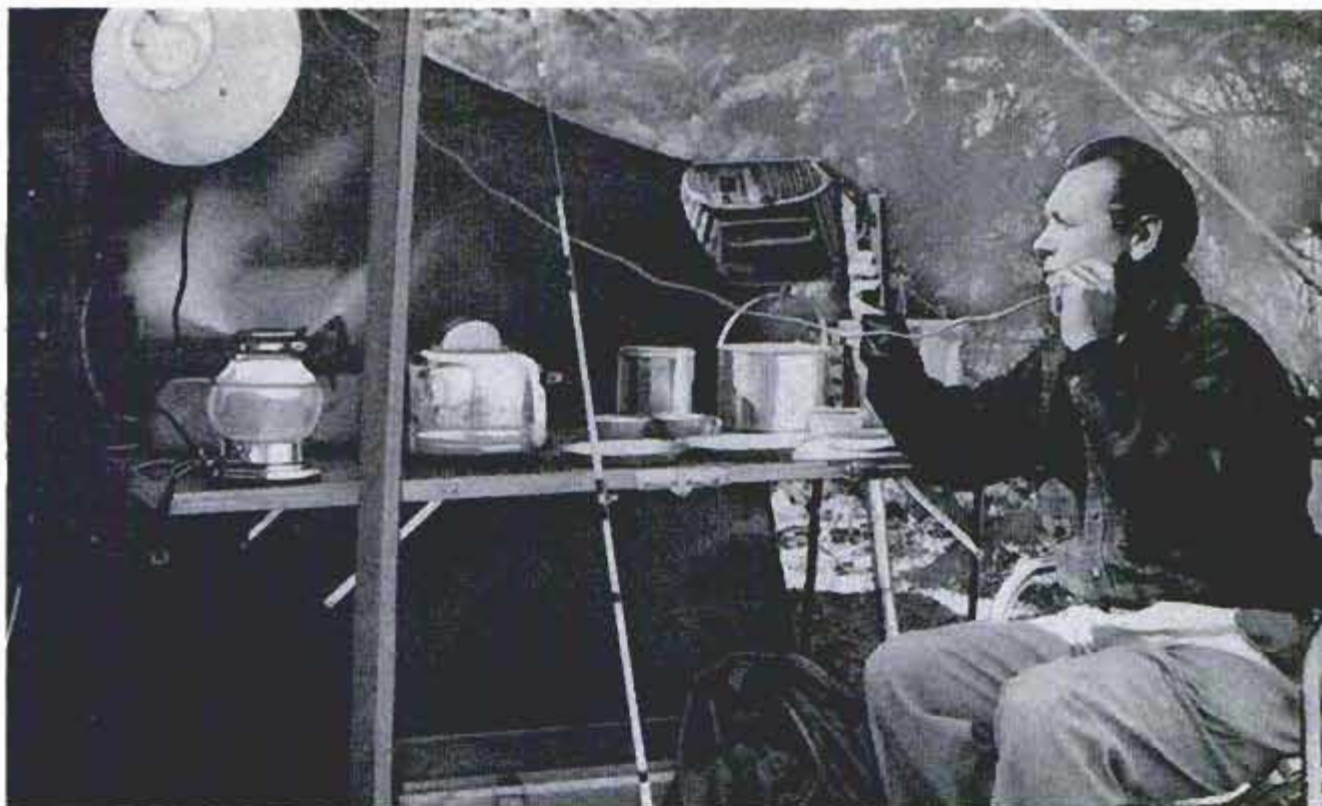
Built for half the cost of a conventional building of the same size, a building designed for a British carpet firm features a "multiple hyperbolic paraboloid" roof. The roof, approximately 115 feet square, is supported at only four places—a concrete column at the mid-point of each side. The roof consists of four panels called hyperbolic paraboloid shells. They are made of three layers of $\frac{5}{8}$ -inch tongue-and-groove softwood. Top and bottom layers are straight, but the middle layer forms a parabola running diagonally across the panel. Laminated edge beams, with a twist of 12 degrees, to accommodate the line of boarding, surround each of the panels. Steel tie rods run diagonally across the panels to resist the outward thrust of the shell. The outside surface of the roof is weatherproofed. Because the roof support is independent of the walls, large areas of glass can be used on the sides of the structure, located at Salisbury, England. Concrete block is used for the lower wall part.

Fish Migration Gets Boost With Dam Skimmer

How can a fish continue its downstream migration after it enters the reservoir behind a big power dam? Engineers and wildlife experts hope to find the answer in a "skimmer" being designed for the Mayfield Dam at Tacoma, Wash. A slot would be cut in the dam, near the top, and the flow

of water into the slot would attract the fish. The fish would pass over a wire screen and into a flume while about 90 percent of the water would fall through the screen and be returned to the reservoir. The flume would carry the fish safely into the river where they would continue their migration.

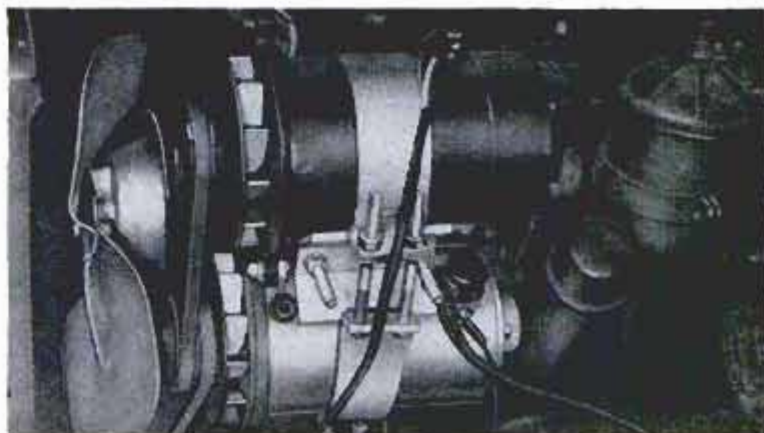




Roughing it like a king, a camper today can operate home appliances from a.c. generator on his car engine

Now You Can Carry House Current in Your Car

When you go on that camping trip this summer, you can take along such home comforts as the electric shaver, coffeemaker and toaster. A combination generator for cars, trucks and tractors produces 120-volt alternating current for home appliances and power tools when you flip a switch. The generator also produces 6 or 12-volt direct current for automotive circuits. An automatic control will speed up the car engine when a 120-volt tool or appliance is turned on. The device also returns the engine speed to an idle and changes the generator back to the direct current range when the a.c. device is turned off. The generator delivers 1200 watts of continuous duty 60-cycle a.c. but can handle up to 1800 watts for intermittent use. The direct-current side of the generator produces 35 amperes. The combination unit also can be used in conjunction with original-equipment generators. The a.c.-d.c. generator is attached to the regular d.c. unit in piggyback fashion. With the two units combined, up to 70 amperes of direct current can be delivered or, by flipping a switch on the dashboard, 1200 watts of 110-volt a.c.



Combination a.c.-d.c. generator can be connected piggyback fashion to original equipment unit for extra power, above. Power tools, below, also can be operated by combination unit





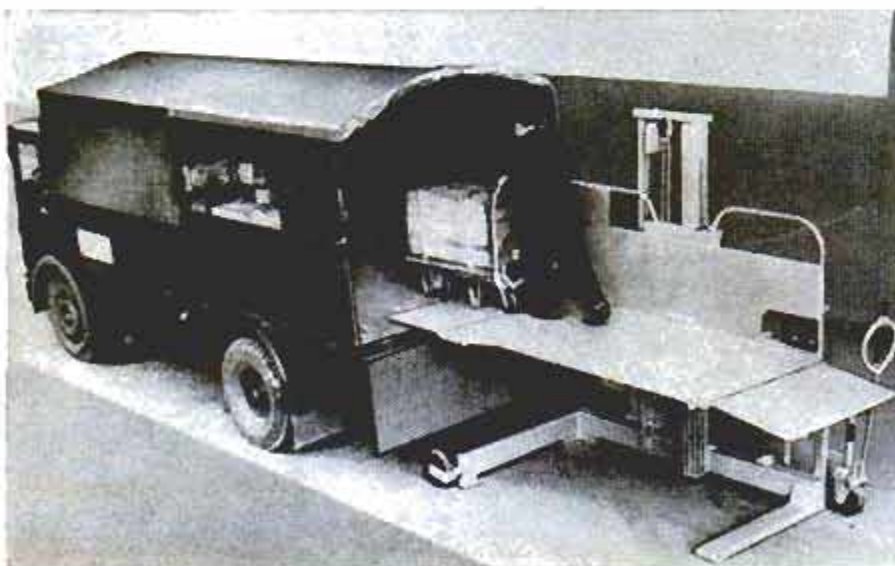
Burglar Alarm Works by Radar

Anything that moves within 25 feet of a radar burglar detector will trigger an alarm. The device can be rigged to turn on a light or activate a siren that can be heard a half mile away. It also can be wired to silently notify police without letting the burglar know he has been detected. The radar alarm is virtually tamperproof—since anything that moves close to the set starts the alarm. An independent battery-powered circuit makes an electric bell ring if the main power supply is interrupted by disaster.



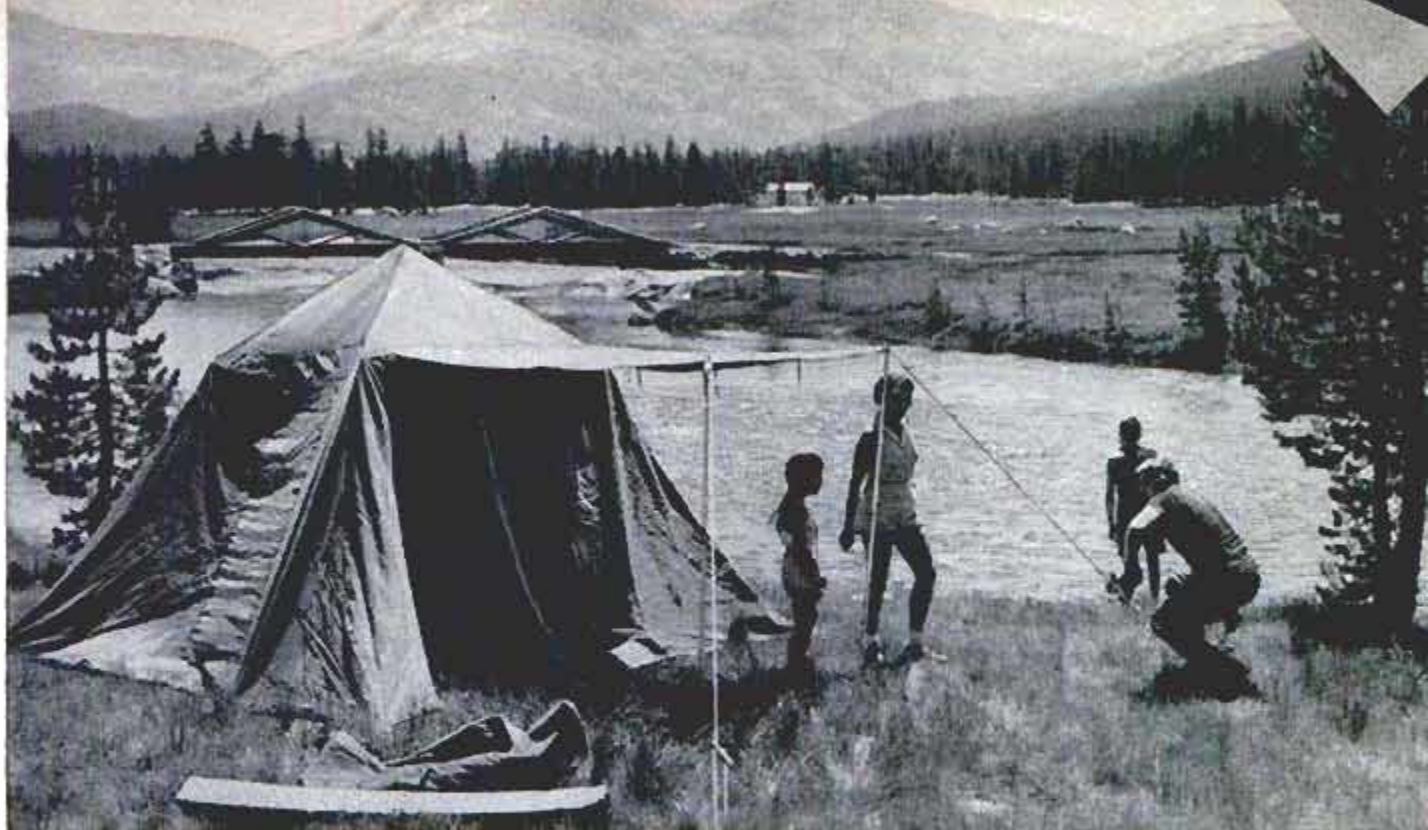
Metal Detector Searches Lake Bed

Prospectors can search for treasures of the earth, even at the bottom of a lake, with a recently developed magnetometer. The portable metal detector can hang over the bow of a boat like a fishing rod. It is sensitive to changes in the earth's magnetic field caused by mineral deposits and variations in subsurface geological structures. The magnetometer also can be used for prospecting on land or in the air.



Portable Dock

Push-button switches at both hand and foot levels control the elevator action of an adjustable loading dock manufactured in West Germany. The machine can raise load of up to six tons to preset levels up to 80 inches. It is used by firms which have no permanent loading docks or to adjust height differences between docks and truck beds. The lift can be moved to various sites.



Where is there a more enjoyable home than beside a stream meandering through a mountain meadow

Four Weeks of Camping on a Family Budget

PART II

Here are tips for campers. We learned them the hard—but enjoyable—way on our 7500-mile tenting tour of the West

By Joseph N. Bell

LOOKING BACK over our 7500-mile, four-week, camping-traveling vacation, we've reached some basic conclusions about both traveling and camping. And we've found that the trip shattered a few of our illusions.

In general, we were disappointed in camping facilities in our national parks. Only one national park—Yellowstone—was doing any modernizing. A whole new development had just been completed at Yellowstone's Grand

Early morning in a mountain camp: The crystal clear and icy water is guaranteed to shock anyone awake





Camping trips don't always mean traveling. One of our happiest stops was with ranching friends. The kids went out to help round up calves for branding



This was one of our most enjoyable lunch spots—right beside the blue Pacific. In our 30 days of travel we ate only three meals in restaurants. Below, map shows route of our first camping trip



Canyon area, including lodge, cabins, restaurants and camp grounds. It was one small bright spot in a generally opaque picture, but a mark of progress nonetheless. Among the other parks, we found Estes Park and Mesa Verde the most satisfactory for camping, and Grand Canyon by all odds the worst. The camper, however, must condition himself to the fact that in our parks he will be surrounded by camping neighbors, generally in a spot that has been camped on countless times before and where the grass has long since disappeared. The parks will also generally be quite crowded during the hot summer months.

Sanitary facilities in our parks range from deplorable to excellent. In general, the newer the park, the cleaner and better the sanitary facilities. Here, again, the state parks outstrip the national parks. State parks are usually much smaller than national parks, but they are also less crowded, cleaner and tend to be closer to their natural state.

The location of parks suitable for camping is spotty. They are sparse through the Midwest, practically nonexistent in the Plains states, thick and beautiful through the Rocky Mountain and Pacific Coast states and again virtually nonexistent in desert areas of the Southwest. One of the first steps you should take in planning a camping vacation is to write the U.S. Department of the Interior for a map (cost \$1.00) called "The Recreational Areas of the United States." Besides pinpointing all state and national parks, this map also shows the facilities available at each and lists the proper department to write to in each state for literature on state recreation areas. A letter to the states along your route will provide you more detailed information on what to expect. From this (and also from talking with others who have traveled the same country) you can set up an itinerary which will at least give you some idea of where and when you

should expect to camp—and also suggest the most appropriate places for motel stops.

The cost of camping facilities is usually negligible; most parks are likely to charge a small entrance fee. The largest we encountered was \$3.00 at Yellowstone and Yosemite.

How long does it take to set up and break camp for overnight stops? The longer we did it, of course, the more proficient we became—up to a certain point. Setting up camp is much easier than breaking it. By the end of our trip, we were able to set up camp (unload the equipment, pitch our umbrella tent, assemble cooking gear, unroll the sleeping bags and inflate the air mattresses) in about 35 minutes. The best we were able to do in breaking camp was 75 minutes. The reason for the difference is the extra amount of time required for deflating the air mattresses, brushing and folding the tent, and loading the equipment into the luggage carrier.

Everyone in the family was assigned specific jobs. When we set up camp, my wife Janet began supper while I threw down camping gear from the top of the car to the children below. The girls then unrolled the sleeping bags and began inflating the mattresses as David and I tackled the tent. David staked out the corners and handed me the proper poles while I went inside and raised the canvas. Janet helped get

the inside cross braces in place when I reached that point. In the mornings, we broke camp while Janet was preparing breakfast. Again, the girls took care of the mattresses while David and I struck the tent. Everyone then handed equipment up to me while I loaded the carrier.

We found that a nine by nine-foot umbrella tent met our needs most satisfactorily. It went up and down quickly and easily, and was large enough for all of us to sleep comfortably. Our sleeping bags were lined with Dacron Fiberfill, and we needed this warmth most of the nights we camped. (Sleeping bags are no place to economize!) We carried no blankets or other bedding, except for sleeping-bag liners which can be washed, and pillow which we left in the car for sleeping during the traveling hours. Although there were several nights we slept in sweat shirts, our sleeping bags usually gave us adequate protection against the cold.

The happiest surprise in our equipment was the tiny two-burner propane-gas stove. It required no pumping, ignited easily and consistently, and the propane cartridges could be replaced quickly when exhausted. (The same was true of our lantern.) Equipment we will leave behind the next time includes the folding table (used very seldom because most parks provided tables at each campsite), the metal dishes (we used paper plates to save the bother of

Everyone helped set up camp. We found that the folding table was a luxury. Most parks provide tables for campers





His camping gear is his home, so the camper keeps it clean. I swept the tent each time we broke camp

dishwashing) and the camp stools.

We carried our food in an aluminum icebox without ice. The reason: Its bulk necessitated keeping it on top of the car where the heat was terrific and there was no place for it to drain. So we carried our staples in the iceless icebox and bought perishable food as we needed it. We preserved our milk and other drinks in two vacuum jugs which effectively kept the drinks fresh until we consumed them. We used a great deal of canned food—to which Janet would often add fresh meat (for example, canned spaghetti with fresh hamburger). We ate well. It wasn't fancy, but there was plenty of it and Janet used a great deal of imagination in preparing menus which were built around canned foods.

One of our most eye-opening discoveries was the auxiliary uses we found for our camping equipment. At our first motel stop, the motel was crowded and the only re-



Mornings in the mountains are cold. Debbie was always bundled to her ears as she greeted a new day

maining room had just a double bed. With the motel owner's permission, we moved sleeping bags in for the children. Thus our motel room cost us \$7.00 instead of the \$13.00 rate for beds for five people. From that time on, whenever we stopped in a motel we used our sleeping equipment to cut costs—and never ran into any objections on the part of the motel owners.

We also cooked all our meals—wherever we happened to be. When we weren't at a campsite, we usually sought out a roadside table; but we also found a surprising number of motels equipped with cooking facilities, even though we didn't ask for them. And on two occasions when we were caught without sleeping facilities of any kind, we simply pulled off the road, put the girls to bed inside the car and the men outside in sleeping bags.

Except for the bears in Yellowstone, the only invaders we had were welcome vis-

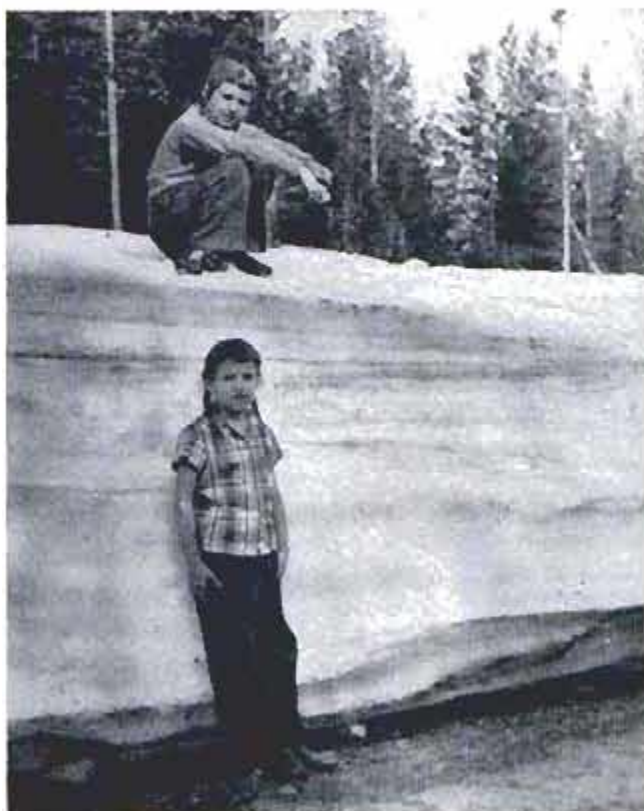
COST OF TRIP		
\$ 300	COMMERCIAL (Estimated)	
	(Figuring a \$10 nightly average for motels.)	
450	LODGING	\$ 92
	(Figuring an average of \$15 a day for five people—a bare minimum)	
240	FOOD	108
	(Gas, oil, repairs, maintenance, grease, oil filter, two new tires)	
45	AUTOMOBILE	240
\$1035	AMUSEMENTS, ENTERTAINMENT	45
	Total Cost	\$485

itors who were also camping. Campers are generally gregarious critters and are likely to stop by for a chat or to offer help when it's needed. One camping family, departing Yellowstone, spotted our camping equipment on top of the car and pursued us for several minutes to tell us of the new camping facilities near Canyon Lodge.

Most of the foregoing applies mainly to overnight camping and inexperienced campers. If you plan to spend your entire vacation at one campsite, your approach would be somewhat different. You would take recreation equipment along—fishing gear, possibly a boat or motor, perhaps a canoe, water skis, hunting equipment or similar accoutrements. Also you would find a great deal more freedom in selecting a site for a permanent camp. You have time to get off the beaten track, explore the back roads, even pack your equipment back into a real wilderness area. Here is where you'll find the type of camping frequently pictured as typical—the virgin forest, untrammled and unspoiled. There are such places—many of them—but few are accessible to the overnight or traveling camper.

But the traveler *can* pitch his camp away from established campsites in our national forests by obtaining a campfire permit from the nearest forest ranger (whether you plan to build a campfire or not). This, of course, precludes toilet facilities and—sometimes—water. We found that it sounded good in the living room at home but was generally impractical be-

There was snow in midsummer in Estes Park—higher than the girls' heads and hard enough to climb on



JUNE 1958

cause of the lack of water and sanitation and the necessity of having the car near the campsite for loading and unloading.

What are some of the rewards of camping your way on a long trip? First and foremost, camping makes it possible for people everywhere to see other parts of our country which wouldn't otherwise be accessible to them because of the prohibitive cost of extended travel with a family. But camping can be more than just a means to an end. It unifies the family while giving a taste of rugged outdoor life, and it can bring the beauties and the wildlife of our country very close indeed.

Financially, camping meant a great deal to us. We were on the road for 30 days. Tabulated on page 140 is what it *would* have cost us without the camping equipment, contrasted with what it *did* cost.

The saving of \$550 meant the difference between taking the trip or staying home to us. It also is a very conservative estimate. Actually the savings would probably amount to much more, as both the lodging and food would undoubtedly average out higher at commercial rates. Especially is this true in national parks; in Yellowstone, for example, first-class accommodations would have cost us upwards of \$25 a day for lodging alone.

Here are a few additional suggestions that might be helpful to you:

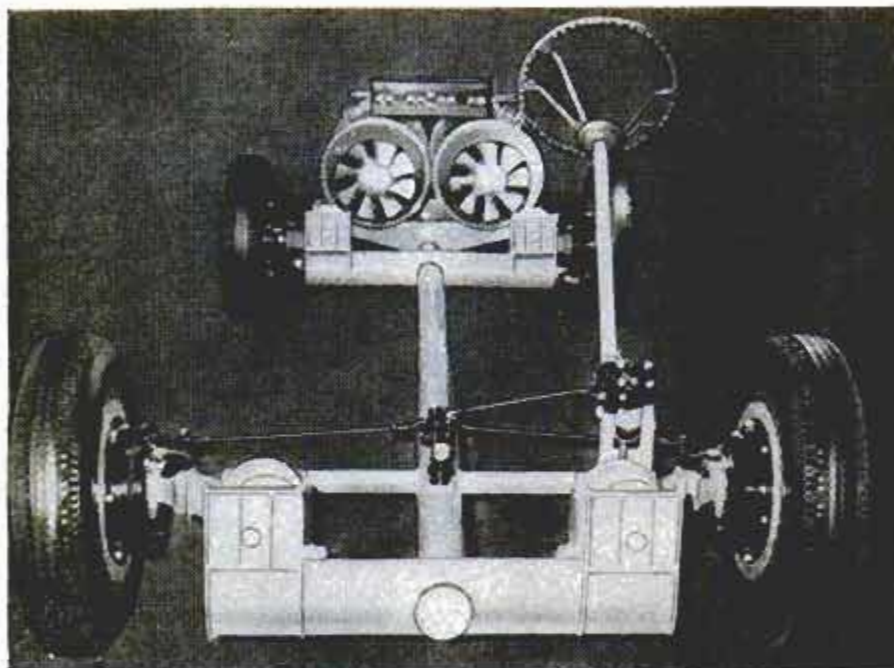
- Buy your food, if at all possible, in supermarkets in towns along the route.

(Continued to page 222)

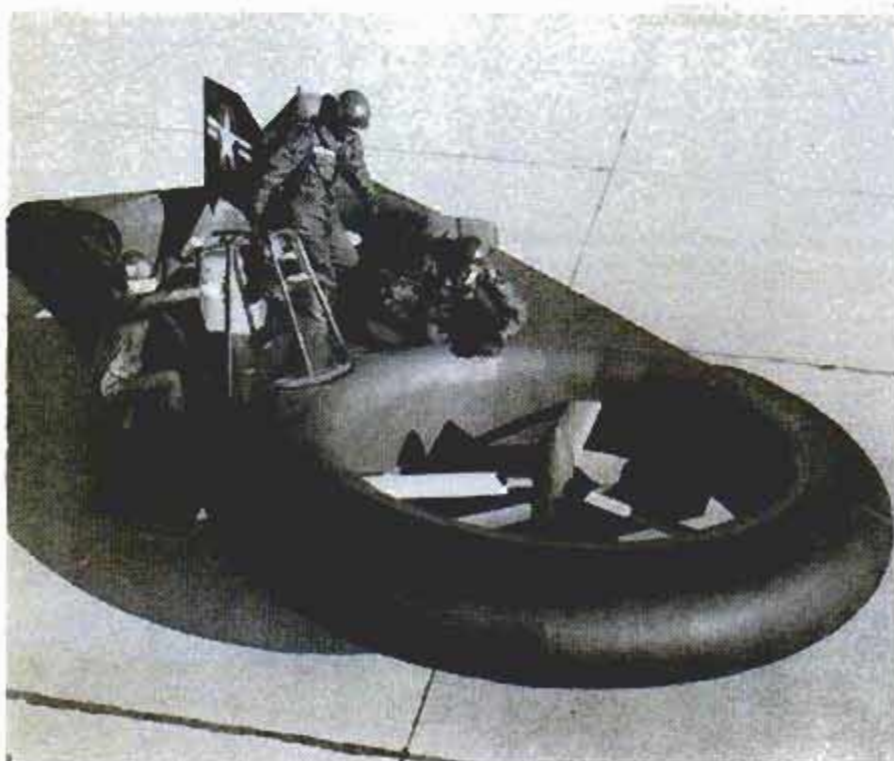
Girl meets mountain goat—and immediately they're fast friends. Wildlife along our route was plentiful



French Car of the Future Needs No Gasoline Tank



Tomorrow's car will be driven by electricity and will need no gasoline tank, if the dreams of French designers materialize. The dream car, called the Arbel, generates its own electricity with an engine mounted in the rear. Four separate electric motors, one at each wheel, do the driving and eliminate the need for a transmission or differential. The chassis is made of rugged tubing which, being hollow, is used as the fuel tank. Still only a dream, the car is said to be easily adaptable to nuclear power.



Tiny Aircraft Has Vertical Take-Off

This unique and radical VTOL (vertical take-off and landing) aircraft will fly by means of two horizontal rotors housed within its chassis—one at the front, one at the rear. Known as the Piasecki 59K, the strange-looking craft will fly forward at speeds faster than 150 miles per hour. It will operate over any terrain and will hug the ground, flying under bridges or wires or behind low objects. Its compact design will enable the 59K to thread its way down narrow streets, between buildings and trees.

Radio Television Electronics



Transistorized tape recorder powered by pen-lite cells provides low-cost, variable speed recording and playback for only \$29.95 with mike and 'phones

INTERESTING IMPORTS

Versatile tilt-back tape mechanism with preamplifier and erase circuits quickly converts any record player into a high-quality tape recorder. Adapter is fastened to record player mounting board and derives driving power directly from turntable. Provides

tape speeds of 7.5 and 3.75 i.p.s. from 78 r.p.m. turntable. Permits recording from microphone, radio or phono and plays back through any radio or amplifier. The latter can easily supply the low power requirements of the recorder's electronic circuits



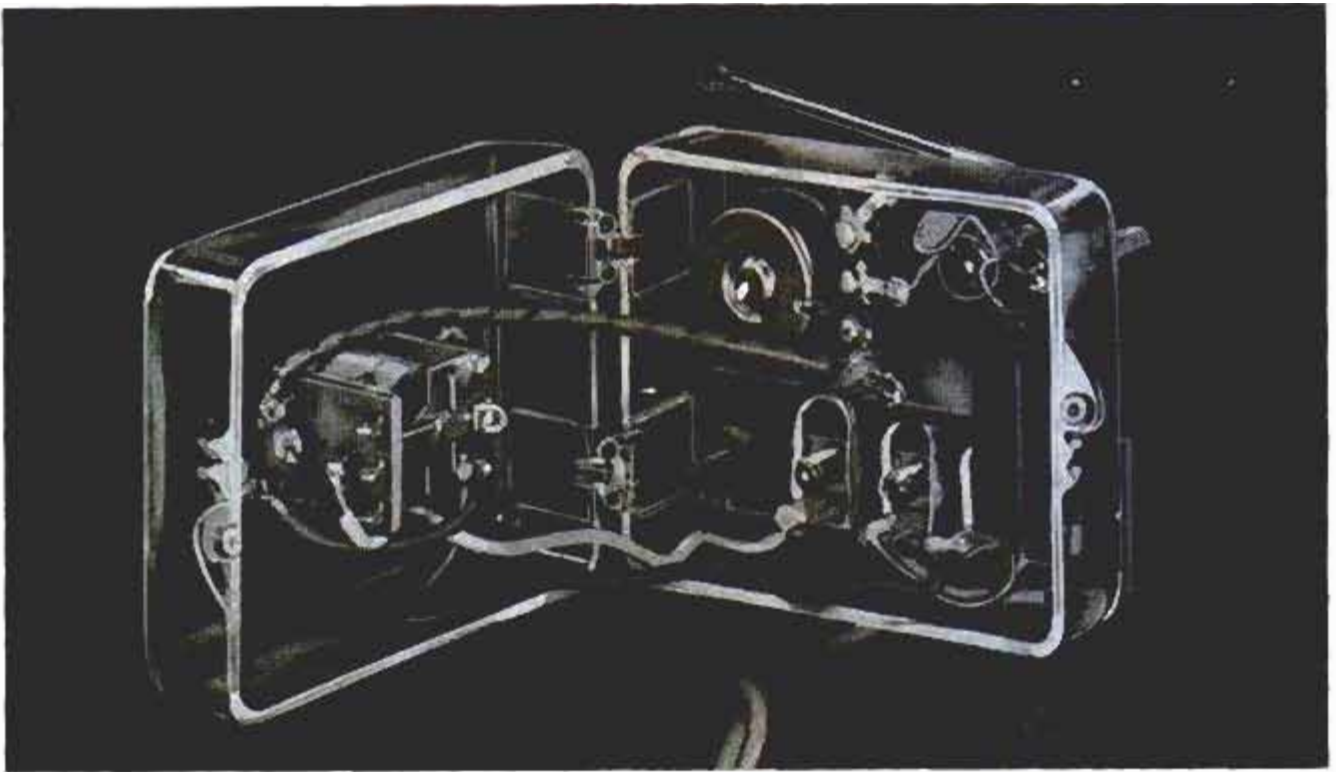
TAPE TIPS

Proper combination of tape size and recorder speed eliminates wasted tape and prevents loss of program material due to changing reels in the midst of an "off the air" broadcast to be added to your perma-

nent collection. The following chart, showing recording time of currently available tapes for various recorder speeds, can be pasted to the inside of your recorder for handy reference.

REEL SIZE (in.)	TAPE LGTH. (ft.)	SINGLE-TRACK PLAYING TIME FOR VARIOUS TAPE SPEEDS AND TAPE LENGTHS				DUAL-TRACK PLAYING TIME	
		TAPE SPEED—Inches per second				3 3/4 i.p.s.	7 1/2 i.p.s.
		1 1/2 i.p.s.	3 3/4 i.p.s.	7 1/2 i.p.s.	15 i.p.s.		
3	150	15 min.	7 1/2 min.	3 3/4 min.	1 1/2 min.	15 min.	7 1/2 min.
3	225*	22 1/2 min.	11 1/4 min.	5 3/8 min.	2 1/4 min.	22 1/2 min.	11 1/4 min.
4	300	30 min.	15 min.	7 1/2 min.	3 3/4 min.	30 min.	15 min.
4	450*	45 min.	22 1/2 min.	11 1/4 min.	5 3/8 min.	45 min.	22 1/2 min.
5	600	1 hour	30 min.	15 min.	7 1/2 min.	1 hour	30 min.
5	900*	90 min.	45 min.	22 1/2 min.	11 1/4 min.	90 min.	45 min.
7	1200	2 hours	1 hour	30 min.	15 min.	2 hours	1 hour
7	1800*	3 hours	90 min.	45 min.	22 1/2 min.	3 hours	90 min.
7	2400**	4 hours	2 hours	1 hour	30 min.	4 hours	2 hours
10 1/2	2400	4 hours	2 hours	1 hour	30 min.	4 hours	2 hours
10 1/2	3600*	6 hours	3 hours	90 min.	45 min.	6 hours	3 hours
14	4800	8 hours	4 hours	2 hours	1 hour	8 hours	4 hours
14	7200*	12 hours	6 hours	3 hours	90 min.	12 hours	6 hours

*Long-play tape, 1-mil film. **Double-play tape, 1/2-mil film. Chart courtesy ORRadio Industries, Inc.



THERMISTOR-CONTROLLED TEMPERATURE RELAY

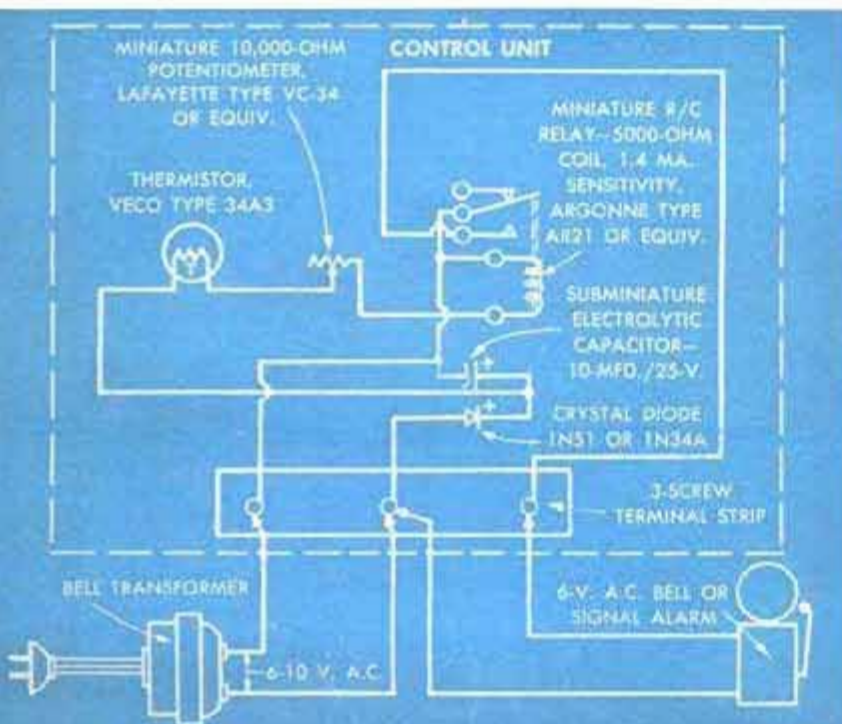
By James A. McRoberts

THERMISTORS, though widely used in military and industrial electronics, are relatively unknown to hobbyists and home experimenters. Yet, the unique characteristics of these readily available components can be adapted for numerous interesting applications. As the name implies, thermistors are heat-sensitive resistors whose instantaneous resistance values depend upon temperature. Since the change of resistance per degree of temperature variation

is appreciable, and is accurately reproducible over wide limits, such units, with properly designed circuits, are ideally suited for temperature measurements, temperature compensation and temperature control.

The unit described here is intended primarily as a reliable home-type fire alarm. Through the simple expedient of adding another relay, however, the same circuit can be used as an adjustable thermostat for turning on heaters or air conditioners at predetermined temperatures.

Fig. 1. Schematic diagram of temperature-controlled relay



How It Works. The thermistor used in this circuit has a nominal resistance of approximately 3500 ohms at 77 degrees F. At 120 degrees F. the resistance decreases to approximately 1400 ohms and continues to decrease at a rate of about 2.5% per degree.

As shown in the diagram, Fig. 1, this thermistor is connected in series with a potentiometer and a relay coil across a source of low voltage d.c. The d.c. potential is obtained by rectifying and filtering the a.c. voltage from a step-down transformer such as a bell or filament transformer. With proper adjustment, the current through the relay coil is limited to a value too small to activate the relay at normal temperatures. As the

temperature increases, the thermistor resistance decreases, permitting a greater current-flow through the relay coil and closing its normally open contacts. As the contacts close, the a.c. voltage from the transformer is applied through the contacts to an external 6-v. a.c. bell or other signaling device.

Once activated, the bell will continue to ring until manually shut off or until the thermistor temperature decreases below that value which originally caused the relay to close.

To eliminate the need for high-voltage transmission line runs, the control unit, Fig. 2, operates from the 6-10 volt a.c. winding of a bell transformer. This compact little unit may be mounted in any desired location and a number of them can be wired in parallel, as in Fig. 4, to afford protection in a number of places simultaneously. When so wired, the energizing of any relay will sound the alarm. Since the current drain of each unit is very small (a dozen of them use less power than the smallest night light), operating expenses are negligible. The entire alarm system may be wired into an existing doorbell circuit with wires from the transformer and bell running to the terminal lugs of the control units as shown in Figs. 1, 2 and 3. Normal doorbell operation is not impaired.

To permit economical operation from a low-voltage source, the relay used in the control unit must be a sensitive one. The one recommended in Fig. 1 is a relatively inexpensive import (available from La-

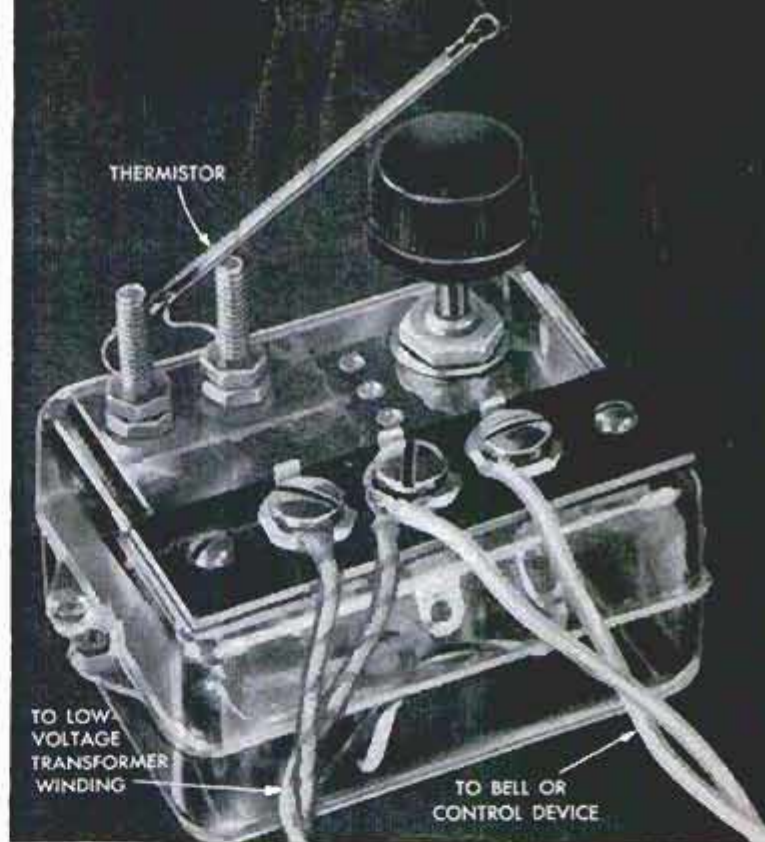


Fig. 2. All small parts are housed in tiny plastic container. Thermistor is mounted on outside of box

fayette Radio) which was designed for remote-control model work. Its contacts will handle the current requirements of an ordinary doorbell, but if a more powerful alarm signal is desired, or if the unit is to turn on motors or other electrical devices, an auxiliary relay with a 6-volt a.c. coil should be employed. The coil of the auxiliary relay should be wired in place of the

(Continued to page 224)

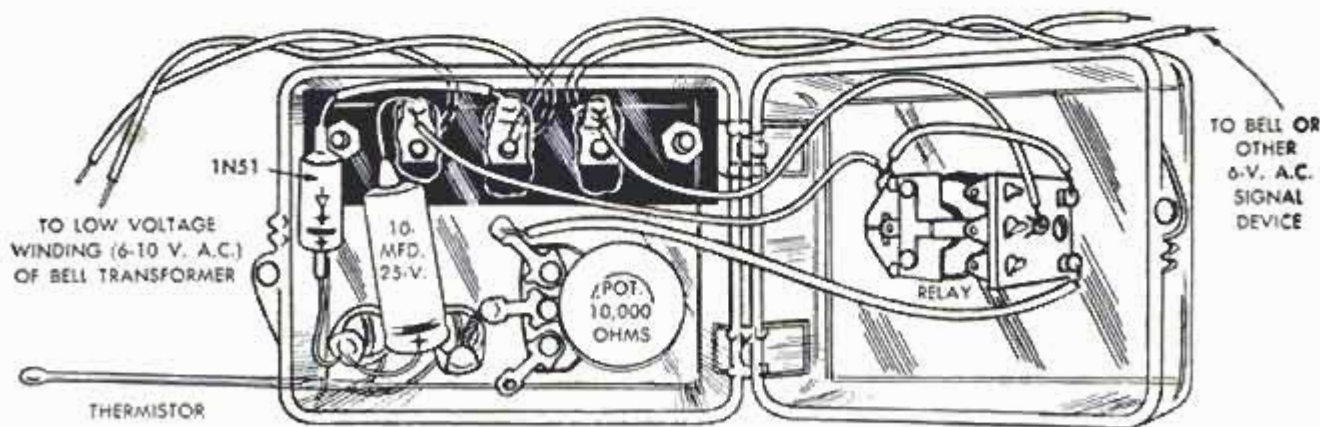
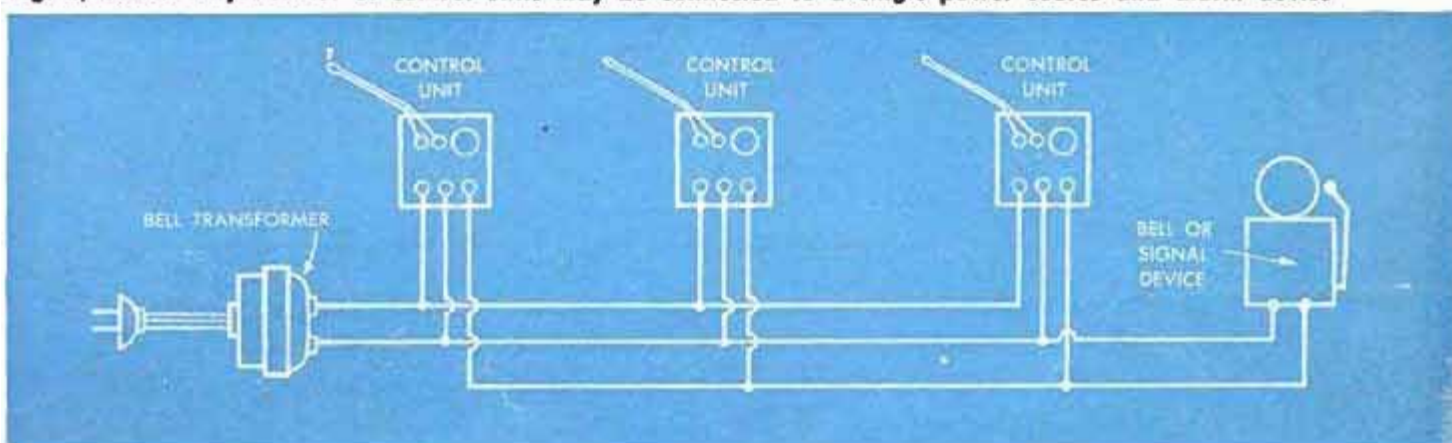


Fig. 3, above. Pictorial wiring diagram showing recommended parts placement. Layout is not critical
Fig. 4, below. Any number of control units may be connected to a single power source and alarm device



NEW PRODUCTS

for Home and Shop

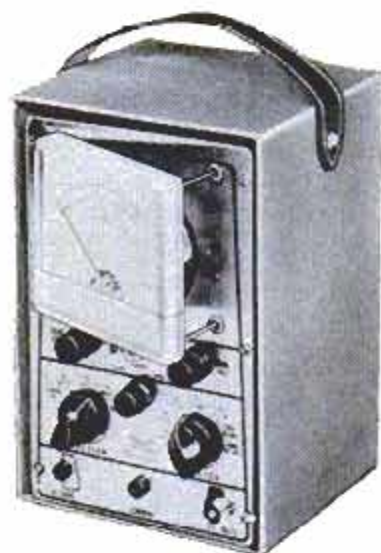


Ideal for music lovers who enjoy listening to records after retiring, Music Minder, left, automatically shuts off entire hi-fi system after last record has been played



Small, inexpensive neon tester, above, quickly checks electric appliances for possible shock hazard due to defects or incorrectly inserted line cords. Supplied with self-sticking markers to label plug and wall outlet for correct polarity and added safety

New features for "old reliable." Available in kit or prewired, new VTVM has meter which tilts up, down and to any desired angle for easy viewing. Also has switch for opening and shorting test leads without disconnecting, for quick zero and infinity settings

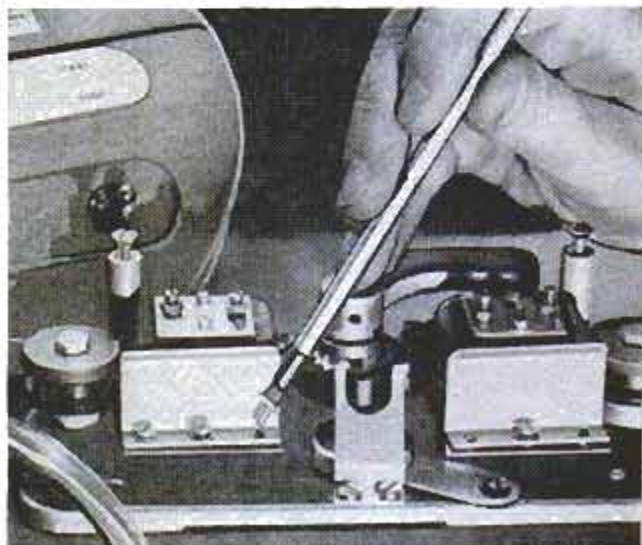
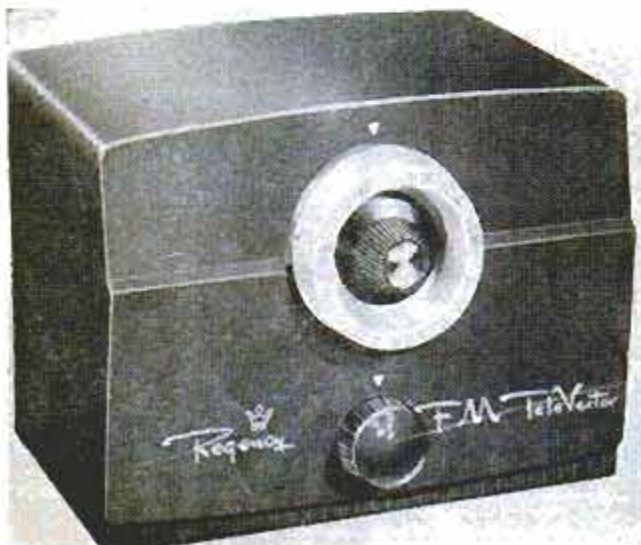


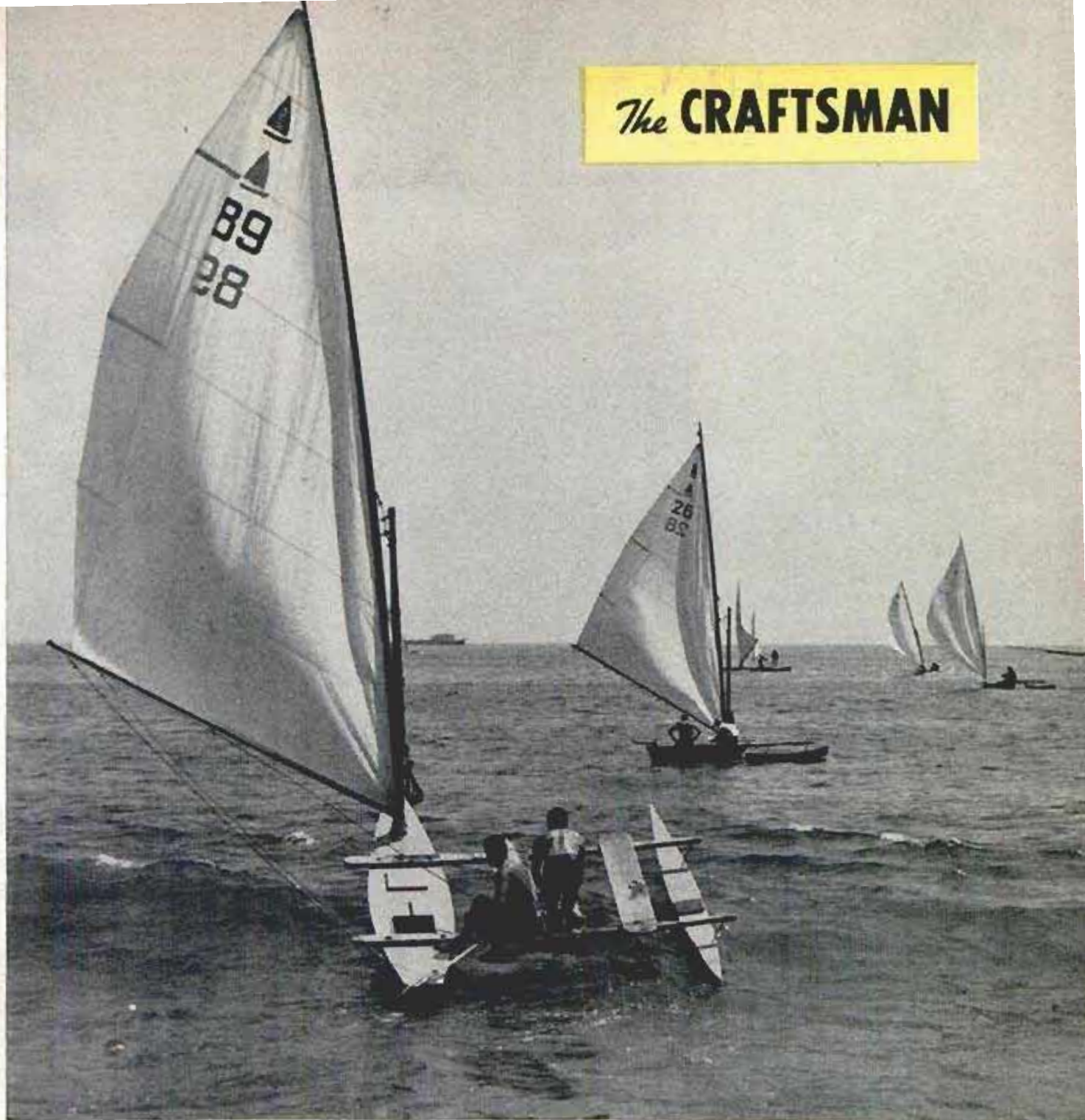
Pen-size and transistorized, novel signal injector generates basic 2000-cycle audio signal and high-frequency harmonics for trouble-shooting electronic equipment. Injector is powered by a single flashlight cell



Transistorized converter, below, provides FM broadcasts through any TV receiver. Easy installation requires only two connections: One to TV antenna, the other to antenna terminal. Front panel selector permits instant switching from TV to FM reception

Avoid skinned knuckles and lost hardware when inserting screws in hard-to-reach places. When pushed into a screw slot, small twin bits in tip of screw-holding driver, shown below, expand to hold screw firmly gripped until it is properly seated in thread





Outrigger for Fun in the Surf

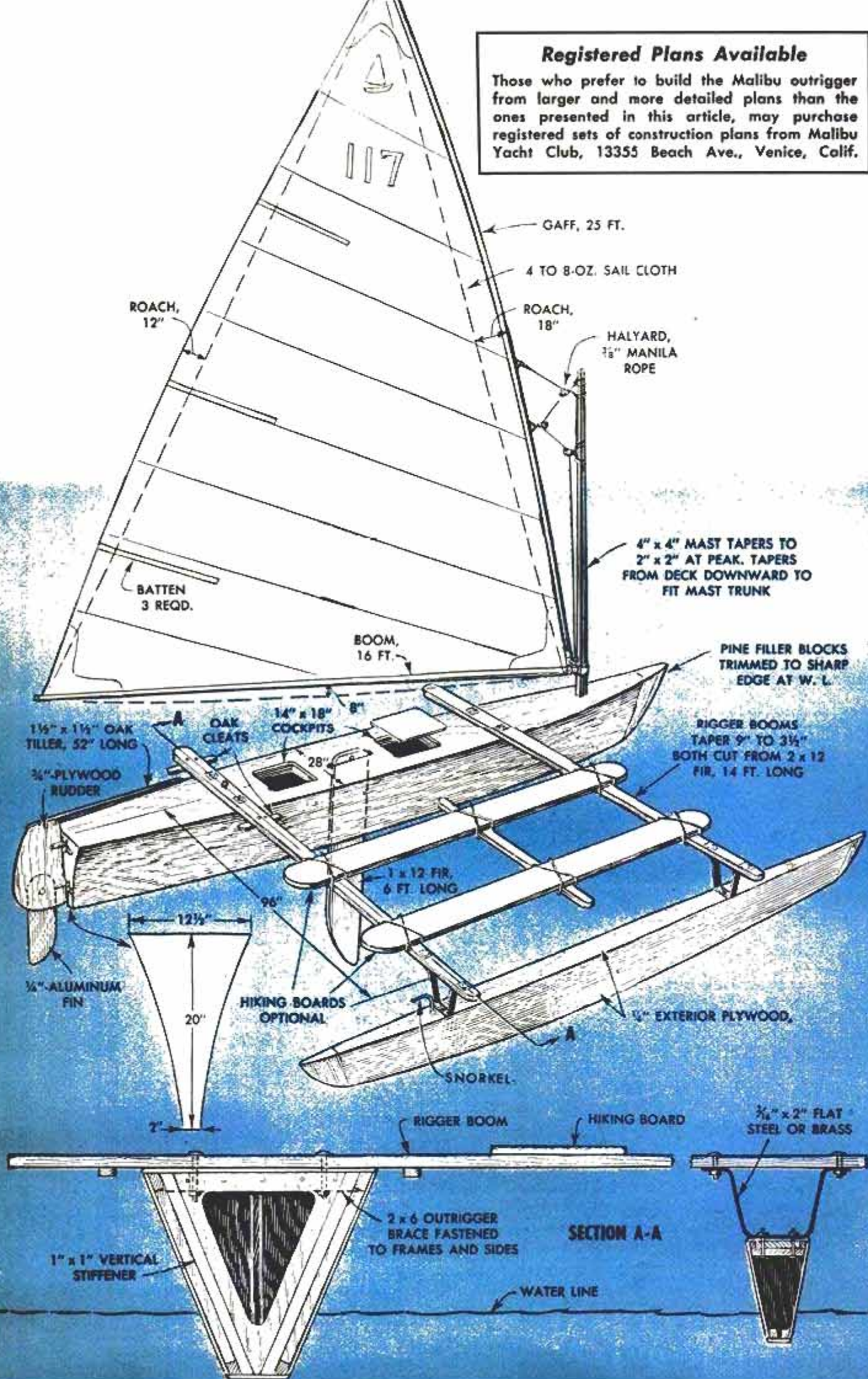
HERE IS THE MALIBU outrigger, an 18-ft. sailboat that can be safely launched in fairly heavy surf and skims over the water faster than any boat of its size to date. The boat was designed for the Malibu Yacht Club by Warren Seaman, a World War II marine who, after seeing South Pacific natives use outrigger canoes in heavy surf without capsizing, decided to build a craft like theirs but with the addition of a sail and a few other refinements.

In most respects the boat is handled the same as any other small sailboat. Its shallow draft and comparatively large sail area give the outrigger tremendous speed in a strong breeze. Best performance is obtained by raising the yard or gaff to a point that results in a slight weather

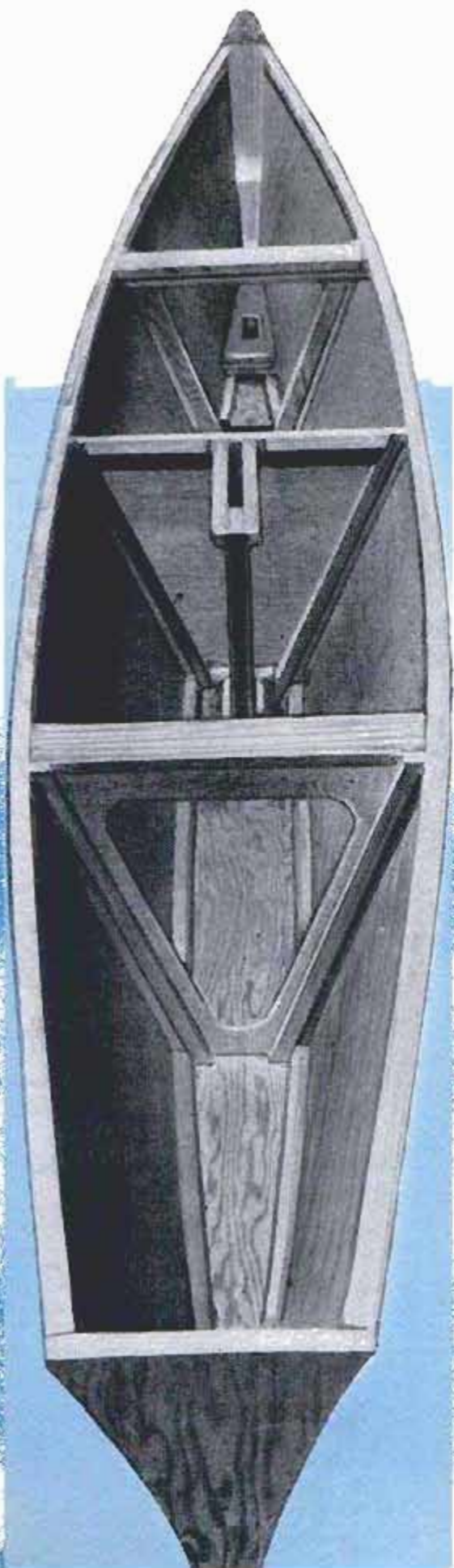


Registered Plans Available

Those who prefer to build the Malibu outrigger from larger and more detailed plans than the ones presented in this article, may purchase registered sets of construction plans from Malibu Yacht Club, 13355 Beach Ave., Venice, Calif.



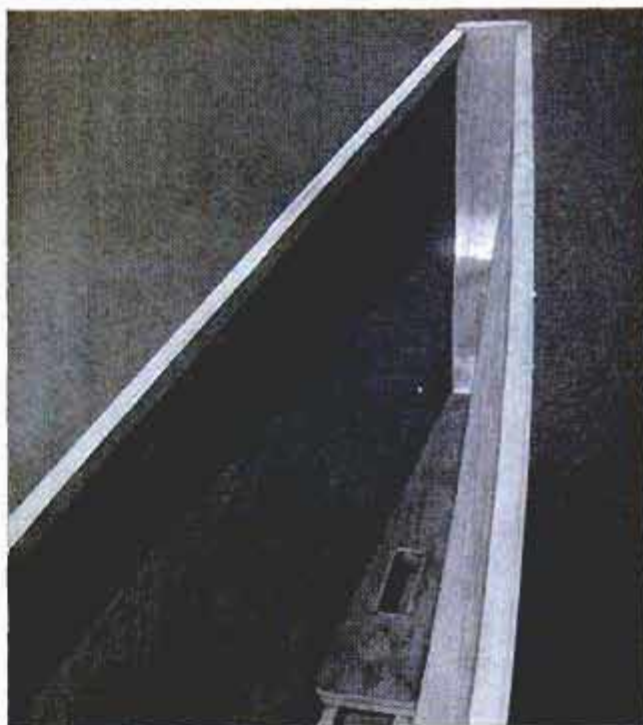
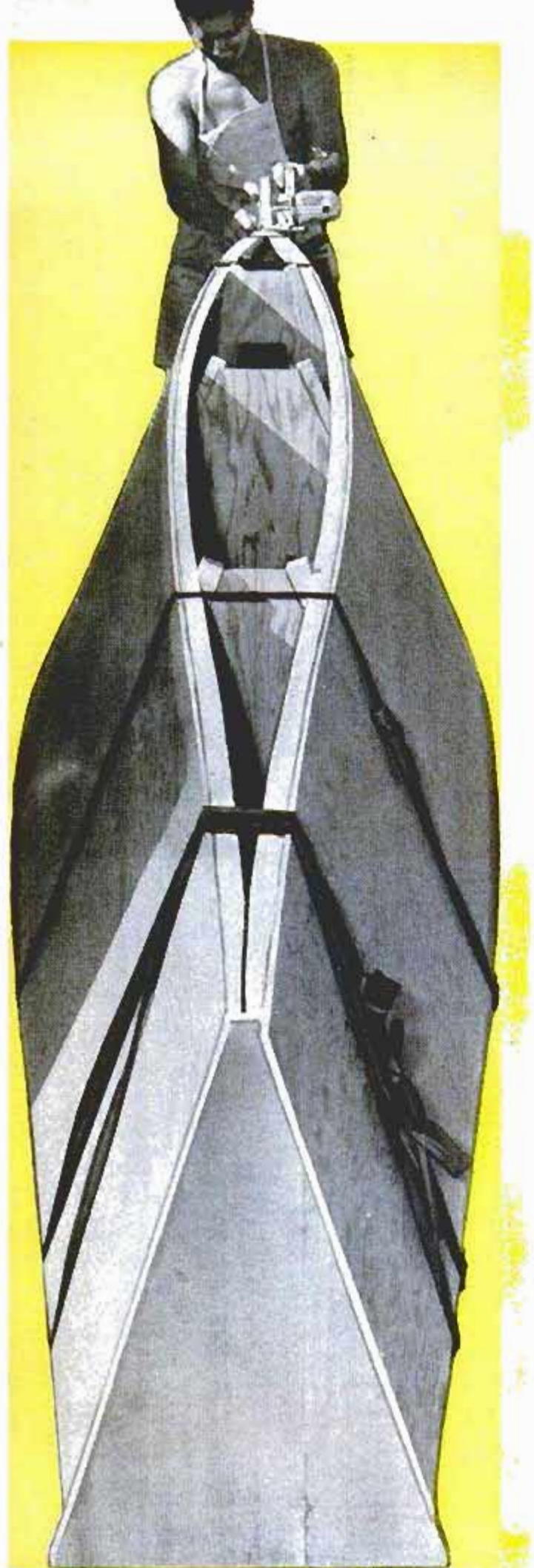
Right, when sailing on starboard tack, crew member moves out on hiking board to help stabilize craft. Below, basic hull is nearly completed with mast step block, dagger-board trunk and outrigger braces glued and nailed in place



helm and then sailing the boat flat on the water.

When launching the outrigger from a beach, the sail is first raised and the rudder fin is allowed to drag in the sand. The dagger board and paddles are secured under rope lashings that are used for tying the hiking boards to the rigger booms. By pushing off at the right time, it is possible to launch the boat through 4-ft. breakers without difficulty. As soon as the wind fills the sail, the boat moves seaward. The board may be inserted in its trunk, when the water is sufficiently deep to avoid grounding. When coming ashore, try to catch a large breaker and ride it up on the beach, taking care to remove the board before shallow water is reached.

An amateur craftsman can build an outrigger sailboat like the one illustrated in 300 to 400 hrs., depending upon the care taken when finishing it. For good sailing performance, it is important to build the hull and float on a building jig to assure accurate alignment of the frames, transom and stem. A satisfactory arrangement can be made simply by driving three sturdy stakes in the ground. The stakes should be in line and be spaced accurately to the frame locations. The frames are then cut from plywood as indicated and temporarily nailed in the inverted position on the stakes. Next, the sheer clamps and chine logs are cut from mahogany stock and glued and nailed to the frames. The side planking is rough cut from a 4 x 18-ft.

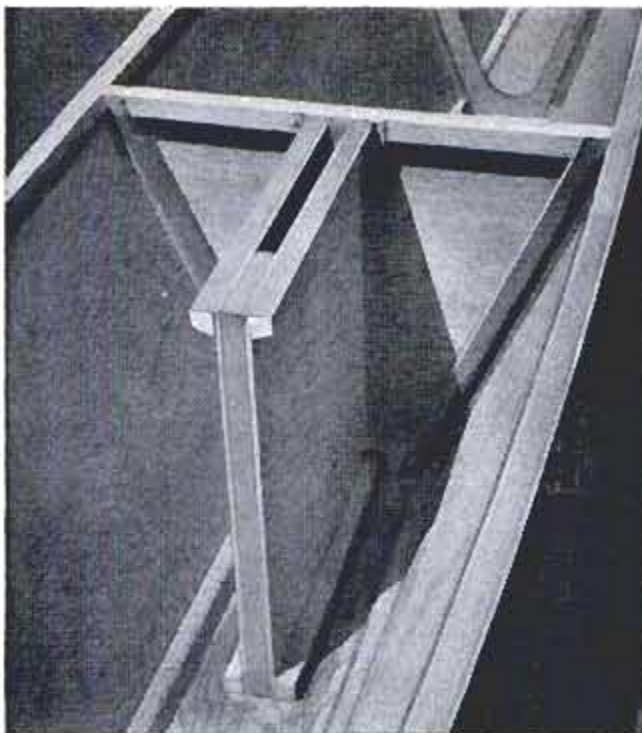


Left, inner-tube strips clamp side planking to frames and stringers for fitting. Above, mast-step block is nailed to chine logs and secured to side planking with resin-coated strips of glass-fiber cloth

panel of $\frac{1}{4}$ -in. exterior plywood and is held in place on the hull framework for final fitting and fastening by means of inner-tube strips stretched around the assembly as shown. Next, the stem and transom are formed from mahogany lumber and are glued and nailed to the sides. Before fastening the bottom planking, it is necessary to fair (plane and sand to the required curves and planes) all of the members coming in contact with it to provide a

Below, mast trunk is glued in step-block cutout. Later, the top is nailed to deck beams and decking





The plywood dagger-board trunk is nailed and glued to bottom planking and after side of second frame



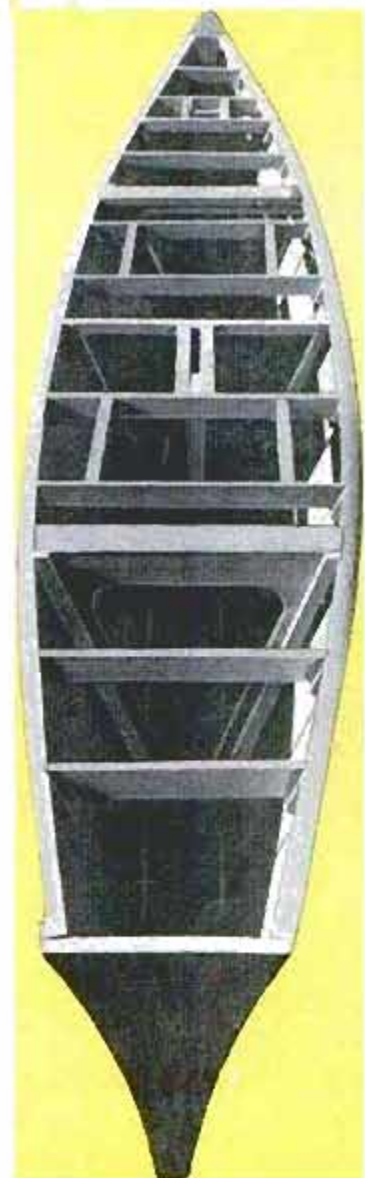
Gooseneck fastened to mast has fittings for attaching boom and lower end of gaff for lateen-type sail

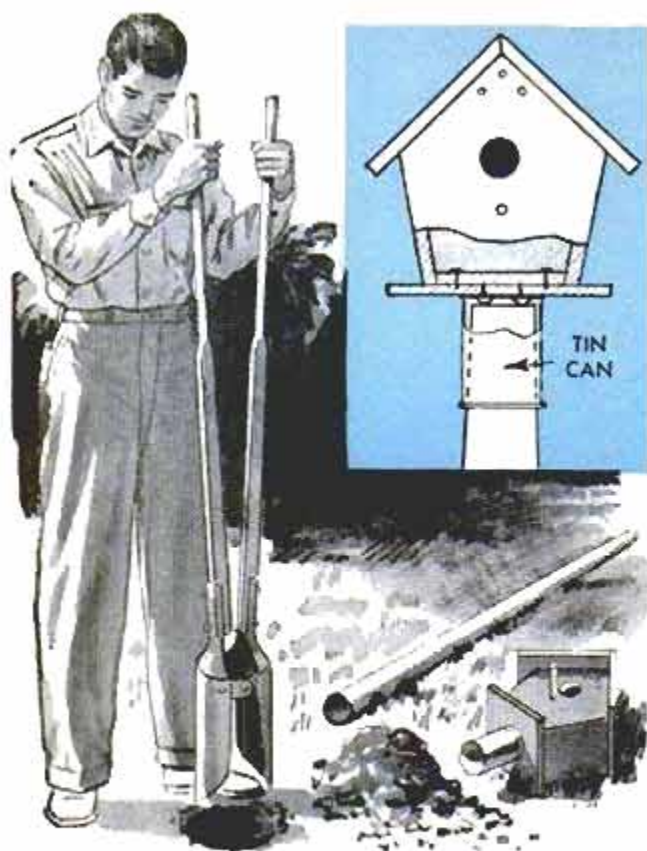
watertight fit. The hull is then removed from the jig and placed in an upright position for installation of the dagger-board trunk, mast-step block, mast trunk and outrigger braces. The latter are glued and nailed to the first and third frames and hull sides to reinforce the hull and provide sturdy members to which the rigger booms can be bolted, detail A-A.

To complete the main hull, the interior is given two coats of wood sealer. Framing for the cockpits and additional deck beams are fastened to the sheer clamps spaced as shown in the photo at the bottom right of this page. After fairing all deck beams and sheer clamps, the deck planking is cut to fit, then glued and nailed in place.

The jig that is used for the main hull also, is used for building the float that is very easy to make. Four longitudinals are the only framing members required. A snorkel tube fitted in the deck permits equalization of air pressure in this closed unit to prevent rupture of the plywood. The float is attached to the rigger booms by means of two U-shaped brackets. These may be formed from $\frac{3}{16}$ x 2-in. flat steel or brass as indicated in detail A-A. For best results, all fittings should be of brass or stainless steel, fastenings of monel or brass.

The mast is formed from a 12-ft. length of 4 x 4 Sitka spruce that is tapered to fit the mast trunk. For racing purposes, the gaff and boom should be of laminated spruce but for day sailing, they can be cut from bamboo poles or other suitable material. The sail is made as indicated, and it may be lashed to the spars with rope, or provided with a bolt rope on the luff and foot for attaching and raising the sail by means of longitudinal grooves cut in facing surfaces of the mast and boom. To add to the life of the boat, the hull and float should be covered with glass fiber, using heavy cloth for the bottoms and lightweight cloth for the sides and tops. Spars and outrigger booms may be varnished or painted. ★ ★ ★

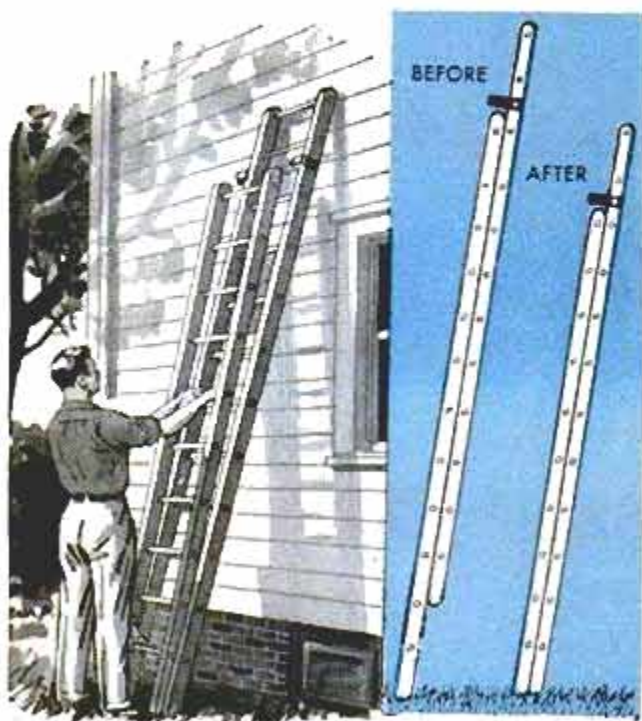




Birdhouse Mounted Atop Pole Is Held By Tin Can

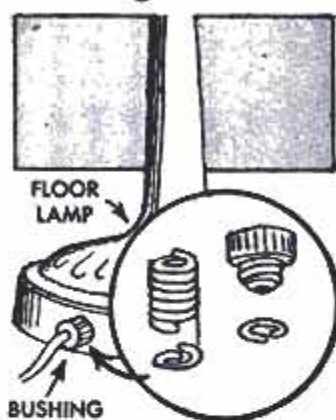
You'll find a simple answer to the problem of mounting a birdhouse on a pole in a manner which allows it to be removed easily if you make use of a common tin can. Select a can which will slip over the pole and fasten it to the bottom of the birdhouse with a couple of screws driven through the end as in the detail. The can forms a socket which lets you simply lift the house off the pole when desired.

Blanche Campbell, Las Vegas, Nev.



Nut Improvised From Spring Holds Insulating Bushing

When an insulating bushing is fitted in a metal lamp base in a hole in which there are no threads, it can be held in place by a "nut" made from a turn of a light coil spring. Cut a single turn from a spring of a diameter close to that of the bushing, then open or close it to provide a snug fit. When the bushing is turned into the spring, it will flex and follow the bushing threads.



Stoppers Plug Pipe.Sockets

Pipe sockets anchored in the ground to hold clothesline posts should be capped when not in use to keep out water. Wooden plugs, usually used for this purpose, swell with moisture and become difficult to remove. To avoid this problem, use ordinary rubber sink stoppers of the correct diameter. To prevent the stoppers from being mislaid, anchor with chains set in concrete.



Extension Ladder Modified For Easier Handling

For easier handling of an extension ladder, one homeowner cut 20 in. from the top of the upper section. This permits that section to be slipped up into the brackets of the lower section when it is placed against a wall as shown in the detail. The lower section does not need to be lifted, or the ladder assembled on the ground, then raised into position.

Wedges Secure Hammer Heads

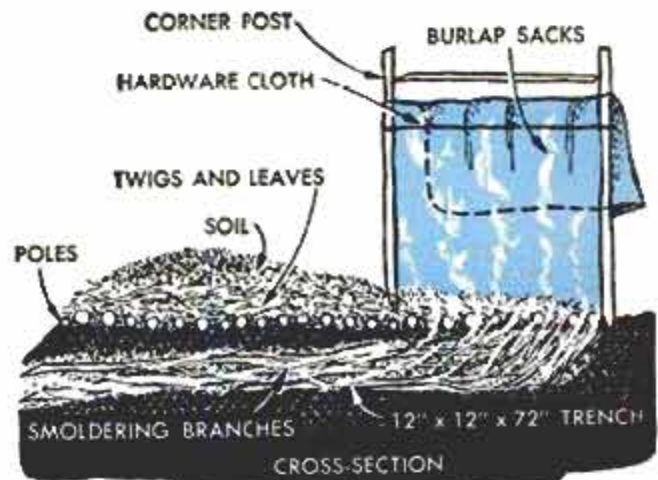
Wedges to hold hammer and hatchet heads securely on the handles may be made from wood screws. Flatten sides of the screw to produce a triangular shape and then drive this modified screw into the wooden handle. Teeth formed by the flattened threads will hold the wedge in place against even the most rough treatment.

CAMPSITE SMOKE- HOUSE

THERE'S NOTHING tastier and tangier than freshly smoked fish, especially when they are prepared for curing in a campsite smokehouse within a few hours after being caught. To make a smokehouse like the one shown, you will need to take with you a 3-ft.-sq. piece of hardware cloth, some nails, several feet of heavy cord and six burlap bags with the seams opened. When setting up the smokehouse, first dig a trench on a stream bank so that it will be open at one end as shown. Next, place the hardware cloth over the closed end of the trench and drive a 4-ft. pole into the ground at each corner. Then, tie the hardware cloth to the posts at a point 3 ft. above the ground and spread them with braces as in the photo below. The burlap sacks are pinned to the posts to form an enclosure. One sack covers the top of the enclosure when smoking.

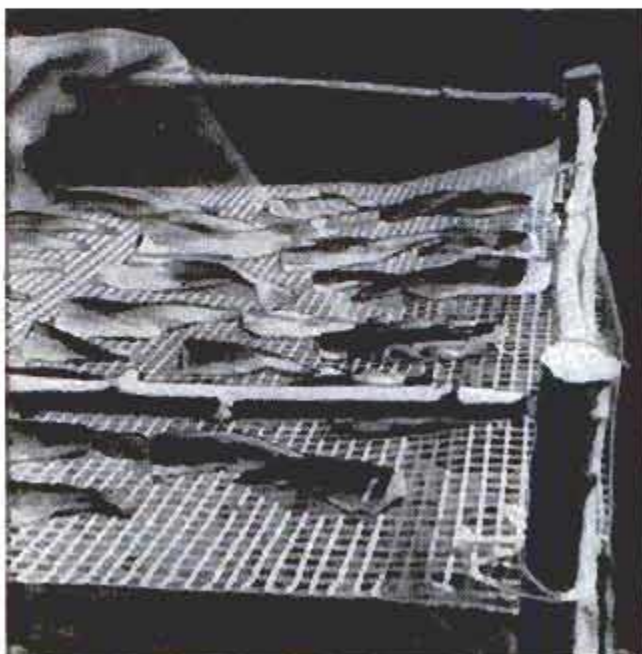
Outside the enclosure, the trench is covered with layers of poles, twigs and leaves and soil to force smoke from smoldering hickory branches into it. Ten to twelve hours before the fish are to be smoked, they are cleaned, salted and placed in a container. Then, they are drained and placed on the hardware cloth for smoking.

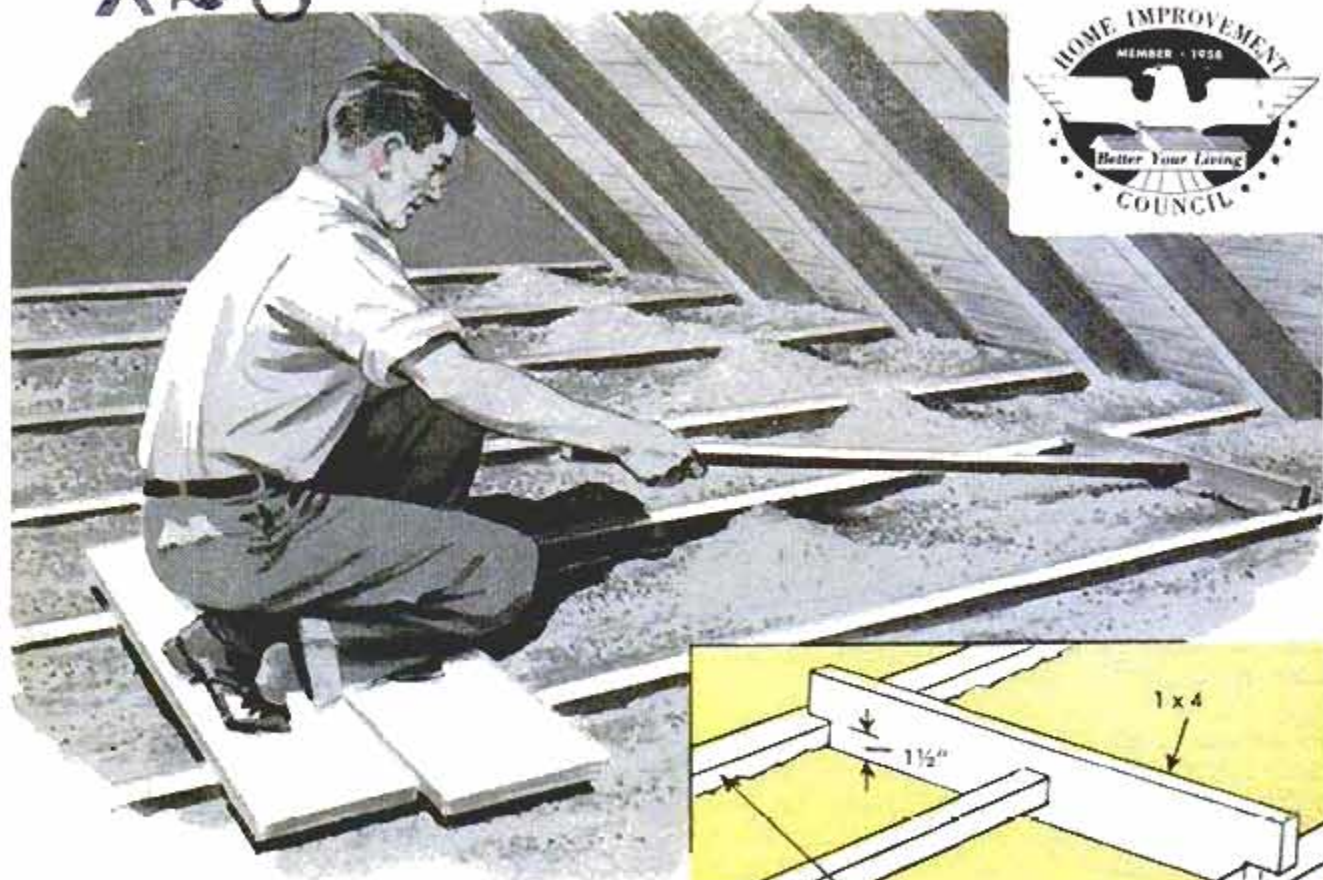
A. Goerg, Port Angeles, Wash.



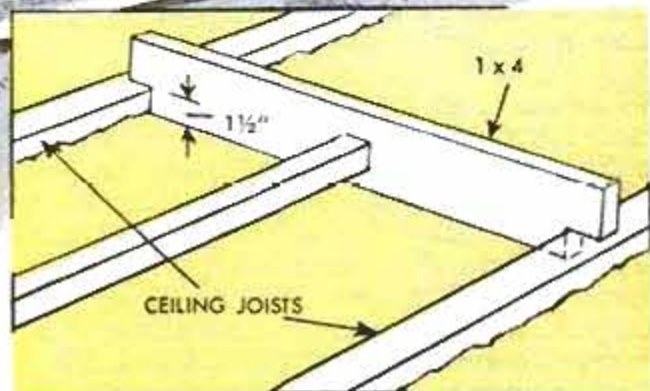
Lower left, fish are cut lengthwise on both sides of spine to lie flat on hardware cloth for smoking

Below, cover material is propped up at open end of trench to prevent it from obstructing air passage





Photos and information
courtesy Vermiculite Institute



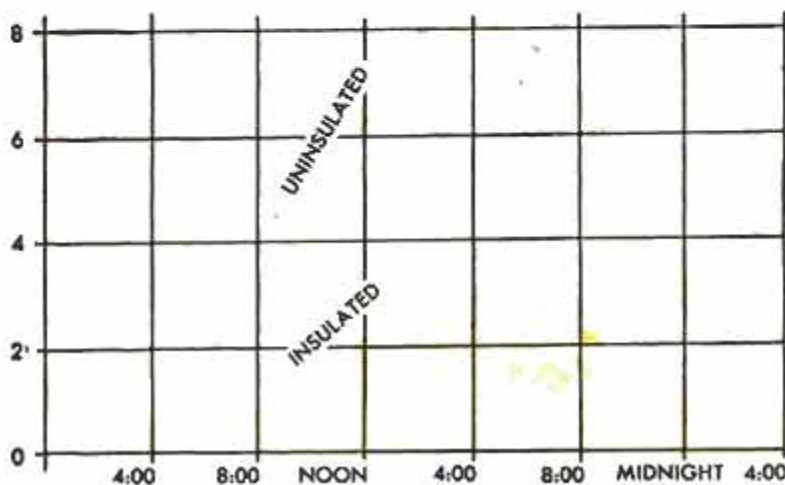
Reinsulate Your Attic

DOES YOUR HOME become so stifling hot in the summer that an air conditioner has to work overtime just to lower the temperature a few degrees? Such an intake of heat in summer means that there will be an equal loss of heat in the winter. Your heating plant will be as overworked as the air conditioner. Both conditions indicate a need for reinsulation. Because the

greatest percentage of heat gained or lost in a home goes through the ceiling, the attic insulation is the first item to check. If a ruler pushed down alongside a joist shows that insulation, whether loose, as in the illustration, or blanket-type, as in the photo, is 2 in. or less, you need more insulation. Modern building practice now calls for a minimum of 4 in. of insulation in the

attic, air-conditioning engineers recommend 6 in. A simple and economical way of reinsulating is to use a loose-fill insulation, such as vermiculite. This is a mineral compound containing mica. It is fireproof, will not conduct electricity and is nonirritating to the skin. One of the big advantages of loose-fill insulation is that it is easily handled. It need only be poured into place. Hard-to-reach voids under the eaves and around pipes and electrical conduits often are not insulated properly, and these areas can add up to a sizable heat loss. When reinsulating, fit sheet-metal collars around pipes and conduits that pass through

HEAT FLOW INTO AIR-CONDITIONED HOUSE
B.T.U. PER SQUARE FOOT PER HOUR



oversized openings. The collars will prevent insulation from being poured down inside a wall and wasted. Another condition to look for before reinsulating is wet spots in the original insulation. These areas indicate that there is a leak in the roof that must be repaired. After the repairs have been made, remove any dampened insulation. Wet insulation is not efficient. It is not necessary to use a vapor barrier with vermiculite. It allows water vapor to pass through it and to escape through the attic vents. Because of this fact it is necessary that an attic have adequate ventilation. "Adequate" in this case means a minimum of 1 sq. ft. of vent area for each 200 sq. ft. of attic floor space, where conventional screened louvers are used.

Ventilation and insulation must be considered together. In an air-conditioned home, adequate ventilation in the attic is even more important. Temperatures on the roof may get to 150 deg. F., and if this heat is not dissipated through adequate ventilation, it throws an additional load on the air conditioner. The chart on the preceding page shows the difference that insulation can make in an air-conditioned home. Adequate ventilation above the insulation is considered part of the insulating factor.

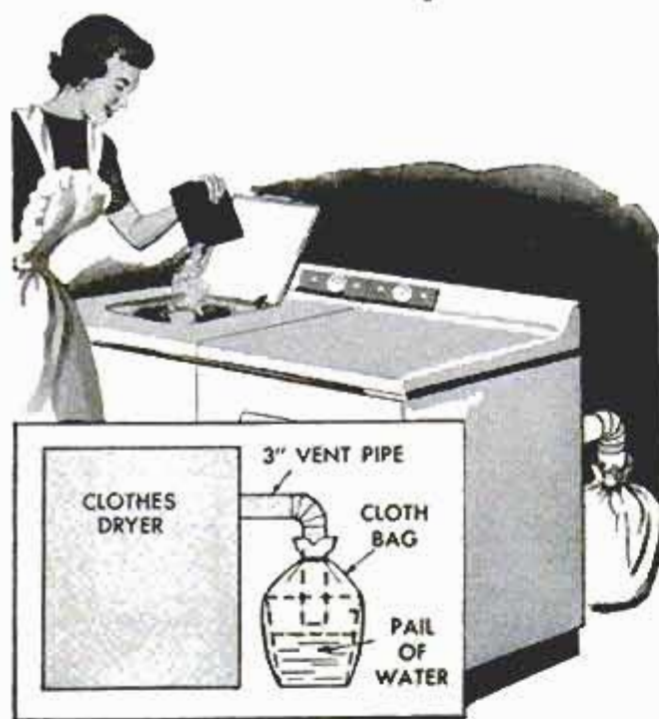
If you want to insulate a full 6 in. with vermiculite, simply spread the material over the joists and level it to the tops of the joists with a convenient length of 1 x 4, as in the photo below. If you wish just 4 in., it will be necessary to make a screed, as in the detail in the illustration on the

opposite page. The screed is a length of 1 x 4, notched as indicated so that it projects below the joists 1½ in. The depth of a finished 2 x 6 is about 5½ in., which is the reason for this dimension of the screed notches. A length of 1 x 2, a broomstick or dowel can be used as the handle of the screed, permitting it to be pushed close under the eaves of a shallow-pitched roof where it is difficult to reach. When estimating the number of bags of vermiculite needed for an attic, figure that a 4-cu.-ft. bag will cover about 26 sq. ft. 2 in. thick, or 17 sq. ft. 3 in. thick. These figures are based on applications where the joists are 16 in. on center. If the joists in your attic are 2 x 8s or 2 x 10s, it will be necessary to use a screed even for a 6-in. thickness. The notches on the screed would have to be correspondingly deeper. If there is a trap door to gain access to your attic, this door also should be insulated. Build a box of 1 x 4 stock on the upper surface of the door, fill it with insulation, then nail a cover on this box. In the case of a folding or "disappearing" stairway, insulating it would be impossible. However, where possible, fasten weather stripping to the edges of the trapdoor on which the stairway is attached, to minimize drafts. Reinsulating is well worth the time and cost. Combined with adequate ventilation it can lower the inside temperature of a home 10 to 15 deg. in the hottest summer weather, and do it without an air conditioner. During cold weather the added insulation will assure more comfortable heating, as well as lower fuel bills. ★ ★ ★

When a full 6-in. thickness is desired, pour insulation between the joists, level with a plank or screed



Air From Clothes-Dryer Vent Exhausted Into Water Pail



Telescoping Pole Provides Permanent Clothesline Prop

Heights of these clotheslines, suspended from two T-shaped poles are readily changed without the need of clothesline props. A "built in" prop is positioned midway between the end poles, and consists of another T-shaped support, this one having a telescoping shaft. The latter shaft and its crossbar are $\frac{3}{4}$ -in. pipe, the fixed portion of the column is 1-in. pipe. Fitting a $\frac{3}{8}$ -in. bolt through a hole in the fixed column, and in any one of a number of holes in the other section adjusts the height.



Because his landlord would not permit cutting a hole in the basement wall, one tenant vented his automatic clothes dryer in the following manner: An elbow is fitted on the end of the 3-in. vent pipe and pointed downward into a pail half filled with water. The end of the elbow is about 1 in. above the surface of the water. A "vacuum cleaner bag" effect is obtained by enclosing the pail in a large cloth bag. The neck of the bag is tied tightly around the end of the vent elbow as shown. Hot, moist air from the dryer is condensed by passing over the water. Dried air and lint then pass into the bag which catches the lint and allows the air to escape.

LeRoy J. Hebert, Arlington, Mass.

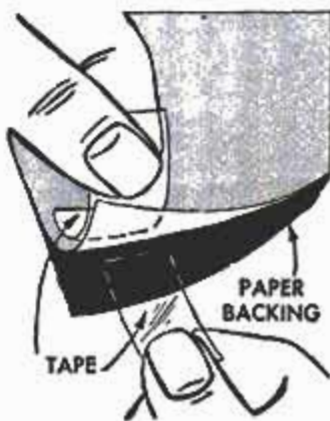
Paper Clip on Back of Calendar Holds Removed Page With Notes

If you mark dates on a calendar with notations for future reference, the page may be "filed" on a paper clip taped to the back of the calendar. Place the tape over the short section of the clip, leaving the longer one free to receive the page.



Removing Paper From Adhesive

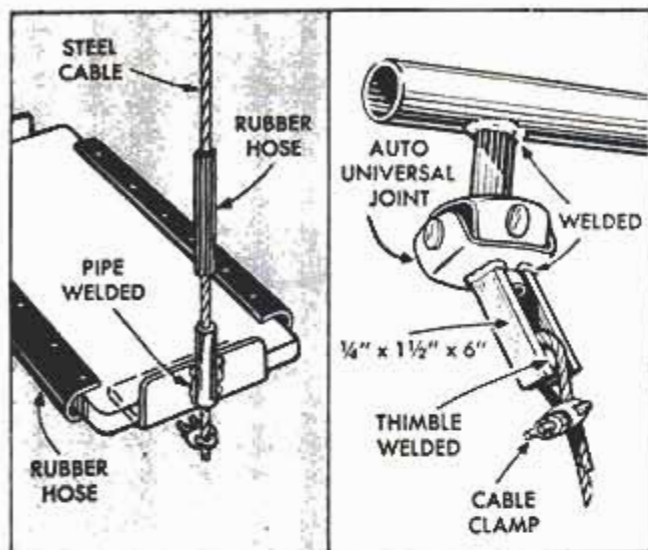
Peeling the protective paper from the contact adhesive on the backs of some types of decalcomanias is simple, once the thin sheets have been separated. To simplify this operation, press a "tab" of cellulose tape to the paper backing and to the decalcomania. Heat the latter at the separation point over a light bulb, then pull the tabs apart.—A. Vena, Philadelphia, Pa.



Cleaning Venetian Blinds

For quick, lint-free cleaning of Venetian blinds, with no need for a clear-water rinse, soak a chamois in a solution of warm water and household detergent. Wring the chamois almost dry to use.

Maximum Strength and Safety Built Into Child's Swing



Both strength and safety are designed into this swing that uses steel cable instead of rope. The upper ends of the cables are looped over thimbles welded between steel flats that are part of a welded assembly made from auto universal joints as shown in the right-hand detail. Cable clamps are used to secure the loops, and to provide stops on the lower ends of the cables. The stops bear against short lengths of pipe welded to steel angles. The angles are bolted to the seats, which are cut from 2-in. straight-grained stock. Lengths of rubber hose, slit lengthwise, are tacked to the front and back edges of the swing seats as another precaution against injury. To protect hands, lengths of rubber hose are



slipped over the cables, to form grips, as in the left-hand detail. Brightly colored paints are used to make a "barber-pole" effect on the swing frame to make it more visible.—John O. Bock, Yakima, Wash.

Repairing Damaged Photo Trays



To repair small breaks and chips that occur in the surfaces of white porcelain photo-developing trays, first clean them thoroughly. Then, using a swab made from a toothpick and a bit of cotton, apply a drop or two of any good quality enamel. Refrigerator enamel is especially good for this purpose, as it dries to a hard, porcelainlike finish.

Robert Hertzberg, Jackson Heights, N. Y.

Improvised Photoprint Washer



If your kitchen sink has a spray-hose attachment, it can be used as a photoprint washer. Tape or tie the hose valve to the "on" position and loop the hose into the sink as shown. Fill the sink, then wedge the drain open slightly to maintain a constant water level. The jet of water from the hose will keep the prints in constant agitation assuring thorough washing.

Hugh Lineback, Stillwater, Okla.



Fig. 1. An enclosure should never be placed over potted plant to reduce moisture evaporation. The plant would then be deprived of fresh air which is required for its survival and healthy growth

Fig. 3, below. Since most plants are accustomed to daily exposure to sunlight to carry on photosynthesis, remember to leave blinds partly open so as not to deprive them of this important requirement



Fig. 2. Mixture of plant food and water is prepared for plants to promote normal growth in your absence

Save Your

HOUSE PLANTS can't be taken along when you go on an extended trip. However, you can be assured that they will not only survive but remain in good condition during your absence, if given special attention before leaving as illustrated.

Remember that plants need fresh air just as much as they need water. Don't try to prevent evaporation of a plant's water supply by covering it with a glass enclosure as in Fig. 1. The plant will die for lack of air. If you have a terrarium, do not give it an oversupply of water since it has no provision for drainage, Fig. 6.

Fig. 4. Give plants their usual dose of supplementary food but no more than is required for one application





Fig. 5. Philodendron leaves are cleaned with wet, lintfree cloth to permit plant to "breathe" properly



Fig. 6. Since terrarium has no drainage facility, water is sparingly applied to avoid decay of plants

Plants While on Vacation

There are several ways of cleaning plant leaves, the easiest being simply to sprinkle a small amount of water on them with a rubber-bulb sprayer as in Fig. 7. Large leaves can be cleaned with a wet, lintfree cloth, Fig. 5.

A good way of reducing moisture evaporation from a potted plant, is to soak the soil and then insert a heavy cardboard disk in the top of the pot to fit around the stem or stems of the plant. For an absence of more than a week in hot weather, it is best to arrange to have your plants watered at least once a week. ★ ★ ★

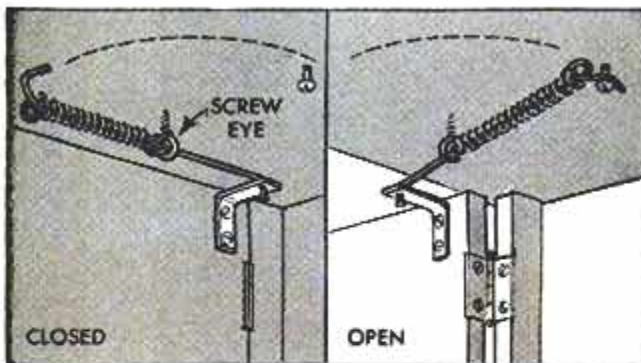
Fig. 7. Rubber-bulb sprayer is ideal for washing dust from plant so that leaves "perspire" properly





Clear Plastic Cover Protects Announcements on Outdoor Sign

Announcements and sales prices that are written or posted on an outdoor-display board can be protected from the weather by hanging a sheet of clear plastic over the front of the board. A metal rod inserted in a hem sewed on the bottom of the sheet prevents wind from blowing it about and keeps the plastic taut for easier viewing of the information displayed.



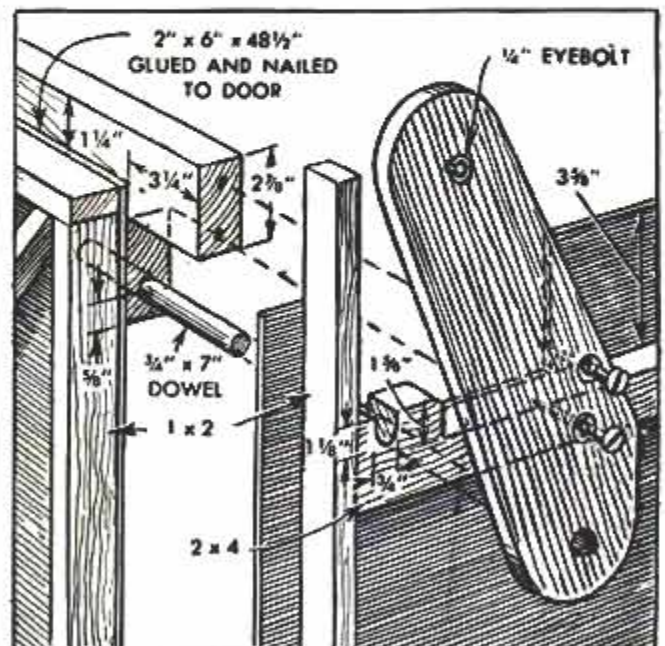
Spring Device Holds Cabinet Doors Open or Closed

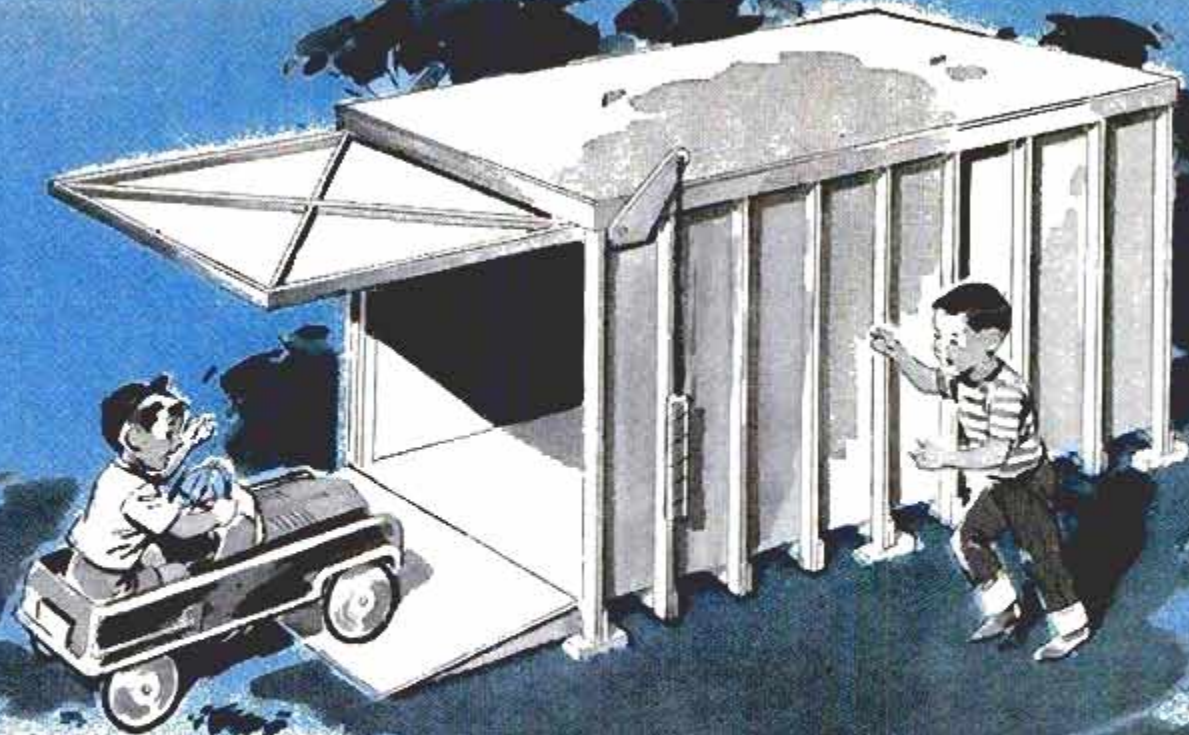
Cabinet doors are held firmly shut or fully open by this pivoting-spring device that consists of a 10-in. length of coat-hanger wire bent as indicated to engage a 3-in. length of screen-door spring. One end of the wire is fitted in an angle screwed to the inside of the door near the hinge. The wire passes through a screw eye driven into the cabinet top, which also holds one end of the spring. Opening or closing the door causes the spring assembly to "pass over center" so spring tension holds the door. A screw acts as a stop.—J. W. Rockne, Atkinson, Neb.

GARAGE FOR SMALL FRY

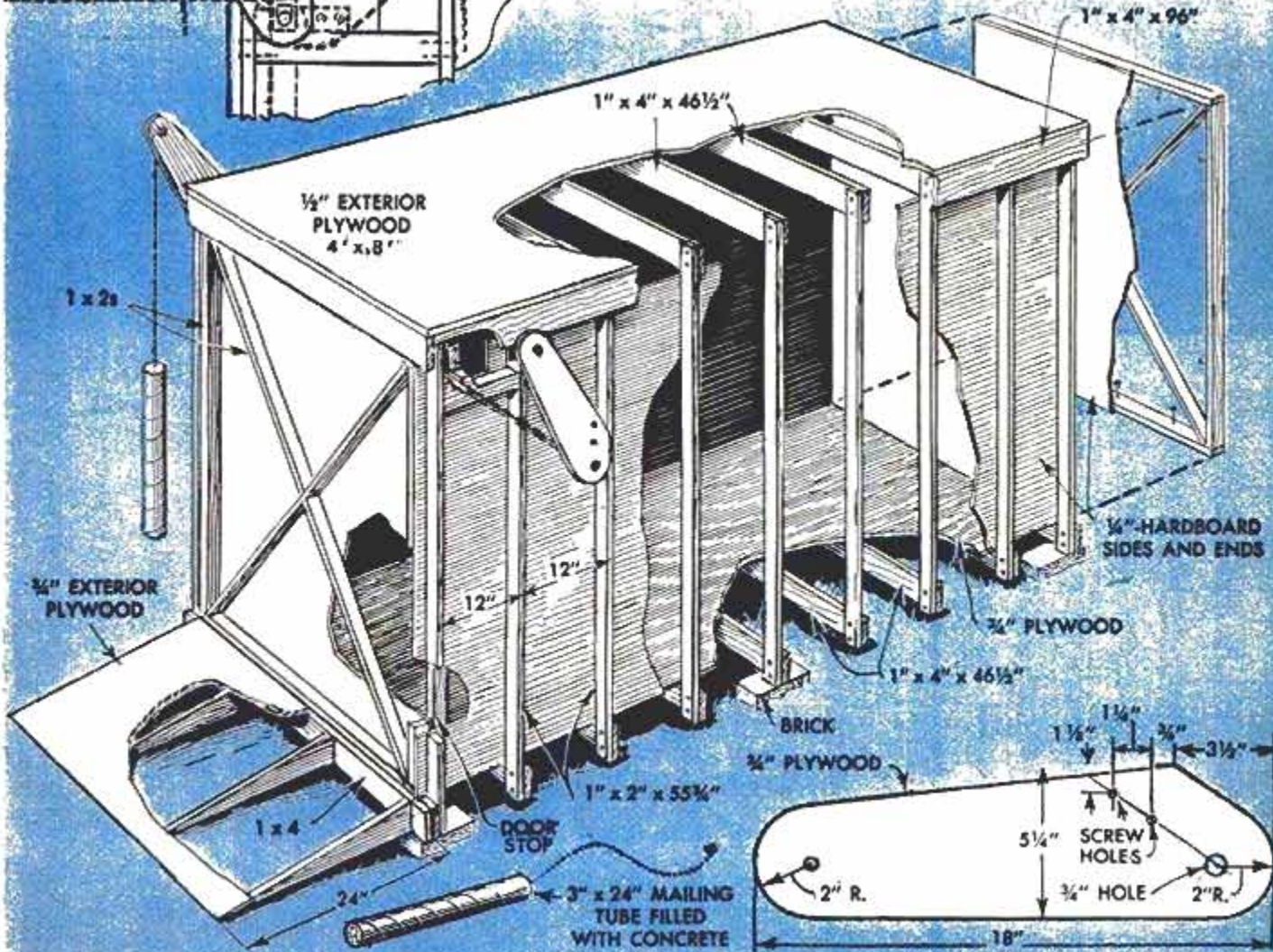
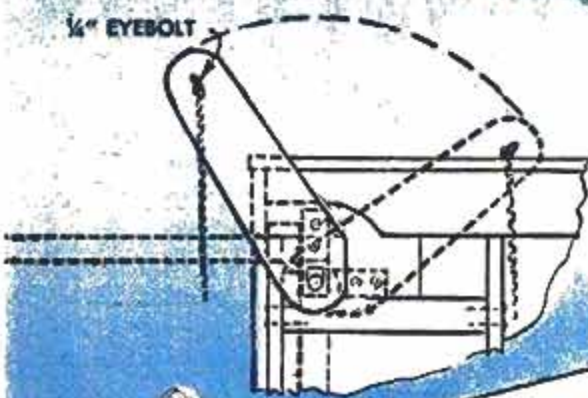
YOU CAN HELP the children in your family keep their "personal cars," wagons, tricycles, autos and other vehicles, from cluttering the driveway and garage by building this junior-size garage for them. The overhead door and other features that are similar to a full-size garage, provide children with a realistic means of mimicking their parents in many garage-use situations for an enjoyable and constructive play activity. In addition to parking their vehicles in the garage, smaller toys, such as rakes, shovels and games can be stored on hooks and shelves.

Constructed of 1-in. pine lumber, plywood and hardboard, the garage is inexpensive and easy to build as shown. After selecting a location for the garage, cut all the joists and studs and nail them together to form nine prefabricated units or squares. Next, the sides, bottom, top and back panels are nailed to the prefabricated units spaced 12 in. on centers as indicated. If the garage is to be built on the ground, bricks should be placed under the center and end floor joists for "footings" as in the drawing on the next page. The plywood panel that is to be used for the roof is then temporarily placed on the bricks to provide a flat surface for nailing the bottom and sides to the studs and floor joists. Next, the parts for operating the overhead door are made and assembled as shown in the detail below and the drawing on the next page. The garage is painted as desired. ★ ★ ★





Designed by
Waldheim-Koepke Associates



Solving HOME PROBLEMS

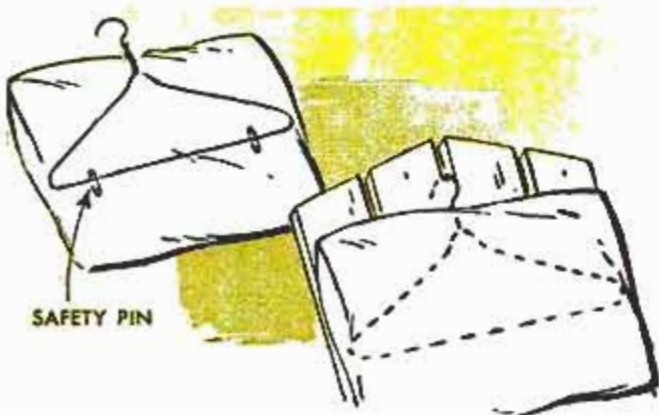


← **SCRAPING DINNER PLATES** at the sink is made extra convenient when a paper bag is clipped to one of the sink doors. Held open by three spring-type clothespins glued near the top of the door, the bag is easily removed for regular disposal



▲ **GLASSES CADDY** for the kitchen made from a pot holder and two lengths of stiff wire. Pencil erasers provide nonslip feet

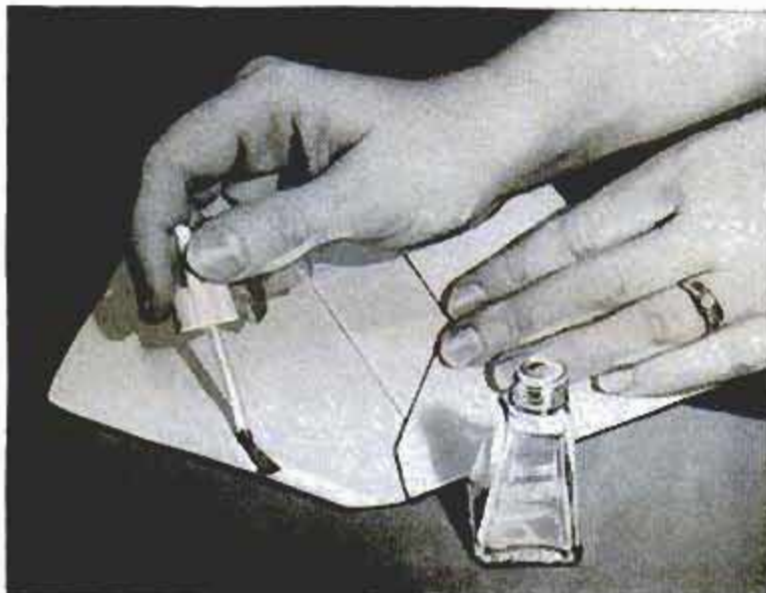
▼ **MAKING A CUSHION** stay put on the back of a wooden lawn chair and yet have it so it may be removed easily can pose a problem. However, a wire coat hanger and two safety pins will do the trick. As shown, the hanger is pinned to the back of the cushion with the two pins and a saw cut or notch is made in the top of the chair back to hook the hanger in place



SAFETY PIN



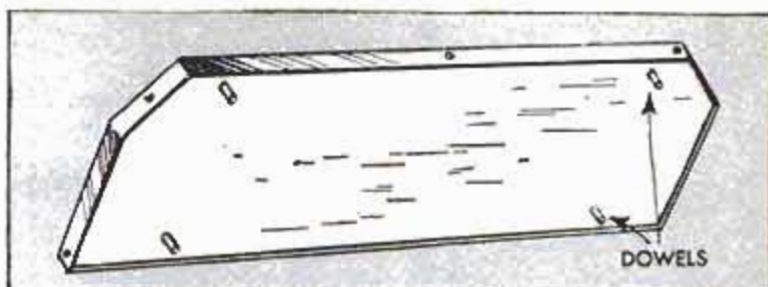
▲ **THE NEXT TIME** you have difficulty opening a screw-type jar cover, wrap a strip of freezer tape around it. Tape provides a good nonslip gripping surface. Be sure tape adheres to cover only and not to jar. Wide adhesive tape works as well



← **IF YOU WANT** to seal an envelope so it cannot be steamed open, "lick" the flap with nail polish. Makes good substitute for paste when flap won't seal. The little bottle brush makes it most convenient to coat the flap without mess

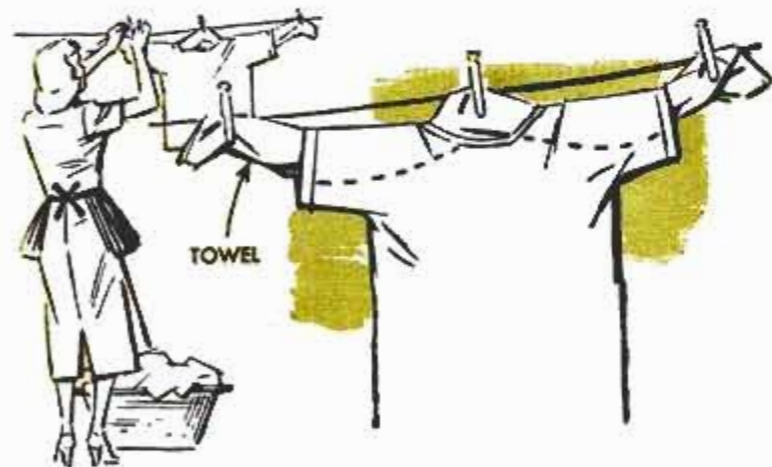


WEED-KILLING SHOTS can be given to individual plant roots when a spike is soldered to oil-can spout. Spike makes hole for quick-acting injection of chemical



ACCIDENTAL BREAKAGE of a toilet flush-tank cover on dated bathroom fixtures makes it practically impossible to buy a replacement. However, you can make an attractive one of plywood by covering it with matching floor tile and trimming with metal edging. Dowels on underside hold it in place

STORING BOBBINS in a bottle is a fine way of keeping them clean and lint free in a sewing-machine drawer. Select a bottle having a wide mouth and a screw-type cap. You'll find the ones that pills come in ideal for the purpose. An olive bottle will do, too, or a tall, narrow pickle jar



GARMENTS, such as T-shirts, blouses and pajama tops will keep their shape while drying on a line if they are first slipped on a towel. Roll the towel and run it through the sleeves and neck and then pin the towel to the line as shown

YOUR GUESTS at your next cookout will like the idea of little wash buckets for sticky fingers. Youngsters' sand pails from the dime store are perfect for this and can be dolled up with appropriate decals. A gay wash cloth provides the towel



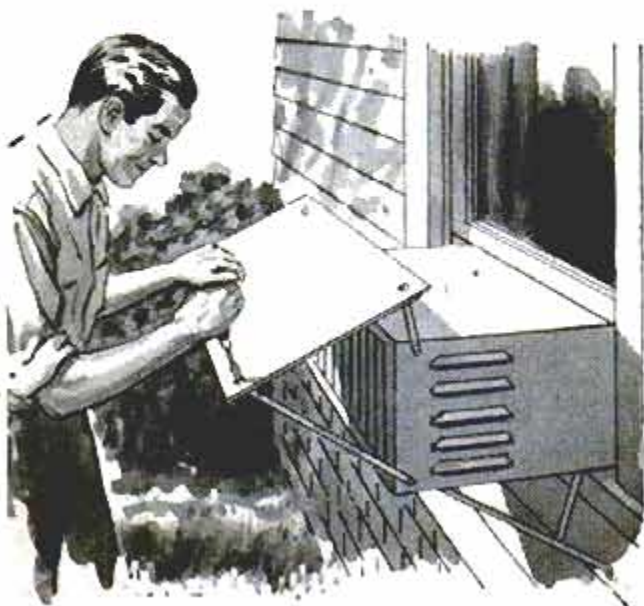
Improved Circle Cutter for Plaster and Wallboard



☞ Store leftover putty in a plastic bag. It will not dry out, and can be kneaded to softness while in the bag.

Air-Conditioner Sunshade

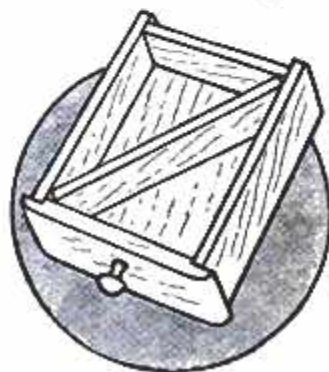
Shading the cooling fins of a window air conditioner from the direct rays of the sun will increase the efficiency of the air conditioner. A sheet of hardboard, installed as shown, with a minimum of 4 in. of clearance to provide air circulation will provide the necessary protection. Even when the window in which the conditioner is located has an awning over it, the hardboard shield will be an aid, as the late afternoon sun may shine in below it.



When he had to cut a circular opening in the ceiling of his kitchen for the installation of an exhaust fan, one homeowner improvised a circle cutter from a dowel and a loop of cord. A nail is driven into the end of the dowel, the head is cut off and the nail filed to a point. A second nail is driven into the center of the circle to be cut, the cord is looped over both this nail and the nail on the dowel and the circle is cut out by using the pointed nail as a cutting tool.

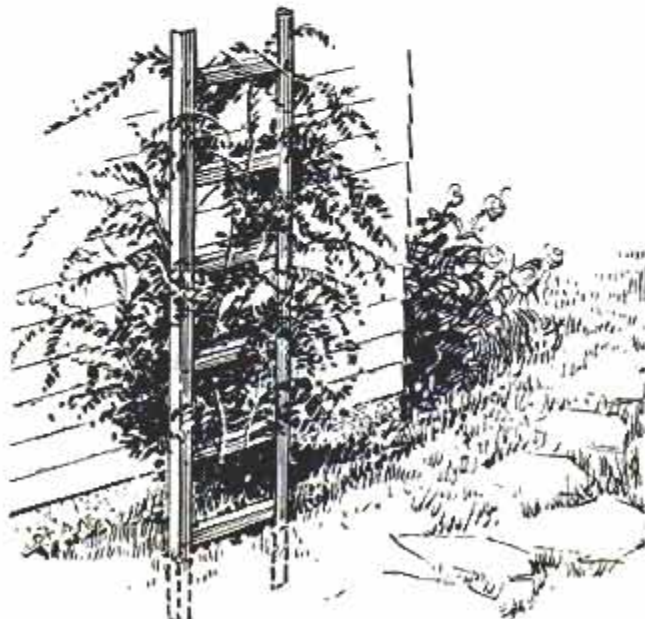
"Free Standing" Drawer Divider

Dividing a drawer into two equal parts does not require a divider held in place by the use of nails, screws or brackets. A self-supporting partition can be installed by fitting a board of suitable length between the diagonally opposite corners. When the drawer is to be cleaned, the divider lifts out easily.



Windmill-Ladder Trellis

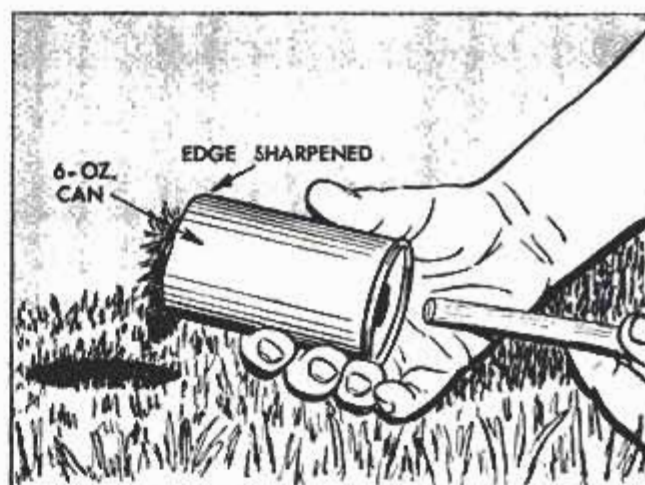
Steel ladder sections from a dismantled windmill are ideal as a trellis for heavy climbing vines. The side rails of the ladder sections are driven easily into the earth, and the upper ends can be fastened to a wood or masonry wall with brackets, lag screws or screw anchors. For added protection the lower ends of the ladder legs should be given a heavy coat of bituminous paint, and the rest of the metal should be painted with rustproofing compound.



Zoysia-Grass Plug Cutter Made From Juice Can and Dowel



Propagation of Zoysia grass is done through the planting of plugs 2 in. in diameter, as the plant does not produce seeds. Cost-free is this tool that cuts holes to receive the plugs. It consists of a frozen-juice can that has the edge of the opened end filed or ground to form a cutting edge. The closed end of the can has a hole cut in it about $\frac{5}{8}$ in. in diameter, through which a 6-in. length of broomstick or dowel can be pushed. To use, place the sharp edge of



the cutter over the spot to be "drilled," push it down into the soil with a hand or foot. Remove the cutter and force out the soil plug by pushing the dowel. The Zoysia plug now can be dropped into the hole and pressed down firmly with your foot. When the grass has spread out well, the cutter can be used for cutting plugs to be placed in other areas of your lawn, in holes bored by the cutting tool.

Oliver Grant, Springfield, Mass.



Work-saving Spout Extension Helps Grain Distribution

This removable extension on the spout from an oat bin sends the grain out far enough so that it piles up in the center of a wagon, eliminating the need for shoveling to distribute it evenly. The spout consists of two lengths of 2 x 8 with a "floor" of strips of 1-in. stock. A flat-steel bracket on the extension hooks over a wooden cleat on the upper surface of the spout, as indicated.

"Antikink" for Garden Hose

To avoid kinking a garden hose at the point where it is connected to a sill cock, spiral-cut a piece of hose of the same diameter and slip it over the hose as indicated. Spiral-cutting the hose will allow it to expand enough to slip easily over the regular hose.—G. E. Hendrickson, Argyle, Wis.



Auto Wheels on Tractor Plow

For easy maneuverability at modern farm tractor speeds it's almost essential to have a tractor plow mounted on rubber. One farmer did this economically by using old car wheels with tires. He cut off the regular plow-wheel axles and welded on car-wheel assemblies consisting of tires, wheels and spindles. It is necessary to get the trailing furrow wheel tilted at just the right angle.

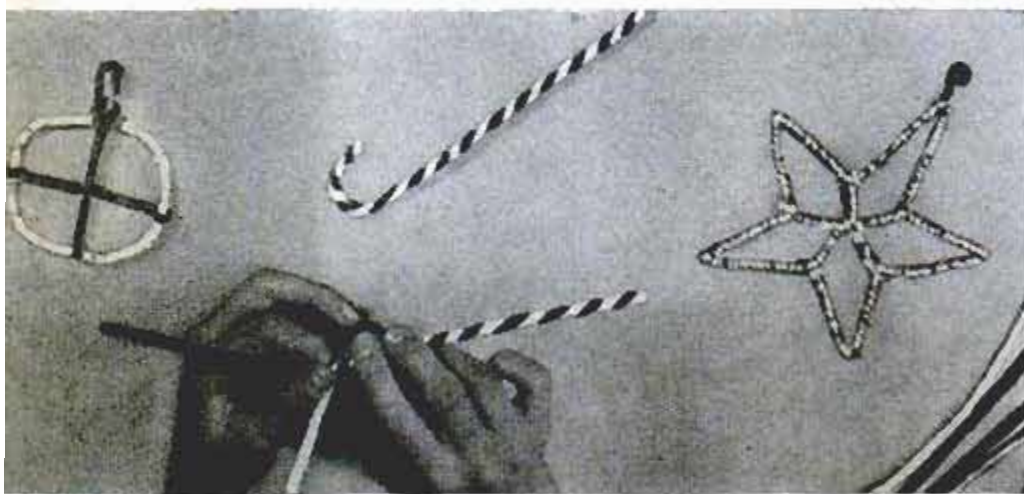


Pipe-Cleaner Decorations



IF PIPE SMOKERS are having a difficult time obtaining cleaners for their pipes, it may be because hobbyists and do-it-yourselfers now are using these cotton-tuft covered lengths of wire for decorative purposes. Illustrated on this page and the next are many ways in which pipe cleaners may be used to decorate objects. In addition to using standard pipe cleaners, you can decorate with chenille pipe cleaners which are about twice the length of the former and are available in a variety of colors. Chenille cleaners can be obtained in arts-and-crafts stores and at novelty counters of most department stores. Their soft-wire centers permit them to be easily formed into any shape desired. When more than one length is needed for a job, simply twist the ends together.

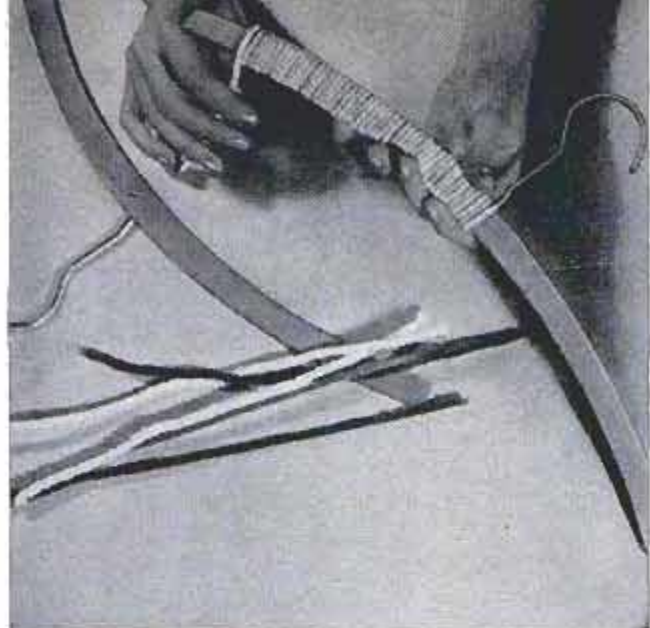
Salt and pepper shakers won't slip from your fingers when pipe cleaners are wrapped around the shakers and ends are secured to bottom and top turns



Holiday and party decorations are easily contrived with pipe cleaners of several colors. "Candy cane" is made by twisting white cleaner with red one



Decorative bookmark can easily be made in one minute. Simply form several kinks in a colored chenille pipe cleaner and curl one end of it for easy grasping



Pipe cleaners provide soft nonslip surface for wooden coat hanger when several cleaners are joined together and wound around the hanger in tight coils



Plant stems that tend to grow in horizontal direction are made to grow vertically by tying pipe cleaner around plant. Soft cleaner doesn't damage stems



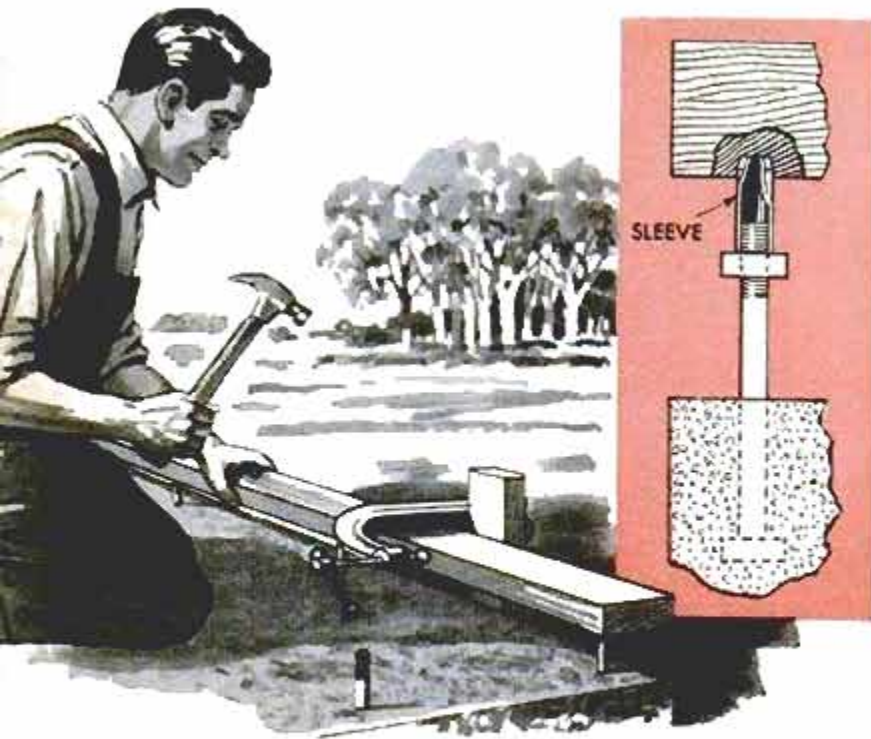
Chenille pipe cleaners wrapped around drinking glasses used for serving fruit juice or iced drinks at parties add decorative touch and insulate the glasses

Beauty of old lamp is considerably enhanced by wrapping pipe cleaners around its base. Light colors are alternated with dark ones for pleasing effect

Gift package is made more colorful by curled pipe cleaners tied to ribbon



Steel Sleeves Score Sill Plate for Drilling Bolt Holes



Here is an excellent means of accurately drilling a sill plate for bolting to a foundation slab. To do this, simply bevel one end of each of several short lengths of steel tubing and place these sleeves over the bolts with the nuts turned on the threads as indicated. Then, position the sill plate on the bolts and tap it against each sleeve to score the member for drilling as shown. Sleeves that don't make contact with the sill are made to do so by adjusting the nuts as required before clamping the sill.

Bruce D. Stewart, Winder, Ga.



Bamboo Handrails for Tots Who Use Basement Stairway

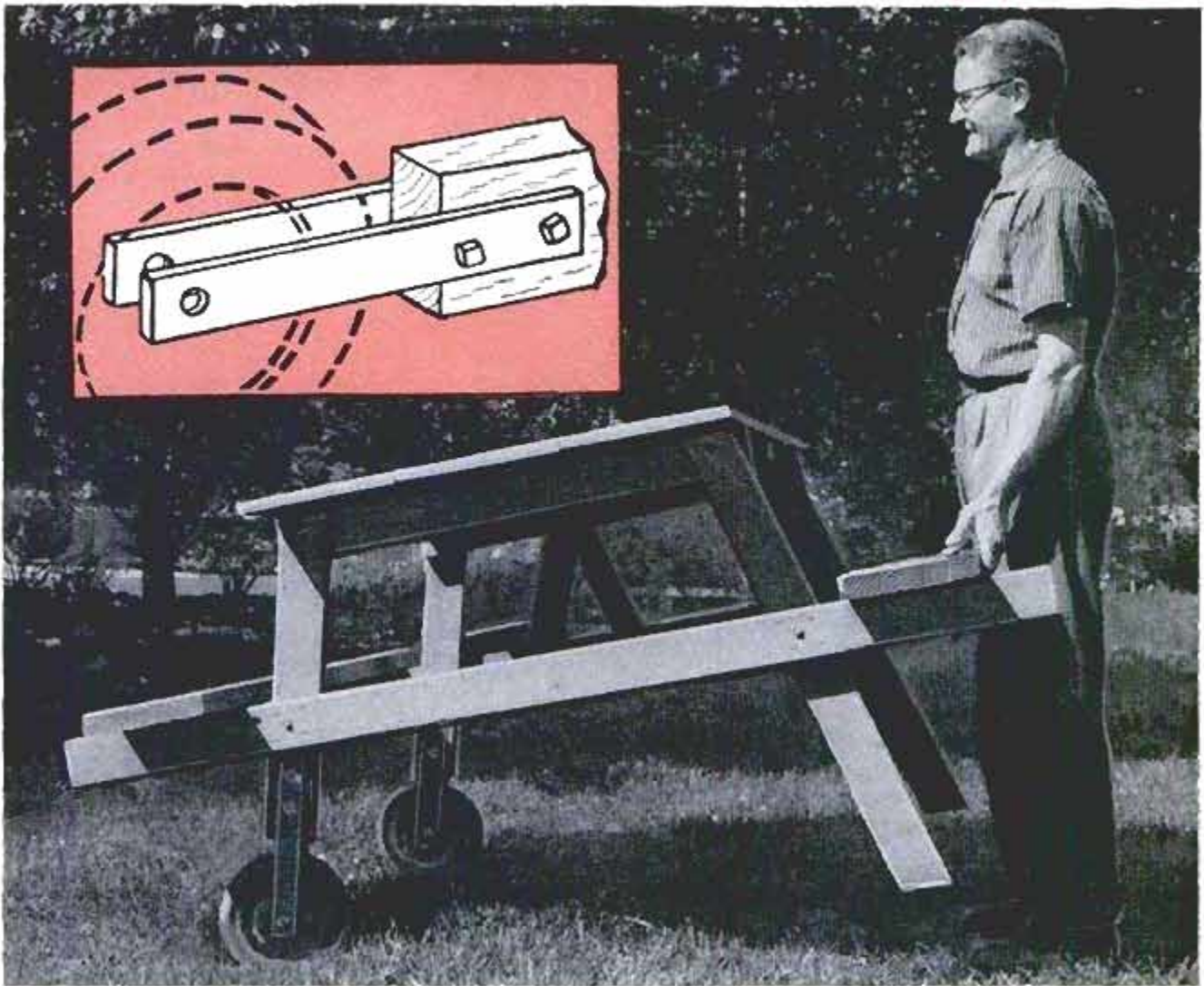
To prevent small children from falling off a basement stairway and enable them to climb or descend it unassisted, one homeowner added two intermediate handrails to the existing rail as shown. The bamboo rails used for this purpose were attached by drilling holes in facing sides of the upper and lower uprights and bowing the rails to insert the ends in the holes. Pipe clamps screwed to a center upright hold the rails rigid.

R. D. Wray, Worthington, Ohio.

Foam-Rubber Seat and Backrest for Outdoor Fishermen



This comfortable seat is ideal for outboarders who sit for long hours fishing at their favorite haunts or when piloting their craft long distances. It is made in two parts with the backrest inserted between the gunwale and inwale, and the seat bottom bolted to the boat to clamp the backrest in position by means of two wooden cleats at its lower end. Steel rods attached to the sides of the seat serve as braces for the backrest. The seat is upholstered with foam rubber covered with waterproof material.



Wheelbarrow Picnic Table Easy to Move

Coaster-wagon wheels mounted on two legs of a picnic table of the type shown, make it easy for one person to "wheelbarrow" the table to any desired back-yard location. The only materials needed to make your picnic table portable are two wheels of the same diameter and four lengths of $\frac{1}{4} \times 1\frac{1}{2}$ -in. flat steel. Two of the

latter are bolted to each cut-down leg to provide arms on which to mount the wheel as shown in the detail. To determine what length to remove from the legs, add $\frac{1}{2}$ in. (vertical clearance required between the wheels and bottom of the legs) to the diameter of the wheels and cut off the legs accordingly.—H. O. Kolze, Bensenville, Ill.

Plastic Stamp Dispenser Is Container for Cotton Swabs



For a handy dispenser of sterile cotton of the type used for photo-retouching work and lens cleaning, place a supply of cotton in a plastic postage-stamp dispenser of the type shown. The slit in one side of the case permits easy removal of a small quantity of cotton at one time while the remaining supply is kept free of soil, yet open to view.—John J. Rea, Urbana, Ill.

☐ An old piano stool is ideal for use as a kitchen stool because the seat can be elevated or lowered to the desired working height for specific sitdown jobs. For easy cleaning, give it a coat of good enamel.

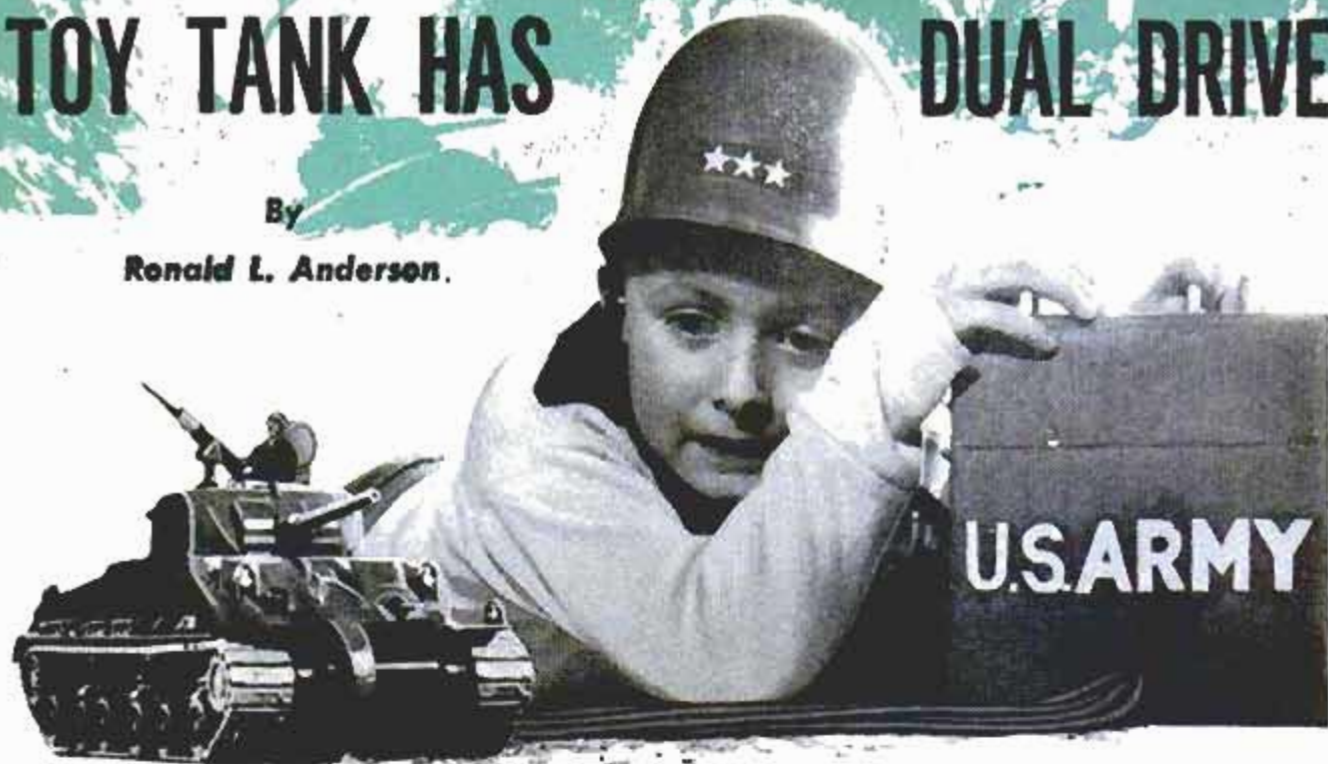
Doris Fenn, Chicago.

TOY TANK HAS

DUAL DRIVE

By

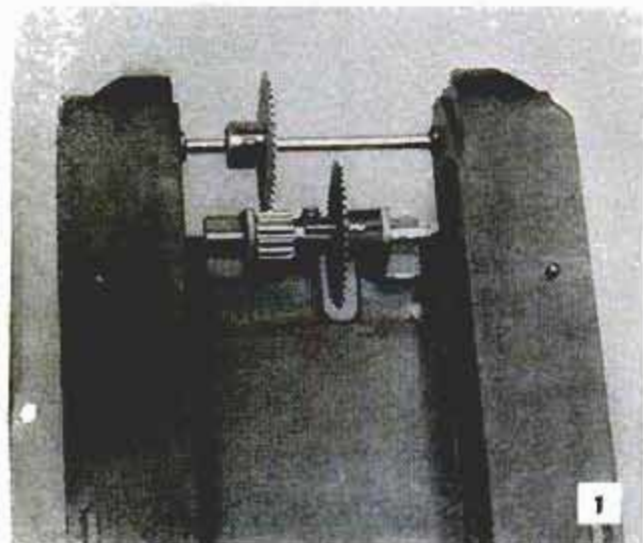
Ronald L. Anderson.



AT THE FLICK of a switch on a remote-control panel, this scale model Sherman tank starts, stops, reverses and turns. It is driven by two 3-6-volt electric motors, Figs. 2, 4 and 7 that are powered by 6-volt lantern batteries. The motors are available at most hobby shops, as are the various gears described in this article. The latter are manufactured by the Wilson Co. of Cleveland, Ohio, should it be necessary to order them.

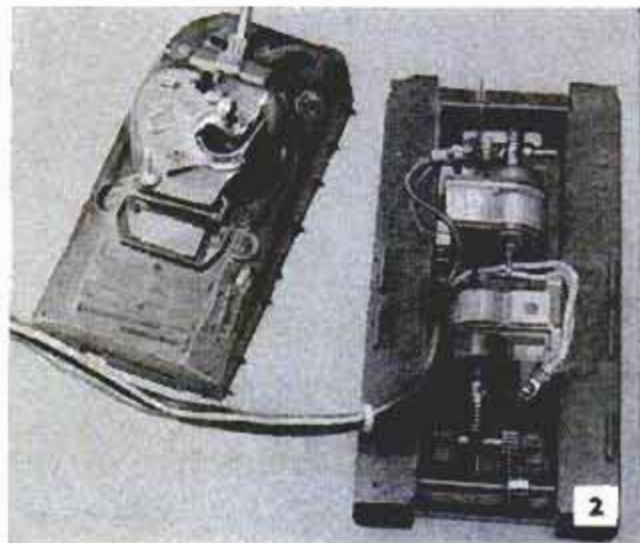
Revell's M-4 plastic scale-model tank was chosen to motorize, as it is large enough to accommodate the motors and gears. To start, cement the sides of the tank to the bottom, but merely snap the top in place temporarily. Next assemble the front axle and wheels. Normally, both sprocket drive wheels are on the front axle.

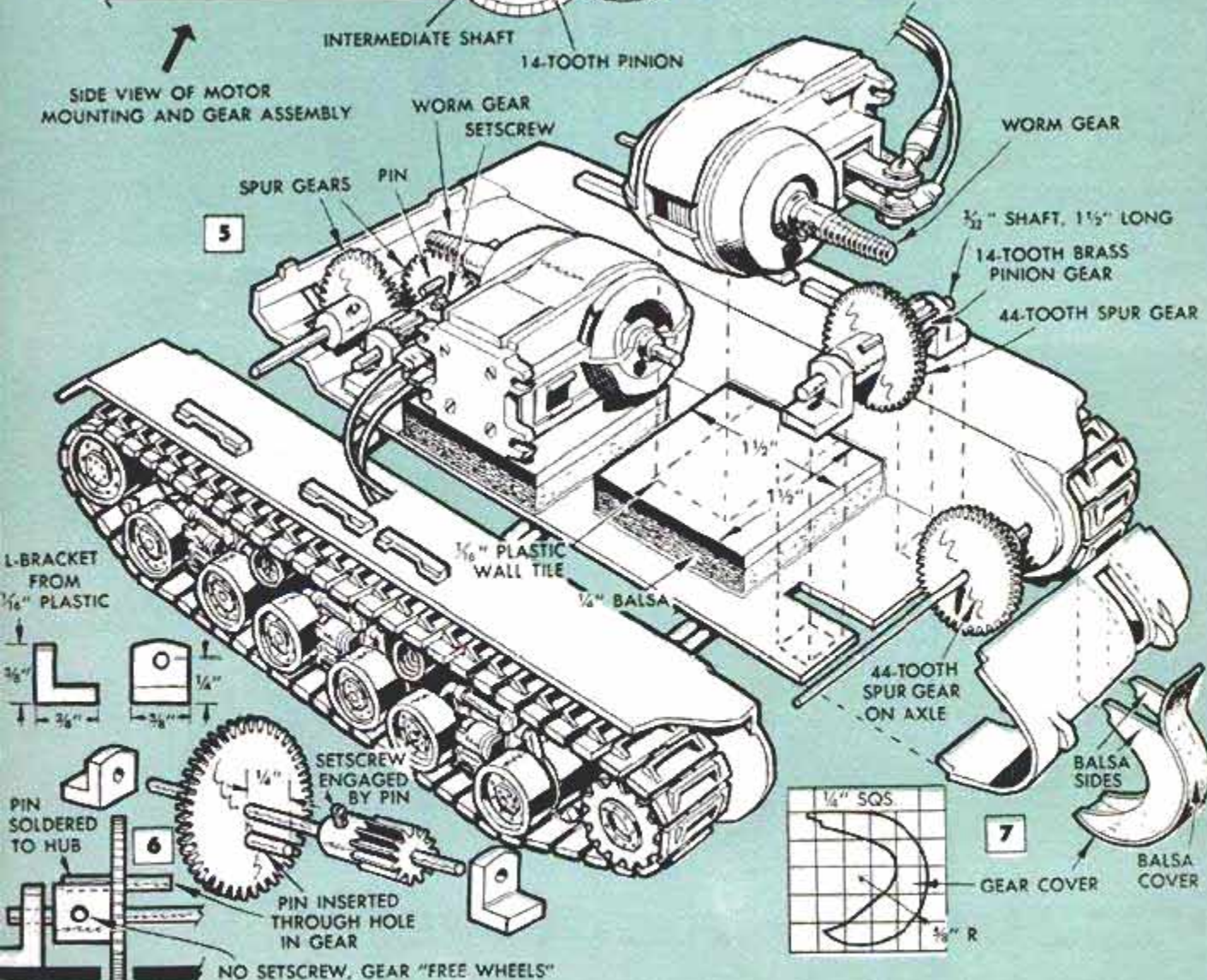
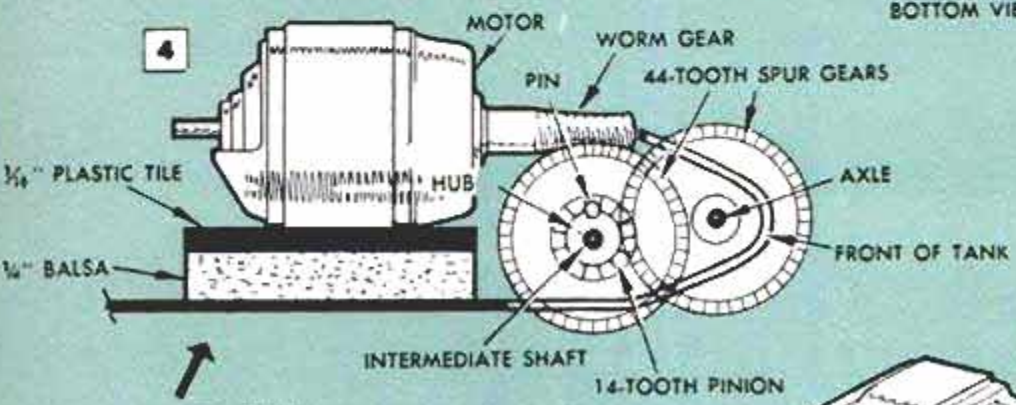
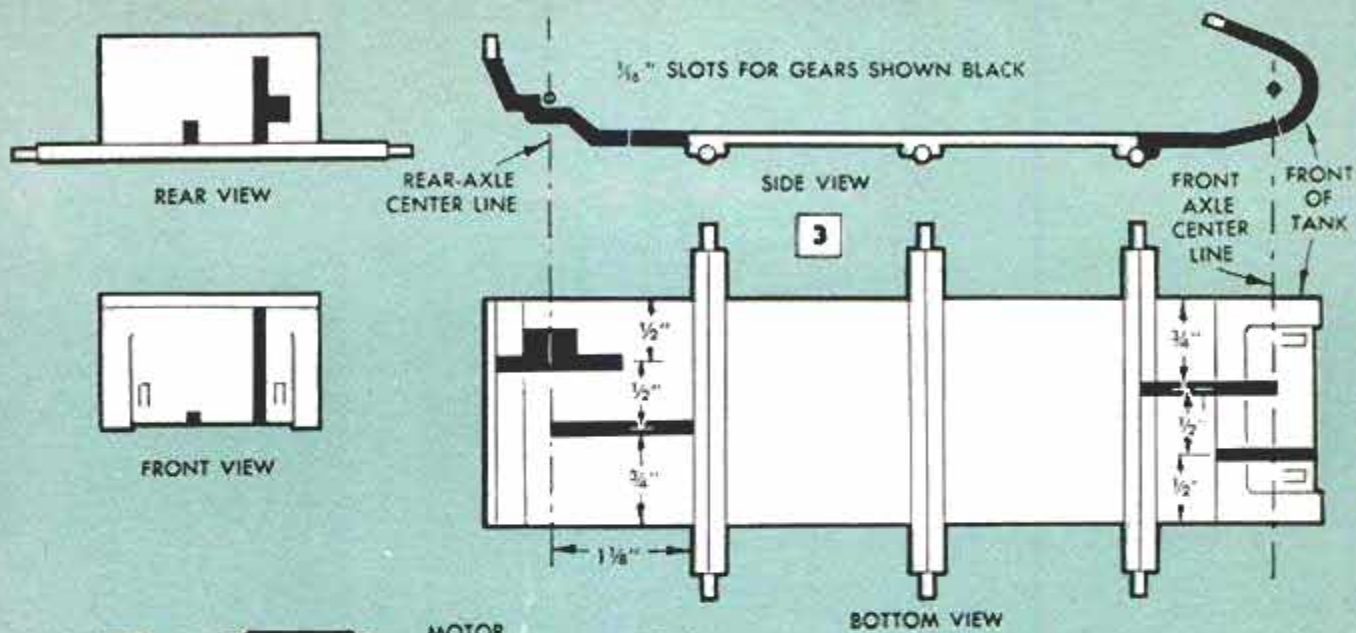
"Clutch transmission" assembly on intermediate shaft and gear on axle are clearly shown in this photo

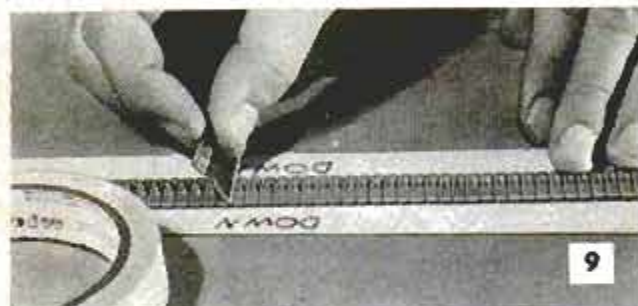


When motors are used one of the sprockets is fitted on the rear axle. As indicated in Figs. 2 and 7, each motor drives a single tread, one through the front axle, the other through the rear axle. Switching the sprocket wheels makes this possible. Before completing the front-axle assembly, slip a $1\frac{1}{2}$ -in., 44-tooth spur gear (Wilson K-1288-3) on the axle, Figs. 1 and 7. Exact positioning is determined later. Each of the motors is now cemented to a plastic wall tile, and the latter is cemented to a balsa-wood block. Note that one motor is positioned on its right side, the other on its left. Fit a worm gear (Wilson K-1283-2) on the shaft of the front motor and cut a slot in the tank bottom directly beneath the gear to provide clearance for the intermediate gear, Fig. 3. Also cut slots for the

Four wires from motors pass through hole in top, can be taped together or enclosed in plastic tubing

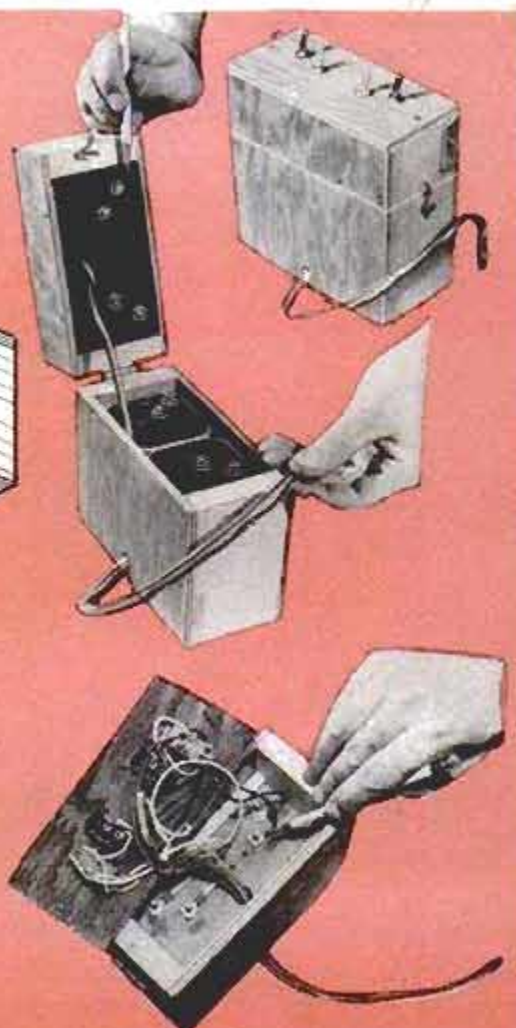
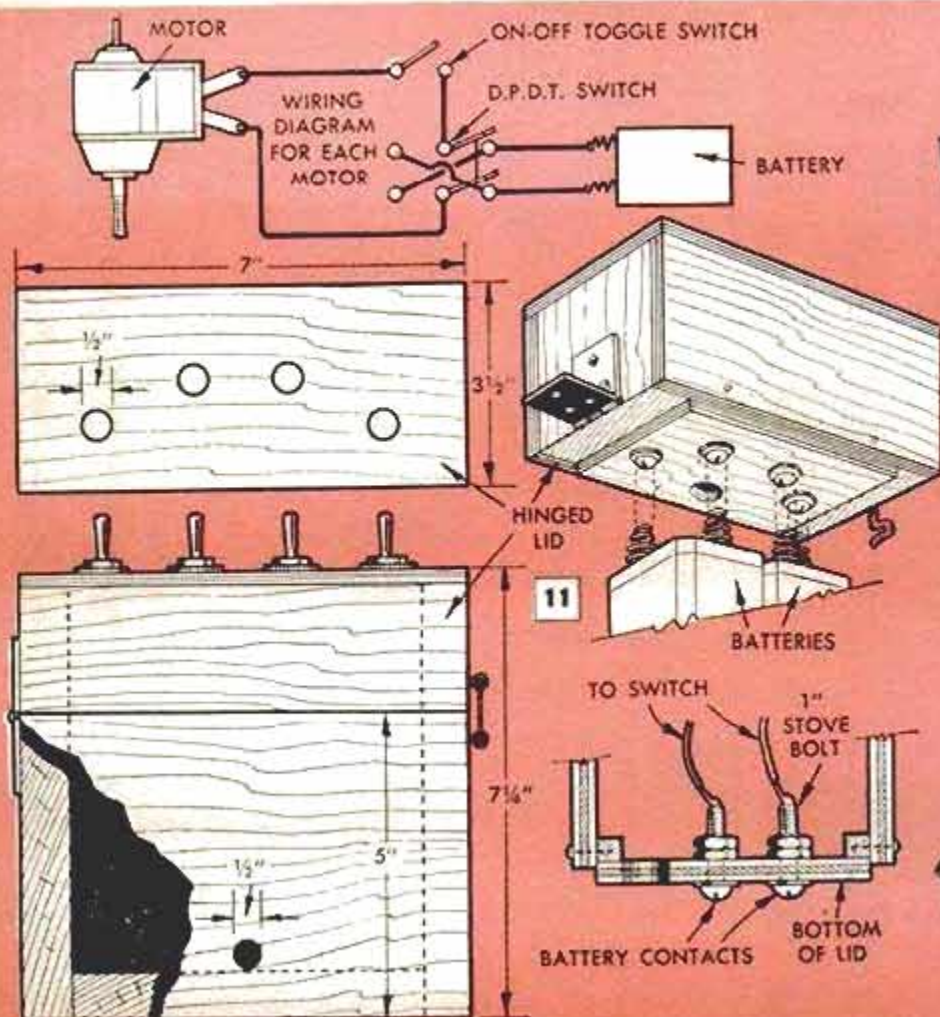






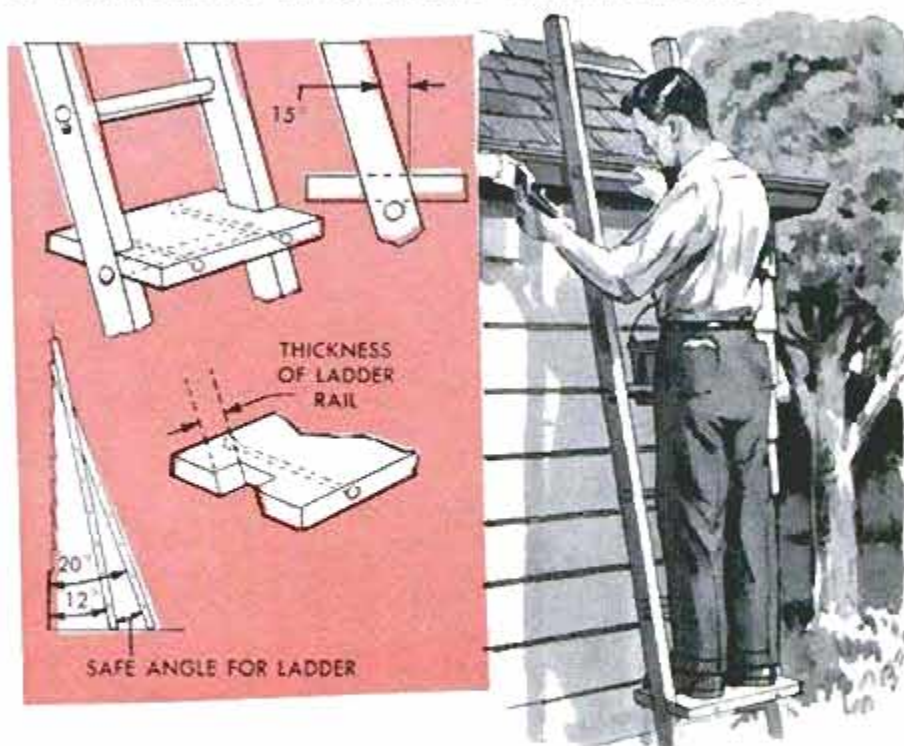
Above is shown method of modifying tank treads so they are more flexible. Original connector link on end of each tread is removed. Below, brass screws in control-box lid press on spring battery contacts

other gears as indicated in Fig. 3. The two intermediate gears, an $1\frac{1}{2}$ -in. spur gear and a 14-tooth brass pinion gear (Wilson K-1286-1) are fitted on a $\frac{3}{32}$ -in. shaft $1\frac{1}{2}$ in. long, Figs. 4, 5 and 6. Fig. 6 illustrates the "clutch transmission" assembly, consisting of a pin soldered in a hole in the hub of the "free wheeling" pinion gear so that it contacts the setscrew on the spur gear. Two L-shaped brackets cut from plastic support the intermediate shaft, Fig. 6. Position the gears and shaft so all mesh properly, then cement the brackets in place. The motor and pad then are cemented to the tank bottom. Repeat these operations for the rear axle, gears, intermediate shaft and motor. Modifying the tank treads is the next step. Two strips of $\frac{3}{4}$ -in. masking tape are used to hold down a third strip, adhesive side up, Fig. 8. Two short strips hold down the ends. The tank tread now is pressed onto the adhesive of the tape and the individual treads are cut apart, Fig. 9. Two strips of $\frac{1}{2}$ -in. plastic tape are pressed onto the separated treads, Fig. 10 and allowed to project 2 in. at one end to provide a means of connecting the tread ends. Slip the modified treads on the tank and install the bogey wheels. The battery-control box is made of $\frac{3}{4}$ -in. solid stock and $\frac{3}{8}$ -in. plywood, Fig. 11. Two toggle switches and two d.p.d.t. switches are installed as indicated. ★ ★ ★



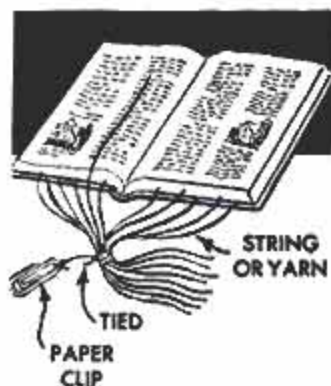
Footrest on Ladder Provides Welcome Arch Relief

If you have ever had sore arches from standing on a ladder rung for a long period of time, this footrest will be welcome. It consists of a piece of 2 x 10 stock cut as long as the outside width of the ladder uprights. Two notches at the ends are cut at a 15-deg. angle as shown to fit snugly on the uprights. The angle will locate the footrest approximately horizontal when the ladder is placed about 15 deg. from a wall. To prevent the 2 x 10 from splitting lengthwise, a $\frac{3}{8}$ -in. carriage bolt is fitted crosswise through the board near each end as indicated.



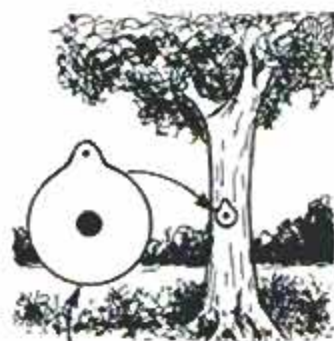
String Is Neat Book Marker

Much neater and more convenient than using a number of slips of paper, this book marker is made from string or yarn formed in loops, then tied and cut. A paper clip holds the marker in a book.



Milk-Bottle-Cap Rifle Targets

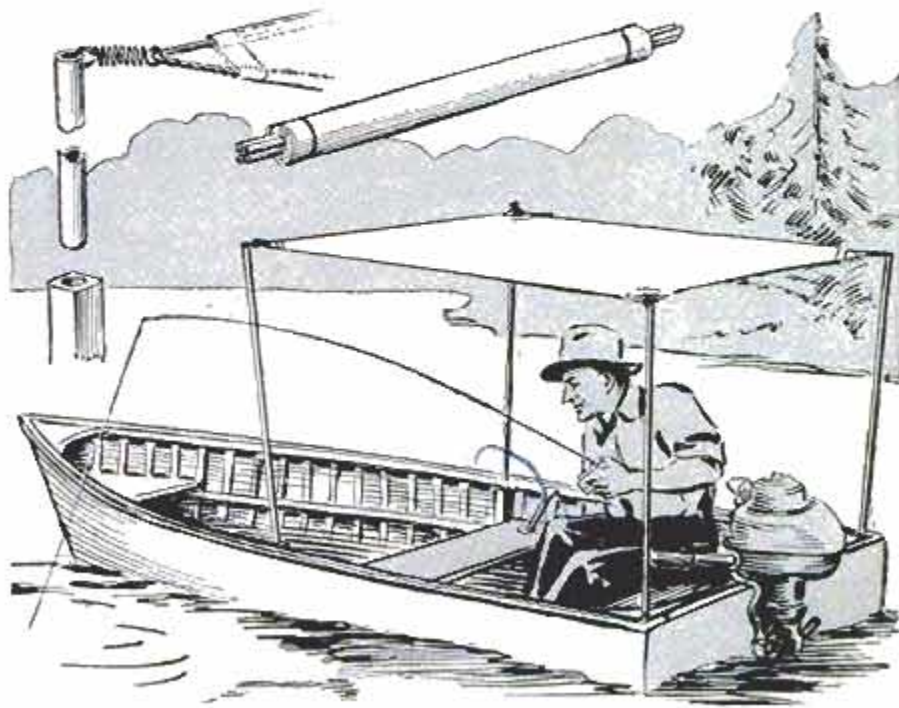
Milk-bottle caps of the type shown make excellent targets for air-rifle practice. Holes punched in the tabs of the caps permit them to be hung on a post or tree. Penciled circles provide bull's-eyes.

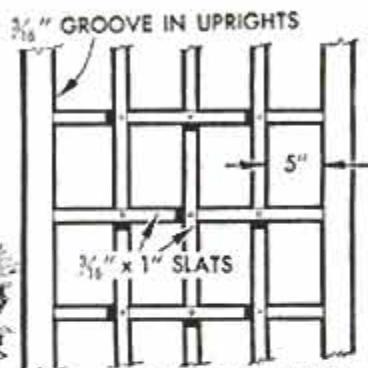


MILK-BOTTLE CAP

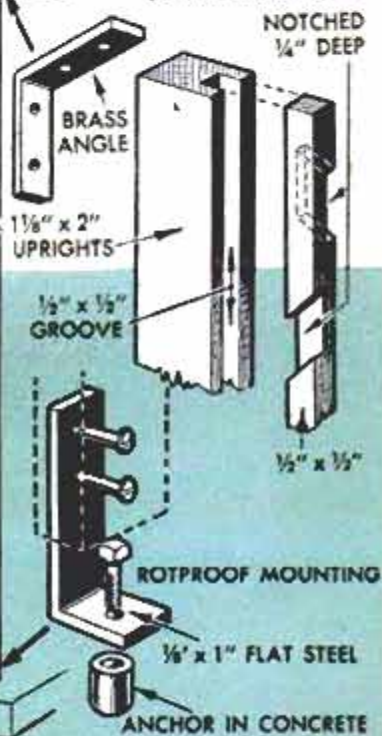
Lightweight Boat Canopy Rolls Into Compact Bundle

Easily carried under one arm when rolled, this boat canopy consists of four lengths of aluminum pipe and a piece of light canvas. Clothesline is sewed into a hem around the edge of the canvas, the corners of which are cut off so the line forms loops. The loops fit in short coil springs that hook into the upper ends of the pipes as indicated in the detail. The lower ends of the pipes fit into wood blocks, drilled to receive the pipes, then screwed to the inside of the hull at four points so canopy springs are kept under tension.—Hi Sibley, Nuevo, Calif.

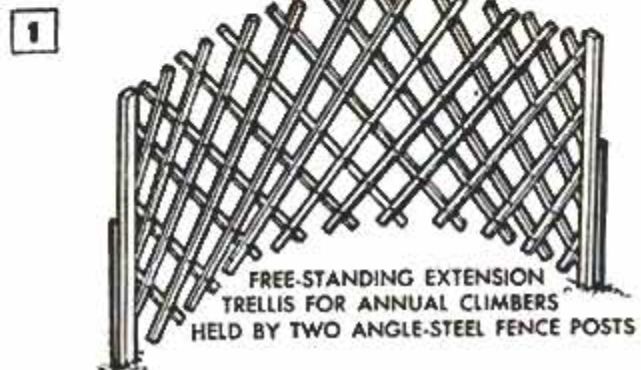
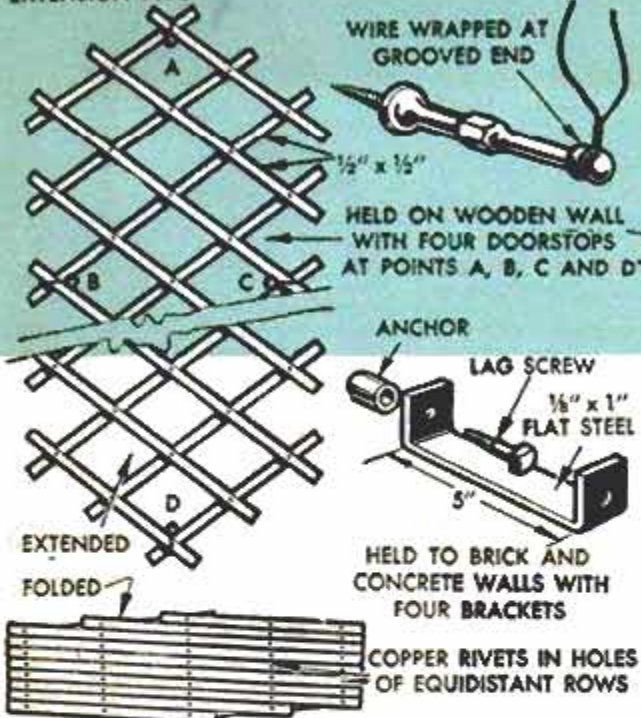




ALTERNATE METHODS OF WEAVING SLATS



EXTENSION TYPE



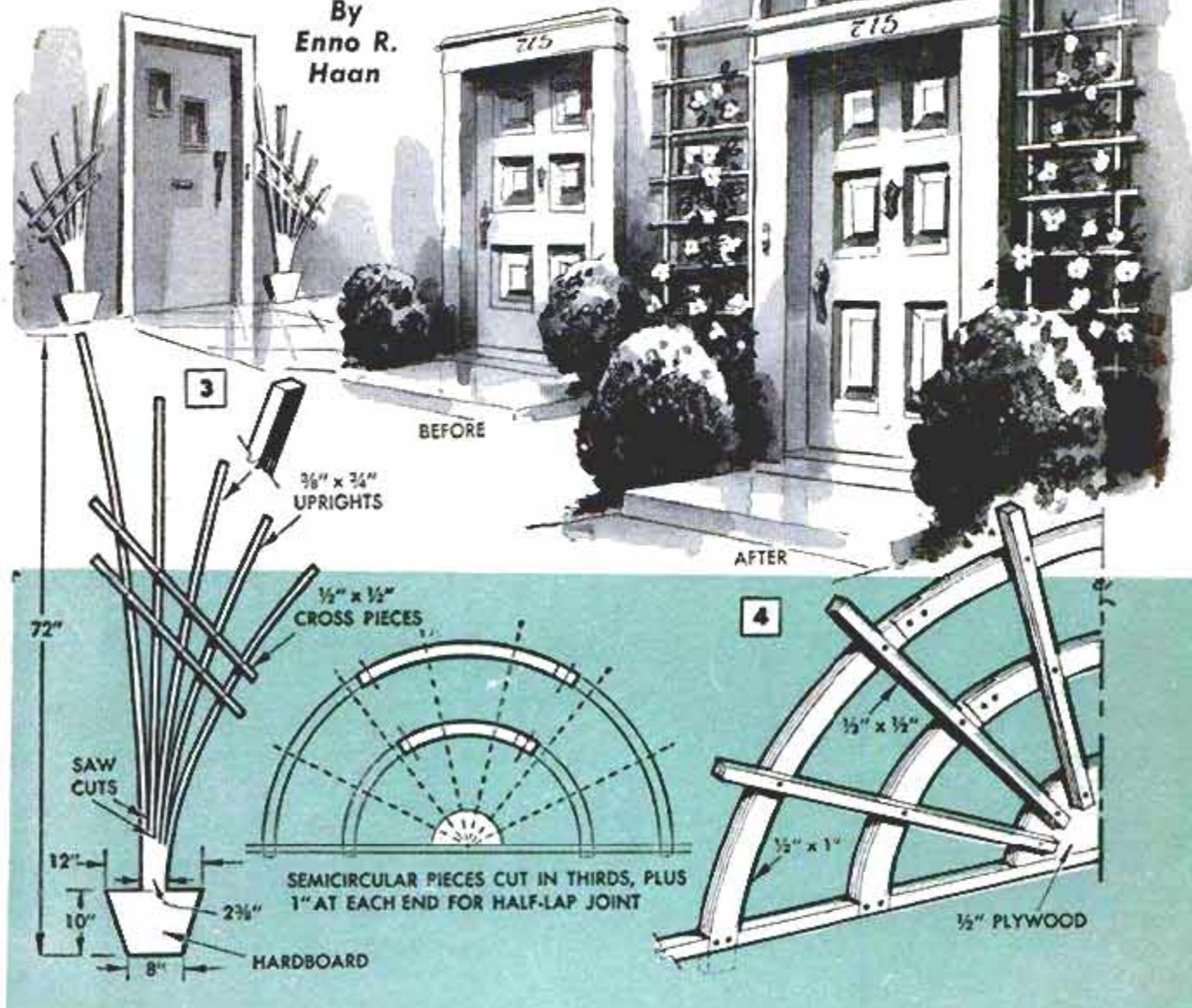
DOES YOUR HOME or garden need that added touch of charm that a well-designed trellis or two can provide? They make ordinary doorways appear more spacious and inviting, add areas of interest to plain walls, and form visual breaks in large expanses of uninteresting foliage. You may prefer a trellis of unusual design, or one "custom tailored" for a location.

Almost any weather-resistant wood is satisfactory for making trellises, when protected with paint, but the most rot-resistant woods are Western red cedar, redwood and cypress. For added protection on parts that are buried, wood should be treated with a preservative, one that will not bleed through paint. Wooden uprights on trellises will last much longer if they are held by pieces of angle-steel fence posts that extend into the ground as shown in Figs. 1, 8, 9 and 10. An alternative to this consists of lengths of flat steel around which

WTM 59

Garden Trellises

By
Enno R.
Haan

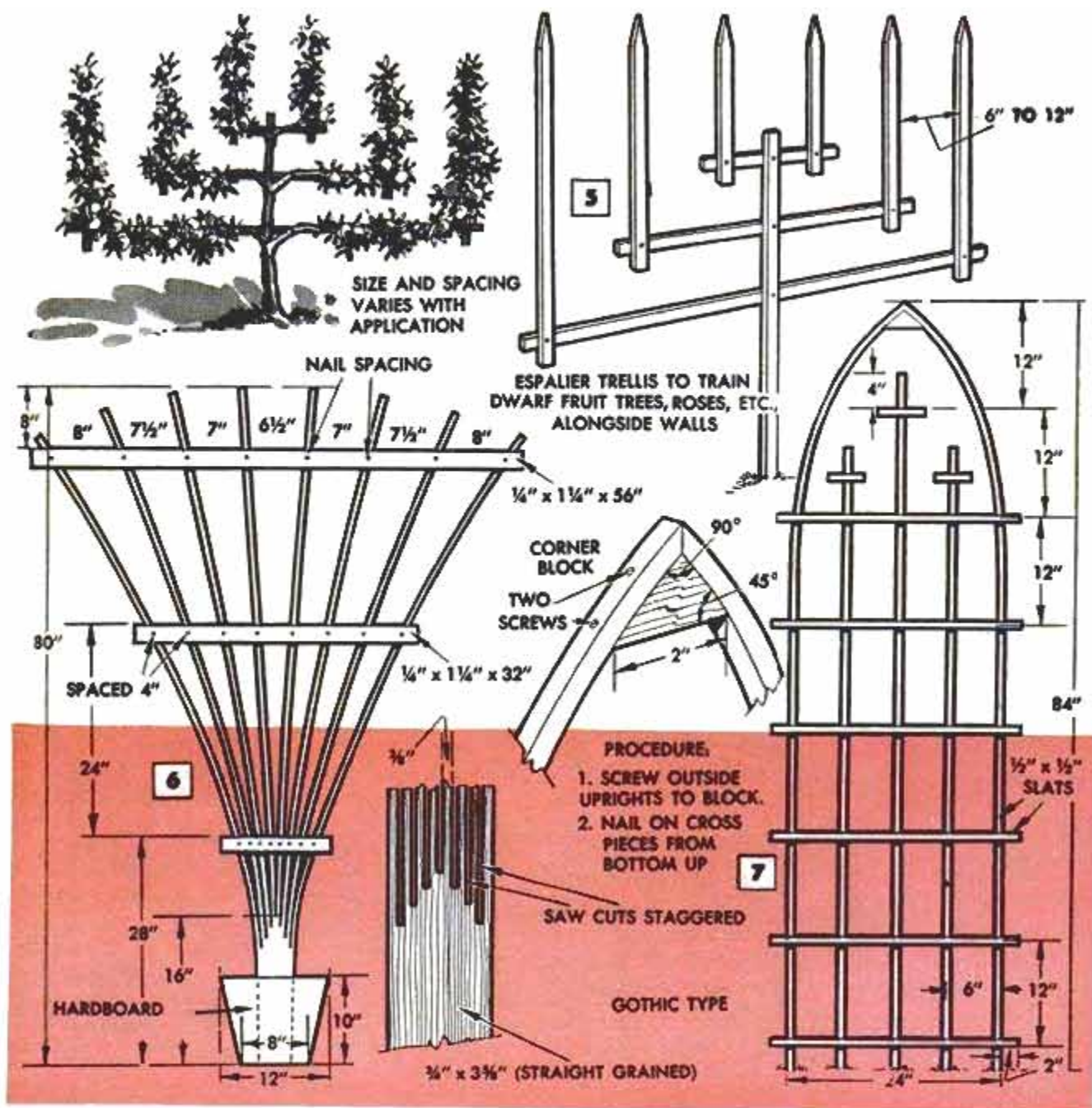


blocks of concrete are poured. Avoid setting uprights directly on a concrete or stone slab, as water then readily soaks up into the end grain of the wood. A good way to prevent this is to attach the uprights to short metal legs that are fastened to the slab as in Fig. 2, so the wood is held above the slab. The legs are fastened to the sides of the uprights with rust-resistant bolts, and to the slab with screw anchors.

To hold trellises firmly against wood walls, yet spaced a few inches from them, you can use doorstops as in Fig. 1. On brick, stone, stucco and concrete-block walls, rust-resistant brackets are installed as detailed in Fig. 1. These are attached with screws and screw anchors. The durability of trellises can be increased greatly by applying waterproof glue to all joints in addition to using rust-resistant nails and screws.

The appearance of a doorway over which

there is a canopy can be improved by installing a pair of trellises as in Fig. 2. The trellis slats may be arranged diagonally, vertically and horizontally, or may be woven. If the trellis is left standing the year 'round, the ends of the slats should be set in grooved uprights. Filler pieces, notched to fit the slats, are glued into the grooves to seal them against water. If a trellis under a canopy is to be removed for winter storage, an extension type can be used as in Fig. 1. The uprights of the door trellis shown in Fig. 3 are formed by sawing kerfs in a piece of straight-grained wood. They are held at the desired spread by means of two crosspieces positioned diagonally. A flowerpot cutout of 1/8-in. tempered hardboard is nailed to the lower end. Fig. 4 shows how trellises increase the apparent size of an entranceway and make it look more inviting. The semi-circular pieces consist of three bandsawed



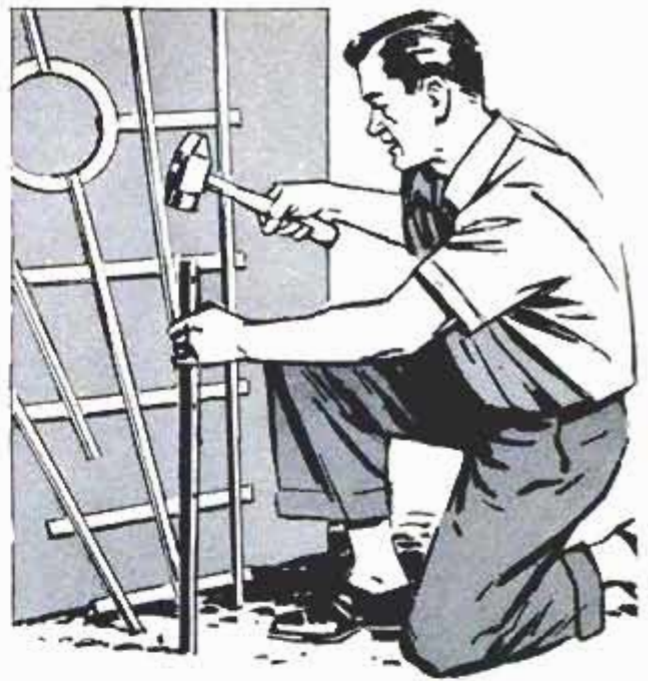
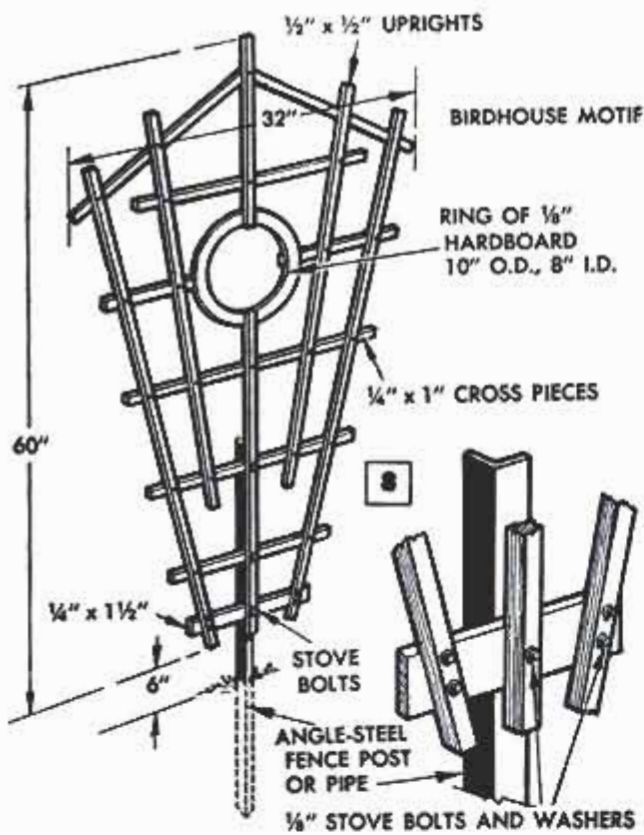
segments, each $\frac{1}{3}$ full length, plus 1 in. at each end for half-lap joints.

Figs. 5 to 7 show novel wall trellises. An extension trellis, Fig. 1, also serves this purpose. Espalier trellises may be simply ornamental and covered with small-leaf climbers trained on each arm but not across them. They often are used to shape dwarf fruit trees and roses. Or, the arms of such a trellis can be bandsawed to an irregular shape to represent leaves so it appears vine-covered, it then being painted a dark leaf green.

The "fern" trellis, Fig. 6, has eight uprights formed by sawing kerfs in a piece of straight-grained stock. The ends of the kerfs are staggered to retain maximum strength for the slats. In assembling, attach the upper cross piece first, then the center and lower ones, and finally the flowerpot cutout. Another unusual trellis is the Gothic type with three small crosses, Fig. 7.

This is suitable for wall decoration with or without a delicate climber, if its style does not conflict with that of the house. It should be placed close to the wall and painted to contrast with it. In making it, first screw the top of the outside uprights to a block of $\frac{1}{2}$ -in. waterproof plywood. Then, attach the lower cross piece to all the uprights and continue upward being careful near the top to form a symmetrical curvature of the outside uprights.

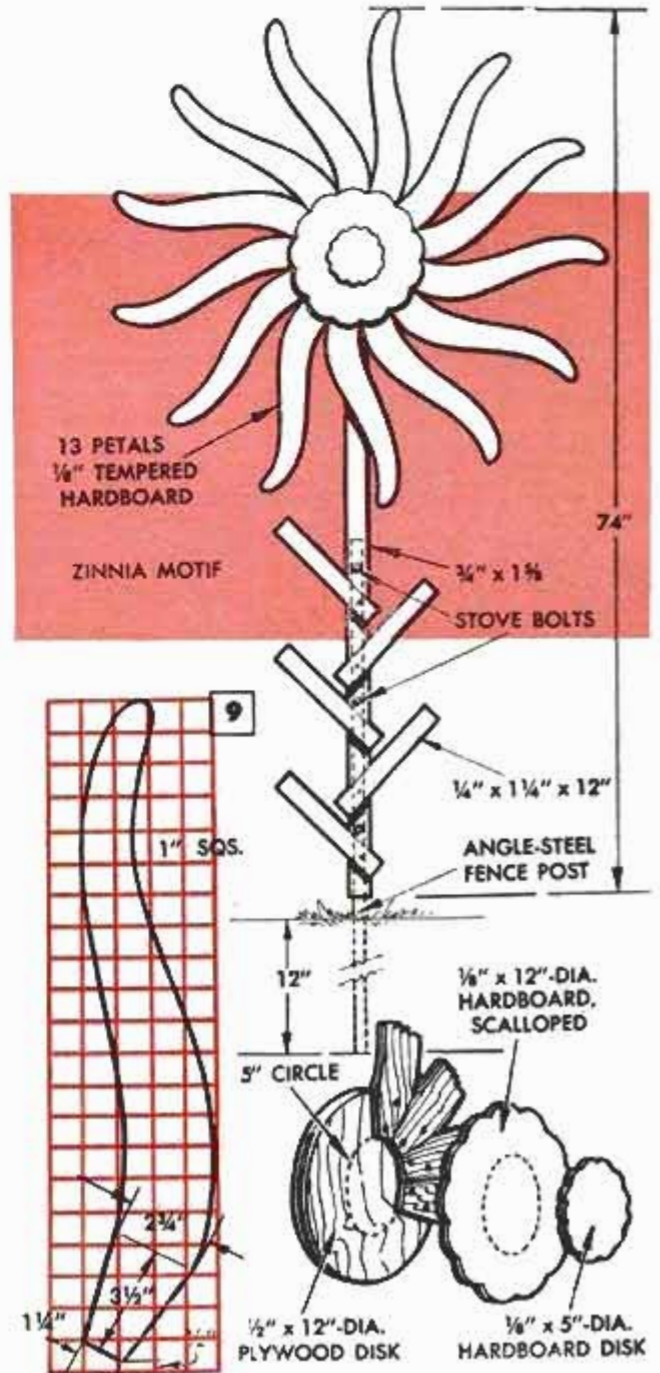
"Stickpin" trellises, Figs. 8 and 9, are simply driven into the ground and can be removed quickly for winter storage. As shown, they can be strikingly different from conventional trellises. To maintain emphasis on the design, they should be covered only sparsely with delicate foliage. The trellises can be bolted to a length of fence post driven into the ground, or the trellis-post assembly can be handled as a unit, the upper end of the post taking the

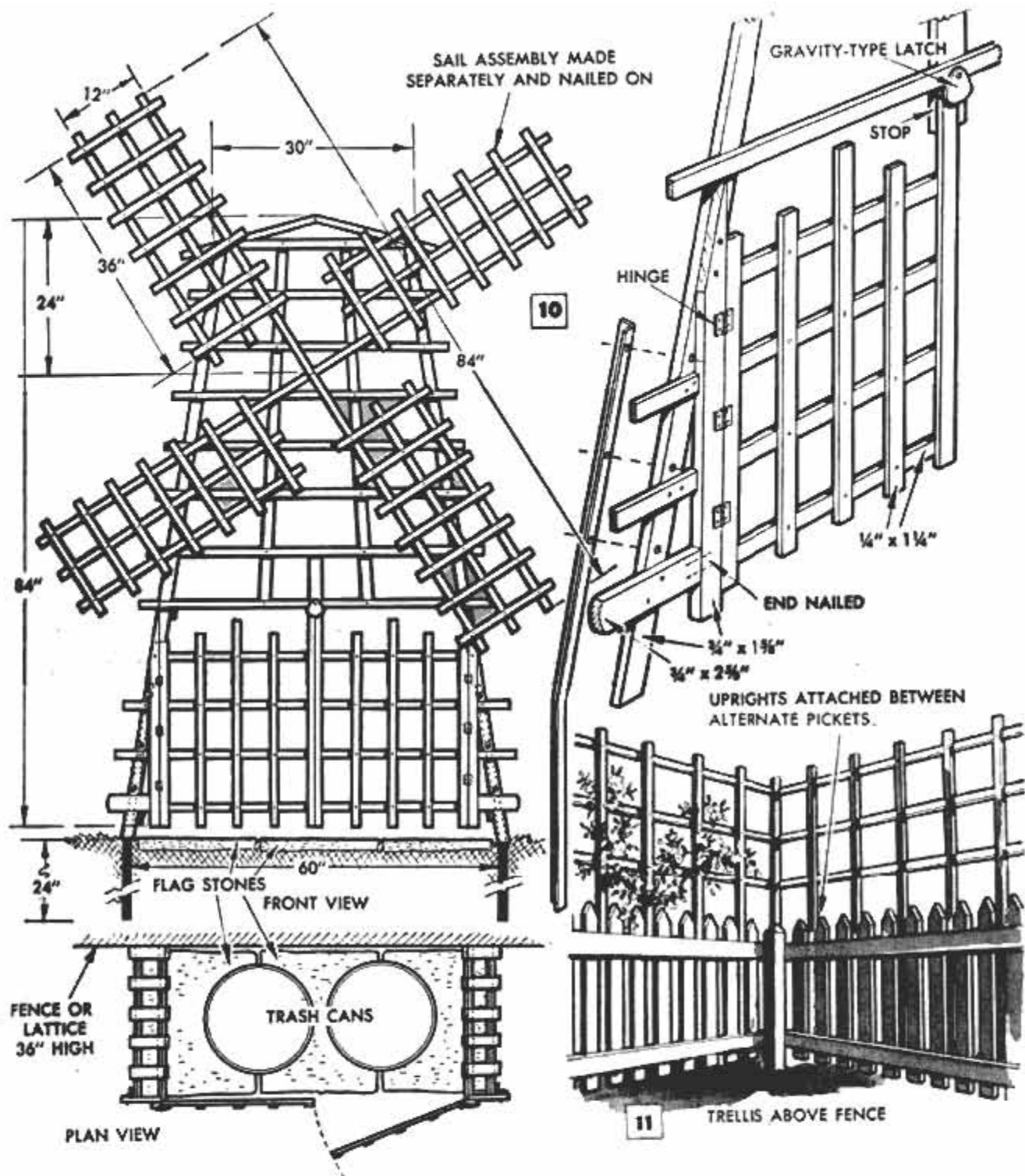


abuse of being driven into the ground. An extension trellis also can be free-standing, by setting it on edge as shown in the lower detail of Fig. 1. It is tied to two or more vertical supports as indicated.

Trash cans that must be kept in a convenient location in a back yard can be made practically unnoticeable behind a suitable screening trellis. This should not be a box-type enclosure that betrays its true purpose. Rather, the trellis should attract attention to itself because of its own design, like the windmill shown in Fig. 10. The lower front portion consists of two hinged latticework panels to permit removal of the cans. A gravity-type latch keeps the panels closed. Wide spaces just above the panels permit easy access to open the cans and insert trash. Two fence posts, slightly bent as shown, provide ample support.

Objectionable scenery, such as an alley that is unkempt and littered, or a vacant, weed-infested lot behind a fence, are concealed effectively by means of a high trellis extending above the fence. On picket fences, the space between the pickets often is enough to permit attachment of the trellis uprights to the fence rails as shown in Fig. 11. A vine trained to grow over the trellis will hide the unattractive view, and at the same time will keep out much of the wind-blown weed seeds, paper and other unwanted debris that would pass through an ordinary fence. ★ ★ ★





When pouring concrete blocks to anchor brackets for supporting a trellis of any type, the blocks should be no less than 24 in. deep so they will not be loosened by normal strains. In cold climates, the blocks should be from 30 to 36 in. deep, depending on the frost line. Blocks above the frost line will be heaved and loosened by alternate freezings and thawings during spring and fall weather variations.

Holes for screw anchors to attach brackets to walls and concrete slabs are drilled easily with carbide bits of the proper size. Chucked in a $\frac{1}{4}$ -in. drill, these bits make short work of drilling holes in concrete and masonry. The bits last a long time and are a valuable addition to the toolbox of any

home craftsman. Should a bit contact a hard piece of gravel, or an over-fired section in a brick, use a blunted center punch to break up the surface of the hard section. The roughened surface will give the carbide bit a new chance for a "bite" and allow it to bore some distance before it will be necessary to use the center punch again. In some cases it is necessary to use the punch several times when drilling through an especially hard section of masonry.

Aluminum now is generally available in angles and flats, and should be used for brackets on trellises, as it is rustproof and weather-resistant. Also, it is bent and drilled easily with hand tools. Some types can be cut with a woodworking saw. ★★



Easy-to-Make End Table for Moderns

Construction of this three-legged end table of modern design is simple enough to be considered an easy one-evening project. The top is bandsawed from 1-in. oak lumber. Ash, walnut or any other suitable lumber that is available may be used as well as cutouts from kitchen countertops with a simulated wood grain in the cover material. The latter can be obtained at low cost from most building-supply stores.

Legs for the table may be purchased, or they can be made from steel tubing. The ones shown were made of $\frac{1}{2}$ -in. thin-wall, electrical conduit of the required lengths. A steel plate welded to the upper end of each leg provides a means of attaching them to the table. When cutting the angled ends of the legs, it is advisable to use a jig to assure correct alignment when they are installed. The completed legs may be finished as desired.

Any type of finish desired may be applied to the wooden top. A "silver fox" finish on the table shown in the photos, is serviceable and goes well with modern decor, yet it is easy to apply. To duplicate this type of finish, first apply a base coat of gloss-black lacquer to the bare wood. No undercoat or sealer is used since it is desired to allow the lacquer to be absorbed by the porous parts of the wood while coating the hard areas. Two or three coats of black lacquer are necessary for adequate coverage. After the last coat of black lacquer has dried, white lead thinned to the consistency of heavy cream is rubbed into the open-grain areas. Next, the excess white lead is wiped off and the surface is cleaned and polished with a soft cloth. After the white lead becomes hard, the finish is protected by giving it a final coat of clear lacquer.

M. C. Anderson, San Lorenzo, Calif.

Embossed Metal Plaque Made From Relief-Design Transfer



You can make an embossed metal plaque by taping a thin sheet of brass or copper on the face of a figure or design that is in relief. The desired design is then transferred in reverse by working all the depressions and ridges into the metal with the round end of a fountain pen as shown. When mounted in a frame, the embossed metal makes an attractive wall decoration.

R. De Cristoforo, Los Altos, Calif.

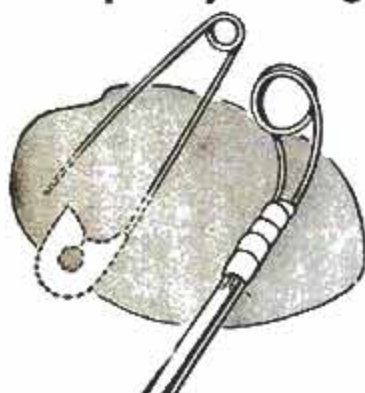
☞ Heating radiators should be painted with an enamel or flat wall finish rather than a metallic paint which tends to retard heat radiation. Be sure the surface to be painted is free of rust and dirt.



Cork Float Attached To Lighter Prevents Its Loss Overboard

On a fishing trip you need not fumble in your pockets with wet or soiled hands to find a cigarette lighter, nor worry about losing it overboard, if a cork float is attached to it with a loop of fishing line. A small hole is drilled in the hinge side of the cover to receive the line. When the lighter is dropped into a pocket, the cork is hung outside so that it may be grasped to remove the lighter. The cork float should be large enough to support the lighter in the water. Using a looped line for the cork permits it to be removed from the lighter when it no longer is needed. Windproof sportsmen's lighters are most easily modified as described.

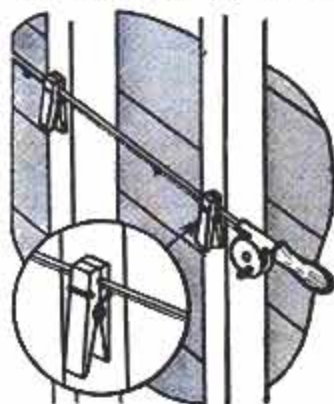
Temporary Fishing-Rod Guide



If you lose the end guide from your fishing rod and no replacement is available, you can alter a safety pin as indicated to provide a temporary substitute. It is taped or held with line to the end of the pole.

Clothespins Hold Fishing Rods

There need be no worry about your best fishing rod being knocked to the floor and damaged if this rack is used. It consists of two spring-type clothespins, glued to the wall studs of a cottage or garage, jaw end up, as indicated. The pins are grooved to fit over a clothesline, and thus will fit firmly over the shank of a fishing rod when it is clamped in place. — E. V. Reyner, Townsend, Mont.



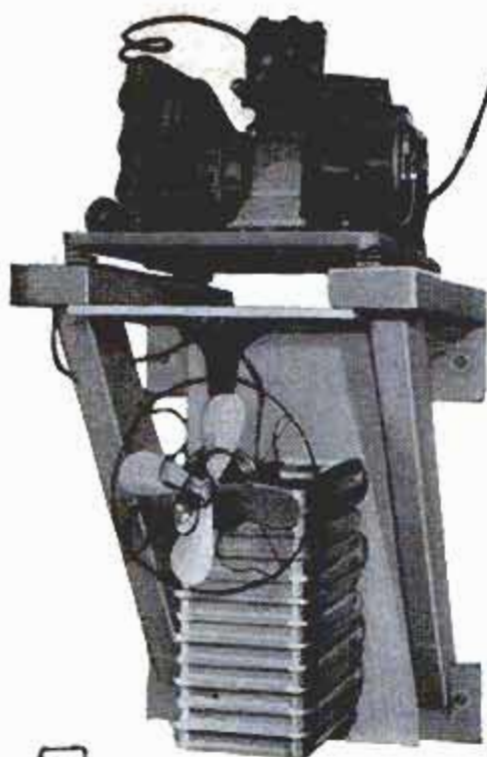
Rowing Aid For Youngsters Made From Sash Cord

Learning to row a boat during a vacation can be made much simpler for youngsters by equipping the boat with two simply made foot supports that are fastened temporarily to the seat. Made of sash cord, the supports are adjustable to suit the length of a child's legs. Easily removable, the rowing aids can be transferred from one boat to another. The ends of the supports can be tied to form loops for the feet, or they can be provided with wooden stirrups for greater foot comfort as shown.

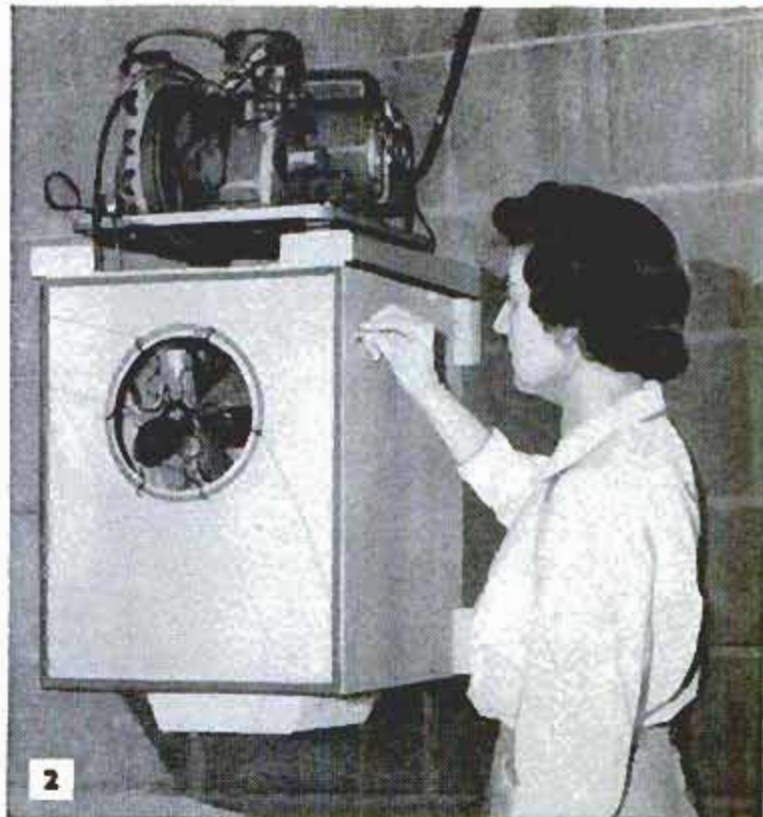


Fishing-Tackle Protection

Protect the enameled surfaces of casting plugs and the plated surfaces of spoons and spinners by lining your fishing-tackle box with rubber. Inner-tube rubber can be used for this purpose, fastened to the inside of the box with rubber cement. Or, paint the box with a "liquid latex" product.



1



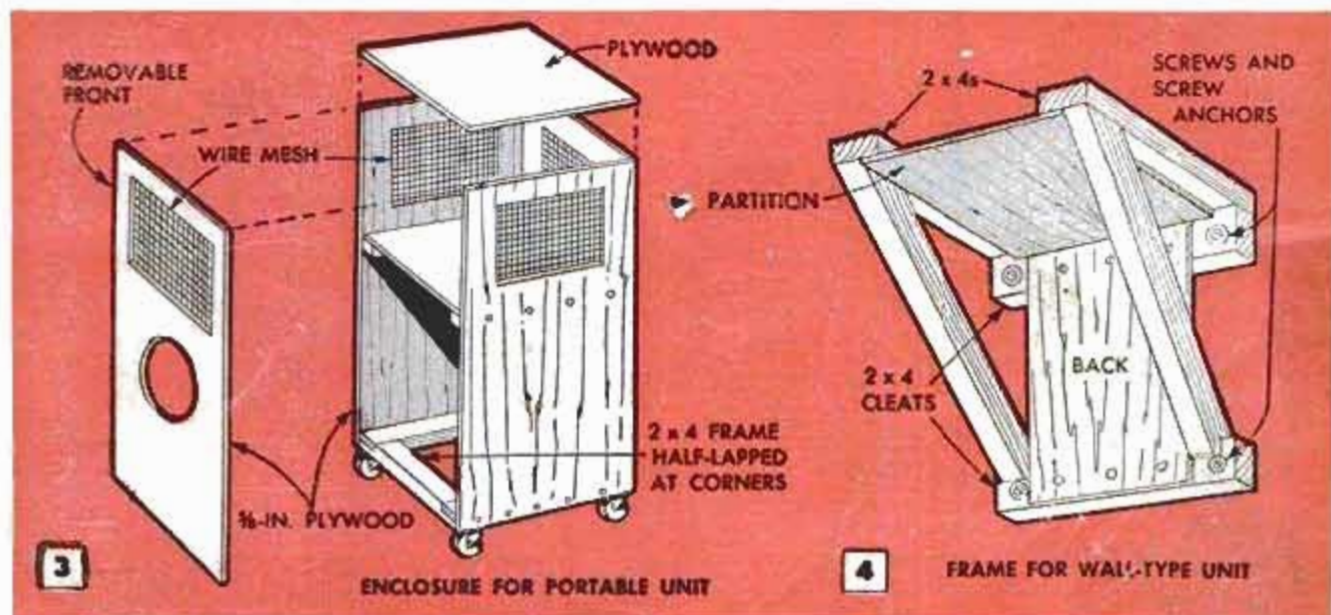
2

LOW-COST DEHUMIDIFIER Made From Old Refrigerator Unit

By Chris Haan

INEXPENSIVELY ASSEMBLED from the components of a second-hand refrigerator, this dehumidifier will remove up to 3 gal. of water from the air in a basement in a 24-hr. period. Rust, mildew and musty odors are eliminated or minimized, making an otherwise damp basement usable as a workshop or game room. Whether made as a permanent, wall-mounted unit, Figs. 1, 2, 4, 5 and 6 or as a portable model, Fig.

3, arrangement of the refrigerator components is the same. The motor and compressor are placed on a partition above the cooling coil, so that a fan attached to the partition draws air over only the cooling coil, Fig. 1. In most refrigerators the coil is positioned horizontally, and contains the ice-cube trays. When used in the dehumidifier, the cooling coil is positioned vertically so that moisture that settles on it runs



3

ENCLOSURE FOR PORTABLE UNIT

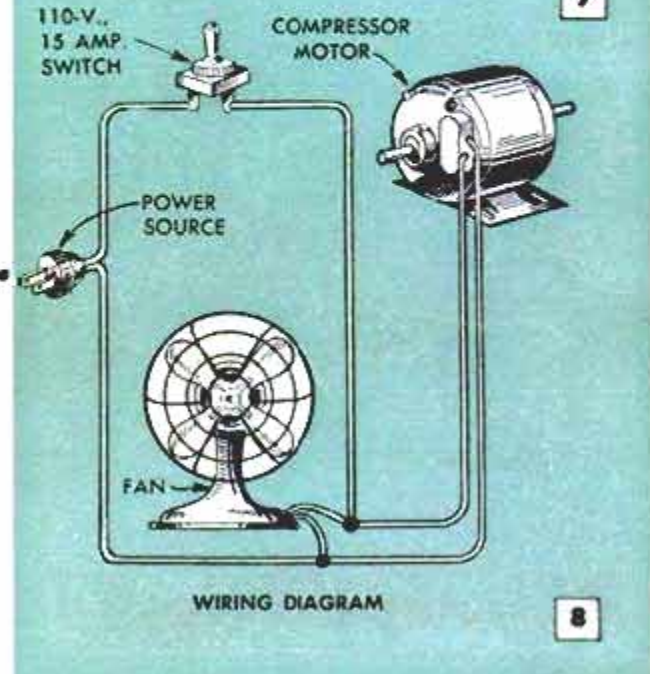
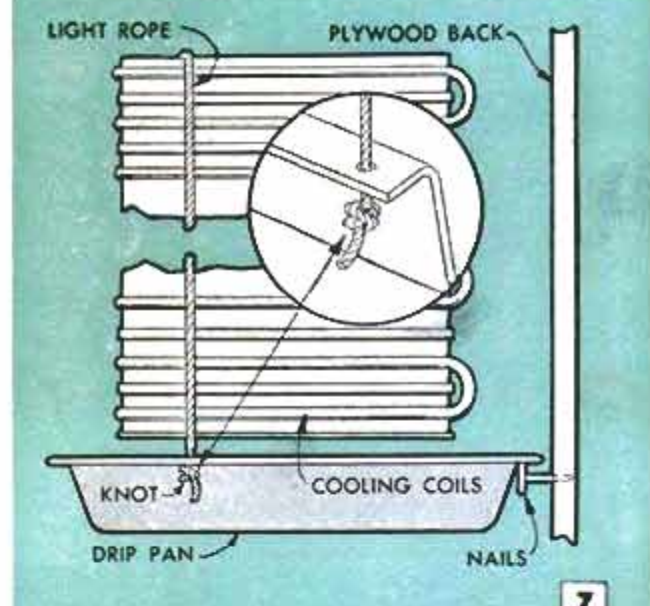
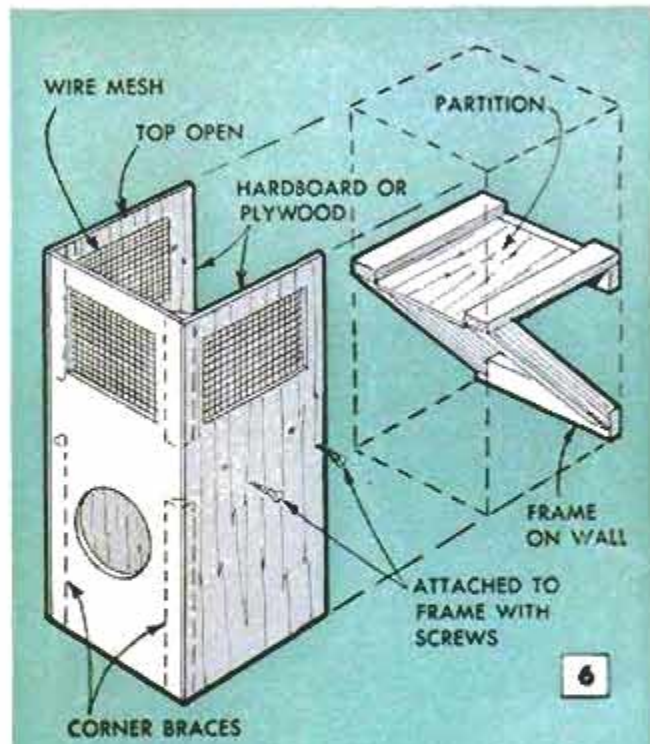
4

FRAME FOR WALL-TYPE UNIT



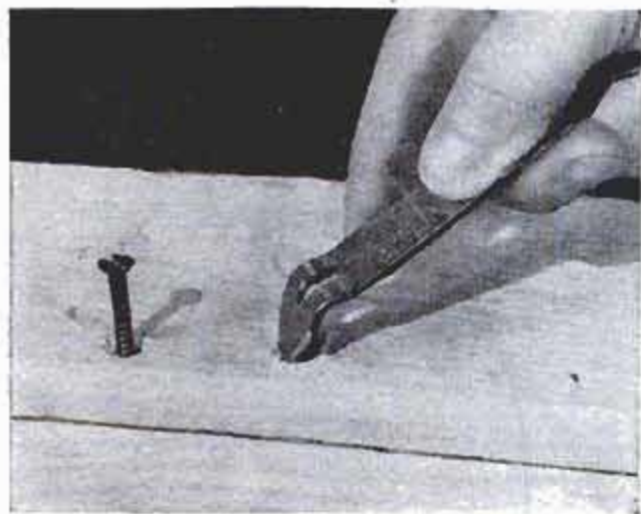
down and drains away. A pan or pail in which the water collects can be emptied by hand, as in Figs. 5 and 7, or a continuous drainage can be arranged. A portable unit simply is wheeled to a location over a floor drain. For a wall-mounted unit it is necessary to run a tubing to a floor drain or laundry tub. Where the tubing must cross a concrete floor, place it in a groove chipped in the floor, then cover it with fresh concrete. The drain should discharge directly into a drain, or empty close to it. If water runs any distance across a floor, or stands in a tub, it can be reabsorbed by the air, which defeats the purpose of a dehumidifier.

After the refrigerator unit has been removed from its original cabinet and set up as a dehumidifier, it will have to be recharged with refrigerant gas. This should be done by a competent serviceman. The wiring diagram in Fig. 8 shows how the fan and compressor motor are wired so they start simultaneously. If automatic operation is desired, a humidistat—a sort of moisture-controlled thermostat—is wired into the line between the off-on switch and the motors. If appearance is not too important, a wall-mounted unit can have the motor and compressor in the open, which allows ample air circulation around them, Figs. 2 and 5. When a cabinet or enclosure is used, generous-sized openings covered with wire mesh, Figs. 3 and 6, are necessary. Any electric refrigerator can be used for the dehumidifier. The original dehumidifier was made from a unit 12 years old, and has given good service for 2 years. ★ ★ ★



UNUSUAL JOBS

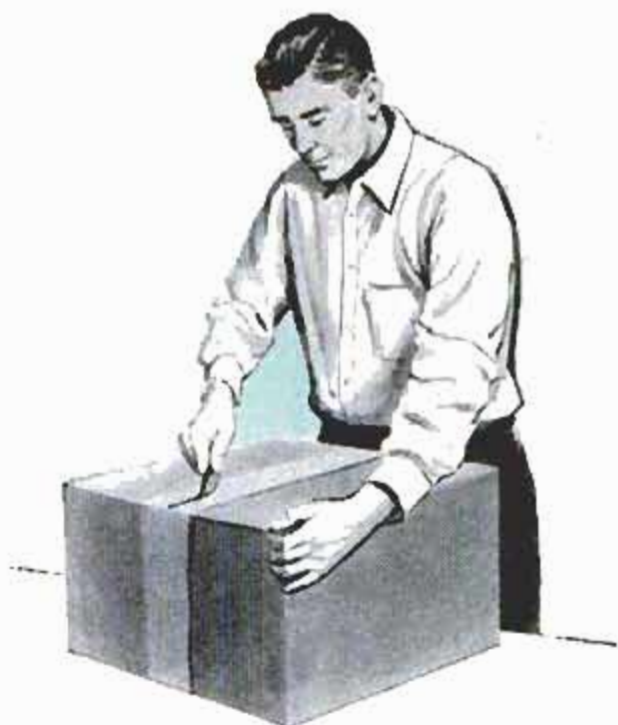
For a Can Opener



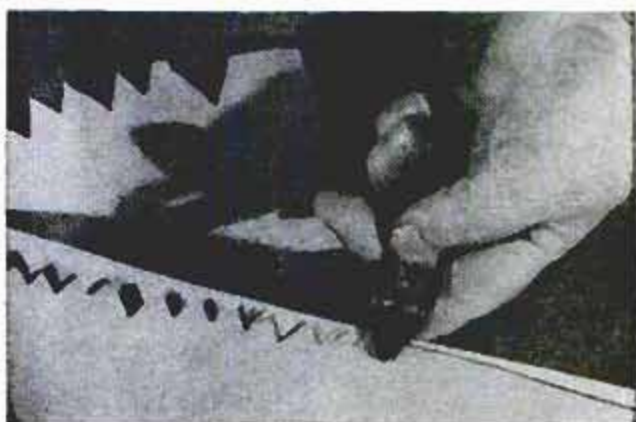
↑Countersinking a wood screw is easy, when the blade of a puncture-type can opener is rotated several times in the hole to bevel the edges as shown in the photo above. The same procedure can be used for flaring the ends of thin-wall metal tubing

To cut a decorative edge on shelf paper, place a sheet of it on a sheet of cardboard and press can-opener point against the edge of the shelf paper to be decorated as shown. Then, quickly lift the paper. Repeat the process for each notch required

↓You can make this food shredder by placing a square of lightweight sheet metal on a wooden block and punching a series of small holes in it with an opener. Side edges are rolled and a 1-in. flange is formed on each side of the shredder for easy gripping



↑When opening cardboard cartons, use the point of an opener to slit tape on lids. The short blade will not penetrate the carton to damage its contents as might happen when a knife is used. When sharpened, the point is handy for removing staples



↓Use an opener as a marking tool when scribing lines on metal or wood stock. To do this, simply attach a small C-clamp to the opener to hold the latter's point the required distance from the edge of the stock and scribe the desired lines as shown

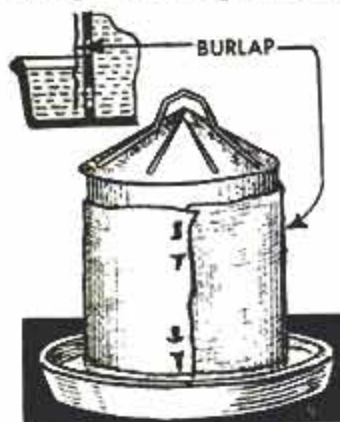


Adapter Converts Vacuum Cleaner to Ant Exterminator



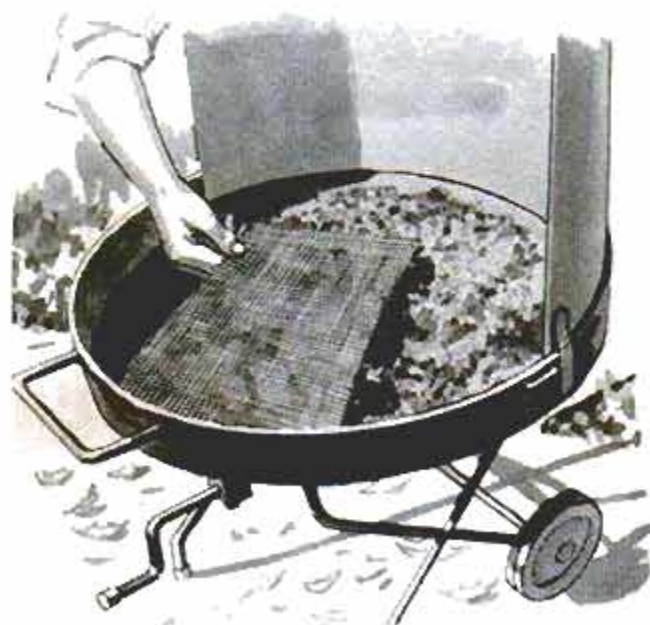
Air pressure from a vacuum cleaner is used to force exterminating fumes into an ant nest with the aid of the adapter shown. The latter is a 1-gal. paint pail with holes cut in the top and bottom. Screen wire in the bottom holds in the steel wool with which the pail is partly filled. A funnel soldered to the top accommodates the end of the vacuum-cleaner hose. Washers and sheet-metal screws hold a twisted-cloth "gasket" to the bottom of the adapter. Air is blown through a chemical-saturated cloth.

Burlap Jackets on Fountains Keep Poultry Water Cool



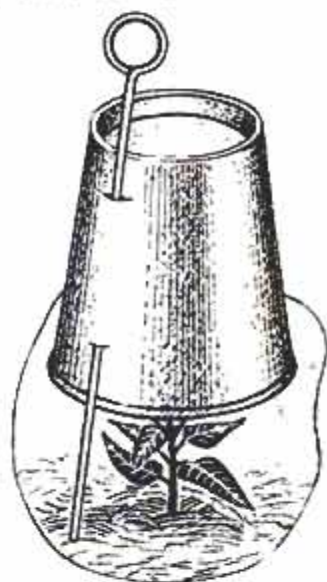
Hens are kept in high production during hot weather by one farmer who keeps their water cool with burlap jackets on the water fountains. The lower edge of the burlap rests in the water where it picks up the moisture and spreads it around the fountain.

Natural evaporation of the wet burlap has a "refrigerating" effect on the fountain water, keeping it cool.



Plant Sun Shield Improvised From Paper Cups and Wire

Adjustable sun shields for young seedlings are improvised easily from lengths of wire bent into loop-ended stakes on which are fitted paper cups. It is a simple matter to slide the cups up and down on the wires to position them at the proper height. When no longer needed, the wire stakes are stored away.

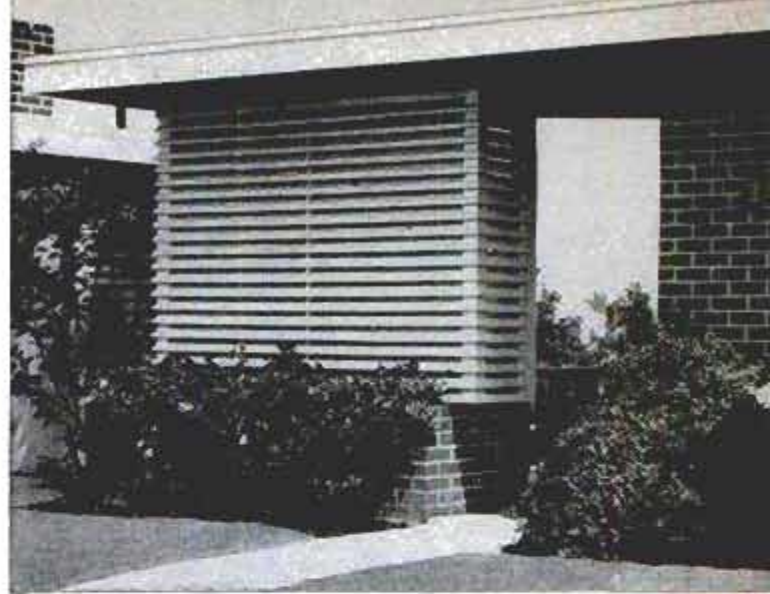
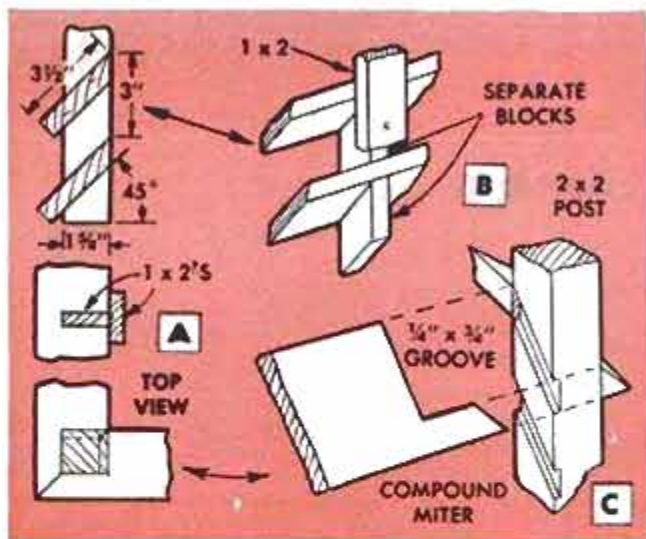


Barbecue "Flame Arrestor"

For the most flavorful barbecuing in an outside grill, flames caused by dripping grease should not be allowed to reach and char the meat. A good "flame arrestor" can be installed in a grill by placing a piece of metal window screening on the charcoal before the meat is placed over the fire. Hot grease dropping through the screen will flame up, but the flames will stay below the screening rather than flare up over the food being cooked.

ⓘ When storing an electric blanket, it is not advisable to spray it with any kind of liquid mothproofing. Liquids other than water might have a solvent action that would affect insulation of the heater wires.

WIM 57



To Build Smart Walls— USE LOUVERS

By Hi Sibley

LOUVERED CONSTRUCTION is ideal for such applications as patio walls, wind screens and porch enclosures where protection against sun, wind and rain rather than against cold weather is desired. The louvers are attractive and modern in appearance, furnish privacy without blocking ventilation and avoid that "flat board fence" look that so often results with conventional construction.

The photographs at the upper right illustrate two such applications of louvered walls. The upper photo shows how louvers are used to fill between the supporting posts of an extended porch overhang. This overhang was intended to provide weather protection for the front door and a terrace around the corner of the house. The use of louvers gives additional shielding from the weather, assures privacy for the terrace, yet does not interfere with ventilation. This latter factor prevents heat build-up under the roof during hot weather. In this particular installation, the louvered wall was attached to an existing masonry wall with lag screws and lead anchors. The lower photograph shows a similar installation, this one being built along one side of a terrace adjacent to a garage. An added



advantage for the garage is that the wall prevents snow from drifting onto the driveway in front of the doors.

Louvered walls do take more time than conventional types, but they are not as complicated as thought by many craftsmen. The end posts of a wall are grooved to accommodate as many louvers as necessary cut from 3/4-in. stock, but no center support is needed unless the wall is extremely long. Instead, single, angle-cut blocks are fitted between the louvers, and backed up by a 1 x 2 nailed to the rear surface of the louvered wall, as shown in details A and B. Details A and C show how the louvers are joined at the corner posts with compound miters. In most cases, louvered walls can be built flat on the ground then lifted into place.

Proper Application of Shellac

When applying shellac, thin the first coat with an equal part of alcohol so that it brushes on easily. The final coat is applied full strength. Do not use shellac as a finish where it will be exposed to heat, water or alcohol.

Stair Tread Is Ladder Aid

Ideal for putting under the forward legs of a stepladder to prevent them slipping on a polished floor is a corrugated-rubber stair tread. Outdoors, the tread will prevent slipping of a regular ladder when it rests on a concrete walk or drive.

10071 60



TOTS' WADING POOL IS GLASS-LINED

By V. Lee Oertle

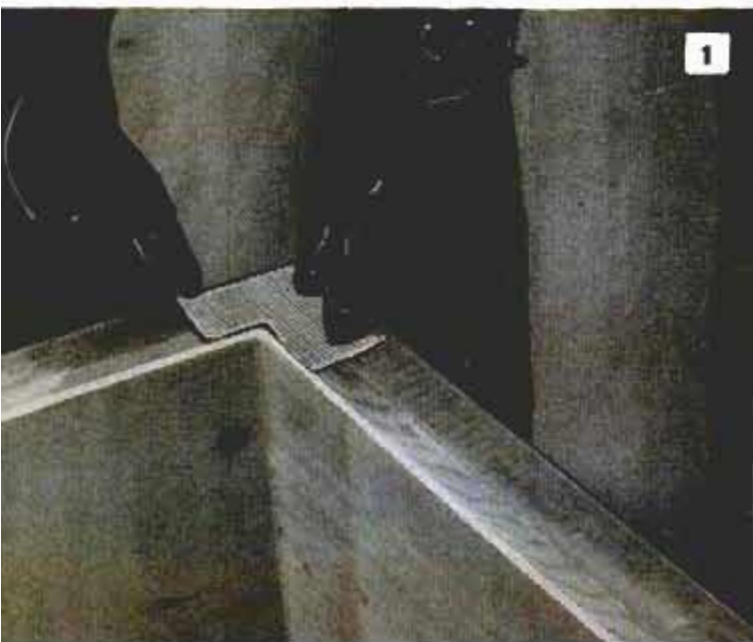
HERE IS a glass-fiber-covered wading pool that will defy the roughest treatment your youngsters can give it, and still provide leakproof service with little or no maintenance for several years. The sturdy runners protect the bottom from damage and permit the pool to be pulled to any location desired. A few hand tools and a minimum of woodworking skill are all that is required to make this simply constructed pool. The runners, sides, ends and molding are cut from pine lumber and are assembled as shown in the drawing. Exterior-grade plywood is used for the bottom. All joints are glued and either nailed or fas-

tened with screws. For easy draining, a sill faucet with threaded spout to take a garden-hose coupling is installed in one end of the pool as indicated.

Applying the glass-fiber cloth is easy, when all the steps recommended by the manufacturer of the resin are carefully followed. First, cut the corner-reinforcement pieces and pieces for the ends, sides and bottom. Then, mix the hardener with the resin and cover one surface at a time as shown in Figs. 1 to 6. An overlap of at least 2 in. should be provided at each glass-fiber joint. All surfaces are primed and given two coats of marine paint.

After coating inside corner and adjacent top edge of side of wading pool with polyester resin, pre-cut glass-fiber cloth is laid in place on corner edge

Application of inside corner strip of cloth completes corner reinforcement. All side corners are reinforced the same way, being sure to roll out air bubbles





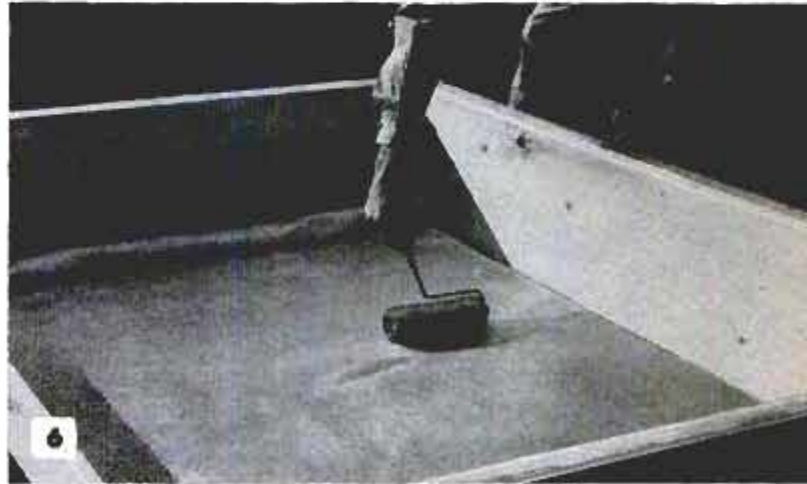
Next, end and side pieces of glass-fiber cloth are applied one at a time as shown above. Each piece is cut and checked for proper fit before applying resin



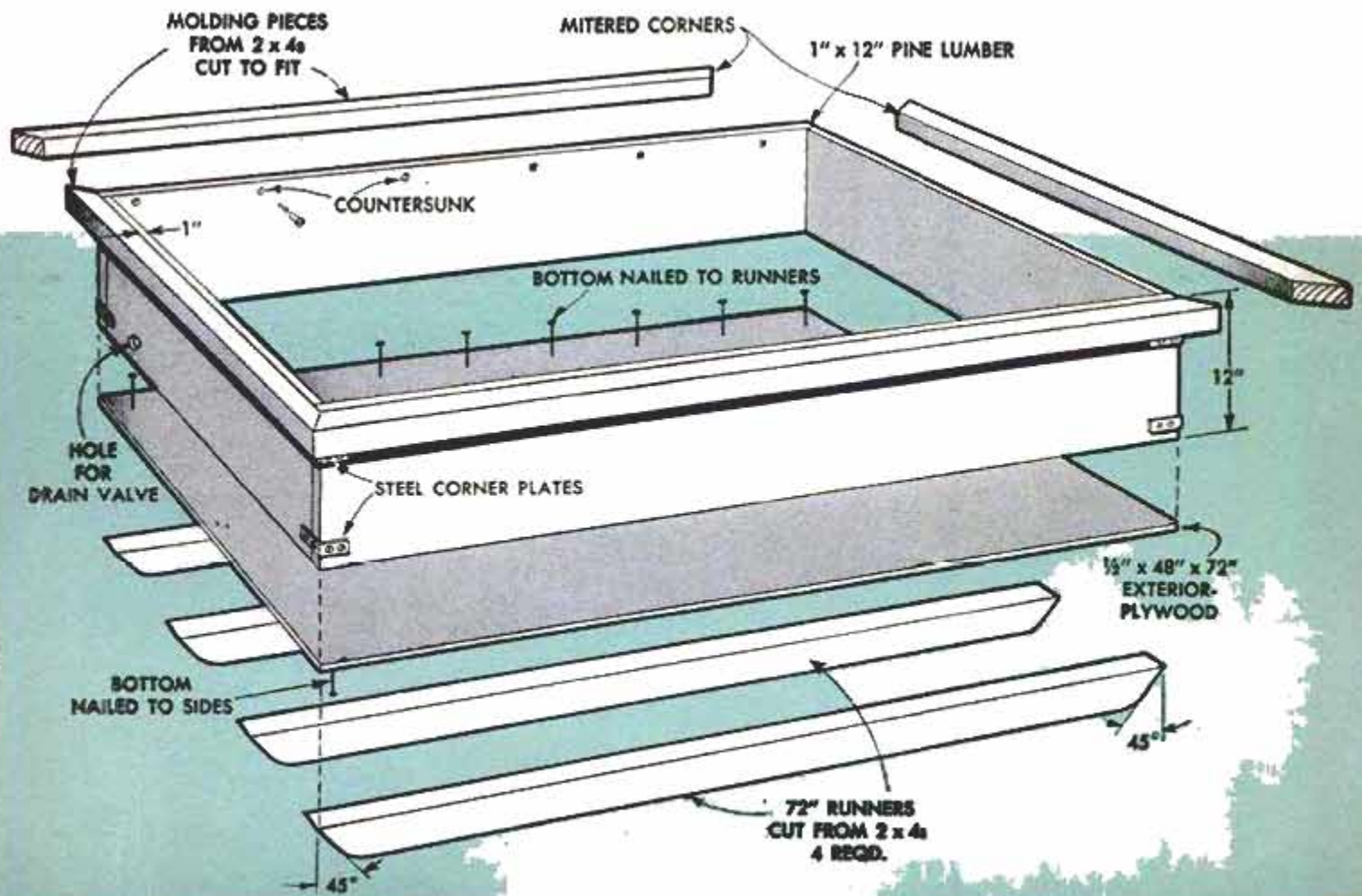
Above, resin-saturated paint roller is used for removing bubbles and wrinkles from glass-fiber cloth, starting each stroke at top and working downward

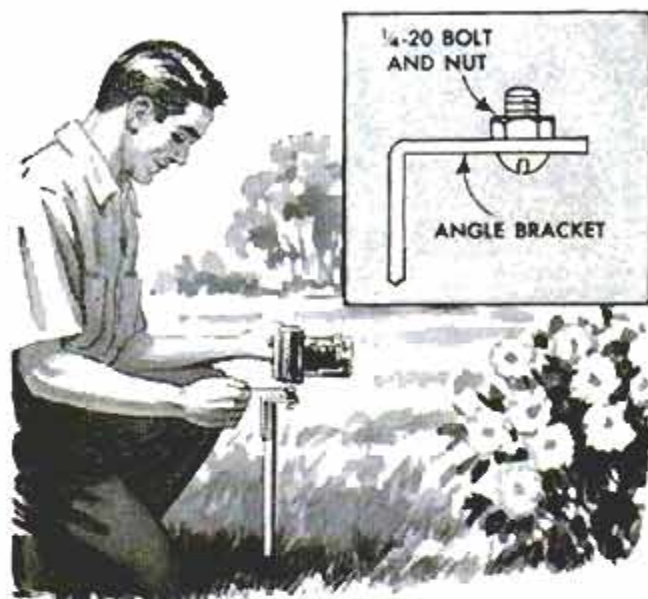


Small paintbrush is handy for working resin-saturated cloth into corners where roller cannot be used. As with the latter, work in one direction



Bottom of pool is covered last. After coating plywood with resin, glass-fiber cloth is unrolled on it and air spaces are rolled out with paint roller





Single-Leg Camera Support for Low-Angle Shots

For close-up shots of wild flowers, one photographer mounts his camera on a short unipod made from a length of dowel with an angle bracket screwed to one end as shown. The other end is pointed so that the unipod can be pushed into the ground easily. A $\frac{1}{4}$ -20 bolt fastened to the bracket as in the detail, permits attaching a tilting pan head on which the camera is mounted.

O. A. Nelson, Seattle, Wash.

Electrostatic Rod Charges Brush To Remove Dust From Negatives

An effective means of removing dust from negatives can be devised from a basic principle learned in high-school physics. Simply rub a glass rod or other object that will take an electrostatic charge on a heavy woolen cloth or fine-haired fur as shown in the photo. Then, transfer the charge to the bristles of a soft brush by passing them over the rod. The electrostatically charged bristles then pick up dust and lint particles when brushed over the negative surfaces.



Threaded Adapter on Lenses Permits Quick Changing

Several different lenses can be attached to or removed from an enlarger if each is fitted to a threaded metal can lid. A matching threaded male fitting is soldered or riveted to the bottom of the enlarger bellows, or to a regular lensboard. The threaded pouring spout and cover from a 10-gal. oil can may be used if the lenses are all of medium or small diameter. Coat the inside of the fitting with nonreflecting black paint. Lenses with a short focal length cannot be used with this method of attachment.



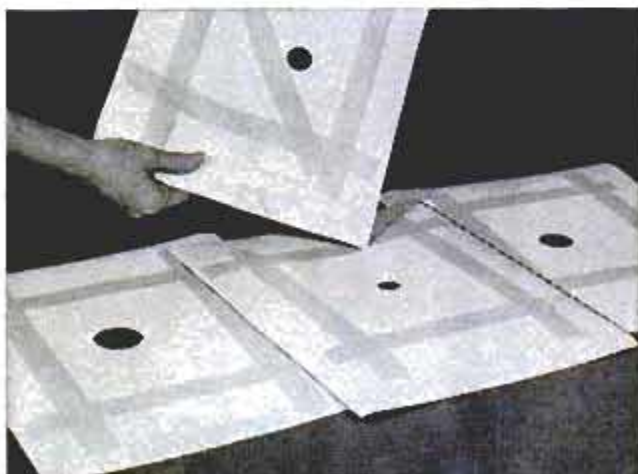
Oilcloth Keeps Print Roller Dry

You can do a better job of removing water from prints placed on a ferrotype plate when the wet prints are covered with a square of oilcloth. This prevents water that is squeezed out of the prints from reaching the roller.

"Burning in" of Enlargements Aided by Set of Hole Sizes

To permit better control when "burning in" (darkening) light areas on enlargements, one amateur photographer uses a set of five 11 x 14-in. tape-reinforced paper squares with a hole of a different diameter cut in each as shown. If desired, cardboard may be used for making these squares in which the following sizes of holes are cut: $\frac{1}{4}$ in., $\frac{1}{2}$ in., 1 in., $1\frac{1}{2}$ in. and 2 in. The size of the area to be darkened determines the proper hole size to be used.

R. C. Florian, Chicago



On the MARKET

for Do-It-Yourselfers

1. PROTECTIVE FINISH can be applied like ordinary paint, resists moisture and corrosive fumes or vapors that attack metals. Can be applied to any metal surface in laundries, dairies, bakeries, tool cribs and plating and anodizing plants. Also useful in the home for protecting ventilator grilles and radiators and other metal parts exposed to moisture

Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio

2. TAMPERPROOF DOOR HINGE is fitted with a special stud which locks the leaves in the closed position. Door cannot be opened by pulling hinge pin or by cutting through knuckles. As shown in sectional views, stud projects from one leaf. When door is closed, stud enters oversize hole in opposite leaf. Hinges available with plain and ball bearings

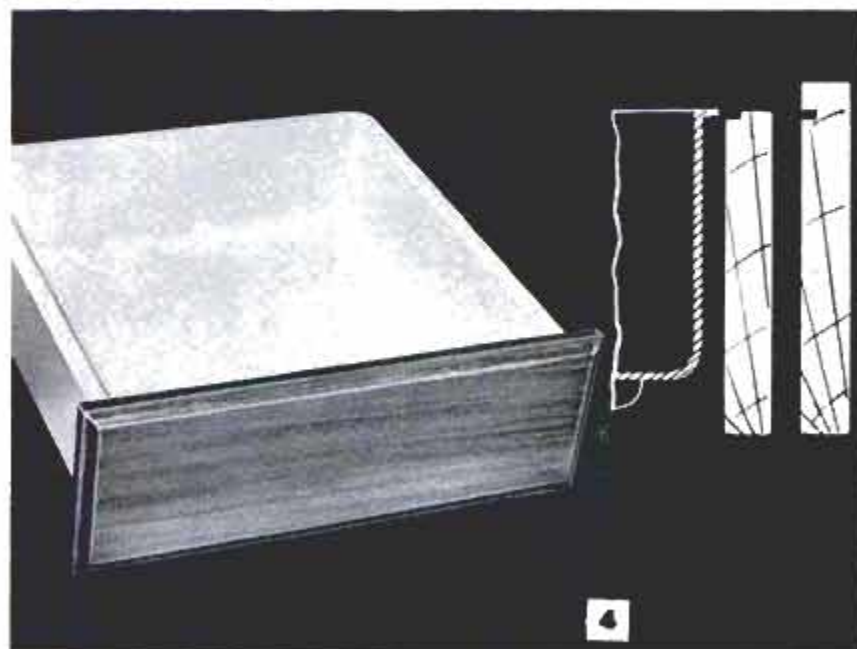
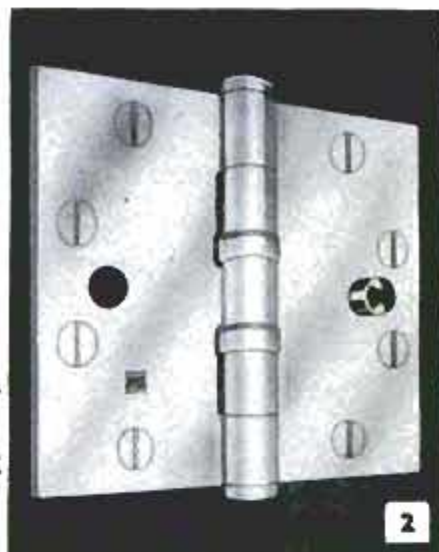
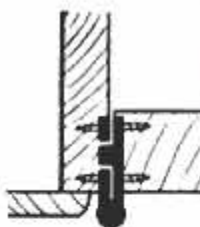
C. Hager & Sons Hinge Mfg. Co., 139 Victor St., St. Louis 4, Mo.

3. TOUCH-UP FINISH comes in a 6-oz. pressurized can, is available in several decorator colors for uniforming worn or damaged finishes on various surfaces, especially furniture on which shading lacquers and other color finishes have been used originally. When using this material it's important to follow the instructions on the container in all details

Saco Chemical Corp., 527 Lexington Ave., New York City 17.

4. PLASTIC DRAWERS, supplied for installation in various furniture projects, are now available with flanged fronts permitting attachment of wooden front pieces. This makes it possible to match drawer fronts to any common woods used in the panels and frame. Detail shows how groove or rabbet is cut in joining drawer front to fit over flange on drawer unit

Pro-Phy-Lac-Tic Brush Co., Proton Plastics Div., Florence, Mass.



Storage Drawer Mounted on Underside of Bed Is Space Saver



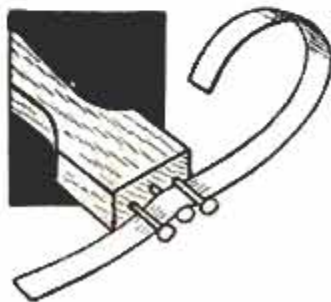
Here is a means of obtaining some additional dustfree storage in a bedroom. Simply make one or more drawers of the desired size and mount each of them on cleats fastened to the underside of the bed as shown in the drawing and detail. A hardboard lid is provided to keep out dust. These drawers can be made to be withdrawn from one side of a bed, or both sides of it as shown. In the latter case, the drawers should be made the same width as the bed and be provided with two-piece lids. The lids may be joined together by a pair of hinges or left unjoined as desired, for easy access to either side of the drawers. When a drawer is mounted on a double bed for withdrawal from one side, its length should be less than the width of the bed for easier handling. Other dimensions are made to suit.

Wood Putty Cornstarch Requires No Drying Time

When painting woodwork, one craftsman saves time by filling holes as he paints with a putty consisting of cornstarch and some of the paint being applied. No drying time is required for this wood putty that is made by mixing starch with paint to produce a puttylike consistency.

Tool Removes Curl From Binding

Removing the curl from strips of metal linoleum-edge or seam-binding is easy, when a tool like the one shown in the detail is used. To make the tool, simply drive three nails into the end of a suitable wooden block as shown. After a strip of binding is pulled through the staggered nails, it will lie flat on the floor for easy tacking. Also, the tool prevents the binding from cutting the fingers.—G. E. Hendrickson, Argyle, Wis.

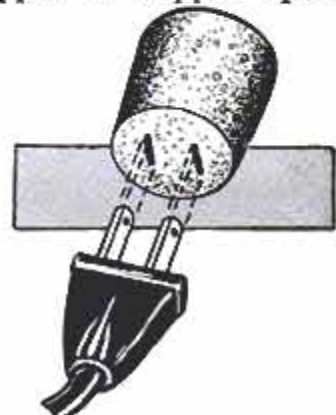


Loose Rung Repaired by Forcing Glue Into Hole in Tenon

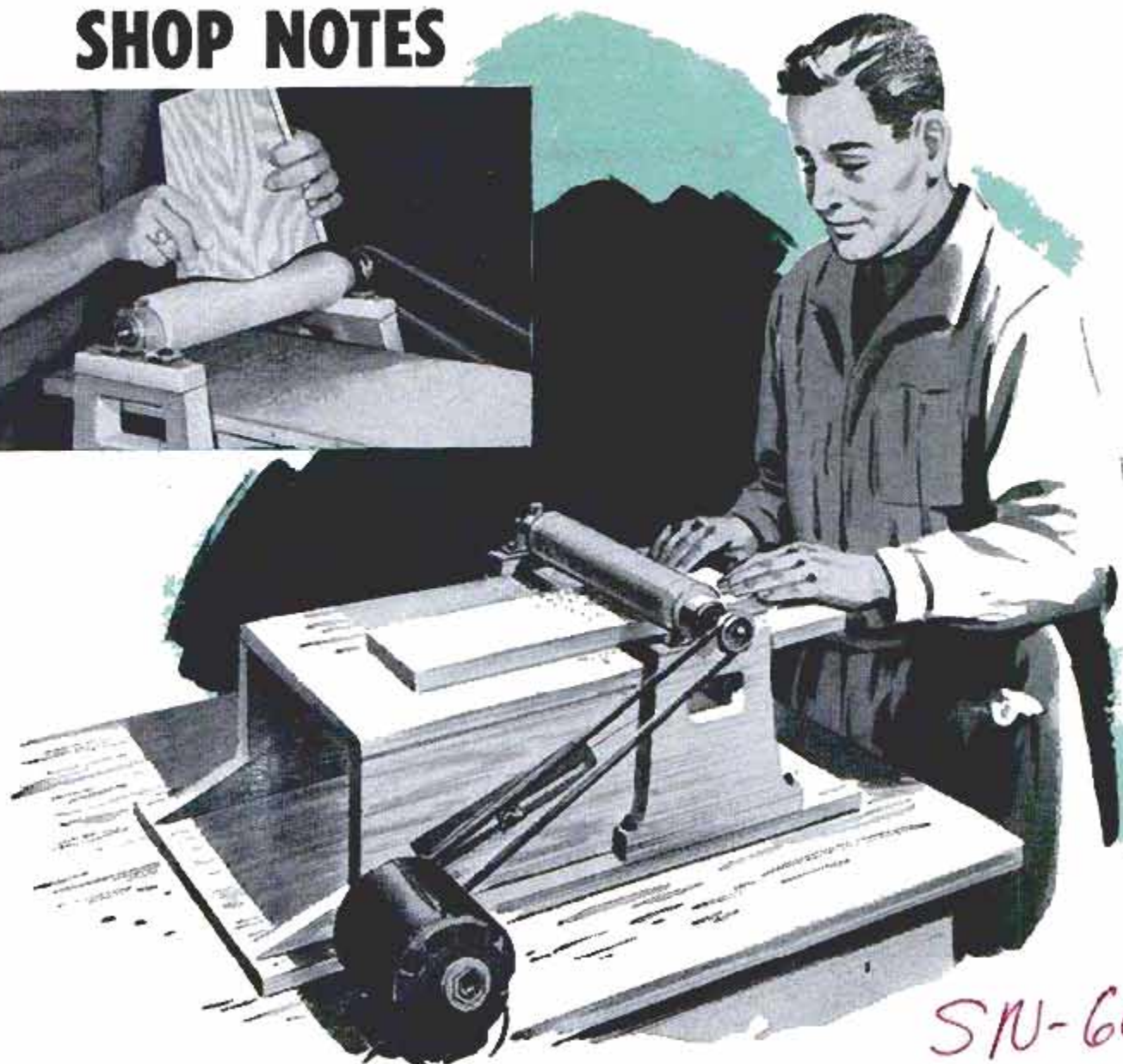
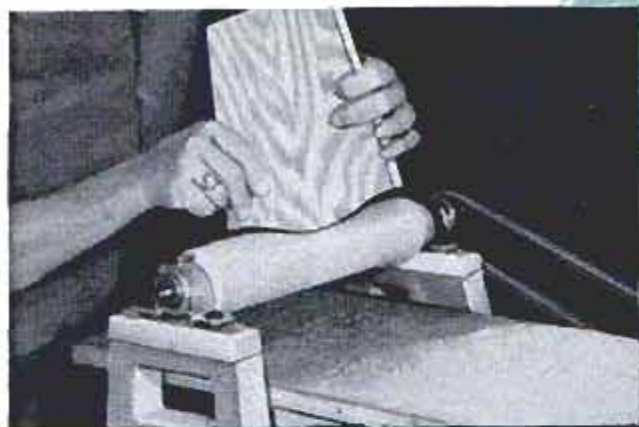
Here is an easy way of regluing a chair that has only a few loose rungs. Expose $\frac{1}{4}$ in. of the tenon on each loose rung and drill a small hole at about a 45-deg. angle through each tenon. Then, force glue into the holes with a medicine dropper or oil can and clamp the rungs into position.

Protect Plug Prongs With Cork

Prongs on a male plug of an electrical appliance cord may become damaged as a result of being dropped or stepped upon. You can prevent this by inserting the prongs in slits cut in the wide end of a large cork in the manner shown in the detail. Care must be taken to accurately space the slits so that the prongs are received in proper alignment.



SHOP NOTES



SN-60

THIS DRUM SANDER

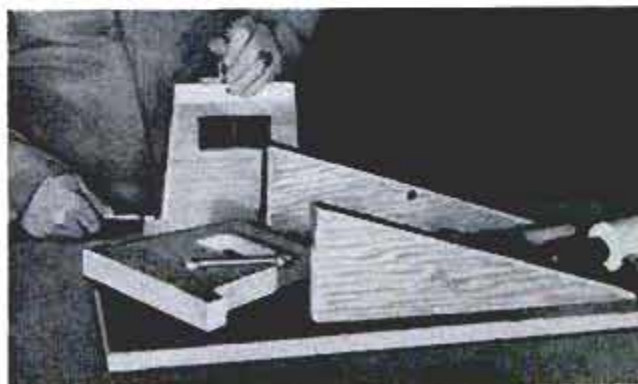
works like a thickness planer, takes stock
to 12 in. wide and from $\frac{1}{8}$ to 2 in. thick

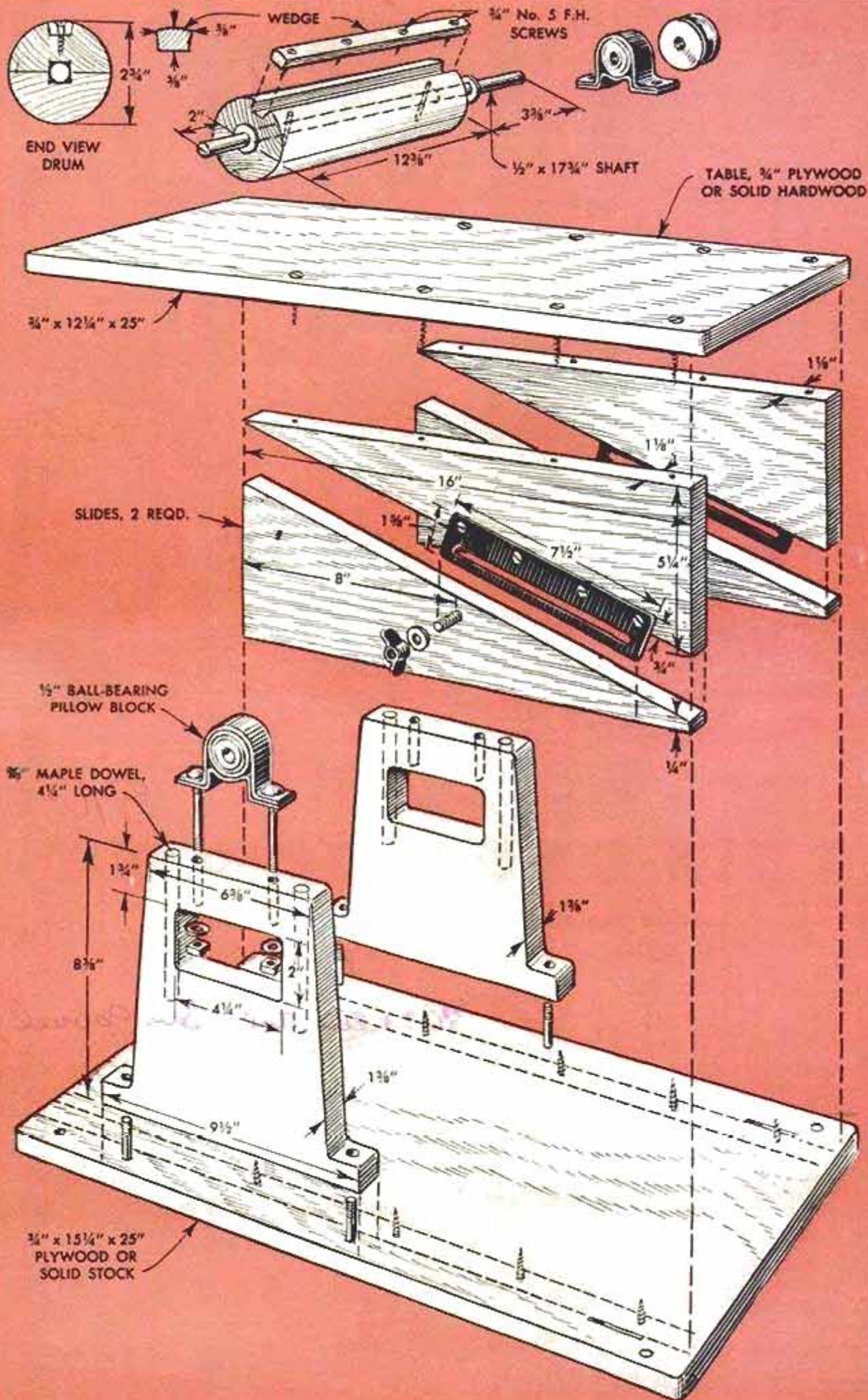
By Dick Hutchinson

8633 Elm Ave., San Gabriel, Calif.

IT'S SHOP BUILT and although it was designed primarily for sanding small pieces of stock to thickness, it will also handle other ordinary drum-sanding jobs. The table raises and lowers in the level position on a simple angle-slide arrangement which can be locked positively in any desired position. The top and the base are of $\frac{3}{4}$ -in. plywood and are the same length, the base being 3 in. wider to permit mounting the bearing posts. As will be noted from the details on the following page, the slides are made by sawing diagonally two pieces of stock $5\frac{1}{2}$ in. wide and 16 in. long. The stock thickness is given as $1\frac{1}{8}$ in., but if you use hardwood, such as maple, $\frac{3}{4}$ -in. stock will serve the purpose very well.

The slotted metal strips screwed to the upper members of the two-piece slides permit the latter to be locked. They are made from $\frac{1}{16}$ x $1\frac{3}{8}$ -in. flat steel. The slots





are $\frac{7}{16}$ in. wide to permit them to slide freely on $\frac{1}{4}$ -in. carriage bolts.

Note especially the construction of the bearing posts, or supports. These are made from hardwood, the cutouts permitting use of bolts rather than screws or lagscrews to hold the bearings. Dowels reinforce the wood on each side of the cutouts to prevent splitting. Note also in the detail that $\frac{1}{8}$ -in. slots are cut in the base flush with the outside edge of each of the lower members of the slides. These take the lower ends of the slotted metal locking strips when the table is fully lowered.

The drum is made from two pieces of $1\frac{1}{2} \times 3 \times 16$ -in. selected hardwood. Each piece is center-grooved $\frac{1}{2} \times \frac{1}{4}$ in. One piece also is grooved $\frac{1}{2} \times \frac{11}{16}$ in. to take the locking strip, or wedge. This groove should be cut with the sides inclined about 5 deg. Glue the two pieces together, making certain that the sides of the center grooves are precisely in line. Fit $\frac{1}{2} \times \frac{1}{2} \times 1$ -in. hardwood plugs in the square opening at each end of the glued-up work so that you can center the piece in the lathe. When the glue is thoroughly dry, mount the piece between centers, turn down to $2\frac{3}{4}$ in. in diameter and cut off to $12\frac{3}{8}$ in. in length. Fit the $\frac{1}{2}$ -in. steel shaft and lock it in place with $\frac{1}{8}$ -in. steel pins driven into holes drilled transversely through the drum and the shaft as detailed.

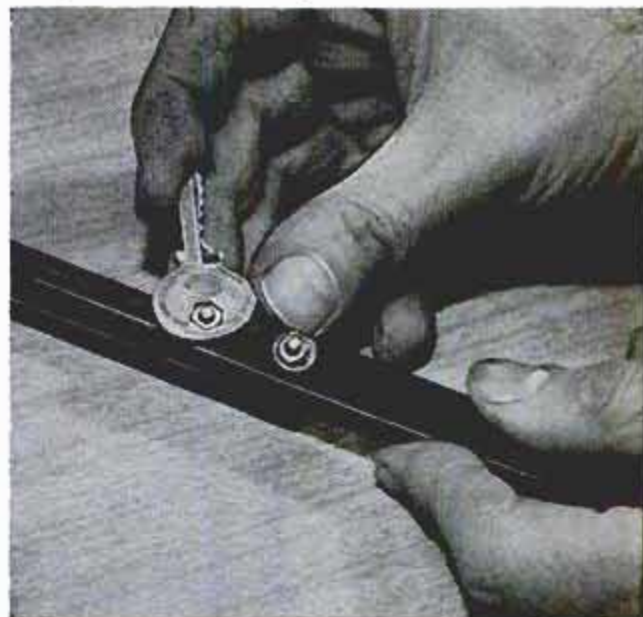
In turning the drum from the square into round, the depth of the groove for the wedge will be reduced to about $\frac{3}{8}$ in. Of course, this may vary somewhat, making it necessary to cut the wedge to fit with an allowance for the thickness of the abrasive paper. The top face of the wedge must be rounded to approximately the curvature of the drum and no part should extend beyond the cutting circle of the abrasive, as otherwise it will strike the work.

After mounting the drum it may be necessary to shim one or the other of the bearings in order to bring the drum parallel with the table. Apply two coats of wax to the surface of the table so that the stock will slide easily. ★ ★ ★

Preheating Large Workpiece Simplifies Soldering Job

When soldering on a large piece of work, much of the heat from the iron is dissipated into the surrounding metal. To overcome this problem first heat the workpiece on an electric hotplate. If no hotplate is available, use an electric iron. Clamp the iron in a vise with the sole plate up and rest the workpiece on it. The iron will keep the work warmed during the entire soldering operation.

Key Becomes Improved Wrench

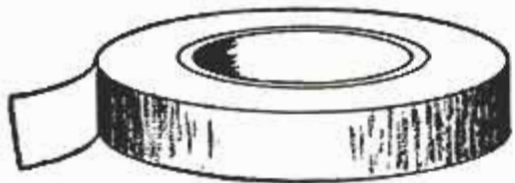


By reshaping the hole in the head of a key, any tumbler-lock key can be utilized as a handy wrench. Several keys in a collection can be modified to fit different size nuts, permitting a wide range of emergency repair work. The round holes are reshaped with triangular files to fit small square or hex nuts.—Walter E. Burton, Akron, Ohio.

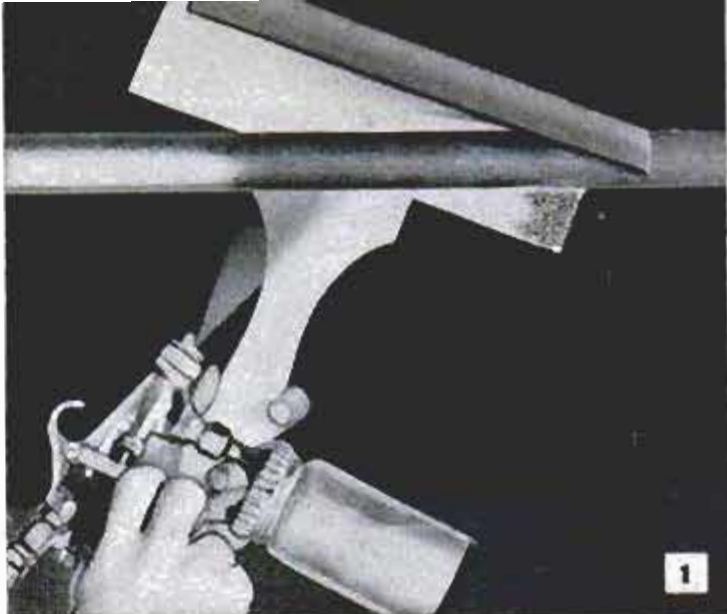
Linoleum Better Than Rubber To Face Vise Jaws



When a machinist's vise must be used both as a woodworker's vise and a metalworker's vise, you can avoid the bother of having to remove and replace the rubber jaw pads normally used by facing the jaws with linoleum. Being firmer than rubber, the linoleum can be left permanently affixed, assuring a good gripping surface for metal and affording ample protection for wood surfaces. The linoleum pads can be cemented to the vise jaws with contact cement.—Frank A. Javor, Newark, N. J.

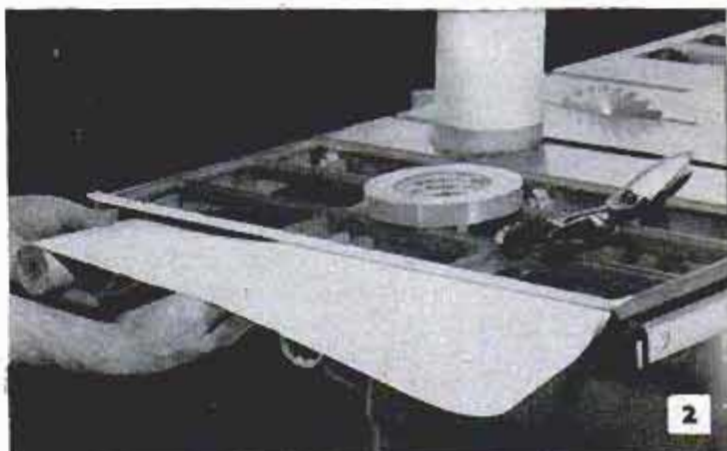


MASKING TAPE PROTECTS PARTS NOT TO BE PAINTED. USE FLAT-BACKED TAPE FOR STRAIGHT LINES, CREPE BACKED FOR CURVED LINES

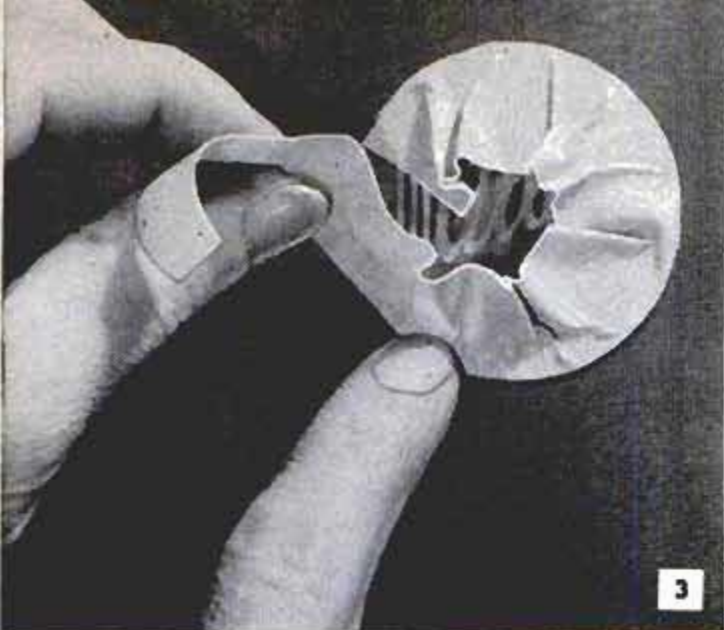


By
Sam Brown

Paper shields, or flaps, are made by running tape along a straightedge, such as edge of saw table. Press paper into contact with overhanging edge of tape



POPULAR MECHANICS

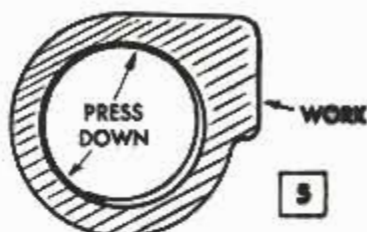


3



4

A sleeve shield, made from tape or paper masks openings from paint spray. Apply with adhesive side out



5

DID YOU EVER look closely at a professional paint job on a workshop machine or project and wonder how it was done? Just how did the painter get those sharp, clean edges, clean nameplates and bolt heads, true stenciling and that uniform paint coat on both the flat and irregular surfaces? As a rule the answer is, he did the job by careful placement of masking tape on those parts which were to be left unpainted, also by using special metal shields he made himself to suit his purpose, and by using rolled-paper or tape shields to keep paint out of holes and other openings. These simple tricks are what give the finished job that certain professional look.

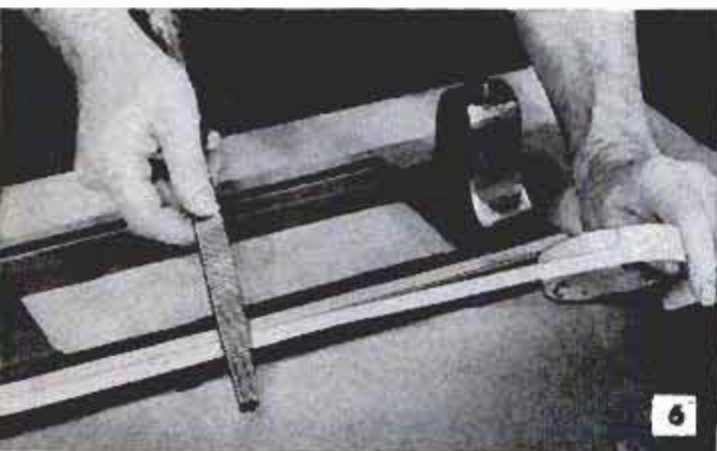
Although masking is practical for use in brush application of paints and enamels, cleaner work will result from spray-gun application. Two kinds of masking tape are used by professional painters, the flat-backed tape and the crepe-backed. The former is useful only for masking along straight lines or edges. It cannot be made to take a curve without looping and possibly leaving some small areas exposed to the paint spray. Where it is necessary to

work the tape around a short radius as in masking a nameplate, Fig. 3, always use the crepe-backed tape. Painters usually apply the tape direct from the roll, pressing it down lightly in the desired location so that it can be lifted and reused. Tape also is available with a paper flap attached along the length to increase the total masking width. However, you can easily make your own tape with a paper flap as in Fig. 2, by first applying the tape to any straight edge, the edge of the saw table in this instance, allowing about $\frac{1}{2}$ in. of the adhesive side to overhang. Then press the paper into contact along the overhang.

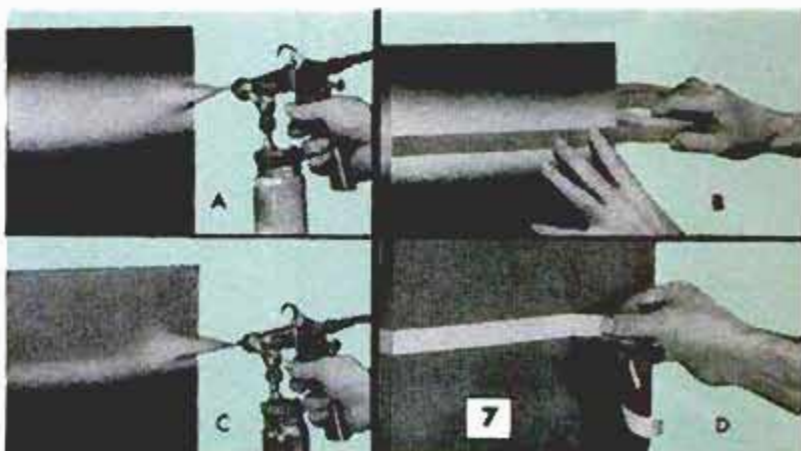
Another trick to make use of when repainting workshop machines is inserting a tape or paper sleeve in openings to keep paint out. Fig. 4 is an example of its use. The tape is rolled loosely into a sleeve with the adhesive side out and worked into the opening. Then it is pressed into contact with a pencil or dowel as pictured. It's important to be sure the length of tape you cut is long enough to overlap, Fig. 5, when it is pressed into contact. Smaller holes can be shielded simply by rolling a small

Trim tape flush with a corner by using a razor blade or better still, a file. A handy trick to know when you're painting a casting up to a machined surface

Ordinary striping is done in four steps. Spray stripe color A, apply tape of desired width, spray ground color, allow the paint to set and strip off tape, D



6



7

MASKING
WINDOW
TRIM



Use tape around window and door trim when painting a wall. Makes sharp line where two colors meet

sheet of paper tightly, inserting it in the hole and allowing it to spring out against the sides.

It is difficult to lay masking tape flush along a straightedge. The trick here is to apply the tape with one edge slightly overhanging, then trim off flush with a razor blade or a file as in Fig. 6. Nuts and the heads of capscrews simply are wrapped with a short length of tape, care being taken to see that the tape covers the flat faces of the nut or capscrew head all the way down to the surface of the machine part.

Striping is done in four steps, Fig. 7. After the over-all coat is dry, spray on the stripe color, A in Fig. 7. Allow this to dry thoroughly, then apply the tape, B. Spray over the tape with the over-all color, C. After this coat has set, but before it is thoroughly dry, strip off the tape, D. It's important to strip the tape immediately after the paint has set. If you wait until it is dry, the paint may chip at the edges when the tape is stripped. Strip the tape by pulling it away at right angles to the surface.

Painting, enameling or lacquering a project you've made in your own shop in one color usually is a simple procedure with either a spray gun or brush. Just remove the hardware after fitting, and any other parts you don't want painted, and you're ready to go. Sometimes it's an advantage to remove parts from projects and machines and paint them individually.

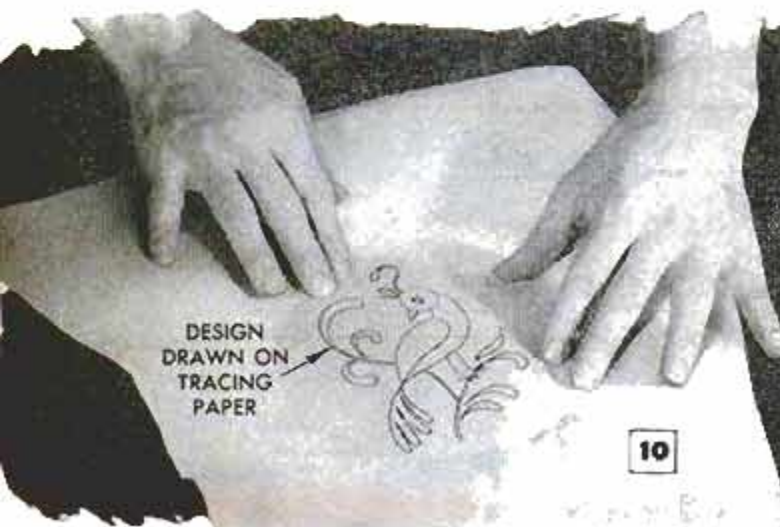
While you can use a sheet-metal shield when painting walls up to woodwork, the use of tape, Fig. 8, will assure a better job. If the tape is applied and stripped off carefully, it can be reused a number of times. A metal shield comes in handy to catch over-spray when painting a pipe, Fig. 1.

Enameling through a stencil on a shop project such as a copper plate, Fig. 9, can be done with a readycut stencil, or you can cut the stencil yourself. Usually you rubber-cement the stencil stock to the work

STRIPS OF
NARROW
TAPE



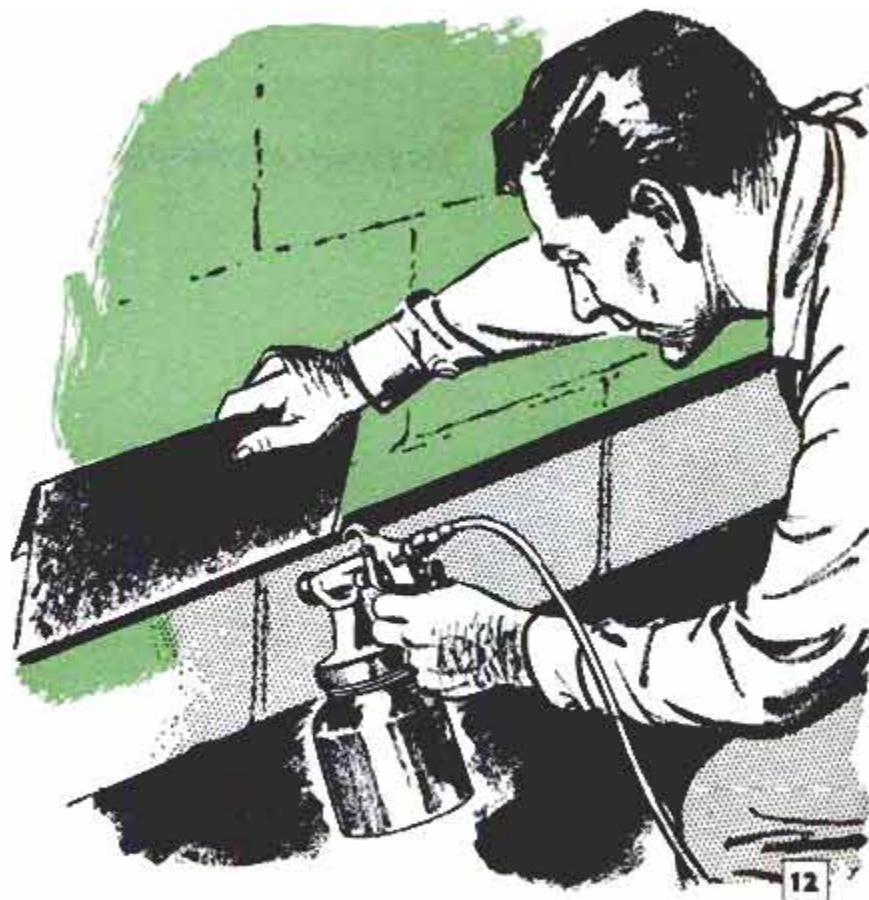
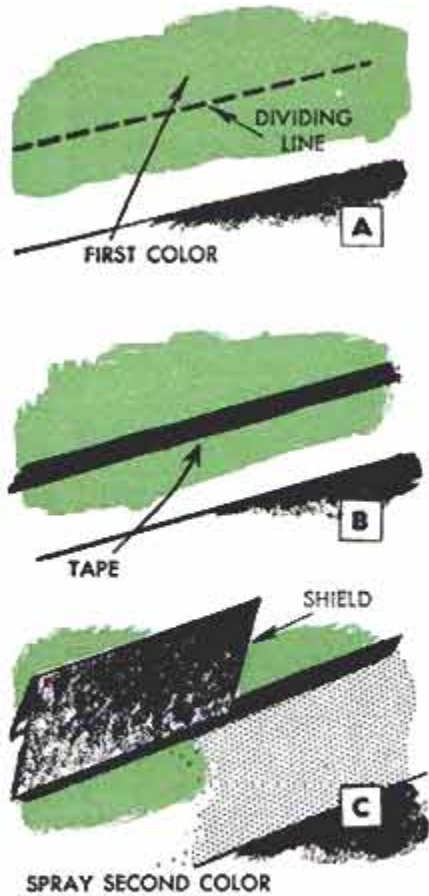
DESIGN
DRAWN ON
TRACING
PAPER



AREAS CUT
OUT FOR
SPRAYING

SAVE
THESE
PIECES

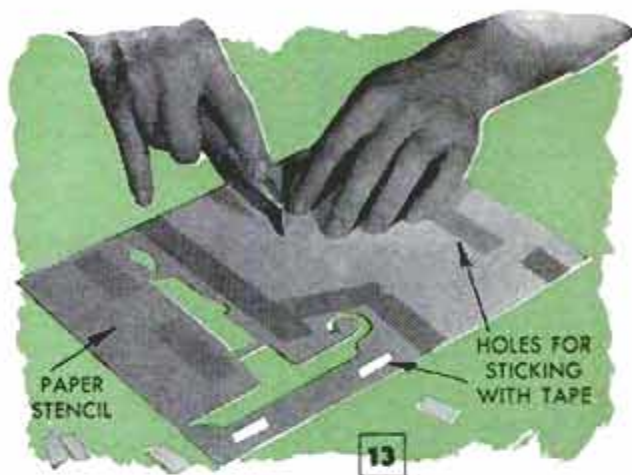




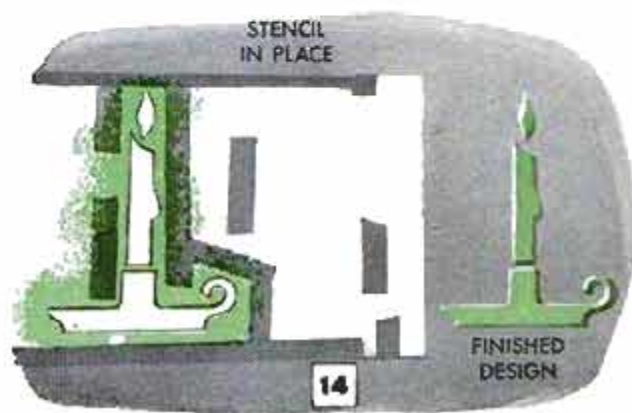
Two colors meeting in a clean, straight line make a neat job on plaster or masonry walls. Use both a tape and shield and proceed as in the three steps, A, B and C. Strip tape immediately after second coat has set

and then cut out the areas you want the paint to cover. A somewhat better way, especially on metal, is to cover the area to be stenciled with strips of tape, Fig. 9, and then cement the design over the tape as in Fig. 10. Or use tape with adhesive on both sides. If the stencil design is to be in two colors, save the pieces cut out so that these can be used to mask out the first color, Fig. 11. Another good way of holding a paper stencil in place while spraying is pictured in Figs. 13 and 14. Cut small openings in the stencil at points outside the design, also in the flap when the latter is used around the borders of the stencil, and then press short lengths of tape over the openings, Fig. 13.

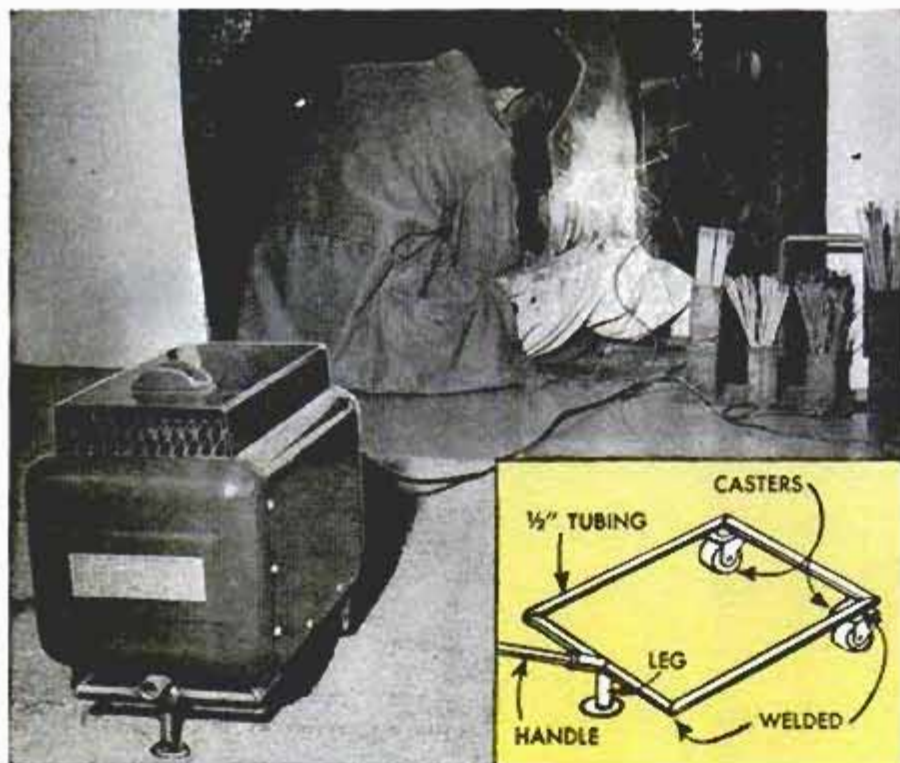
When spraying or brushing paint on plaster or masonry walls and you want two colors to meet in a sharp, true line, use both tape and shield to do the job, Fig. 12. Spray the first color down to a point below the dividing line, A in Fig. 12. Then run the tape along the line, B in Fig. 12, making sure that it is perfectly straight and is pressed into contact all along both edges. Finally, spray the second color, using a shield as in detail C to prevent over-spray from striking the first color above the tape. Strip the tape immediately after the paint sets. If you wait longer the paint may chip along the edges of the tape, resulting in a broken line where the colors meet. ★★



Above, cut small rectangular holes through paper stencil and press tape over openings to hold stencil in place while spraying. Note position of tape below



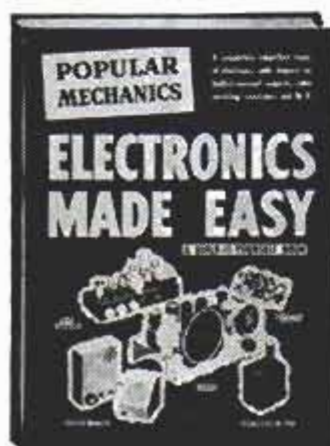
Two-Caster Dolly Takes This Welder to Work



A 100-amp. transformer-type welder is a bit too heavy for easy handling, especially when you have to move it into the living room to do a welding repair on a fireplace liner. It was this experience that prompted the owner of the welder pictured to assemble the simple dolly detailed. Note that it's built with a three-point support so that it will stand firmly on an uneven floor and the handle is detachable for convenience in maneuvering the welder in close quarters. The casters are the plate type with rubber wheels welded to corners of tubular frame members.—Lincoln Electric Co.

Remove dust from tungsten and platinum crosshairs by using a single hair from a camel-hair brush. Cement the single hair to a toothpick and use as a brush.

Spot an exhaust leak by pouring a small quantity of lubricating oil in the carburetor air intake. White smoke will issue from any leaks in the exhaust line.



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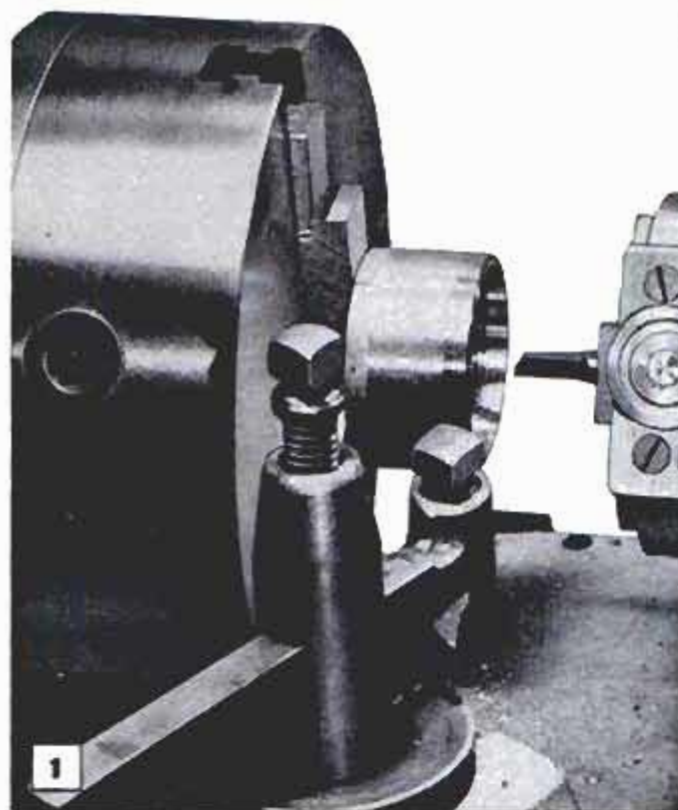
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BORING CHUCK for your lathe



By Walter E. Burton

A BORING CHUCK, or head, having a micrometer adjustment of the cutting tool will run shallow bores with a speed and accuracy not always possible with conventional drills or boring tools. A small head like that pictured works equally well on a lathe or a drill press equipped with a slow-speed drive. In Fig. 1 you see it mounted on the lathe tailstock sleeve and being adjusted to bore a short length of tubing. Here the work turns and the chuck remains stationary. On the drill press, Fig. 2, motion of the parts is reversed, the work being clamped in a stationary position while the chuck turns.

The unit consists of four parts—the head which carries the toolholder, or slide; the mounting pad; an adapter for use in the drill press or milling machine, and a clamp collar, which is necessary when the unit is used in either a lathe or drill press. The pull-apart detail, Fig. 3, shows the position and relationship of the parts. Note that the adapter is shouldered to $\frac{1}{2}$ in. to fit drill-press chucks of $\frac{1}{2}$ -in. capacity, but that the diameter at the large end of the adapter is not given. This must be turned down to a sliding fit in the shouldered end of the mounting pad, Fig. 3, the diameter of the



bore in the pad being determined from the lathe on which it is to be used. Note also that the shouldered end of the pad is slotted to permit it to grip the tailstock sleeve or the adapter when the clamp collar is tightened.

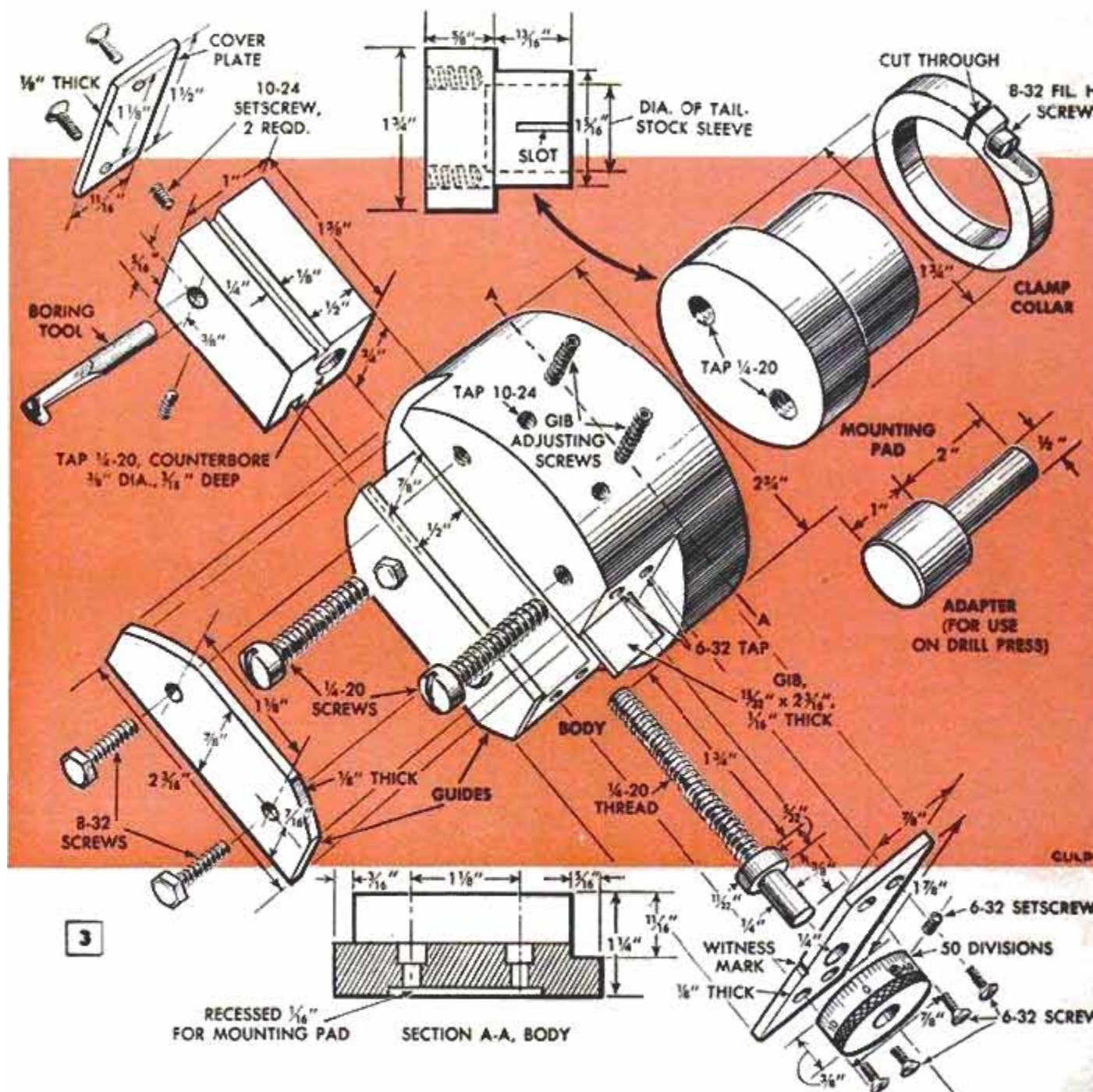
The back of the head, or body, is recessed $\frac{1}{16}$ in. to take the pad, section A-A, Fig. 3. The $\frac{1}{4}$ -20 fillister-head screws which hold the body on the pad fit in countersunk holes drilled through the body after the slot for the tool slide has been milled in the

lathe-milling attachment. Note especially the variation in the width of the flats milled on opposite sides of the body. These provide seats for the $\frac{1}{8}$ -in. cover plates, the wider of the two carrying the micrometer screw which adjusts the tool slide. The latter is grooved to take the guides which are screwed to the face of the body in the assembly. These parts should be carefully fitted so that there is no side play when the parts are assembled as in Fig. 4. One guide also serves as a cover plate, or retainer, for the adjustable gib, Fig. 3.

Although not necessary to the satisfactory operation of the finished unit, somewhat smoother operation of parts can be attained by using brass for the gib and the micrometer screw, also the guides. In any case, the sliding parts should be finished by light filing and polishing with a

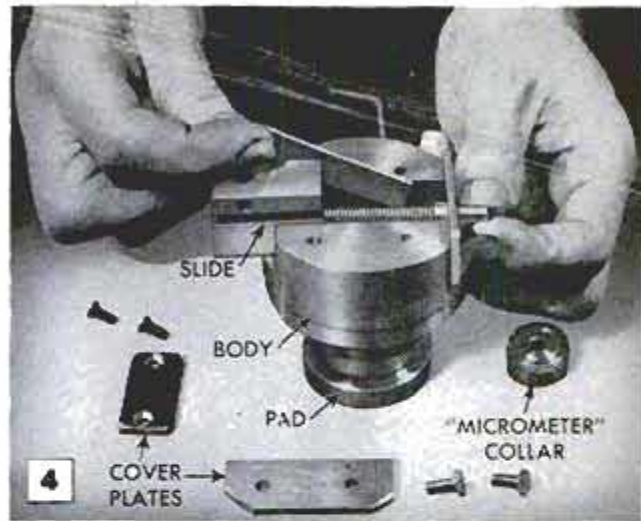
fine abrasive, such as crocus cloth. Care must be taken when drilling and tapping the sliding block for the screw. Note that the tap hole for the screw is counterbored to take the flange. When tapping the hole make certain that the tap is started straight.

The micrometer collar is turned down from 1-in. brass and shouldered $\frac{1}{2}$ in. for a distance of $\frac{1}{4}$ in. The remaining $\frac{1}{8}$ in. of the face is knurled. The collar is then centerdrilled, the hole being $\frac{1}{4}$ in. in diameter and $\frac{1}{2}$ in. deep. The part also is drilled and tapped transversely for a 6-32 setscrew, but is not cut off until after it has been graduated into 50 divisions. This is done in the lathe as in Fig. 5, using a graduated master collar (the collar from the lathe compound often will do) as a means of indexing the graduations on the new part. To make the setup, insert a $\frac{1}{4}$ -in. rod in the

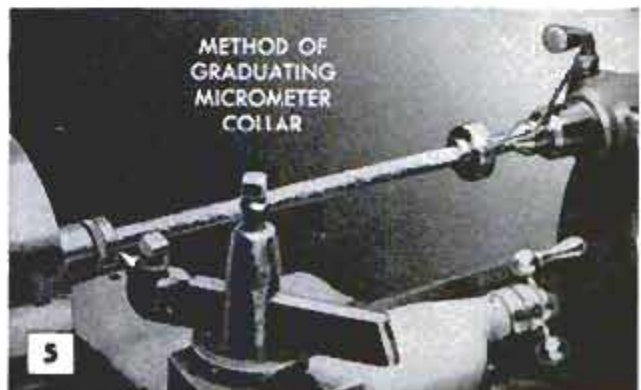


collar, which has remained locked in the chuck, lock the setscrew on the rod, then center-drill the opposite end of the rod to take the lathe center. Mount the master indexing collar as pictured, turn the lathe tool 90 deg. in the holder and adjust to take a light cut. Attach a pointer to the tailstock temporarily to provide a means of indexing accurately from the divisions on the master collar. Set the pointer at 0 deg. on the master collar. Clamp a stop to the lathe bed (or use the micrometer stop if the lathe is so equipped) to assure that the division marks on the new collar will be of a uniform length. Make the first cut by running the lathe carriage up to the stop by hand and return it until the tool clears the work. Turn the work to the next division as indicated by the pointer and repeat the operation until the 50 divisions have been marked. Then cut off the new collar to $\frac{3}{8}$ in. in length. Use $\frac{1}{8}$ -in. numeral stamps to mark the divisions. When cutting the divisions it is best to use a threading tool set on the center line.

Assemble the unit as in Fig. 4 by first turning the micrometer screw into the tool slide. Drop the adjustable gib into place as pictured and then assemble the guides and cover plates. Make sure when assembling the guides, that the tool slide moves each way to the limits of travel without binding at any point. ★ ★ ★

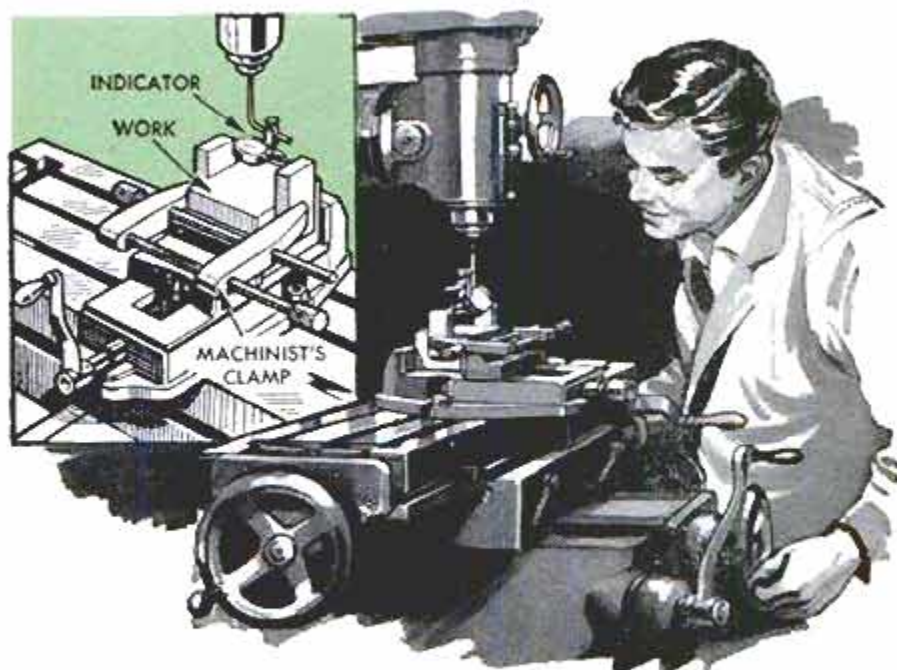


Above, when assembling, be sure that parts fit properly and move smoothly. Below, micrometer collar is set up in lathe for graduating to 50 divisions



Milling Machine Spindle Centered for Cutting Slots

Although there are several ways of setting up a vertical milling machine to cut slots and keyways, one machinist uses this method. The work is placed in the vise as in the detail, then a flat piece of stock is placed on each side of the work and clamped in place with a machinist's clamp. The ends of the pieces should project above the top surface of the work at least $\frac{1}{2}$ in. Then the indicator with right-angle arm is placed in the spindle and the work centered by eye. Next turn the spindle by hand and take the first reading as the indicator contact passes one of the flat pieces clamped to the work. Turn the spindle 180 deg. and take the second reading on the indicator. Note the variation and make the necessary correction by moving the machine table. Recheck the setting of the



machine table at least once again before running a cut. Where extraordinary accuracy is required use machinist's parallels rather than ordinary flat stock clamped to the sides of the workpiece. Be sure also that the contacting surfaces are clean.

SHOPPING FOR TOOLS



1. "ELECTRIFIED TROWEL" lays a mortar strip of any desired size 20 to 30 ft. in length, at one filling of the hopper. Motor-driven auger forces mortar from

hopper in a strip of uniform size. The amount delivered is varied by the speed at which the hopper is moved along the wall. Saves time and material

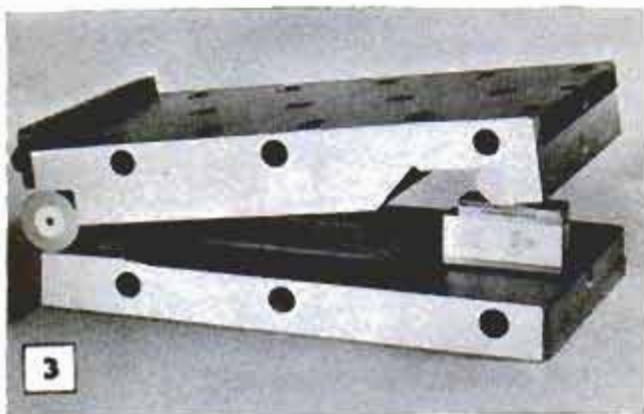
Vita Labor Saving Tools Co., Winter Park, Fla.



2

2. COMBINED DRILL AND REAMER drills and reams a hole to size in one operation. Comes in standard sizes and also can be made to specifications for any work requiring special sizes or characteristics

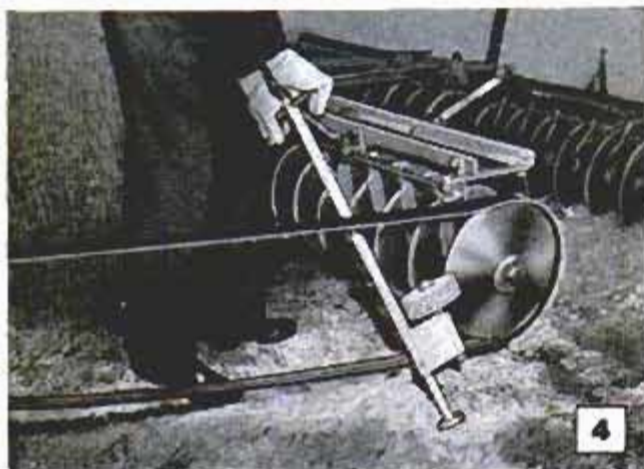
Chicago-Latrobe, 411 W. Ontario St., Chicago 10.



3

3. PRECISION SINE PLATE gives angular work settings within its range at gauge-block accuracy within .0002. Ground to a glasslike finish on bottom, top and sides. Working surface of hinged plate is 3½ x 6 in.

Brown & Sharpe Mfg. Co., Providence, R. I.



4

4. BLADE SHARPENER for disk harrows saves time when readying implement for field work. Disk gang is raised, rotated slowly from power source by flat belt. Grinds blade to sharp edge with narrow bevel

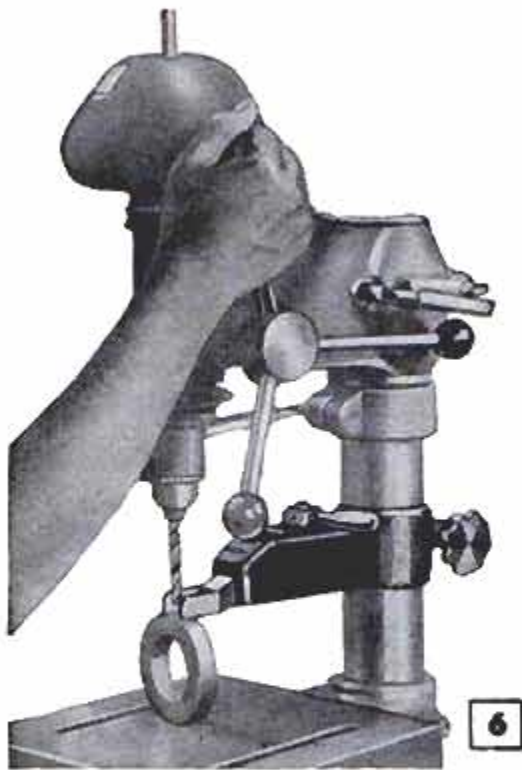
Allied Equipment Corp., 427 Main St., Bloomington, Ill.

5. HOLDER for single-edged razor blades is specially made for opening cardboard cartons, frozen-food containers and for cutting linoleum. Handle has space for storage of extra blades. Blades easily changed

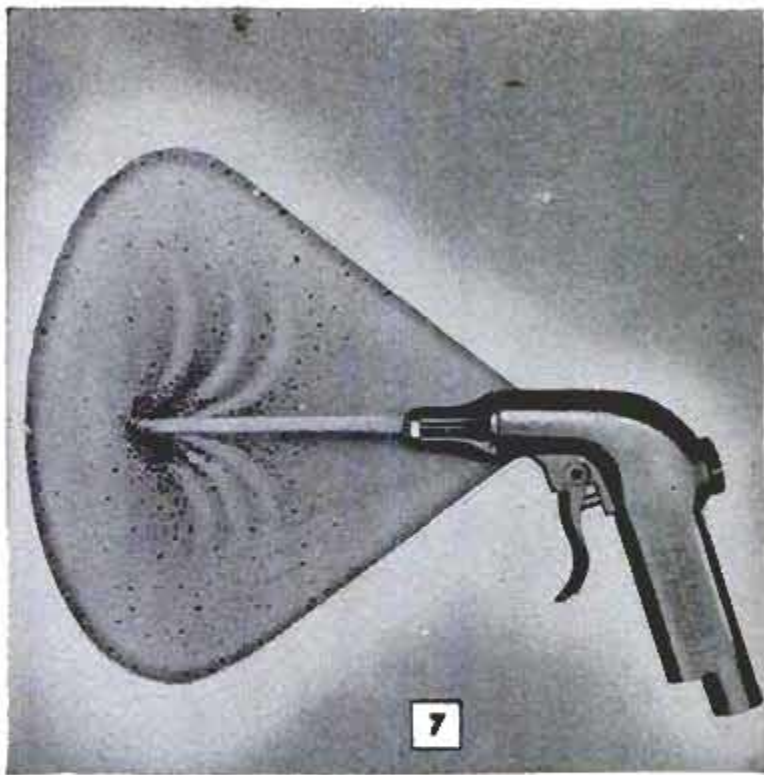
Zee, Inc., 1784 Summer St., Stamford, Conn.



5



6. WORK CLAMP slides on drill-press column, clamps rigidly at any point. Holds almost any shape work for drilling, tapping
Cincinnati Tool Co., Cincinnati 12, Ohio

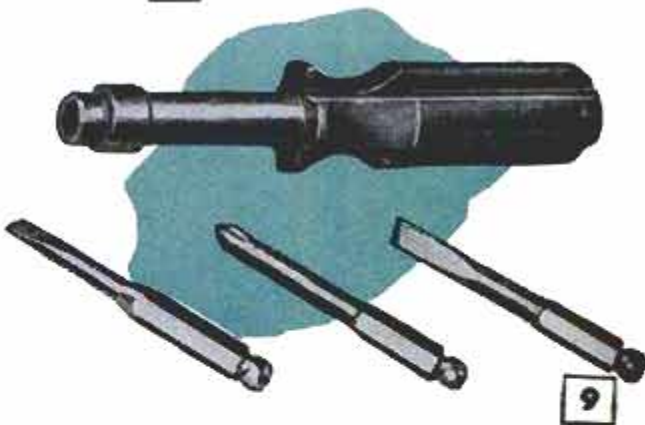


7. SAFETY AIR GUN for blowing dust and chips from work has a novel dual-jet nozzle. Second jet forms an air cone, or shield, which prevents metal particles and dust from flying upward
Hydraulic Mfg. Co., Kiel, Wis.

8. SPADE DRILL for hard-to-machine metals comes with replaceable blades and provision for circulating coolants through shank. Wide range of sizes available
Robert H. Clark Co., 9330 Santa Monica Blvd., Beverly Hills, Calif.

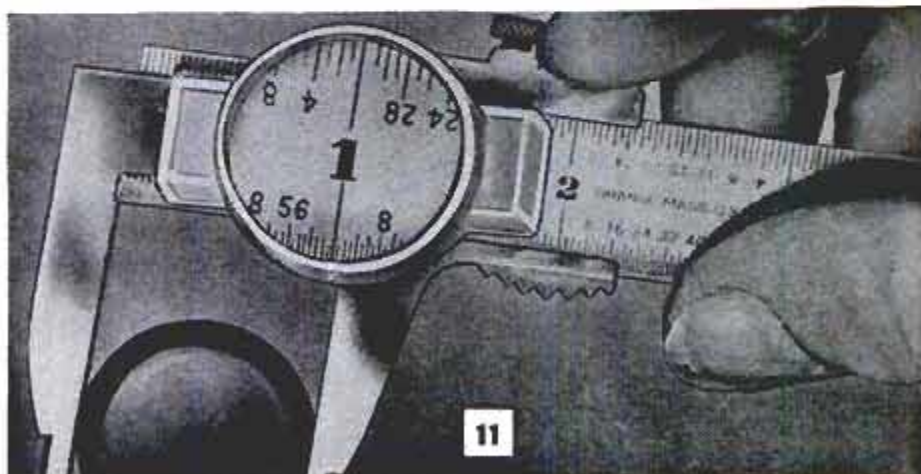


9. COMBINATION SCREWDRIVER carries two bits of different sizes in the handle, a third one in position for use. End of shank forms 1/4-in. socket wrench
Cormier & Shaver Mfg. Corp., 1838 E. 40th St., Cleveland 3, Ohio

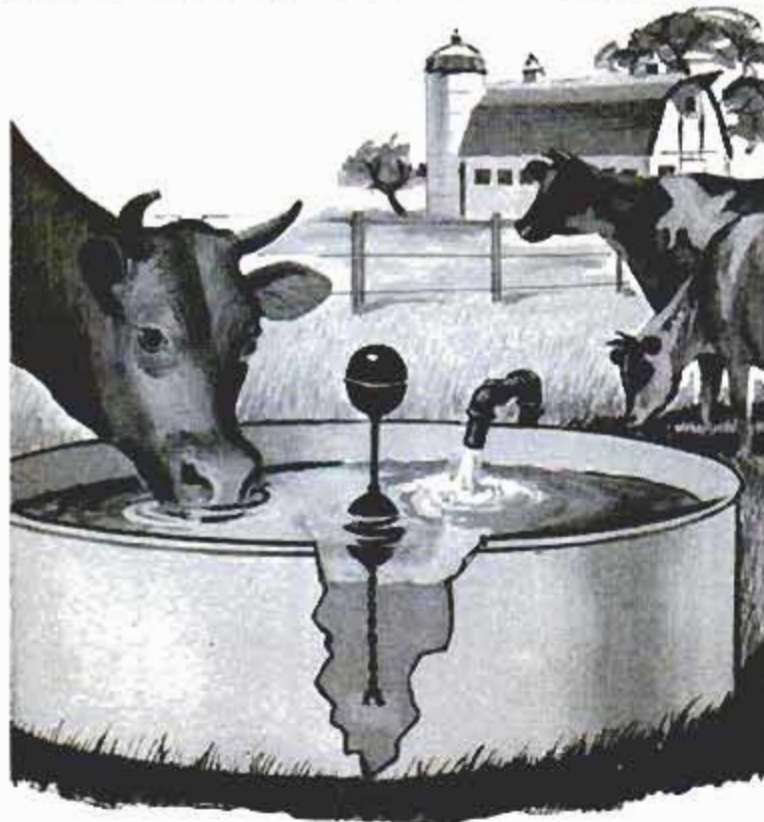


10. VACUUM CLEANER for workshop picks up shavings, sawdust from floor, or attaches direct to machine with hose and fittings. Fitted with 7/8-hp. motor
Craftools, Inc., 396 Broadway, New York City 13.

11. MAGNIFIER snaps onto rules, height gauges and calipers, is held in place by permanent magnets. Six-power magnification shows scale readings accurately
Magnaglass Mfg. Co., Inc., Fredonia, N. Y.



Float Gauge Shows Water Level of Field Stock Tank



Faced with the problem of determining the water level in a stock-watering tank placed some distance from the shut-off valve that was located in a barn, one farmer made a gauge that could be seen from that distance. The gauge consists of two toilet flush-tank floats screwed to the ends of a length of steel rod. This assembly is anchored to the center of the tank bottom with a length of light brass chain that holds one float so that it is just submerged when the tank is full of water. When the float is held in this position, it causes the rod to be held vertically and the float on the opposite end of the rod is held well above the top of the tank where it is easily visible for some distance. A coat of brightly colored, reflective paint on the float adds to its visibility.



Concrete Silo Floor, Road Assure All-Weather Access

This 18 by 100-ft. surface silo has a poured-concrete floor that adjoins a concrete road leading from the silo to the barn and feed lot. The smooth floor of the silo drains well and prevents spoilage of feed, while being easy to clean. The concrete road assures that there will be no mudholes to bog down equipment, no matter whether the feed is hauled in dry weather or wet. Snow is easily plowed from the road in the winter, so the silo is easily reached the year 'round.



Ends Cover Cattle Guard When Livestock Must Pass

When it is necessary to drive livestock over a cattle guard located in the roadway leading to the farmhouse, one farmer drops the hinged ends of the guard over it so the animals can pass. The ends are made from heavy lumber spiked to 2 x 4 crosspieces. Hinging of the ends is done by means of 1/2-in. steel rods. The cattle guard itself is made of lengths of steel pipe.

Special Bonus!

Save
\$66.67
on This Lathe

Up to \$66.67 of Accessories FREE With South Bend 10-K Lathe

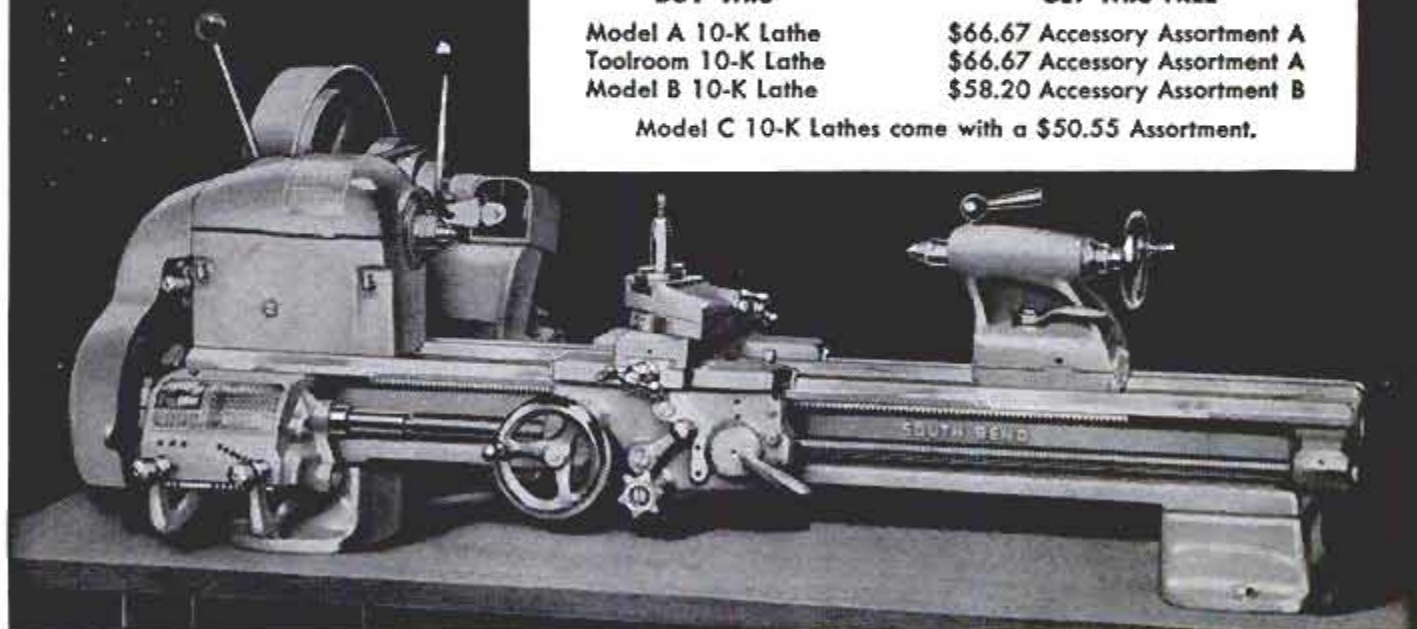
BUY THIS

Model A 10-K Lathe
Toolroom 10-K Lathe
Model B 10-K Lathe

GET THIS FREE

\$66.67 Accessory Assortment A
\$66.67 Accessory Assortment A
\$58.20 Accessory Assortment B

Model C 10-K Lathes come with a \$50.55 Assortment.



Here's your chance to get a fine South Bend 10" Precision Lathe plus a big assortment of essential lathe accessories without extra charge. Choose from 68 models and sizes for all your production, toolroom, maintenance and experimental needs. This is the first time such an offer has been made—but it ends August 31st—so act quickly. Mail the coupon now.

Model A 10-K Lathe illustrated. Model B Lathes have independent change gears instead of gear box. Model C Lathes have independent change gears and plain apron.

Accessory Assortment A

10 in 1 Tool Holder.....\$14.70
Face Plate Chuck..... 19.50
Set 21 Drills, 1/16" to 3/8"..... 11.97
Thread Indicator Dial..... 10.95
3 Dogs—1/2", 1", 1 1/2"..... 4.60
Knock-out Bar..... 1.65
Cutter Bits..... 3.30
Total.....\$66.67

No substitutions, returns or exchanges.

Accessory Assortment B

10 in 1 Tool Holder.....\$14.70
Face Plate Chuck..... 19.50
Thread Indicator Dial..... 10.95
Knock-out Bar..... 1.65
Cutter Bits..... 3.30
Center Drill Holder..... 3.50
3 Dogs—1/2", 1", 1 1/2"..... 4.60
Total.....\$58.20

10-K LATHES

12-SPEED HORIZONTAL MOTOR DRIVE

Catalog Number	Model	Bed Length	Price
CL653Z	C	3 1/2'	\$412
CL653A	C	4'	436
CL653R	C	4 1/2'	470
CL667Z	B	3 1/2'	487
CL667A	B	4'	511
CL667R	B	4 1/2'	545
CL670Z	A	3 1/2'	570
CL670A	A	4'	594
CL670R	A	4 1/2'	628
CL8670Z	Toolroom	3 1/2'	800
CL8670A	Toolroom	4'	824

Also available with 16-speed V-belt drive, and with Metal Column Base or Self-Contained Motor Drive. Prices f.o.b. factory, less electrical equipment.

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SOUTH BEND 22, INDIANA

Builders of Lathes, Milling Machines,
Shapers, Drill Presses, Pedestal Grinders



Up to 24
months to pay.

South Bend Lathes, South Bend 22, Indiana

Please send literature on 10-K Lathe Special Offer—also name of nearest distributor.

Send complete Time Payment information.

Name _____

Street _____

City, Zone _____ State _____

(Offer limited to continental U. S. and expires August 31, 1958)

Why your 35_{mm} camera should be a new Kodak Retina Reflex

Beautiful new Kodak precision miniature gives you professional full-area ground-glass focusing . . . plus clear split-image rangefinder . . . built-in exposure meter . . . fast-action film wind . . . fully automatic diaphragm action . . . lens interchange . . . and a complete accessory system. It's built to do anything you ask—with no errors, no failures.

This distinguished new member of the world-famous Kodak Retina family immediately identifies its owner as a truly discriminating photographer.

Under all picture-taking conditions, you see exactly the picture the lens "sees." You view and focus at eye level on the superfine ground-glass . . . see your picture bright, upright, about natural size, and clear to every corner.

When you prefer, you use the split-image rangefinder. Either way, you always view the picture at the maximum lens opening

—for utmost brilliance—because the diaphragm is automatic for all lenses.

The ultra-fast $f/2$ lens is a coated 50mm Retina Xenon-C. Its six elements give you an extra edge in sharpness and color correction.

No extra viewing or focusing device is needed—at any distance—with wide-angle, telephoto, or close-up units. No danger of cutting off part of a subject—because your viewing is free of parallax error, even in extreme closeups.

The built-in exposure meter measures the light for correct exposure. It's ultrasensitive, reads both reflected and incident light on a single scale, in full and half EVS numbers.

And lens aperture and shutter speeds are EVS-linked—so you can switch at will without recomputing exposure.

Ask your photo dealer to demonstrate this brilliant new Kodak Retina Reflex Camera. \$215, or \$22 down.



View and focus through the lens—your picture is sharp and clear—corner to corner—on the extra-fine ground glass. Rangefinder in center.



Built-in light meter shows full and intermediate EVS numbers for film speeds from 5 to 1300 ASA. Mask for incident light is included.



Simplified exposure system. Lets you vary lens-shutter combinations without changing exposure. Lens and shutter scales read from top.



Single-stroke lever advances film, sets shutter, opens lens to $f/2$ for focusing. Shutter speeds—1 second to 1/500, B, and self-timer.

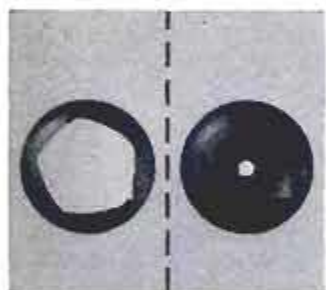
(Prices are list, include any Federal Tax, are subject to change without notice)

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With supplementary "R" lenses, you take shots this close—and no framing errors!



Fully automatic diaphragm—closes down to your pre-selected aperture an instant before exposure. Works with *all* supplementary lenses.



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New Automatic Kodak Cavalcade Projector changes slides itself! Slides stay in constant focus. Projects at 300 and 500 watts. Three ways for semi-automatic change. Kodak Cavalcade projector, \$149.50 or \$14.95 down.

Kodak
TRADE MARK

Rochester 4, N. Y.

JUNE 1958

207

WORKSHOP HINTS

from Weldwood



WOODEN STORM WINDOWS, SCREENS, OR DOORS COMING APART? Mend them with Weldwood Waterproof Resorcinol Glue. Clean both joint surfaces and coat with this completely waterproof glue. Clamp or tie to maintain pressure overnight. Weldwood Waterproof Glue in the joints stands up to door-slamming, rain, or sun better than the wood itself. Ideal, too, for boats—even below-the-waterline jobs. Sizes from \$1.15.



REPAIR WOBBLY TABLE LEGS with Weldwood Plastic Resin Glue. Mix with water to heavy cream consistency and apply to facing surfaces of joint, after removing old glue. Clamp, and reinforce with nails or screws if possible. Weldwood Plastic Resin Glue makes rigid, super-strong joints, unaffected by paint or lacquer. For all nonmineral porous materials. From 40¢.



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PM6-58

Send for your handy Weldwood Household Adhesives Kit that meets most household and workshop gluing needs. Includes Weldwood Presto-Set Glue, Contact Cement, and Plastic Resin Glue. An 83¢ value, yours for only 50¢ with this coupon. Mail before September 30, 1958.

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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.



Time to Prune Shrubs

Q—I have a number of shrub plantings and all of them need pruning. But when should these be pruned for best results, spring, summer, fall or winter? I have Hydrangeas, snowberry, Abelia, honeysuckle, Weigelas, red dogwood, hybrid tea roses and several Viburnums. I want to know which should be pruned and when.—G.N., Ind.

A—Some shrubs winter-kill and have a certain amount of deadwood which should be removed each spring. Among these are the Hydrangeas, snowberry and Abelia. This pruning can be done at any time during the late winter or early spring. When pruning out the deadwood care should be taken not to damage buds, break live twigs or score the bark on live wood. Cut all deadwood as close to ground level as possible. Several of the shrubs you list should have the live wood thinned early in the spring. These are shrubs which bloom on new growth such as the Hydrangeas, honeysuckle, Abelia and also the hybrid tea roses. However, if these have not been pruned the previous season, remove only a small amount of live wood. More can be removed the next pruning season. Shrubs that should be pruned lightly after blooming and again in the early spring include the Weigelas, red dogwood and most of the Viburnums. Again we would emphasize that it is best to avoid removing too much live wood at any one time, the more especially if the shrubs have not been regularly pruned on schedule. If you are not especially concerned with maximum bloom each season, plan to thin the shrubs progressively, retaining the more vigorous canes or trunks and eliminating the weaker ones. It also is best to plan a regular feeding schedule, starting on most shrubs in June.

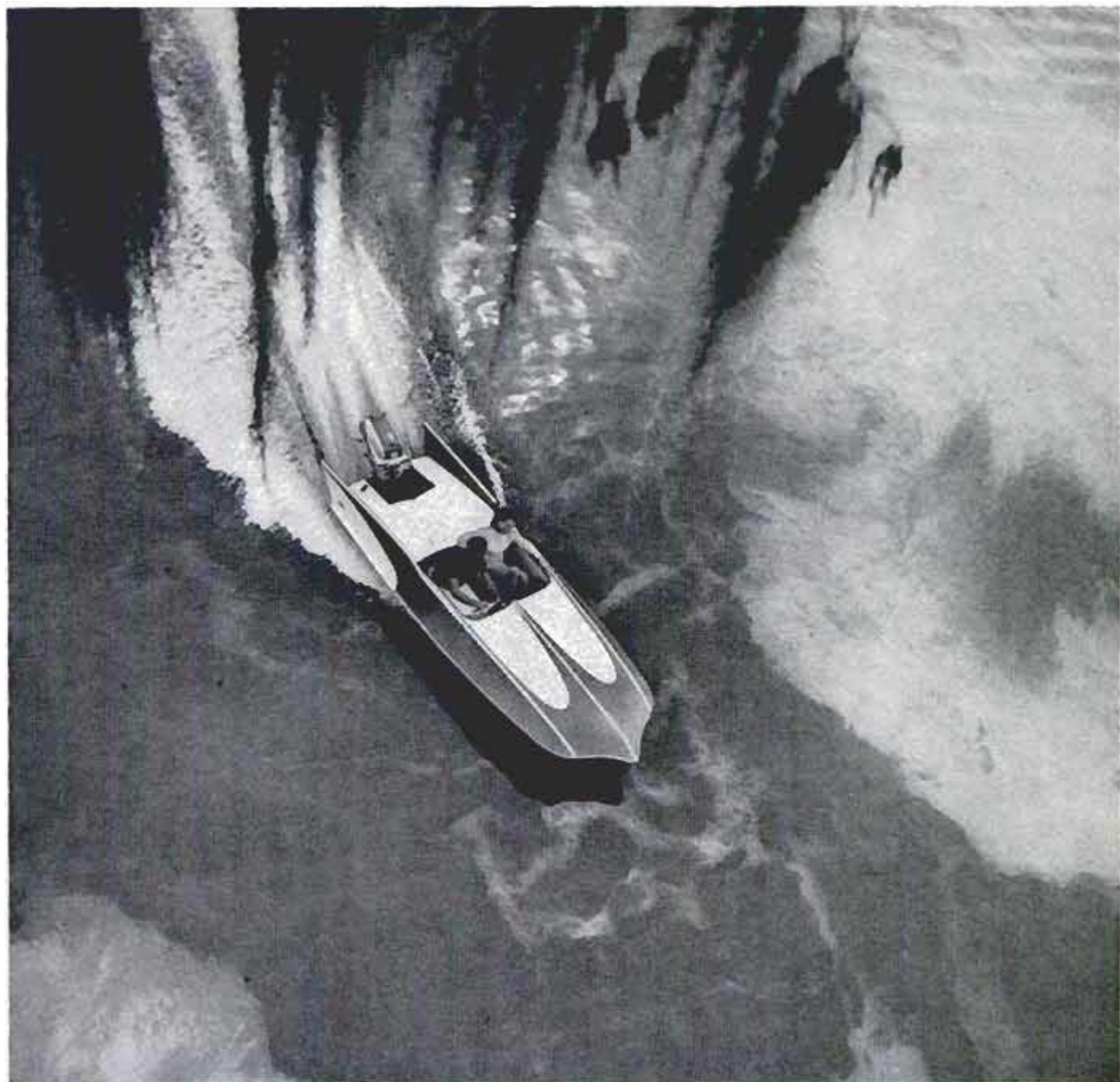
Masonry Planter

Q—I'm planning to build a planter extending from one end of the front porch to a corner of the house. The house is frame construction with wide siding. I plan to use either concrete or bricks for the retaining walls of the planter. If I pour concrete against the siding how can I protect the wood from moisture? — T. C., Md.



A—We wouldn't think of pouring concrete against wooden siding as good practice, even though it may be done and perhaps is considered permissible. Even though the wood is protected with a waterproof membrane of plastic or asphalt-

(Continued to page 210)



In outboard engines as in motor cars, Champion spark plugs deliver *full-firing power*. Above: Champion-equipped Johnson "35" on runabout at Cypress Gardens, Florida.

Q. Why does every major manufacturer of outboard motors use Champion spark plugs?

A. Champions give full-firing power. Put new Champions in your car every 10,000 miles. You'll get an *immediate* boost in horsepower...and save gasoline, too!



World's favorite spark plug—engineered for every car built by Ford, General Motors, Chrysler, American Motors, Studebaker-Packard and every major foreign maker

CHAMPION

How to select a paintbrush

A good brush performs better... wears longer... saves you money



Check these points when buying your next paintbrush.

First, look for a full stock of bristles in a firm, strong setting (1). Avoid brushes with loose bristles. Then inspect the individual bristles closely (2). They should be finely tapered, with slightly curled

tips. Look again and be certain a generous portion (at least 10 to 20 per cent)

of the bristles have tips which are split or "flagged" (3).

Your final assurance of a brush which will give the best painting performance is

bristles of varying lengths (4), but with a high proportion of longer lengths.

If the brush you look at passes all these tests, it will have a greater

working and paint-holding capacity and eliminate excessive dipping. It will (5)

release any type finish smoothly and evenly on any surface.

One short cut to selecting a good brush is to look for the black and yellow tag, signifying a brush with TYNEX nylon bristles

(6). Properly made paintbrushes with tapered bristles of improved Du Pont TYNEX nylon give you better painting performance. They pick up a full paint load at every dip and give velvet-smooth paint-out. With proper care, brushes with durable bristles of TYNEX clean easily... rinse thoroughly... are quickly ready for another job.



2



3



4



5



6

FREE—"How to Choose and Use a Paintbrush." This booklet tells how to paint walls, ceilings, trim, furniture, radiators and do other special jobs. Gives tips on the correct painting stroke, how to hold a paintbrush, how master painters dip their brushes, how they clean them. Tells what kind of paintbrush to use for each painting job. Write to E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept., Room 536, Du Pont Building, Wilmington 98, Delaware.

(Continued from page 208)

coated building paper, there is always the chance that settling or frost action will open a crack between the wood and masonry to admit water and insects. It is then that damage is likely to occur. For these reasons we could not recommend the procedure. Is it not possible for you to plan the location and construction of the planter in such a way as to avoid pouring concrete against the siding as you have suggested? Of course, it is not possible for us to outline a suggestion of much value at such long range, but it would seem quite practical to design something attractive and useful without involving questionable building practices.

Sagging Ceiling

Q—I've acquired an older home in which the separate dining and living rooms have been made into one large room by removing the partition. This has caused the ceiling to sag, cracking the plaster upstairs. What to do?

H. E., Vt.



A—This condition usually calls for a major repair job. Ordinarily, it will be necessary to remove at least a part of the ceiling plaster and lath and possibly upstairs flooring, and install new floor joist and bridging, the new joists installed alongside the originals and bolted or spiked to them along the length. Of course, the ceiling will have to be leveled with jacks and this may necessitate dismantling the partition above and rebuilding it after the work is finished. Naturally, such a procedure is likely to be quite expensive. An alternative, and considerably less costly, is to install a large beam to carry the weight of the ceiling. Lateral beams, smaller in sectional size, can be run from the center beam to the ends of the room, the ends housed in a cornice board, or flat cove. The ends of the main beam should be supported firmly, either on headers or on ribbands let into the studs flush. Another method of supporting a center beam, often used in very old construction, is that of supporting the beam ends on what are known as gunstock posts. These supports extend from the floor to the beam and slant outward at the top, giving the effect of a narrow room divider.

Objectionable Odor in Papered Room

Q—Recently we finished papering our new home and immediately we noticed an unpleasant odor throughout the house. It still persists even though we have used several kinds of deodorants. We did notice that several spots on the walls in two of the rooms did not dry for several days after papering. Finally this dampness disappeared, but some discoloration of the paper remains. What's wrong and what can we do about it?—W. M., Wash.

A—We think it likely that you applied the wall-paper before the plaster was thoroughly dry. If moisture was still present in the plaster at the time you papered, it would work its way to the surface of the plaster. Wallpaper pastes made with a starch or a wheat or rye-flour base would tend to decompose, or "sour," under these conditions, especially if no antiseptics were present, in the dry powder or were added at the time of mixing. Sometimes wallpaper pastes tend to develop a rather unpleasant odor if mixed in solution and allowed to stand overnight before using. The only permanent remedy for the condition you describe is to remove the paper and paste, allow the walls to dry out, then apply a wall size and repaper. Use a prepared size and paste and follow the manufacturer's instructions in all details.

Output of Light Bulbs

Q—A friend and I disagree on the light output of ordinary lamp bulbs. He says that a 100-watt bulb gives more light than two 50-watt bulbs. I maintain that the light from the two 50-watt bulbs will equal that from the 100-watt bulb. Who is right?—E. L., Pa.

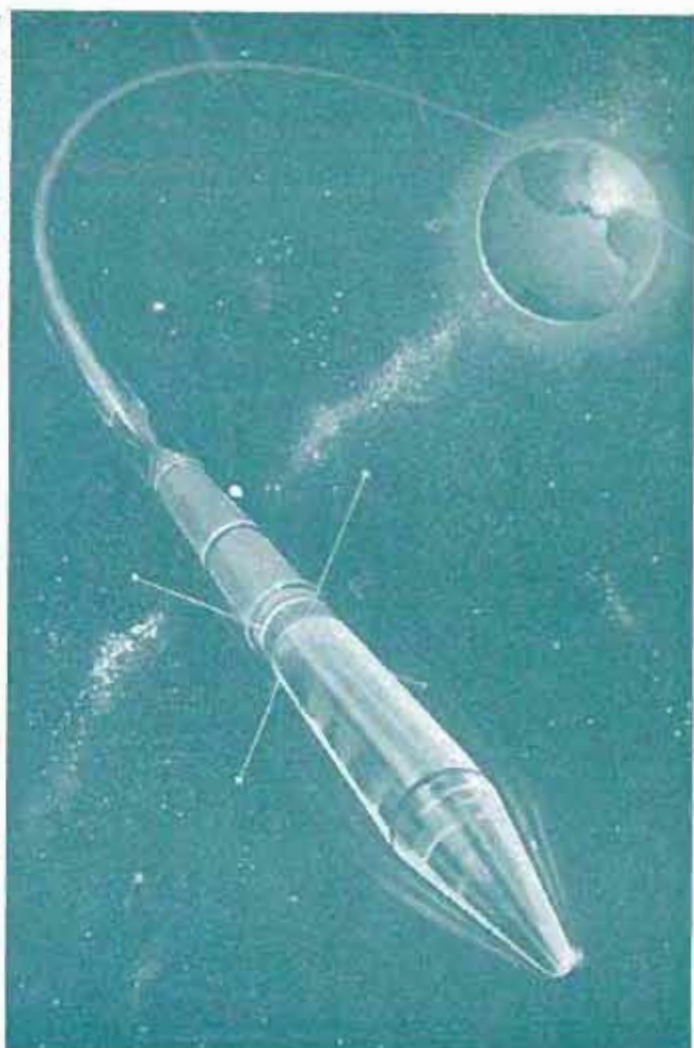
A—Your friend is right. The light output of a 100-watt bulb exceeds that of two 50-watt bulbs by about one-fourth.

TYNEX is the registered trademark for Du Pont nylon bristles.



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NYLON BRISTLES

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THE ADJUTANT GENERAL
Department of the Army
Washington 25, D. C., Attn: AGSN

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it's a genuine
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Only Channellock has this reinforced edge for greater strength.

Only Channellock has undercut interlocking non-slip channels.

LOOK FOR THIS TRADE MARK

Why? Only Channellock has undercut, interlocking channels that can't slip no matter how tight you grip. Only Channellock has the reinforced tension edge to withstand maximum gripping force. These exclusive features have made the Channellock No. 420 the first choice of skilled mechanics everywhere. So be sure you get only genuine Channellock pliers. Look for the trademark on the handle.

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CHAMPION DeARMENT TOOL COMPANY
MEADVILLE, PENNSYLVANIA



Canadian prospector uses his head in more ways than one to search for mineral wealth in northern Ontario

School for Prospectors

(Continued from page 96)

right to prospect anywhere in the province where mining rights belong to the Crown—he also gets 10 coupons entitling him to 10 free ore-sample tests.

The schools stress the practical aspects of prospecting. The instructors point out that the modern prospector must figure on at least 175 pounds of equipment for a month in the bush, of which 108 pounds is food. Students are discouraged from plans to live off the land and are warned that a prospector needs about 3½ pounds of food a day.

How does a prospector finance himself for a month or two in the bush if he doesn't have money of his own? If he shows promise as a student he can get a grubstake from British Columbia which every year gives between 50 and 90 carefully selected men gifts of \$300 to \$500, depending on how far north they intend to prospect. Many mining-development companies offer graduates jobs as prospectors at salaries of \$300 to \$500 a month plus expenses and a 10 percent interest in any important strike they make.

Instead of looking aimlessly, prospecting school graduates are urged to concentrate on some likely five-mile-square area and to study it systematically, to keep careful maps and daily accounts. Then, when they think they really have something, to follow

(Continued to page 214)

THE ORIGINAL PACKAGED BOAT KITS

NEW FOR 1958! CATALOG FOR
SEA-RAY FIBERGLASS PLASTIC
BOATS, BOAT KITS AND HULLS
CLOTH RESIN
FIBERGLASS
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Constructed in one day. 12 models
from 10 ft. built in performance
Utilities and Runabouts. No Upkeep
Professional Results

MADE ONLY BY *Custom-Craft*



NEW 1958 CATALOG
70 MODELS

WORLD'S
LARGEST
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DESIGNED FOR AMATEURS!

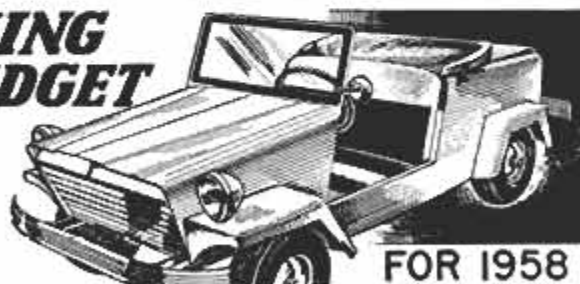
Over 200 Boats, Kit Frame packs
8' - 21' All Types: Plans, Skiffs,
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Floor Materials Available. Easy To Build!
Also Semi & Custom Finished Boats at new LOW prices

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FINANCE PLAN
AVAILABLE

SEND 35¢ FOR 64 PG. CATALOG AND 34 PG. "SEA-RAY"
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Fiberglass materials. Send \$1.00 for both catalogs plus
"BOATING HANDBOOK." DEALERS-AGENTS INQUIRE

CUSTOM-CRAFT-BUFFALO **7L** NEW YORK

KING MIDGET



FOR 1958

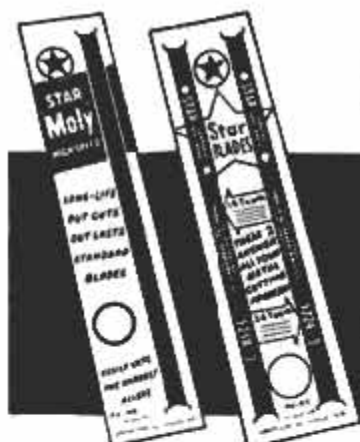
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wanted. Earn your own car. If no dealer near you send 25¢
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and tensions blade
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• Handle molded for comfort.

• High-strength tempered steel
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AT ALL LEADING HARDWARE STORES

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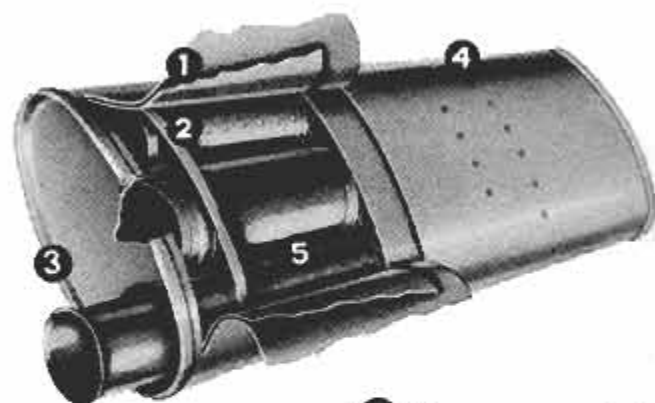
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heavier shell, heavier outer heads and tubes; this
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pickup and smooth acceleration. And with im-
proved performance you get real savings on gas.

3. LOWER FIRST COST— Despite their extra
performance and longer life, Silentones actually
cost you less. Many stores will install a Silentone
for you at big savings. Ask about one today.
They're individually engineered for your car.



1 Double shell—26 gauge
inner shell, 22 gauge outer
shell—lasts longer

2 Nonclogging extruded
holes—no whistling, no re-
striction

3 16 gauge spun locked,
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4 Crimped seams eliminate
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5 High and low frequency
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Here's what happens
when you
PULL weeds



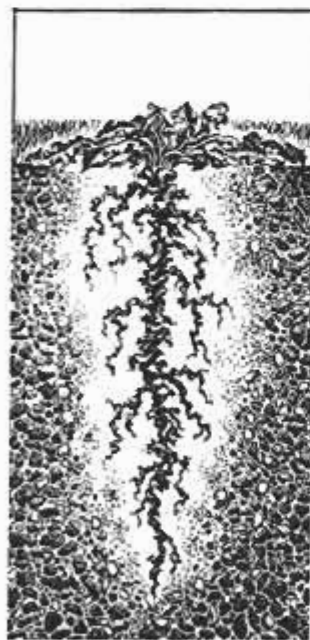
Tiny roots remain—to grow again

You don't get the whole weed—because you don't get *all* the roots! You may hope you do, but tiny roots always remain to grow again. So you've got the job to do over—and sooner than you think. Yanking weeds is just not *effective* . . . not thorough . . . not lasting.

Here's the result when you KILL weeds with **WEEDONE**

THE MIRACLE WEED KILLER

You kill not just the surface plant and main roots. You kill every hidden root. For Weedone's action is deep—its killing power penetrates to every tiny root; so there's nothing left to regrow. Weeds *stay* killed with Weedone. You do a thorough, lasting job. Yet remember—



All roots killed —
nothing to regrow

New dry form for use in a
spreader. 5-lb. bag \$2.25 (slightly
higher west of Rockies)
ALSO LARGER SIZES



Weedone Easy Weed-Away
Applicator 59c

AMERICAN CHEMICAL PAINT COMPANY

St. Joseph, Mo. • AMBLER, PA. • Niles, Calif.
Originators of 2,4-D and 2,4,5-T Weed Killers

the rules carefully in staking their claims. The rules vary from province to province. A prospector can stake out five claims in Quebec, eight within a 10-mile area in British Columbia and 18 in a single Ontario mining district. He pays a nominal fee when he records each of his claims and must do \$100 worth of work on each of his claims every year to maintain his rights.

Old Methods and New

To illustrate the difference between the newer and older prospecting methods, Pierre Mauffette, who heads the prospecting course at the Ecole Polytechnique in Montreal, tells his students that in 1894 students attending the first Canadian prospecting class in Marmora were practically sitting above a 17-million-ton iron-ore body and didn't know it. They couldn't know it; there were no surface outcroppings and the ore itself was 150 feet below the surface.

Yet this huge deposit was discovered recently by an airborne magnetometer survey of the Marmora area. Developed as a submarine detector, the podlike magnetometer is attached by cable to an airplane flying 500 feet above the ground.

Prospecting students also learn about airborne-scintillation surveys for uranium and gravity-measuring instruments which can detect any mass of material in the earth different from that of the surrounding rock. Students even learn how to analyze plants, since many of them absorb metallic elements from the soil.

Instructors of the prospecting courses emphasize, however, that the newer and more dramatic techniques can be very expensive. And they do not guarantee success. Dozens of the major finds were made by individual prospectors working without costly or highly technical equipment.

Recent Big Discoveries

Among the alumni of Canadian prospecting schools who have struck it rich in recent years are: Ray Pitri, a fisherman who took the course in Vancouver and discovered the \$6,000,000 Privateer gold mine in British Columbia; Hiram Nelson, a Nova Scotia youngster who received \$500,000 for his interest in an asbestos deposit he helped find, and Yves Proudhomme who discovered an immensely valuable deposit of lithium, an important metal of the atomic age. Some are recent immigrants like Bob Zielinski, a Rumanian photographer who arrived in British Columbia in 1952, took the course and has since staked 30 worthwhile claims, and G. M. de Modzelezski, a Pole who went prospecting at 48. He found great uranium deposits in the Athabaska fields and is now reputed a millionaire.★★★

*Smooth
"TOUCH
CONTROL"
rewind
when you
press
this button*



**IT'S THE NEW MEZURMATIC TAPE RULE
by Lufkin . . . and it's really something special!**

A new automatic rewind lets you bring back the blade at the speed you want . . . controlled by an exclusive "ball-bearing" governor. When you want to rewind the blade, just press the big button. Release the button . . . the blade stops instantly . . . and it will not "creep". See the new MezurMatic on display now at your hardware store. It comes in the standard White Clad® blade or the all-metal Chrome Clad® blade. Both types of finish come in 6', 8', 10' and 12' lengths . . . in either ½" or ¾" widths.

THE LUFKIN RULE COMPANY
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Mend leaky plastic hose with tough, waterproof, "SCOTCH" Colored Plastic Tape. Stretchy tape sticks tight, resists wear, sunlight, corrosion. New clear plastic blends invisibly with any color. Also available in white, red, yellow, green, brown, blue, black. $\frac{3}{4}$ " width, 25¢; $1\frac{1}{2}$ " width 50¢ at stores everywhere.

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NEXT TIME BUY TWO!

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THE PERFECT FASTENER to hold anything
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With Molly you can install fixtures exactly where you want... not just where studs are. Won't pull through. Spider backing reinforces area in which used. Fixtures can be removed and replaced in same anchor. Easy to install without disfiguring wall. Inexpensive, guaranteed. Ask your hardware dealer for genuine Molly... the name is stamped on the cap.

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IN USE



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SAMPLE BOX
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Enclosed is \$1.00 for which please send
me a sample box of 12 Mollys postpaid.

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What We've Learned From the IGY

(Continued from page 103)

have discovered a great, permanent cold-air mass, cyclonic in movement, over the central part of Antarctica. Quite likely it plays a vital role in the Southern Hemisphere's weather.

And speaking of weather, IGY meteorologists already can boast of two accomplishments. For the first time, daily weather forecasts are available for Antarctica. And—partly as a result of those forecasts—weather forecasting throughout the Southern Hemisphere has been considerably improved.

Consider the "continent" of Antarctica itself. There now is a ring of oil barrels (no barber pole!) marking the South Pole. Scientists recently set off three shots of high explosives near the barrels. Echoes of the shots showed that the ice at that point is 8297 feet deep, and rests on land rising 903 feet above sea level. However, at Byrd Station, a relatively short distance away, the land is 5000 feet below sea level, and the station itself squats on an ice cap 10,000 feet thick. Traverse recordings of Antarctica are now being made and may well reveal that the continent is a series of peaks thrusting up above sea level.

Mountains Under Polar Sea

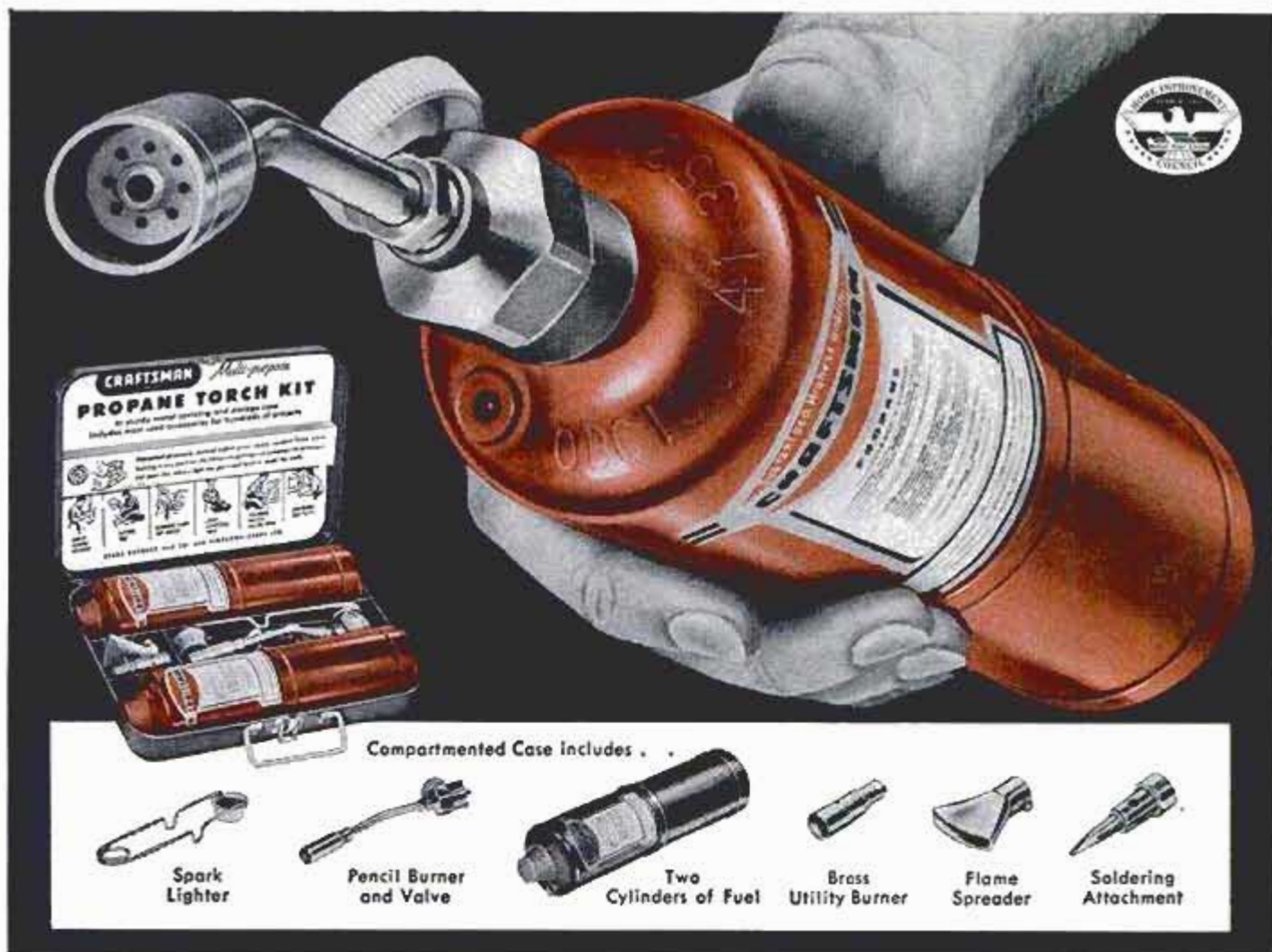
At the other end of the world, IGY teams have been living a perilous existence on an ice island, and atop a two-square-mile ice floe seven feet thick. On August 12, 1957, the men were amazed when their sounding instruments suddenly revealed the existence of an unsuspected range of polar undersea mountains more than 5000 feet high. Through more research is required, scientists believe this tremendous ridge may form a barrier to the movement of polar waters. This, in turn, could influence the ocean currents of the Northern Hemisphere, the weather of half the world, and the refertilization of subarctic fisheries.

IGY scientists hauled an oil rig into Greenland and drilled more than 1400 feet into the ice to pull up ice cores. So great was the compression at that depth that some of the cores exploded as the compressed air in them expanded. Nevertheless the cores are a history book of the climate, for each layer shows the annual precipitation. The cores are studies like tree rings, and are expected to reveal the trends of the climate for past hundreds of years, and to help answer age-old questions regarding climatic cycles.

(Continued to page 218)

Great Father's Day Gift!

(Start hinting now)



Compartmented Case Includes . . .



Spark Lighter



Pencil Burner and Valve



Two Cylinders of Fuel



Brass Utility Burner



Flame Spreader



Soldering Attachment

CRAFTSMAN PROPANE TORCH GIFT KIT

You'll wonder how you ever got along without it. This Craftsman Propane Torch Kit makes dozens of everyday chores and repairs far easier. The torch is as easy to light as a gas stove—no filling, no pumping, no priming. Safe, too, it lights or burns in any position—even upside down! (UL listed.) Carry the kit to your work—accessories are always with the torch, handy and in place. Idea: Tear this page out right now, as a Father's Day reminder! It's a "must" for any handyman.

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would total \$14.95

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Buy this Craftsman Torch Kit at your nearest Sears Retail Store or Catalog Sales Office . . . or through Sears Catalog at home.

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Spring fever

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HARLEY-DAVIDSON **SPORTSTER**

The open road is a clear call to outdoor adventure. Your answer is the Harley-Davidson Sportster . . . with surging response to your lightest touch.

Cat-quick acceleration blends into a smooth, effortless purr — thanks to the big 55 cu. in. OHV engine. Here is pulsing power perfectly engineered to obey your every command. Hydraulic front fork and swinging-arm rear suspension combine to give cloud-cushioned comfort. Giant brakes stop you smoothly, safely.

Road-fashioned from front fork to flashing tailpipe, this gleaming streamliner is available in a wide range of harmonious two-tone color stylings.

Make a date with a Sportster

Stop at your Harley-Davidson dealer for a date to test ride the 1958 Sportster. Ask about his liberal trade-in deals and low monthly terms.

HARLEY-DAVIDSON MOTOR CO.
DEPT. P • MILWAUKEE 1, WISCONSIN

Oceanographers in the Atlantic sank "beeping buoys" to preset depths and tracked them as they drifted. Surprisingly, the buoys revealed a countercurrent beneath the Gulf Stream moving briskly along toward the southwest.

New instruments are being used in studies of gravity. Gravitational attraction, of course, depends upon the land mass. For example, due to the flattening of the earth at the poles, a 200-pound man weighs a pound less at either pole than at the equator. Mountains also can affect gravity. Carnegie Institution seismologists have discovered that the roots of the Andes are far deeper than previously believed.

Tides of Earth's Crust

Earth tides are also being investigated. The earth's crust thrusts up and falls back in a manner identical to tides of the ocean. Hawaii, for example, rises and falls four inches each day.

Perhaps the most significant discovery of IGY so far has been the revelation that men of all nations, even in these times of tension, can cooperate in a vast scientific undertaking. Though the Sputniks beat Explorer into orbit, there has been little chest-beating or rancor among the scientists themselves, who see the satellites primarily as tools for studying the earth's environment.

But scientists, like Hercules in the Greek myth, find themselves facing a many-headed monster. As fast as one head is cut off, two grow in its place. As fast as one scientific question is answered, the answer itself suggests two new questions. Here are just a few of the questions that now are popping up:

Is the earth really "inside" the sun?

By what path does a drop of water from a melting arctic glacier move to the frozen Antarctic, and how long does it take?

What is the origin of the huge electrical fields in space?

What does the land mass of Antarctica look like?

Is the earth's climate warming, or becoming cooler?

What is at the center of the earth?

Does the earth radiate less heat than it absorbs from the sun?

What is the origin of cosmic rays, and what influences their trajectories through space?

What does the earth look like from the moon?

Some of these questions no doubt will be answered, but still others will be raised, as IGY scientists complete their study of this wobbling, erratic, pockmarked but magnificent old planet. ★ ★ ★



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The quality-built CAPRI covers dial selected areas up to 38' x 45' with a gentle, soaking spray. Colorful drive gears of nylon are visible through plastic side in motor housing. Fully guaranteed.

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HEAVY-BODIED KLEAN-STRIP

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SMITH 45-P air compressor



Right for spray painters, plumbers, contractors, monument shops, tire changing trucks, maintenance shops, quarries, utilities, many other users. Delivers 45 plus cu. ft. per minute; pressure up to 150 PSI. Powered by Wisconsin 4-cyl. air-cooled engine; uses less than 1 gal. gasoline an hour! Most compact, biggest-value compressor for its capacity anywhere! Other models to 230 cfm.

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PLANS 25¢ EACH. Order by number. Also write for free folder describing boats in detail. (Offer good USA only). Douglas Fir Plywood Association, Dept. 9, Tacoma, Washington.

Use only Exterior plywood (EXT-DFPA®) for boats. Comes in several sizes, grades—including premium quality solid-core "Marine Exterior" for hull construction.





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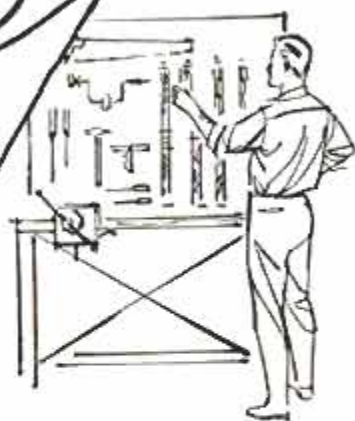
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Perma-Pak hangs at your workbench or fits neatly into your tool kit. Sizes boldly labeled to give you instant selection.

Only GREENLEE has Perma-Pak . . . only Perma-Pak gives you these advantages . . . and at no extra cost!



Look for GREENLEE tools in new Perma-Pak at your favorite hardware or building supply dealer.



GREENLEE TOOL CO.

2106 Columbia Avenue, Rockford, Illinois

He Furnished His Home With Wood Scraps

(Continued from page 98)



Traylor puts a coat of sealer on his unique coffee table made of a discarded slab of pecky cypress

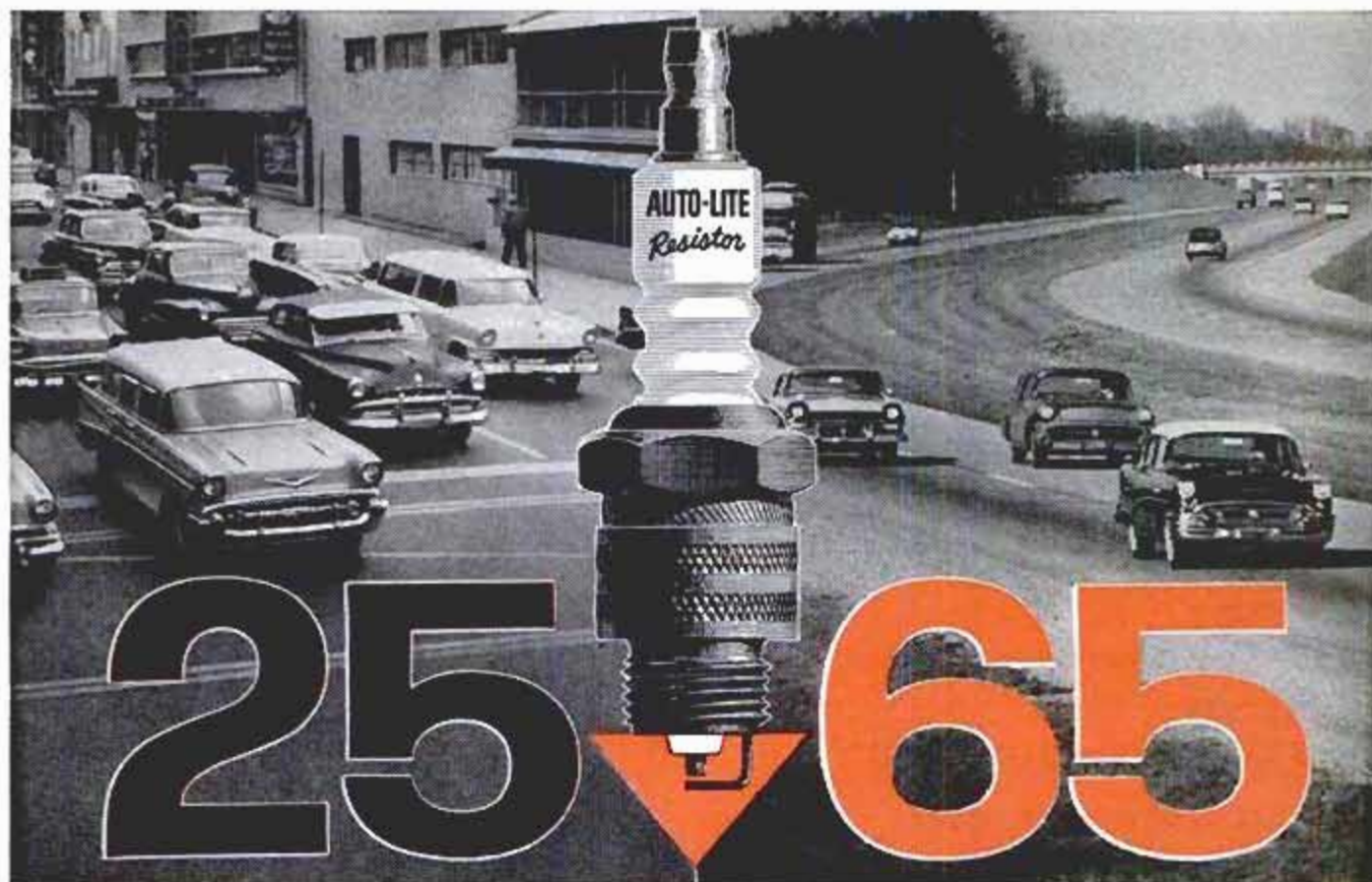
other items of unique interest—a half-cask wine server, a cactus garden planted inside an old slab of cypress, and a decorative screen made of woven strips of wood.

In the bedroom is a treasure for history hunters—a bed with a nine-foot canopy and a trundle, which slides out to form another bed. This beautiful piece is made of British Honduras mahogany inlaid with rosewood. To match it, there's a combination highboy and secretary.

To complete his home, Traylor has covered the old ceilings with mullet-fisherman's netting, weighted down with preserved fish and Florida shells. ★ ★ ★

In the guest room, mahogany shadow boxes serve as attractive storage for books, radio, pictures, plants





IN TOWN TRAFFIC . . . some spark plugs, designed for high speeds, become fouled and cause misfiring and loss of power when driven at low speeds.

ON THE HIGHWAY . . . some spark plugs, designed for low speeds, misfire causing power loss and invite destructive pre-ignition when driven at high speeds. Why gamble when . . .

Auto-Lite Resistor Spark Plugs with **POWER TIP** "Fire Up" your engine* at all speeds!



If you drive at both town-traffic and highway speeds, here's why you should use Power Tip . . . the first spark plug ignition-engineered for today's engines and today's driving.

At low speeds, the projecting Power Tip is in the thick of combustion where it gets hot quicker and stays hot to burn fouling deposits away *clean*. At higher speeds, the projecting tip is in the path of the incoming air-fuel mixture where it stays cooler to effectively *check* power-robbing pre-ignition. Ask your garage or service station to install Auto-Lite . . . the *only* spark plugs with Power Tip . . . and start enjoying top performance and economy from your car at *all speeds*.

*Power Tip, with or without Resistor, is ignition-engineered for overhead-valve V-8 engines and for most overhead-valve 6-cylinder engines in all these cars—Buick, Cadillac, Chevrolet, Chrysler, De Soto, Dodge, Edsel, Ford, Hudson, Imperial, Lincoln, Mercury, Oldsmobile, Nash, Packard, Plymouth, Pontiac, Rambler, Studebaker.

YOU CAN SEE
 THE BIG NEW
 DIFFERENCE IN
 SPARK PLUGS!



Ordinary Tip Power Tip

Power Tip protrudes farther into the combustion chamber for better ignition. Fuel burns more evenly and completely to give top performance and economy at *all speeds*.

AUTO-LITE POWER TIP

RESISTOR SPARK PLUGS WITH

Auto-Lite makes a complete line of spark plugs, including Standard, Resistor, Marine, Small-Engine, Transport, and Aircraft.



TIME: now
PLACE: your shop
ACTION: smart craftsman
 sharpening your own
 rotary mower blade



Why pay someone else to sharpen your rotary lawn mower blade when you can do a professional job yourself—with the Nicholson or Black Diamond Rotary Mower file?

It's the first tool ever designed specifically for the job. Best news of all: it costs only 98¢, and literally pays for itself the very first time you use it.

The Nicholson or Black Diamond Rotary Mower file comes with a handy hang-up hole for easy storage in your shop or garage. Every file comes with its own protective plastic sheath.

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 Look for your file in its colorful display rack. It's at your hardware dealer's now.



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NICHOLSON FILES

A FILE FOR EVERY PURPOSE

Four Weeks of Camping On a Family Budget

(Continued from page 141)

Food stores in the parks are high-priced.

- Collect and correlate all the literature you can get on camping sites along your stops in such a way that if one site isn't satisfactory, you'll have an alternate.

- Plan to stop in a motel at least once every fourth night if you are traveling steadily. You'll need a bath by that time.

- Hit the park in which you plan to camp as early in the day as possible. Most parks are on a first-come, first-served basis and they are crowded during the summer.

- Check your camp-ground listings for laundries (and shower baths, too). Many of the larger parks have these facilities.

- As soon as your tent is pitched, spray the interior with an insect bomb; then keep the opening zipped tight against bugs.

- Roll your clothing and stuff it inside the sleeping bag with you at night; otherwise it's likely to be cold and clammy in the morning.

- Be prepared for the worst that Nature can deal you, then you can effectively rebuff her. Have clothing and sleeping equipment for weather extremes; insect bombs for bugs; a tent overhang to protect food from rain; weathertight tarpaulin to protect equipment while under way. In short, don't expect perpetual ideal weather conditions; you won't get them.

- Get to bed early, get up early and travel as early in the day as possible. You'll have to allow yourself 1½ hours in the morning to eat breakfast and break camp, which means crawling out of the sack almost with the sun.

And don't expect green and verdant campsites or cloistered solitude for overnight camping during the summer vacation season; you just won't find either in our parks. Most of the time you will have neighbors close by on either side of you; and the campsite is more likely to be dusty than grassy. But the people are invariably pleasant, and—once you accept the drawbacks—so is the camping. Some parks, of course, are much more beautiful than others. When you find such a spot, you'll get your greatest camping pleasure in staying over an extra day or two to enjoy the country fully without the problems of setting up and breaking camp.

Probably the greatest satisfaction of all from camping is the fact that it is peculiarly and completely a family experience. During an age when living is often geared to each member of the family going his own way, camping brings the family back together to share a common adventure. ★★★

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A HONEYCOMB

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bowl is lined
with real honey



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Pipes of imported briar \$1.50 to \$3.50

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Do it now with

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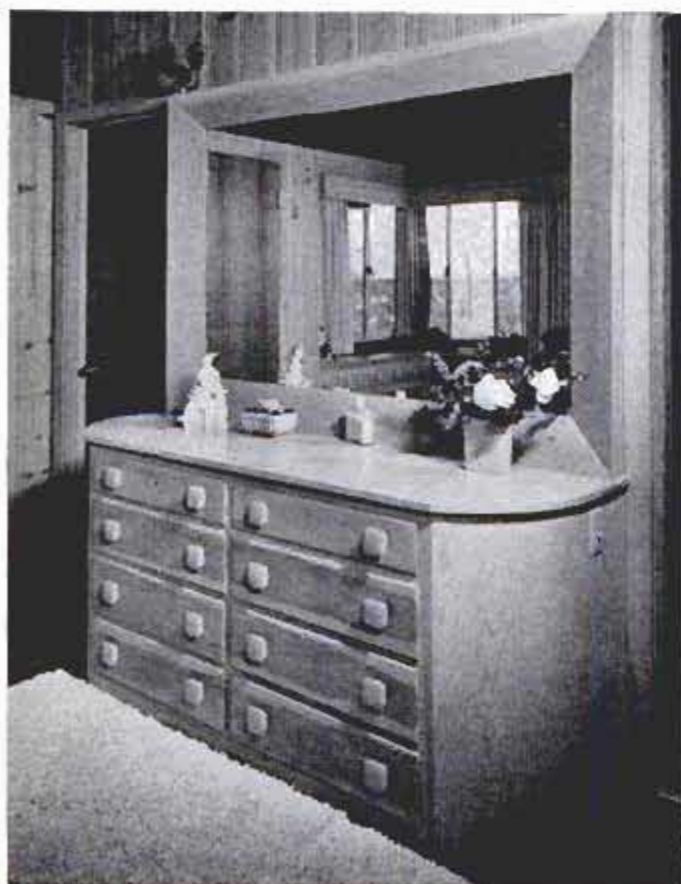
Use DAP Caulking Compound to fill cracks around windows, door frames, anywhere. Saves heat. Stops insects, drafts, rot. Fast, easy. Get tube, cartridge or can and free do-it-yourself booklet at your nearest hardware, paint or building supply dealers.

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one tool into
twenty-four
with
Black & Decker **MAGIC SWITCH
ATTACHMENTS** **24**

"Dress up" a bedroom with Western Pine Region woods



Here's a dressing table you can turn out easily and economically with Western Pine Region woods.

Straight-grained, soft-textured, they're easy to work and won't play tricks on you... you can be sure they're always thoroughly dried and seasoned. You can finish them with any stain, or paint, or wax and rub them up to a satiny, natural glow.

Which of the Western Pine Region woods should you use? Talk it over with your lumber dealer. He sells them for furniture and remodeling jobs, all kinds of projects.

FREE! 6 FINISH BOOKLETS... feature unusual **COLOR AND TEXTURE** ideas for finishing Western Pine Region woods in traditional or contemporary designs. Plus tips on installing, sanding, painting, or staining these distinctive woods. Write to **WESTERN PINE ASSOCIATION**, Dept. 305-N, Yeon Bldg., Portland 4, Oregon.

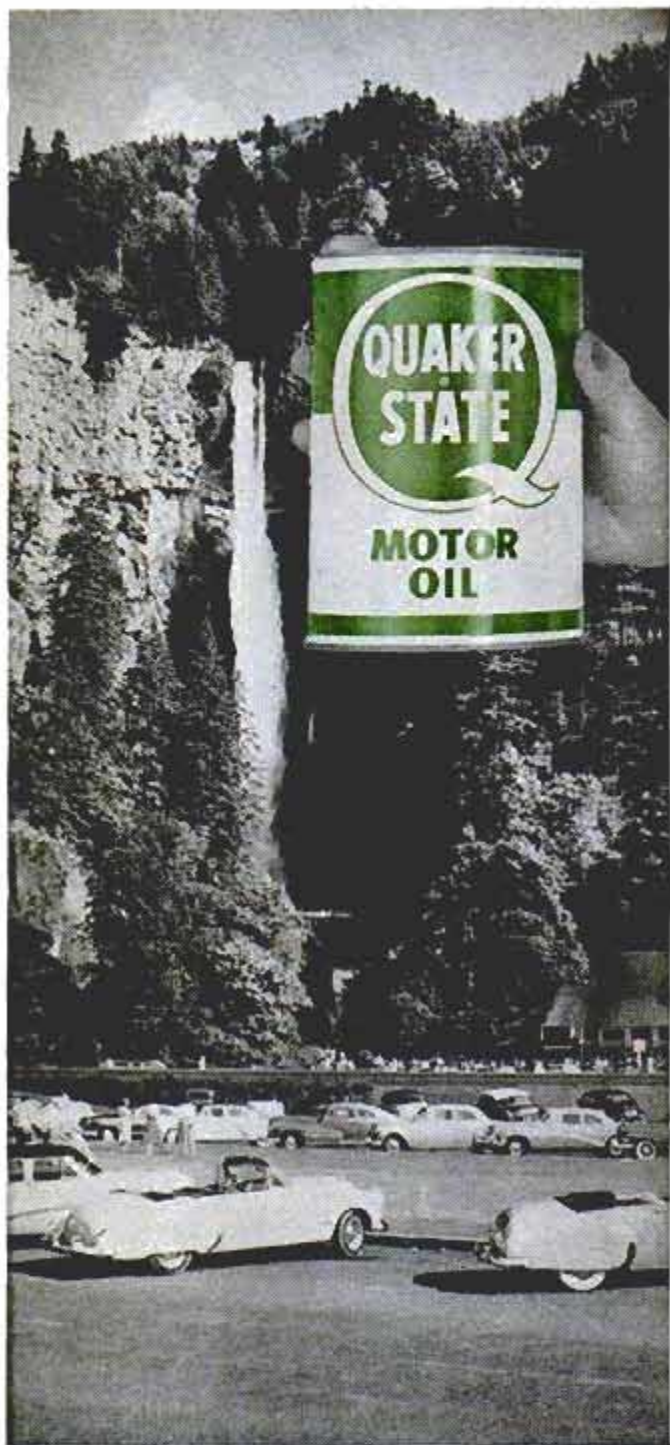


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member mills manufacture these woods to high standards of seasoning, grading and measurement
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Big news on the road today is Quaker State. It's the pure Pennsylvania oil that keeps car engines cleaner, lubricates better. And it lasts longer, giving mile after mile of *extra* driving pleasure! Wherever you drive, ask for

... it's the best motor oil

money can buy!

QUAKER STATE OIL REFINING CORPORATION, OIL CITY, PA.
Member Pennsylvania Grade Crude Oil Association

Thermistor-Controlled Temperature Relay

(Continued from page 145)

bell, and its contacts must be wired in series with the load (motor, alarm, etc.) to a separate source of power capable of supplying the load requirements.

Construction. The small Argonne relay is shipped in a plastic container which is used to house all parts of the control unit. The relay should be left in place, as shipped, while the remainder of the parts are nested around the relay and wired as illustrated in Fig. 3. The thermistor is externally mounted with its leads fastened between two hex nuts on 6-32 machine screws. Two solder lugs inserted beneath the heads of the screws, on the inside of the case, serve as tie points to connect the thermistor into the circuit.

Carefully observe the polarity of the crystal diode and electrolytic capacitor and wire these exactly as shown in the diagram. Solder the diode leads as quickly as possible to prevent damaging the unit due to excessive heat. Avoid touching the plastic case with the hot soldering iron.

All wires must be carefully placed to keep them from interfering with the operation of the relay when the case is closed. Otherwise, the placement of parts and wires is not critical.

Testing and adjustment. After all wiring has been completed and checked, the unit should be bench-tested before being permanently installed. This is done by connecting the secondary winding of the transformer and a bell (or a 6-volt pilot light) to the terminals so labeled in the various diagrams. With power applied, it should be possible to turn the alarm, or light, on and off by rotating the potentiometer knob. Carefully note the position of the potentiometer knob at the turn-on point and, with the alarm extinguished, slowly adjust control knob to a position just before the previously determined turn-on point. Hold the tip of a hot soldering iron or a burning cigarette about an inch below the black bead in the tip of the thermistor. After a few seconds, the alarm should be activated automatically.

A more precise adjustment can be obtained by taping the thermistor to a thermometer and raising the temperature at the junction of the two tips to the desired point as observed on the thermometer. The control can then be carefully adjusted to turn on the alarm at that temperature. **Caution:** The temperature of this thermistor should not be raised above that of the boiling point of water or steam

(Continued to page 226)

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Painting
is easy
for anyone!*



• Low-cost PRESSURE MAID Paint Sprayer with special spray cap for MULTI-COLOR paints is ideal for *do-it-yourself* projects. Rugged, portable, trouble-free. Complete — ready to spray. Piston-type, direct-drive, single cylinder compressor. 1/3 h.p. 110 Volt AC motor.

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In celebration of its 25th year, GOLDAK CO. introduces new transistor instruments for greater sensitivity — less weight — low cost flashlight batteries. Write for information today!

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Exclusive Double-Bearing HEAVY-DUTY PUMPS

IRRIGATE • DRAIN • CIRCULATE • SPRAY

Use 1/4 HP motor or larger . . . 1 HP for up to 7,500

GPH; 1,000 GPH 60' high; or 3,000 GPH from 25' well.

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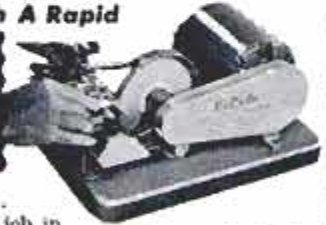


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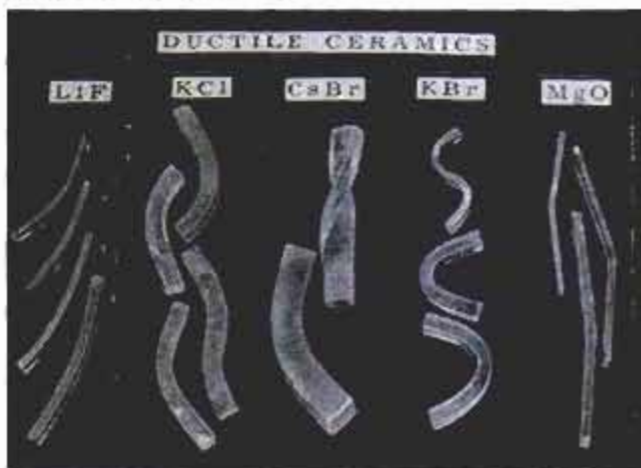
Dept. AM-68, 1840 Diversey Parkway, Chicago 14, Ill.

(approximately 212 degrees Fahrenheit).

Placement of Control Unit. Because heated air rises, the control units should be mounted near the ceiling with the thermistor uppermost. Furnace rooms, basements and kitchens are particularly hazardous spots. If control units are placed in such locations, however, they should not be mounted in places which are normally subject to large temperature variations. Obviously, locations directly above stoves, ovens or similar appliances are far from ideal. Staircase ceilings or similar projections, where hot air is likely to be trapped, are good locations, as are ventilating ducts which carry a large amount of heat in the event of fire.

Editor's Note: Thermistors are available in numerous shapes, sizes and nominal resistance values and can be used in the design of sensitive thermometers, time-delay circuits, voltage regulators, r.f. power meters and for many other applications which may be of interest to hobbyists and experimenters. A technical catalogue and data book as well as an interesting series of chapters discussing the characteristics and applications of Veco thermistors is available without charge from Victory Engineering Corp., Springfield Rd., Union, N. J.

Certain Ceramic Materials Found to be Flexible



Ceramic materials previously thought to be hopelessly brittle can now be treated so they become ductile enough to be bent by hand without cracking. The discovery may have great significance in the search for materials to withstand high-temperature requirements of rocket and jet engines. Scientists at the University of California split thin slabs from each face of a large salt crystal and found that the core could easily be bent. Using the same technique they were able to bend and twist other materials as shown in the photo above.

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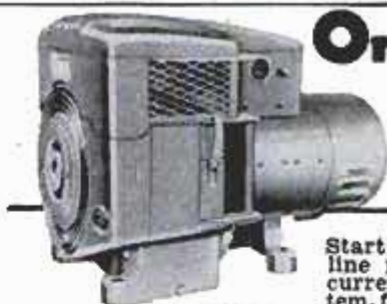


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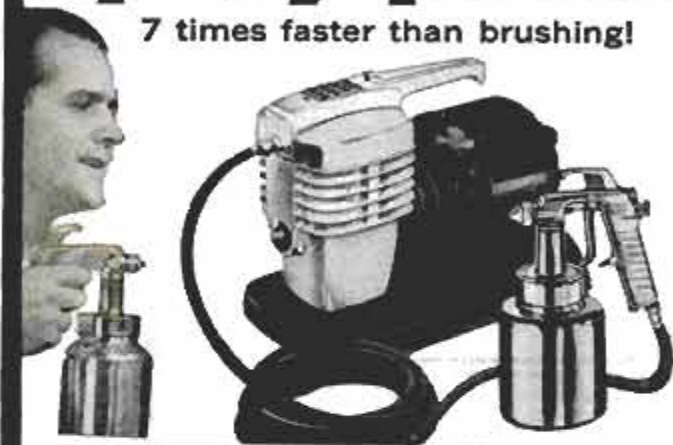
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GET ESTIMATE AT LUMBER AND BUILDING SUPPLY DEALERS

Your Snack Shop Is Going High-Hat

(Continued from page 114)

to such a varying commodity as food. The goal: To standardize a restaurant's bill-of-fare so that today's order of meatballs tastes exactly like yesterday's and that of the day before.

Explains the owner of an Atlanta quick-service eatery, "A patron ordering a chef's salad today expects it to taste exactly as it did last week. That's the secret of successful operation. Dish up something he likes, and keep dishing it up—precisely the same—day after day."

It's considerably more difficult than it sounds. But electronic gadgets have gone far to make that dream reality. Patrons' clamoring for "sameness"—and the restaurateur's quest for control over both costs and quality—fomented the "kitchen revolution."

Restaurants which once left the proportioning to hired help, the chef included, are turning toward automated cooking. And in the process, many an eatery owner—whether he bosses a drive-in or is proprietor of the swankiest steak place in town—has called in the scientist, the food engineer. Given free rein, engineers have become "kitchen-range riders," their mechanical brainstorms all but commandeering the nation's hamburger corrals.

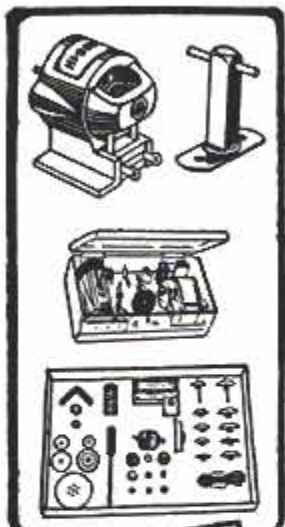
"Food service," explains Richard Kramer, a Los Angeles restaurant consultant, "has become an exact science."

Consider the milk shake. Until recently it remained one of the few delectables over which the restaurateur had but little control. A fountain man might grab up almost any size scoop (often giving you, the drinker, more ice cream than the fountain's boss could afford). Nor was there any certainty how much milk would find its way into the drink. Flavor makers, though they'd designed dispensers which delivered just enough syrup with one push of a button, had to admit that a frenzied soda jerk might push twice. Now many fountains have automated shake-making. The machine whips and freezes a pre-flavored mix, by-passes all the hand labor, serves up a ready-to-drink shake every five seconds (and in a rainbow of flavors). With electronics on the job, there's no guesswork about ingredients. What's more, that's how the customer likes his shake: As standardized as this year's Ford.

Just as foolproof is coffee making. Heart of the electronic mocha maker is a brewing chamber. Chamber loaded (with enough coffee for a dozen cups), water pre-heated to the just-right temperature is monitored

(Continued to page 230)

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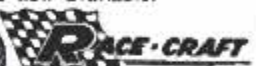
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electrically into the machine. Three-and-a-half minutes later the coffee is brewed and it begins gurgling into an awaiting Silex. Brew chamber empty, a solenoid is tripped—and cold water rinses the grounds away, cleans the filter cloth, readying things for the next brewing cycle. Some coffee machines go a step further: They grind a fresh batch of beans for each brew.

Those french fries garnishing your hamburger are just one more example of the behind-the-scenes changes which are automating our eating. There was a time when spuds were sliced by hand. Trouble was, the restaurant man never knew how many fries he'd get from the peck.

Today, your french fries—almost as precisely sized as bolts coming off an assembly line—are cut by machine. One slicer turns out 1100 pounds every hour (each the same size, shape and thickness). The pantryman drops a potato into the machine. Hydraulic pressure, electrically actuated, pushes the spud through stainless-steel cutters spinning at better than 200 revolutions per minute. Result: Fries guaranteed to fit snugly into fry-sized glassine bags, custom-tailored to your plate.

You and I profit from the restaurant's gadgetry almost as much as its owner. Infrared lamps, installed above the chef's counter, assure that food—though momentarily neglected by the waitress—stays hot. Coffee-makers, geared to automation, have taken most of the suspense out of coffee breaks (you're served a good brew every time). And you're served faster, too, what with cooking time vastly reduced by ever-hot griddles, electronic rays and infrared waves in the kitchen.

But the cost of push-button food service runs high. An electronic range may cost upwards of \$2500-\$3000. That conveyerized deep-fat fryer is tagged about \$2000. The shrimp cleaner and deveiner? It's priced at \$195—a bracket which would hardly fit your wife's budget, even if she hankers for it in the kitchen. The magnetic hot-chocolate stirrer costs \$19.95. Restaurant owners, installing their quick-order places with a kitchen-full of labor-savers, don't flinch when the bill for automation creeps above the \$50,000 mark.

Little wonder then that the average eater-outer finds himself staring in amazement at consoles of push buttons. But you're not alone in your bewilderment. Behind doors which open automatically, the chef finds himself the only thing *not* automated in the restaurant's kitchen. And like that old-timer, some of the white-hatted clan have all but concluded that it's not a cook the boss needs—but rather, an electronics engineer. ★ ★ ★

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Also see the famous ROCKET at \$5.25, with polished octagon head — the carpenters' favorite.

TRUE TEMPER

THE RIGHT TOOL FOR THE RIGHT JOB

Farm Machines Race the Population

(Continued from page 120)

too early to measure just how effective, but the comments of Dr. James E. Kraus, Dean of the University of Idaho's College of Agriculture, which has been administering the program in Ecuador, are typical.

Broiler Industry in Ecuador

"Adapting Idaho research on poultry, Ecuador has a new commercial industry in broiler production," said Dean Kraus. "Eight-week-old fryers are finding a steady market."

"Almost a 'coals to Newcastle' incident was observed in the extensive potato fertilizer and variety trials Dr. George Woodbury, head of horticulture at Idaho and leader of the Ecuador unit, has instituted near Quito. His trials are near the area where the potato originated. Yet research results from Idaho show great promise of helping get more and better potatoes in that country."

And how is all this world agricultural development affecting this country?

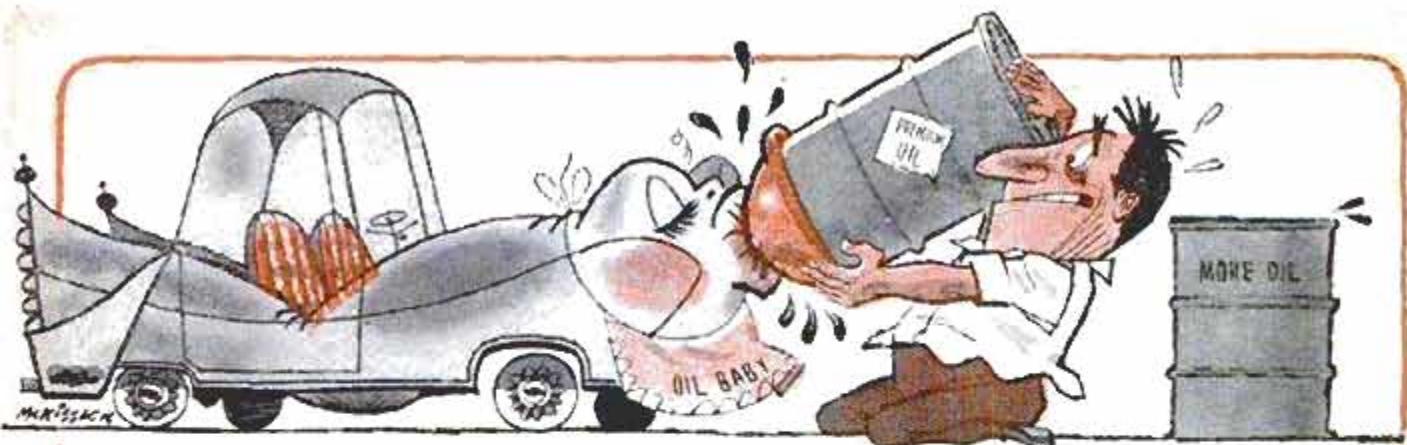
Well, just remember that the world's agricultural output has not yet caught up with the increase in population. Through world political developments, our customers have changed, but we have more of them — and our surpluses have been shrinking.

Even though you can find modern farm equipment operating today in darkest Africa, it will be a long time before agriculture throughout the world reaches the point of mechanical intensification and efficiency in the United States. It will be a long time before you will see a scene beyond our borders such as the one we witnessed the other day in Oregon.

Our car was stopped at a highway rail crossing, and we sat and sat as 90 flatcars passed before us. Each car was loaded with three combines, making the total 270. All were headed for the same destination—the town of Pendleton—to be fanned out from there to regional farming areas. ★ ★ ★

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Think Fast!

(Continued from page 69)

into catastrophe. Who does not recall the disastrous Coconut Grove fire in Boston? It was panic, more than anything else, which claimed 491 lives.

And yet there were survivors. They were those who kept their heads and thus saved their own lives and the lives of others. There was the chorus boy, for example, who instantly realized that the safest place in the fire-swept nightclub would be the refrigerator room downstairs. He led 12 patrons there and bolted the door. The group remained in the well-insulated room until the fire was extinguished.

Panic is a mass killer. But, according to Dr. Walter Cutter of New York University, a noted authority on the subject, it can be prevented. From his careful analysis of panics throughout the world, Dr. Cutter has evolved four principles which everyone but a confirmed hermit should keep in mind when they step out for an evening:

Leadership. In every panic, one person must take command. Always there is one "opportune moment" which, if seized and sensibly acted upon, can stop a panic before it gets rolling.

Distraction. The group's mind must be taken off the panic element. This might be achieved in a theater stampede, for example, by playing "stand by" music. Music can have a calming effect on a brain which is on the verge of snapping its mainspring. In a darkened room, panic might be averted by turning on the lights to show the crowd that everything is under control. Imagination develops enormously in the dark, and feeds on fear of the unknown and unseen.

Normalcy. Something should be done that invokes a normal response. In large groups of people, there is an unfortunate tendency of the law of the jungle to prevail. Men and women may turn against each other and resort to violent means to escape. But in union there is strength—and safety. To achieve that union a bond must be established immediately. A classic example is to play the "Star-Spangled Banner."

Removal of hysterical persons. Under conditions of panic, certain individuals become temporarily crazed through fear. Individual hysteria can suddenly become magnified a thousand times. All that is needed to trigger that panic is one woman's hysterical scream or a man's thoughtless outburst. Such persons must be removed quickly, before the panic spreads. If they will not go willingly, a hard punch to the jaw—male or female—is justifiable.

(Continued to page 236)

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For six months this year, through October, we're mailing checks *every month* for \$200, \$100 and \$50 to those folks sending in the longest, practical lists of uses for Vise-Grip. (And the winners' favorite tool dealers win the same amount!)

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NOTE: Decision of judge is final. Winners announced on request. All entries become property of Petersen Mfg. Co., Inc. In event of tie, full amount of prize fund will be awarded each tying contestant. This contest open only to residents of U.S.A. and territorial possessions. Subject to federal, state and local regulations.

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No human activity is more prone to sudden crises than driving. Most motorists meet and overcome them every day. But some do not, and these are the ones you read about in your newspaper. Here are four of the most common crises you are liable to encounter behind the wheel and the "prepared decisions" that go with them.

1. When skidding on a curve, your natural reaction is to slam on the brakes and turn your wheel in the opposite direction. Don't! Instead, train yourself against this reaction. What you *should* do is leave your clutch engaged and steer in the direction of the skid.

2. If a car approaches you on a two-lane road, and a reckless driver behind is trying to pass you, you have two crucial choices. One involves slowing down; the other, speeding up. If you are certain the driver behind is going to pass, slow down and give him the chance. But if he hasn't drawn abreast, and the opposite car is coming fast, your safest move is to put on speed.

3. If your brakes fail on a hill and you lose control of the car, apply the hand brake, shift to second gear and steer to the side of the road.

4. Your car starts to slide on an icy hill. What to do? Instead of slamming on the brakes, pump them with slight pressure and shift to second. If possible, leave the clutch engaged and steer to the side of the road. This action should prevent the slide from developing into a dangerous skid.

Lessons From Fires

One of the most terrible catastrophes ever likely to confront us is, also, unfortunately, one of the most common—fire. More than in any other crisis, your psychological preparedness can spell the difference between life and death. As a tragic case in point, consider two "classic" fires which occurred a few weeks apart.

On December 7, 1946, the Winecoff Hotel in Atlanta, Ga., was swept by fire. Most of the men and women involved made the wrong moves. As a result, 119 of them perished.

Six weeks later fire struck at the Terre Haute House in Terre Haute, Ind. But here, the men and women involved made the right moves. The reason was that the Winecoff Hotel disaster was still fresh in the minds of people all over the country. They had been shocked into a psychological state of preparedness.

When the fire was discovered, the telephone operator immediately notified the Terre Haute fire department. Next she woke the guests. There was no panic. No

(Continued to page 242)

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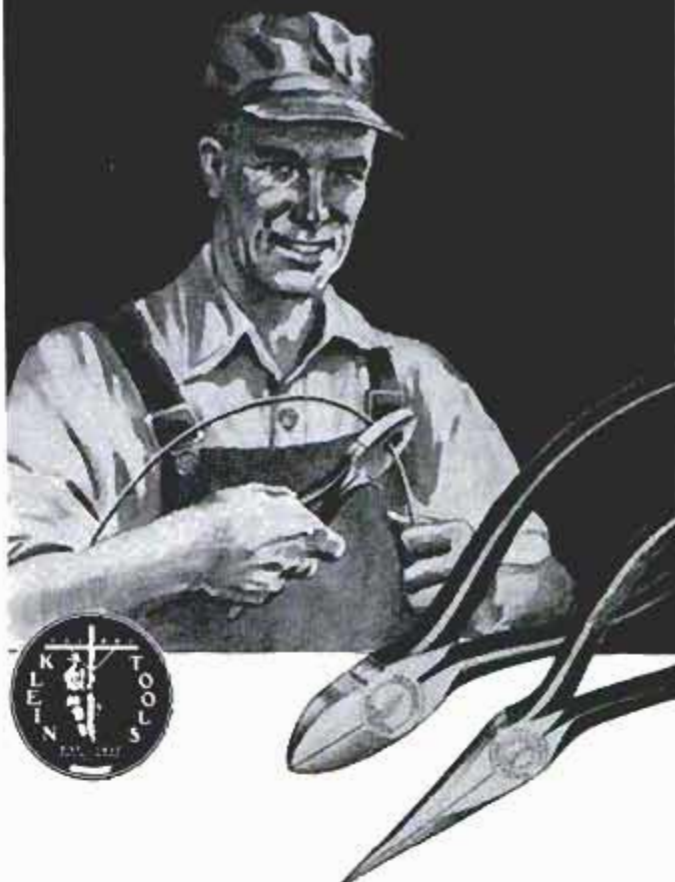
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Owners Report

(Continued from page 127)

"Engine pings on top-octane gasoline. Proper fuel needed is about 102 octane and it is not available out here."—California oil-company executive.

"When they painted the car, they left the chrome on. Paint is over parts of the trim."—Utah cook.

"My worst complaint is that the chrome around the tail-lights and fins is cast white metal and does not hold up. My car is only three months old and that part of the trim looks terrible."—Wisconsin salesman.

"Entirely too much chrome trim. Some of it could have been placed so that door scratches from car parked next to you would be prevented."—Illinois analyst.

"Price too high. Cost up 25 percent in four years. Will probably make me shift to a smaller inexpensive car under \$2000."—Massachusetts businessman.

"Trunk too small. Hump over axle not long enough to lay suitcase down nor low enough so you can stand one up on it."—California salesman.

"People sitting in the back seat of this four-door hardtop do not get a good view out the side windows."—Massachusetts accountant.

"I have only one complaint. I do not like the elimination of the horn ring and the use of horn buttons on the steering-wheel bars."—Illinois truck-line owner.

"Not enough headroom in back of this 98 sedan for a tall man to sit comfortably."—Rhode Island farmer.

"Would rather have needle gauges than lights for the heat, generator and oil."—Pennsylvania steelworker.

"Windshield wipers do not cover the correct amount of surface, especially on the driver's side. Car tends to bottom with weight in trunk or with two persons in back seat."—California serviceman.

"Clock does not keep correct time. Had it fixed and still doesn't."—Florida welder.

Miscellaneous Comments

There are always some interesting comments by owners that, while they do not represent the opinion of a sizable group, are interesting nonetheless. Here are some:

"I think perhaps we bought beyond our means, but we wanted everything on this Olds 88. We got all but air suspension, a clock and maybe something else that was on the list. We want all these luxuries, but we really can't afford them."—Illinois designer.

"Car was delivered with a single horn. I wrote to Oldsmobile complaining about a single horn being issued as standard equipment on a \$4000 car. Such a horn is 'tinny' and detracts from the luxury of the car. Dual horn is \$10.75 extra. They replied they were sorry. I later learned they are including dual horns as standard on later 88s, but it is not retroactive. I am well pleased with the car, but am still sore about the horn."—New York lawyer.

"I don't care which dealer I buy my car from (and I have had a '53, '55, '56, '57 and now this '58 Olds) because my experience has been the same each year. After you have bought the car you're a forgotten man unless you need service they can make money on."—Ohio steelworker.

"It took three trips to the dealer to eliminate wind noise, but the body is now quiet."—Tennessee owner.

(Continued to page 240)

He's going to have trouble finding a new car for under \$2000 today.



See photograph on page 127. The trunk is big, but the floor topography is so broken up that there's less room for suitcases than you might expect.



Kelly and Railton also prefer needles to lights, but if we must have lights, the Olds arrangement is best.



By this time owners should realize that an auto clock is a decoration, not a timepiece.



Here, in a sentence, is the dilemma of the industry. People want (and buy) big, deluxe cars, but can they afford them? It is beginning to look like they can't.



Buyers blame dealers for the troubles, dealers blame the factory workers. Who is to blame? It's impossible to say. The fact is that you can't make drastic design changes each year without introducing production "bugs."



IS AN ENGINE OIL SUPPLEMENT REALLY IMPORTANT?

What's the reason for using a good engine oil supplement, or engine oil concentrate? And exactly what do these products do?

All automobile engines develop corrosive acids, rust-producing fluids and gummy deposits as a natural result of combustion.

Under ideal driving conditions, your car's engine is able to combat these destructive by-products as they are formed. But to insure the job is done most effectively under all driving conditions, Chrysler Corporation Engineers have developed MoPar Engine Oil Supplement (replaces 1 quart of oil at the time of oil change) and MoPar Engine Oil Concentrate (added to your crankcase *between* oil changes). These products: (1) retard rust by chemically neutralizing corrosive acids, (2) coat metal surfaces with a protective oil film that clings even after engine oil has stopped circulating, (3) provide added protection against rapid wear of valve tappets, (4) inhibit formation of sludge formed by oil oxidation and (5) help keep hydraulic valve lifters, piston rings, valve stems and guides free from harmful deposits.

The result is a measurable improvement in power and pickup. You'll *feel* your engine running quieter and smoother—longer.



And for a good all-round engine clean-up, use MoPar Carburetor and Upper Cylinder Cleaner. Poured directly into the carburetor throat, it chemically removes deposits blocking the fuel system, frees sticking valves and sluggish rings, and leaves a lasting protective film on all upper engine moving parts.

To get the *most* out of your car, you won't want to overlook any of these benefits. And you won't want to overlook the big benefit you *always* get from MoPar—highest quality.

MoPar means genuine *Chrysler Corporation* products, made to Chrysler's uncompromising standards.

MoPar products are available at all Plymouth, Dodge, De Soto, Chrysler or Imperial dealers—and leading independent repair shops.



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Other comments on PM test car: Defroster excellent with lots of air movement. Hydra-Matic shifts smoothly, up and down, but not, of course, as smoothly as a torque converter. Lever control for transmission still seems best to this driver, much more convenient than push buttons. Front suspension noisy on sharp bumps. Windows hard to wind. Over-all a well-balanced, agile car that "senses" smaller than it is, a pleasant and desirable characteristic.

"They should compel designers to pay more attention to public opinion. I hope you forward your findings to the man in charge of design so people over five feet tall can once again get in and out conveniently."—Illinois minister.

"I can't understand why American manufacturers have allowed the foreign cars to get such a firm foothold here. All we have to do is meet their economical fuel consumption."—California businessman.

"The public is buying foreign-made glorified scooters for one reason only: Gasoline economy. They couldn't possibly be buying them for looks, comfort or proven ability. I think the smart boys are killing the well-known goose. Anytime anyone wants more taxes the first thing is add another penny to gasoline tax. There is a rebellion in the making right now."—Alabama accountant.

"Very nearly bought a foreign car but the style of the 1958 Olds swayed me."—New York factory worker.

"Service the automobiles at the factory. The class of mechanics in a dealer's place of business today is of low mentality for such a complex car. They can't even adjust windows."—New York sales manager.

"Increase gas mileage. That expense eats a person up on a long trip."—Illinois waitress.

"Improve the windshield-wiper operation. I don't think they clean a large enough area in the corners."—Wisconsin service representative.

"Make the cars a little easier to get in and out of."—Texas mechanic.

For an engineering analysis of the Dynamic 88 with its economy carburetor and rear axle, turn back to Dale Kelly's report on page 126.



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Great for tree, termite, airbrush & paint spraying; filling tires, aquariums, etc. Dual & remote control electric receptacles, 115v 60 cycle AC, heavy duty HP. Westinghouse Motor. Direct drive. Water & explosion-proof. Built-in air filter, adjustable pressure setting up to 47 lbs. 3 cu. ft. per min. Self-contained switch. Mounting brackets. These units made under license of Sperry Gyroscopic Co. Wt. 66 lbs. gross. Approx. GOVT. COST \$585. Like NEW. \$21.95.

With portable steel hand cart (shown), rubber wheels, specially constructed for mounting this unit. Incl. 25' rubber air hose, 6' extension cord with plug & fittings. Wt. 76 lbs. Complete with cart—\$26.95. With new internal-pressure spray gun with 3 adjustable spray tips, 1 qt. cap. \$38.95 complete.

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Build your own complete make-up package incl. 1 Aircraft DC Gen. 200 Amps. 24 V; Rheostat, Toggle Switch, 1 Ammeter. Electrode Holder, Welder's Shield, 30' New Welding Cable, Voltage Rez, Simple instruction wiring diagram. Wt. under 100 lbs. Approx GOVT. COST \$475. All units guaranteed pre-tested, \$20.00.

R1 GENERATOR KIT Jack & Heintz or GE. Rated 300 Amps. 24-32 V. With same items as above. Approx. GOVT. COST \$800. Complete 60 lb. kit—\$38.00.

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one opened their doors, which would have sucked flame into the rooms and created drafts to draw the fire throughout the building. They remained in their rooms, put wet sheets at door cracks to keep out smoke, opened windows to get as much air as possible and stood by them awaiting rescue. As a result of their psychological preparedness, not one guest was injured.

Things to remember in case of fire:

If the blaze is a very small one, call the fire department; then see what you can do about putting it out yourself.

If it is obviously too big for you to handle, get everyone out of the house.

Simple Ways to Stay Alive

If you're trapped in the house, stay put in your room. Keep the door closed and, if possible, place wet sheets at the cracks. A closed door can usually keep out a fire for over 20 minutes. Open the windows for air and wait at the window until help arrives. Don't become hysterical and jump until a net or other equipment has been set up. Not much to have to remember, yet it could save your life!

These are only a very few of the literally hundreds of crises likely to confront us at some time or other. How can you best prepare yourself to meet unexpected emergencies? Dr. Stack has this to say: "Emotional stability is the greatest single factor in meeting and successfully coping with any crisis, major or minor. The emotionally stable person will always be better able to face an emergency than the unstable individual. The best-equipped person is one who has learned to control his or her emotions. Unfortunately, this cannot be learned overnight. It takes time and long training."

Rule Number One

Control of emotions may take time and concerted effort, but it is a worthy goal, for you can think logically only if you first learn emotion control. So Rule Number One for quick thinking means remain calm, no matter what. If you are injured and allow fear to get the best of you, the pain you already feel will gradually intensify, and your awareness of the pain will keep you from thinking a way out of your predicament. Take the recent case of Charles Williams, an Australian cattleman.

Williams was sitting by a campfire on a ranch when a snake suddenly appeared and struck him. It was a deadly tiger snake whose bite meant certain death within minutes—unless something was done quickly. As soon as he felt himself struck, Williams leaped to his feet and staggered back. He had no knife to cut open the

wound, and he was alone. Panic uncoiled and squeezed at his brain.

Shoots Self to Save Life!

As quickly as it had come, the momentary grip of panic was replaced with a feeling of calm. "Easy, boy," Williams cautioned himself, "don't panic or you're done. There's got to be a way out of this."

There was. His rifle. Swiftly loading it, the cattleman placed the muzzle of the weapon against the bite and pulled the trigger!

Other cattlemen heard the shot and rode over to investigate. They got the wounded man on a horse and took him 10 miles to medical aid. Physicians said Williams' drastic action in shooting himself had undoubtedly saved his life. Quick thinking and a refusal to be panicked by pain had saved his life.

Bucket Ride to Safety

Ten men who are alive today owe their happy state to a man who thought quickly and acted the same way. One spring day, 44-year-old Francis X. Gray, a crane operator was hauling concrete up to construction workers on a new apartment-house skeleton in Brooklyn, N. Y., when fire broke out in the wooden concrete forms.

Flames quickly raced up to several drums of highly volatile propane gas stored just below a crew of workers on the 13th floor. Those men were as good as dead unless somebody did something and did it fast. Gray was that man.

Quickly dumping the concrete from his bucket, Gray ran the huge, 165-foot boom up to the 13th floor, neatly nudged the huge bucket against the frame and got all 10 men down safely. And not a second too soon, for the burning wooden framework and forms collapsed, dropping the floor on which the men had been standing. But there was no one left to get hurt—thanks to the quick thinking and fast acting of Francis Gray who chalked up what is one of the strangest rescues on record!

Think Fast—and Live!

Psychiatrists agree that any person with average intelligence can learn to be mentally fast on his feet. And quick thinking, as any day's perusal of your newspaper will attest, pays off in more ways than one. Naturally, its most rewarding feature is the ability to think your way out of a jam in a hurry. But it can also enable you to save more lives than your own. Just remember: In time of crisis, slow thinkers die fast. Don't you be one of them. Think fast—and live!

★ ★ ★

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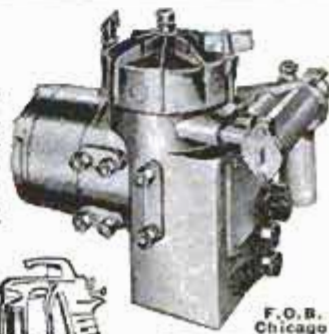


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Do You Know This Old-Timer?

(Answer to quiz, page 12)



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East Springfield Mill &
Lbr. Co.
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& Sup.
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Eaton Rapids
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Garden City
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Neals Paint & Hdw.
Grand Haven
Hoeker Hdw.
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Bergman Lbr.
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Bruninks Hdw.
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Highland Hdw.
Huizinga Hdw.
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Leo's Hdw.
North Park Hdw.
Page Hdw.
Bert Ross Hdw.
Thompson Hdw.
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Grant
Saur Hdw.
Molland
T. Keppels' Sons
Sneller's Hdw.
Howard City
Johnson's Hdw.
Mudson
De Merrit Hdw.
Inkster
Inkster Lbr. Co.
Kalamazoo
Emerson App. & Hdw.
J. R. Mouse Hdw.
South Side Lbr. Co.
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Lansing
Lickfelt Hdw. Co.
Valley Farms Lbr. Co.

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Montague
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North Muskegon
Northshore Hdw.
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Otsego
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Petersburg
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Spring Lake
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Helmus Hdw.
Jack's Handy Store
H. Jacobson Hdw.
J & M Hdw.
Kingston Hdw.
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Utica Hdw.
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Equipment Co.
Farr Brothers Hdw.

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Hdw. Co.
Snow's and Son Corp.

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Canivan Bros. Hdw.

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Clinton Hdw.
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Halleron's Hdw.
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Baxter's Hdw.
Mineola
Jack's Hdw. Co.
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Litehouse Bldrs. Sup. Inc.

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Bldg. Co.

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Pontiac

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Rumford Hdw.

Valley Falls

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Redmond

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Snohomish
Snohomish Hdw. Co. Inc.

WISCONSIN

Adell

Huibregtse Hdw.

Allenton

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Fraser Lbr. Co.
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Belgium Coal & Lbr.
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Beloit

Badger Paint Store
Dallman Hdw.

Brodhead

Coast To Coast Hdw.
Dederick Hdw.
Pierce Hdw.
Roderick Lbr. Co.

Burlington

Dardis Lbr. Co.
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Lbr. Co.

Cedar Grove

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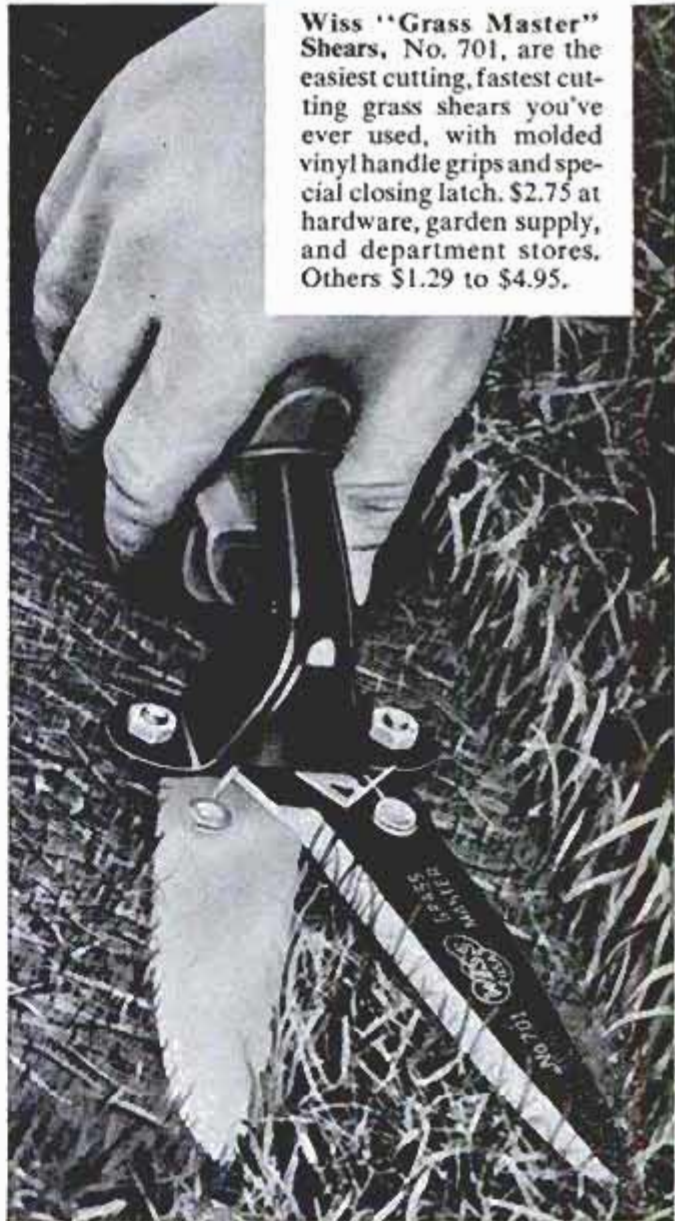
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World's Largest Manufacturer of Shears, Scissors, Pinking Shears, Skalloping Shears, Metal Cutting Snips and Garden Shears

CUT ANY SIZE - ANY SHAPE WITH Spearhead Cutter

Handy pocket size - cuts leather, asbestos, rubber, cork, etc. - round 1/4" to 5" - any size straight and odd shapes.

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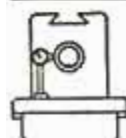
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What's It Like to Live in a Vacuum?

(Continued from page 83)

the plane leveling off between dives. The X-15 may even be fitted with a small nose rocket to help slow the plane with its reverse thrust. The object of all this is to return to earth without building up excessive heat from friction with the atmosphere. Even at best, skin temperatures of the plane may approach 1000 degrees, though this extreme heat won't penetrate to the pilot.

Emergency Landing Fields

The X-15 will be flown over a course extending from Edwards Air Force Base near Los Angeles to Wendover Air Force Base on the salt flats west of Salt Lake City. This 500-mile range was selected because of the number of dry lake beds that occur along it. Any of these could serve as an emergency landing field for the plane, which will be equipped with landing skids instead of wheels.

Each flight of the X-15 will involve some 2500 technicians, including the radar, telemetering and photographic crews stationed at intermediate sites along the range.

As originally planned, the X-15 program was to be a leisurely, step-by-step investigation of conditions and hazards at the edge of space. It was to be spread over several years and was to culminate, ultimately, in placing an inhabited, winged satellite in orbit. Today there are indications that parts of this program may be telescoped. An effort may be made in the next 6 to 12 months to shoot a modified X-15 out into space. This would be done by attaching the plane to the side of a large rocket similar to the way the unmanned X-10 Navaho was attached to a rocket booster for achieving supersonic speed.

Big Rocket Drops Away

The big rocket would drop away when its fuel was expended, then the pilot of the X-15 would turn on his own rocket motors to accelerate to orbital speed. The plane would be a true satellite for at least a few orbits around the earth after which the pilot would cautiously bring it back down through the atmosphere again. A different idea in the race for space is to build an inhabited nose cone for a big rocket and use a number of ICBM boosters as the first stage. The nose capsule and its auxiliary equipment would weigh about 2500 pounds and would use parachutes instead of wings for returning down through the atmosphere after a number of orbits.

Whether or not either of these crash

(Continued to page 254)

BUILD WELDER OR LIGHT PLANT **General** SALE

Q-1 160-250 amp, 30V, New \$15.50 used \$9.95
G.E. 200 amp., 30V. Good cond. \$15.50
R-1 J. & Heints, G.E. or Ford 300 amps \$18.95

V-BELT PULLEY KIT. Fits R-1, P-1, G-1 & AC-DC generators; has 2 ball bearing blocks with high speed bearings, three groove V-pulley, Dr. shaft 8" long & flex coupling \$17.50

AC-DC WELDER KIT #511 G.E. Generators
 Makes A.C. light plant & D.C. welder & battery charger, 1250 Watts A.C., & 200 Amps. 30V. D.C. incl., 1 volt reg., 1 R.C. relay, 1 R.P.M. Indicator, 1 electrode holder, 1 switch, 1 helmet, 1 rheostat & instr. \$38.95.

Kit with above R-1 J & Heints or G.E. 300 amp. gen. \$37.50. Kit with new 160-250 amp. \$25.50. Kit with G.E. 200 amp. gen. \$29.50.

New Reactor Coil Arc Stabilizer with #4 S. Copper wire, for R-1, P-1, G-1 & AC-DC, gen. 7"x5"x4" wt. 11 lbs. \$10.95.

New Throttle Control Solenoid & Idling Device for all welder engine control, 1" travel, shaft is 6" long, threaded end #8C-11 wt. 4 lbs. \$8.95.

NEW HYDRAULIC POWER KIT Your complete hydraulic system consists of Peaco gear driven pump, 980 G.P.H. 1000 P.S.I. with 3/4 HP. DC motor 2300 R.P.M., relief valve, unloading valve, filter, Bendix 5" accumulator, 2 gal. Reservoir, hose & fittings. Complete \$37.50 kit minus motor \$29.50.

HYDRAULIC LIFT KIT New Weaver hyd. hand pump with relief 2000 P.S.I. 1 D.A. cylinder 2"x9" stroke, 1 four-way c. valve, filter, tank, hose & fittings \$27.50. (WEAVER HAND PUMP ONLY \$12.95.)

GEAR REDUCTION MOTOR BARGAIN 42:1 ratio, reversible 24V. D.C. 200 RPM, runs on 6- or 12V D.C. & Appl. for 110V/A.C. \$4.89, 2/\$8.95.

ROMEC HYD. PUMP & Motor. Positive displacement, 900 G.P.H., 28 H.P. 2500 RPM for 12- or 24V. D.C. 3/4" ports. New \$8.95.

NEW Four Way Open Center Control Valve with built in adj. relief for 1 to 4 D.A. cylinders. 3/4" ports #10060 \$14.50. #4811 four way with 2 handles for 1 S.A. cylinder. New \$8.95

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#11 1 1/2"	6"	3/8"	\$6.50
#512 2 1/2"	4"	3/8"	\$8.50
#24 3 1/2"	2 3/4"	1 1/4"	\$29.50
#511 3 1/2"	2 1/4"	1 1/4"	\$24.50
#111 3"	2 1/4"	1-3/16"	\$27.95

NEW HYDRAULIC SYSTEM KIT
 #400 K. Heavy duty Power Driven. Rated 14,000 lbs. lift. Consists of 2 D.A. hyd. cylinders, 3" bore x 2 1/2" stroke, each rated 7000 lbs. with 1000 P.S.I., 1 four way hyd. control valve with built in relief #821, 1 Vickers hyd. pump, 400 G.P.H., 1500 P.S.I., 3750 RPM, 1 hyd. 2 gal. reservoir, 1 Purolator hyd. filter, 1 gauge 0-2000 P.S.I. all hose, & fittings. Value \$184.10, save \$90.00. Kit price \$94.10. Kit with two #511 cyl. \$79.95.

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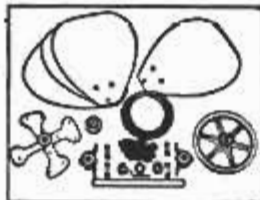
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programs is carried out, the original investigations planned for the X-15 type of aircraft will still be conducted. Under consideration, too, are still other types of vehicles. One that is being studied is a "boost glide" aircraft that would climb to 100 miles or so under rocket power, glide until some of its momentum is lost, then turn on its rocket power again for another burst of speed. Each boost would keep it aloft for additional time.

Another intriguing idea is to use the ricochet principle. This calls for bouncing an aircraft off the upper limits of the atmosphere in much the same way that a flat stone is skipped across water. The thought of bouncing an aircraft off thin air may seem incredible, but scientists say there are good possibilities that it can be done at the speeds that are contemplated.

Project Dyna-Soar

Out of these experiments will come the final design for Project Dyna-Soar, the Air Force plan for a manned orbital glide vehicle that could be used for international surveillance on a regular daily or weekly schedule.

Out of these experiments, too, will come the answers to many of the problems that face designers today. If re-entry heating is too severe, would ceramic leading edges be better than metal? Or, should very thick leading edges of metal be used as a "heat sink" to prevent the heat from seeping inward to the pilot?

Should the cockpit be double-walled as a protection against meteorites? If a typical windshield is impractical, what kind of transparent viewing port is best? On orbital flights lasting days or weeks, what kinds of exercise are best for the pilot? And what about food and sanitation? What can be done to alleviate the extreme feeling of loneliness that research pilots already have reported when flying high above the earth?

A Cure for Loneliness?

Fortunately, not all the answers need to be sought in the sky itself. Many studies can be conducted at ground level. At Randolph Air Force Base, San Antonio, Tex., for instance, a young airman recently spent seven long days in a metal chamber that simulated many of the conditions of a space capsule. During the week he remained in a sitting position under a pressure of only half an atmosphere, unable to see or hear anything of the outside world except for messages on a radarscope such as a spaceman might receive during a round trip to the moon. Although the real

(Continued to page 256)



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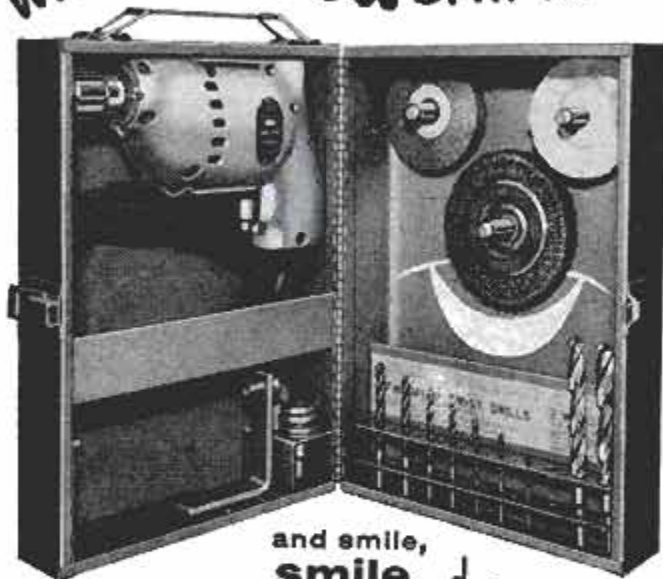
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loneliness and uncertainties of an actual space flight could not be simulated, the test nevertheless proved that a pilot is physically competent for space journeys.

Answers to some of the other questions are being sought in a large steel room in Beverly Hills, Calif.

Feather Bounces From Floor

In this room a feather bounces from the floor if it is dropped. Tied to the end of a string, the feather swings back and forth almost as if it were a pendulum. Here, too, an ordinary vacuum tube continues to function even when its protective glass case is removed. A set of steel gears, ground to utmost smoothness, feels surprisingly rough when rotated.

The reason for these effects is that the room is actually a huge vacuum chamber. Powerful pumps have removed all except one in every 18,000 molecules of air.

The feather bounces because it is in a vacuum. There is no air to cushion its fall. Similarly, the gear train is rough because the usual layers of air on the contact surfaces aren't present.

Called an inhabited high-vacuum laboratory, the big cylindrical chamber is used by Litton Industries in special studies of what happens to man and his equipment in the outer fringes of the atmosphere.

At the same time that scientists are finding the answers to the immediate problems of space flight, they are beginning to consider other problems that will need to be solved later. One of the unknowns in interplanetary travel, they say, is the true distance to other planets.

One way to plot these distances precisely, they say, would be with the help of an artificial comet that would be sent hurtling around the sun in an elongated ellipse. Instead of a fireball with a glowing tail, the comet could be a plastic balloon 300 feet in diameter and equipped with a solar-powered transponder that would emit a radio signal when triggered from earth. A radar plot of its journey, plus other information, could be the basis for an accurate table of distances for the whole solar system.

Looking even farther into the future, scientists are beginning to wonder what will happen when man learns to travel at almost the speed of light. If he travels away from the sun at such a speed, will the sun become dim or even dark? Or, going toward the sun, will visible sunlight be converted into invisible X rays because of the Doppler effect? And what happens if you cut across sunlight at almost its own speed? These are serious questions. Someday mankind may have to answer them. ★ ★ ★

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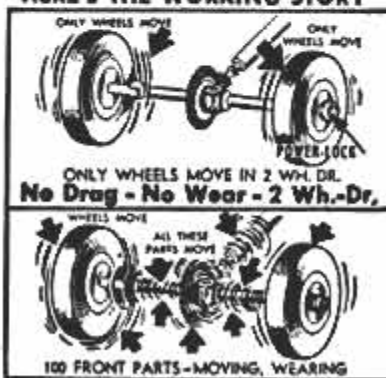
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EVANS, Elizabeth, N. J.

Jet "Donkeys" for the Jets

(Continued from page 75)

canted cowls to deflect the jet blast from the planes they push.

As planes become faster, so will the jet cars. Boosting the vehicles to supersonic velocities is feasible, says Terry, if guide rail slippers are used instead of wheels. What will these super jet buggies look like? One concept, shown in this article, envisions a bullet-shaped machine with four turbojet stacks jutting from its rear. Riding steel rails on skids, it would move down the track at the speed of sound—or faster—to shove a dead load or launch an aircraft.

One jet car at Lakehurst will carry a passenger—"for evaluation of human tolerance of acceleration in special cases of launching and arresting," says Terry. Reason for this is that today's carrier pilots, during the two seconds it takes them to be catapulted from a carrier deck, are subjected to forces five times the force of gravity. Some of them may undergo momentary blackout. By sending them down a 7000-foot runway in a constantly accelerating jet car, experts can get a good 15-second look at what happens to a human under such conditions. If pilots do indicate signs of blackout, devices may be installed on all carrier-based planes to fly them automatically for a moment or two after launching.

Up until now, aircraft designers have been under the severe handicap of giving their planes enough tolerance so that they could land and take off at reasonably slow, safe speeds. Clumsy high-lift features have had to be part of the plane—limiting the altitude and speed at which it could fly without coming apart. If things like the jet cars, flying jet "booster" planes and new arresting gear prove practical, you may see rocketlike aircraft with tiny, paper-thin wings that can zoom at fantastic speeds along the edges of space. ★ ★ ★

Speeds of Spaceships May Top 2,000,000 M.P.H.

Spaceships may travel faster than 2,000,000 miles per hour. This prediction was made by Dr. Winston H. Bostick of Stevens Institute of Technology, Hoboken, N. J. He explained that Western and Russian scientists have accelerated ionized gas to speeds of more than 300,000 miles per hour. If the mechanism producing these speeds for ionized gases is thought of as a propulsion motor for spaceships, said Dr. Bostick, speeds of more than 2,000,000 miles per hour are possible.

JET STEAM MASTER

Now, a super efficient portable steam generator that produces live steam at 100 lbs. pressure in 60 seconds from a cold start! Produces large volume of high pressure steam on 2 pints of fuel oil. Instantly cleans sticky grease, dirt, rust, old paint, etc. off implements and road machinery. Pays for itself in a few weeks. Sterilizes soil. Sterilizes as it cleans—milk equipment, etc. Fully automatic—oil fired with new, built-in lifetime bronze water circulating pump. Draws water from faucet or bucket. Simple and safe anyone can use. **Item 463.** Complete with 12 ft. of hi-pressure steam hose and new triple efficiency steam gun that automatically mixes in soap solution if desired. Wt. 250 lbs. Item 463. **\$349.50** Special factory price.



RUBBER HOSE

Genuine Neoprene Hogg—ordinary rubber 3 to 1. Reinforced with super tough cotton cord plies—yet completely flexible. Equipped with standard thread male and female fittings. Pump water for irrigation, stock tanks, home, barn, fire fighting, etc.—or pump gas and fuel oil. Volume factory prices—save more than 60%.



TERRIFIC VALUES!

Size	Price	Size	Price
1"x10'	5.95	1 1/2"x50'	29.50
1 1/4"x10'	7.95	2"x10'	16.50
1 1/4"x20'	10.95	2"x10'	9.50*
1 1/4"x30'	13.95	2"x14'	21.50
1 1/2"x30'	24.95	2"x50'	27.50
1 1/2"x100'	45.95	2 1/4"x10'	21.75
1 1/2"x10'	10.95	2 1/4"x15'	25.00
1 1/2"x25'	14.75	3"x10'	25.50*

*—Discharge Hose.

Double Acting Hydraulic Cylinder



A powerful cylinder mfr'd. by Massey Harris which develops both a pushing and a pulling action. Will push 8,100 lbs., with a 1000 PSI pump pressure. Cylinder is 3 3/4" O.D. with 6 1/2" stroke—standard heavy duty clevises on both ends. Has standard 1/2" pipe thread openings. Can be used for tilting buckets or blades, raising or lowering implements, hydraulic presses, etc. Can also be used as an air cylinder. (Item 802) Wt. 17 lbs. Reg. \$68 value. Special. **\$14.95**

OTHER DOUBLE ACTING CYLINDERS

8" stroke — 3" bore	\$34.00
10" stroke — 3" bore	34.80
16" stroke — 3" bore	43.00
24" stroke — 3" bore	47.50
42" stroke — 5" bore	75.00
60" stroke — 5" bore	125.00

We have all sizes of cylinders available.

HYDRAULIC CONTROL VALVE — 4 way open center valve with built-in adjustable relief. Controls 1 double, or 2 single acting cylinders. Equalizing feature permits easy control even under heavy loads. 3/4" pipe thread on inlet & outlet. 1/2" on cylinder outlets. Easily mounted, finger tip control. Wt. 1 1/2 lbs. (Item 823). **\$21.95**



HYDRAULIC KIT

Complete Hydraulic Kit consists of hydraulic hand pump with built-in 2 gal. reservoir and item 802 hydraulic cylinder described above. Pump has a built in relief valve and is rated at 10 tons. Kit is ideal for presses, jacks, snow-plows, etc. Pump is 29" long—8" diam. with 3/4" ports. A terrific value! (Item 836). Wt. 50 lbs. **\$39.50** Pump only (Item 836a) only **\$23.50**

HYDRAULIC HOSE COUPLERS Connect or disconnect hydraulic lines without loss of oil. 1/2" pipe threads. (Item 818) per set **\$3.95**

GIANT METAL SHEARS

"PEKTO"
Nine inch cutting blade made of special high carbon alloy steel, perfectly aligned and ground. Easily cuts steel plate up to 12 gauge or 1/2" thick. Overall length 40". Wt. 23 lbs. (Item 156) Regular **\$49.50**. While they last. **\$14.95**

Send check or M.O. Prices f.o.b. Factory. 10 day Money back guarantee. SEND 10c for **MASTER MECHANIC MFG. CO., DEPT. A-60 Burlington, Wis.**

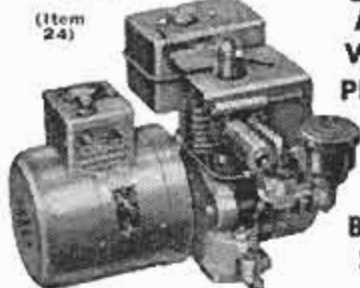
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700 WATT PLANT



(Item 24)

PUSH BUTTON START

115 v. 60 cyc. AC Powered by a rugged 2.2 HP. easy starting Briggs 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 television and radios. Complete with voltmeter and built-in winding to charge auto batteries. (Item 24) Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. **\$143.50** Regular \$275.00 value. **\$199.50** 1200 Watt Plant (Item 45) same as Item 24 but larger generator and engine with 50% greater output. **\$329.50** We make every type and size of light plants. Write giving us your requirements!

MASTER-LITE 2500 WATT PLANT

110/120 v. 60 cyc. AC. A powerful plant, ruggedly constructed and yet designed for easy portability. Can be started by type or built-in 12 v. electric push button starter. Built-in winding to charge battery. Powered by a big 5.10 HP Briggs engine, complete with all accessories. Includes control box, voltmeter, and handy plug-in power receptacle. An ideal plant for permanent or stand-by service. Wt. 225 lbs. Reg. price \$645.00 **\$329.50** (Item 21) Factory Price



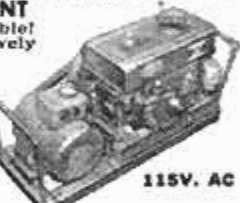
(Item 21)

3500 Watt Plant Push Button Start (Item 23) 115 v. 60 cyc. AC. Similar to above, but larger and 33 1/2% more capacity. Wt. 270 lbs. Reg. \$675.00. Factory Price **\$379.50** DUAL VOLTAGE 110/220 for item 21 or 23 —\$30 additional.

EXCLUSIVE! NEW!

LIGHTWEIGHT WATER COOLED DIESEL GENERATOR PLANT

Never before available! Now offered exclusively by Master Mechanic. A low priced, lightweight, continuous duty, Diesel generator set. Powered by a super rugged, exceptionally smooth running, one cylinder Diesel engine. Operates at conservative 1750 r.p.m. and delivers full 1750-2000 watts of power. Operates on low cost fuel oil. Wt. only 240 lbs. representing a triumph of Diesel Engineering. Complete with fuel filter, oil pressure gauge, control box with duplex receptacle and voltmeter. (Item 830) **\$399.50** Special factory price.



115V. AC

MASTER AIR COMPRESSOR

COMPARE! This is the only compressor built with a **NO RUST** stainless steel tank. Safe up to 500 lbs. (Item 209) High pressure type 4 c.f.m. Large volume of air for heavy duty service. For paint spraying, inflating truck & auto tires, greasing, sand blasting, etc. Piston type 2" bore compressor with built-in air filter. Master built with high strength alloys and precision bearings. Tank, 12"x24", 2100 cu. in. cap. Equipped with automatic switch that starts and stops motor to maintain desired pressure (up to 150 lbs.) and check valve, safety valve, gauge, shut-off valve, 20 ft. air hose and tire chuck. Beautifully balanced on ball bearing wheels and rubber tires. Don't take chances with used or surplus equipment. Our compressors are factory new and are guaranteed **SAFE**. 1/2 H.P. heavy duty model, rep. ind. motor and unloader switch. **\$129.50** Item 209A, low factory price. **\$109.50** 1 1/2 H.P. model, Cap. 3 c.f.m.—85 psi, Item 209. **\$109.50**

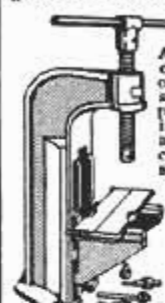


Tank Tented up to 500 lbs. per sq. in.

HI-FLO Centrifugal PUMP

Completely self-priming! No foot valve required. Tremendous capacity—100 gal. per min. Special impeller enables pump to handle muddy or sandy water. Simple to operate—simply start engine and watch the water go. Powered by a rugged, easy-starting 2 HP Briggs engine. Pre-lubricated sealed bearings for years of heavy low-cost service. Big 1 1/2" Model, Item 502, Wt. 70 lbs. Factory price **\$134.50**

2" Model (150 gal. per min.) with 3.6 hp engine. Item 502B—90 lbs. Special. **\$169.50**



SCREW-TYPE PRESS

A tremendously powerful press capable of exerting nine tons of pressure. Pays for itself straightening bent parts, or pushing out bearings and bushings. Ideal for manufacturing and assembly operations because of precise control. Massive 1 1/2" screw permits precise control over vertical travel. Extra heavy ribbed yoke has a throat 21" high; depth capacity for working to the center of an 11" object. Includes 8" x 15 1/2" vise-type table and two pushing anvils. Wt. 150 lbs. (Item 707). Reg. \$149.50. Special. **\$49.50**

HYDRAULIC PRESS. Nine ton capacity. See May Pop. Mech's ad for details—or write. Complete, Wt. 110 lbs. (Item 464). **\$69.50**

ELECTRIC HOIST

2000 lb. CAPACITY. A fortunate purchase from the Air Force enables us to offer these powerful 2000 lb. electric cable hoists at a fraction of their value. Perfect for material handling, boat hoists, elevators, lifts on assembly lines, etc. Two separate 22 ft. lift cables with independent controls permit leveling the load and controlling it perfectly. Rugged ball bearing motors of geared down design 110 volts. Available for A.C. or D.C. Please specify. Makes a terrific portable hoist with our #273 D.C. light plant at \$89.75. Offered at less than 33% of regular cost (Hook not included). Wt. 145 lbs. A.C. Model, Item 847A. **\$149.50** D.C. Model, Item 847. **\$129.50**



NEW ITEMS: (Too late to illustrate)

- MINE DETECTORS:** Used by plumbers, contractors, water dept. etc. for detecting buried metallic or non-metallic objects. Finds buried sewers, water pipes, wires, etc. Complete in carrying case. Batteries \$10.00 extra. Our price **\$39.50** Gov't Cost \$600.
- AIR HAMMERS:** Originally designed to hammer dents out of auto bodies, fenders, etc. Complete with 2 different shaped arms, a set of 5 bumping dollies, and 20 ft. of heavy duty air hose. Hammer can also be used without arm. Uses only 4 CFM at 60-100 PSI. **\$39.95** Reg. pr. \$175. Special Surplus Price

MASTER D.C. ARC WELDER

Easy To Use
Now! a portable rugged, industrial type welder with terrific performance, yet at a price hundreds of dollars less than you'd expect. Senior model made for years of trouble-free, continuous service. High capacity DC welding unit enables you to tackle any job with confidence—easily welds anything up to 2" plate using from 1/16" to 1/4" rods. Built-in stabilizer and cooling system makes arc easy to strike and hold. Dual control rheostat provides low heat softening, brazing and welding from 50 to 300 amps. Complete with instructions, guarantee and triple V-belt or flat pulley. Easy to hook up and easy to operate. **WELDER ONLY — DUAL CONTROL MODEL**. Same as above, but drive with your tractor, jeep or gas engine of 14 HP or more. (Item 38a.) Wt. 110 lbs. \$450 value **\$119.50**

WELDER ONLY—INDUSTRIAL MODEL same as above but with ceramic rotary type rheostat providing 74 different heat settings for all types of welding (Item 38b) **\$139.50** \$200.00 value. **COMPLETE POWER MASTER** (Illustrated above) powered by a 16 hp., air cooled Wisconsin engine. Wt. 480 lbs. (Item 280) Compares with welder costing \$1200. **\$449.50** Factory Special.

WELDING KIT Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at... **\$10.50**



(Item 280)

Now! a portable rugged, industrial type welder with terrific performance, yet at a price hundreds of dollars less than you'd expect.

Easy To Use

A BOY NEEDS A DAD HE CAN BRAG ABOUT!



Remember when you were a kid — and your Dad was the strongest, smartest, bravest guy in the world? "That's my Dad," was your big claim.

Now you're the "Dad"—and that's *your* kid looking up at you.

You're a hero in his eyes. You *know* that. But how do you look in your own eyes? Are you using your abilities to build a secure future for your family — to give them the good living and advantages that could be theirs? Maybe you

lost a few years in military service — or a lack of formal education has shut you out of the big-pay jobs that could be yours.

So, you're trying to fit into a job that's too small for you.

If that's your story, then I.C.S., the oldest and largest home-study school in the world, can be your way out of dull, routine, low-pay work. Practical, down-to-earth I.C.S. Courses can provide the training you need for a better job — bigger pay. You can be one of hundreds of thousands of capable people who have won success the I.C.S. way. No other school has so many of its former students in supervisory and management positions.

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- Industrial Electronics
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- Diesel Electrician
- Diesel Engr. and Fireman
- Diesel Locomotive

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- Power Plant Engineer
- Stationary Diesel Engr.
- Stationary Fireman

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- Carding and Spinning
- Cotton Manufacture
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"I did a clean-and-wax job in 55 minutes



with Du Pont's NEW CAR WAX



... 6 months later it's still mirror-bright"

says George T. Duffin of Los Altos, Calif., after waxing his '57 Chevrolet with Du Pont New Car Wax. George found that this new paste wax is as easy to use as a liquid polish, because it cleans, waxes and glazes—all in *one easy application*. And it protects with real Carnauba wax, *the toughest wax known*. Proof of protection is the long-lasting gleam. Six months, 11 car washings later, the finish still shows clear reflections of George and his wife! Try Du Pont New Car Wax—it makes any good finish look new. At service stations and auto supply stores. Only \$2.00.



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"HAPPY AS A LARK OWNER!"

Wouldn't you love to be winging through spray and sun... in a gay Lark-powered runabout? Fact is, it's the *only* way you'll ever know the pleasure it offers!

The lilt of its name suggests the Lark's unfettered spirit... its crisp response and dazzling power. Its engine floats on rubber mounts in a sound-tight nacelle. Result is a luxurious *new kind* of power... ultra quiet, flawlessly smooth! 35 spirited horsepower that'll handle a husky runabout with breath-

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See the Lark and 10 other sparkling new Evinrudes, including the revolutionary 50 hp Starflite V-4! And, if you really want to know the meaning of "happy as a *Lark* owner," ask your Evinrude dealer for a *free* "Revelation Ride." Look for his name under "Outboard Motors" in your phone book. Catalog free—write Evinrude Motors, 4304 N. 27th Street, Milwaukee 16, Wis.

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