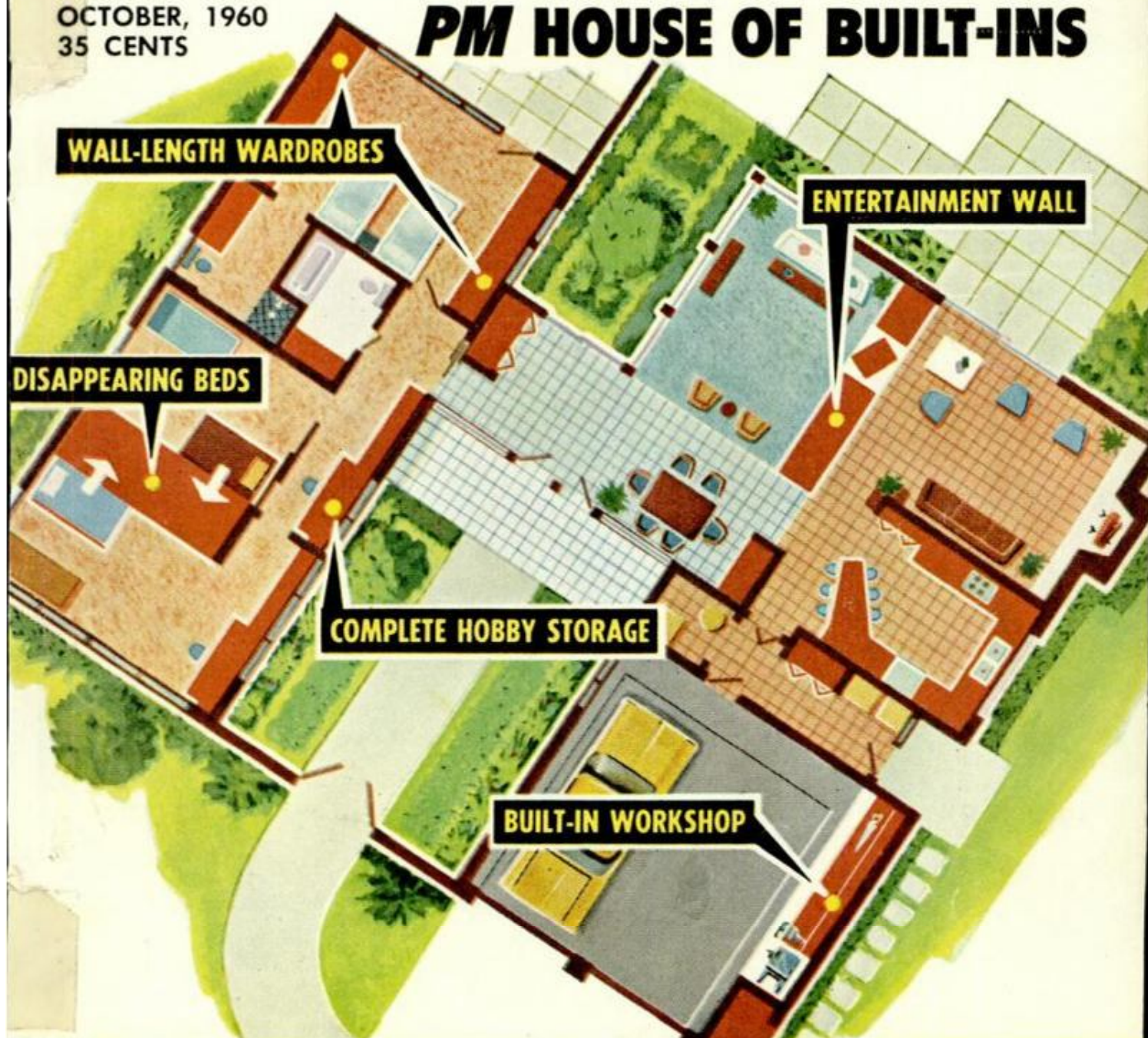


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OCTOBER, 1960
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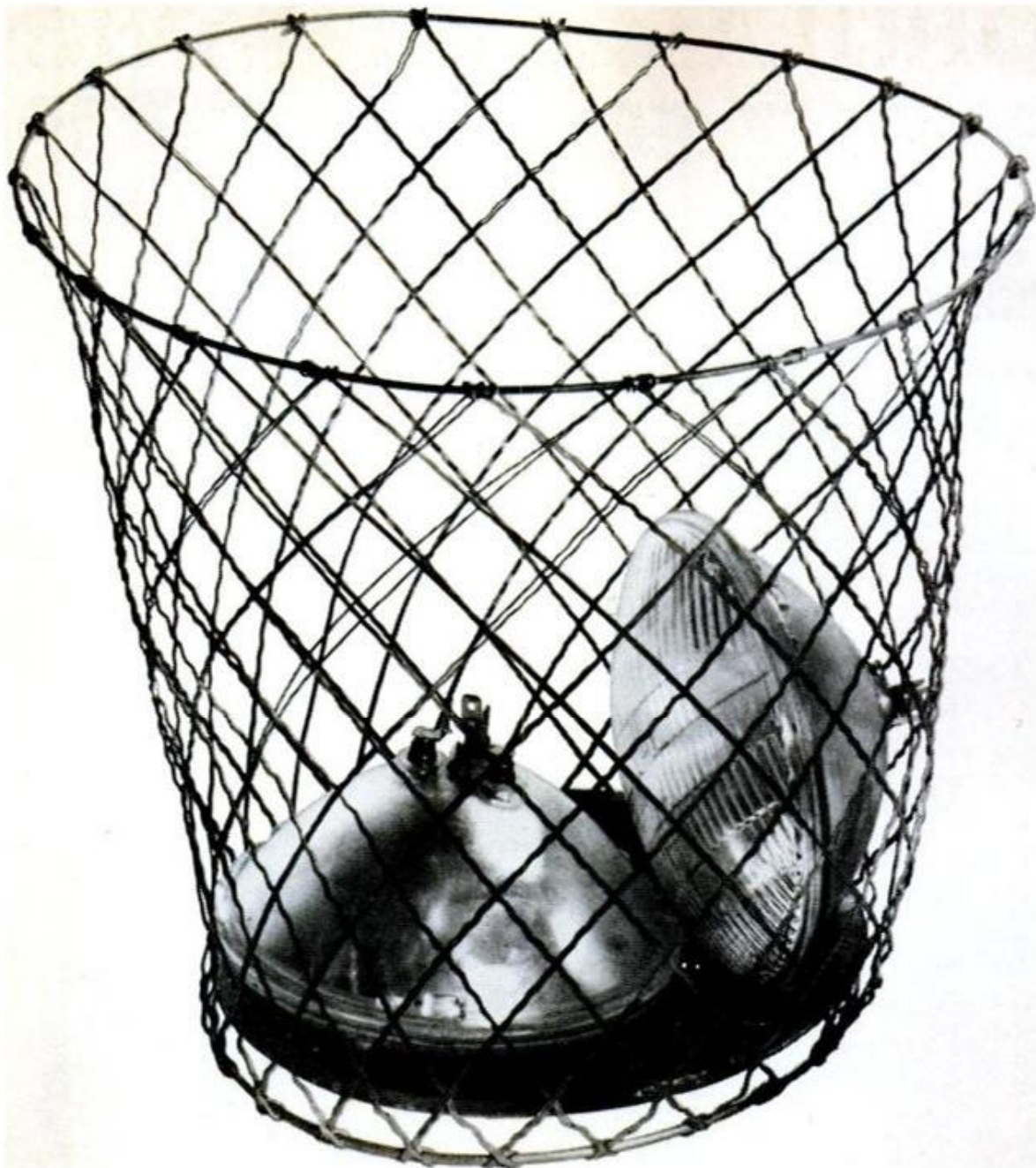
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235 Montgomery St., YUkon 2-0823.

Published monthly by Popular Mechanics Company, 200 E. Ontario St., Chicago 11, Ill. Richard E. Berlin, President; Richard E. Deems, Executive Vice-President; Fred Lewis, Vice-President and General Manager; Robert F. MacLeod, Vice-President; John R. Miller, Vice-President; G. Harry Chamberlaine, Vice-President; G. O. Markuson, Treasurer; R. F. McCauley, Secretary. Single copy in the United States and Canada, 35 cents; subscription rates in the United States and possessions and Canada, 1 year \$3.50; 2 years, \$6.00; 3 years, \$8.00. In countries of the Pan-American Postal Union, 1 year \$4.50; 2 years \$8.00; 3 years \$11.00. In all other countries 1 year \$5.50; 2 years \$10.00; 3 years \$14.00. If you plan to move, notify us at least 30 days in advance so you will not miss an issue. Give both your old and new addresses. Second-class postage paid at Chicago, Illinois, and at additional mailing offices. Entered as Second Class Matter at Post Office Dept., Canada. Registered as Second Class Matter at the Post Office at Mexico, D.F., Mexico, June 20, 1950. ©1960 by Popular Mechanics Company. All rights reserved. Printed in the United States of America.

OCTOBER 1960

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SPANISH: Mexico-Caribbean, Southern Hemisphere
FRENCH, DANISH, SWEDISH, GERMAN, PORTUGUESE, DUTCH

Volume 114

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Number 4

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Next Month...

THE 1961 CARS will appear in full color. All the American manufacturers will be represented in a comprehensive display . . . A veteran pilot recounts his experiences in making an approach and landing a transport plane at an overcrowded municipal airport in "Let's Bring Our Planes Down Safely" . . . Five-year-olds on bucking broncs? Yup—they do it out West; see "Kid-Sized Rodeo"



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LUMBER PRODUCTS HAULER: Maury Goodloe, Chicago, Illinois. "Running 2,000 miles a week over Route # 66 can be murder on tires. That's why we've switched to Firestones. They can really take the torture."



PRODUCE HAULER: John Romkema, Grand Rapids, Michigan. "Getting fresh produce to market on time demands a tight schedule. I can't afford any delays with tire trouble. That's why I'm 100 per cent on Firestones."

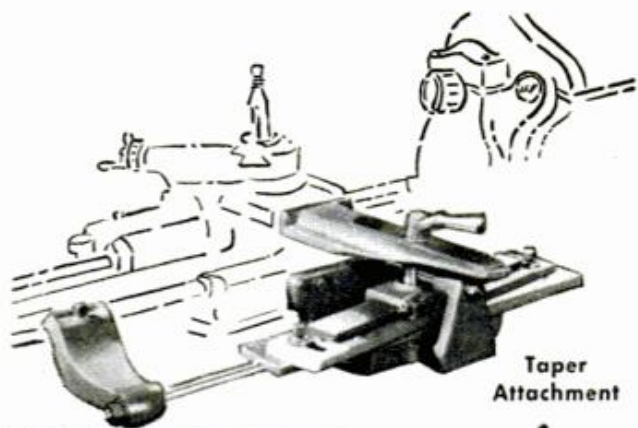


GRAVEL HAULER: Grove Lawson, Des Moines, Iowa. "I've never had a Firestone blow-out in all the years I've used them on my truck. I would recommend Firestones to anyone on the basis of the performance they've given me."



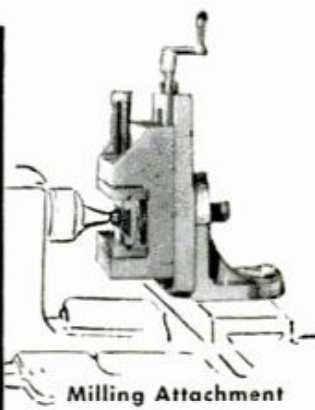
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With Sources of New Products



Taper Attachment

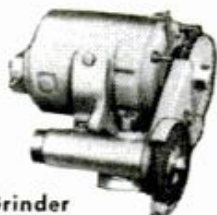
Get More Work out of Your Lathe



Milling Attachment



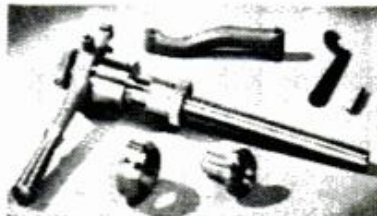
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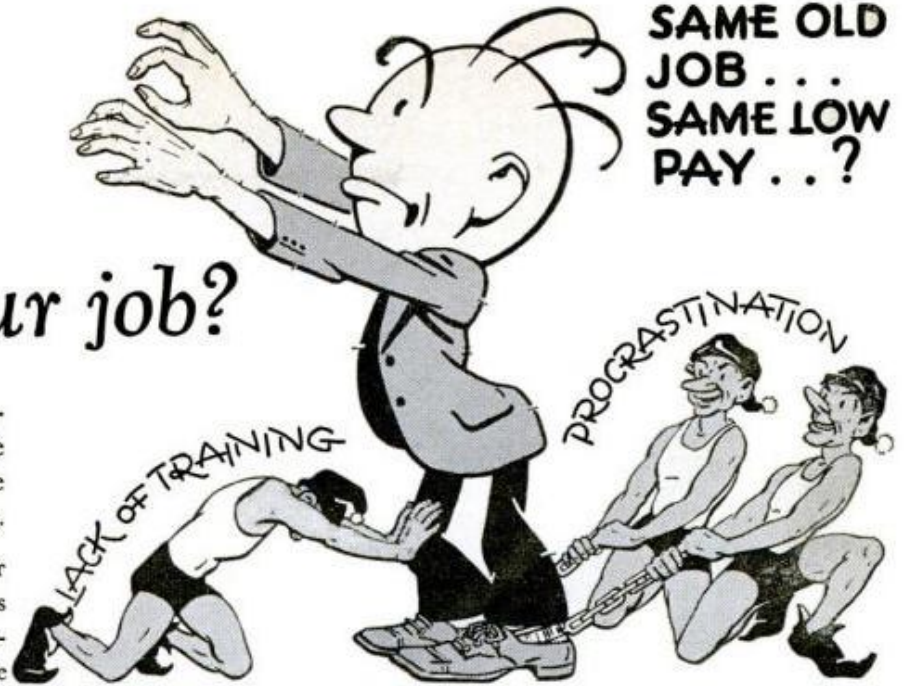
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Write for the name of your nearest Ranger dealer.
Endicott Johnson Corporation, Endicott 1, New York.

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NOTICE—It is the intention of this magazine to provide its readers with information regarding the latest developments in the mechanical arts. Except where otherwise indicated, this magazine has no information as to any unexpired patents in respect of the developments reported herein. In the event that commercial use is to be made of any of the developments reported herein, it is suggested that legal counsel be consulted to avoid liability for patent infringement. It is not the purpose of this magazine to encourage patent infringement but, as indicated, it is the intention of this magazine to report on the latest developments in the mechanical arts.

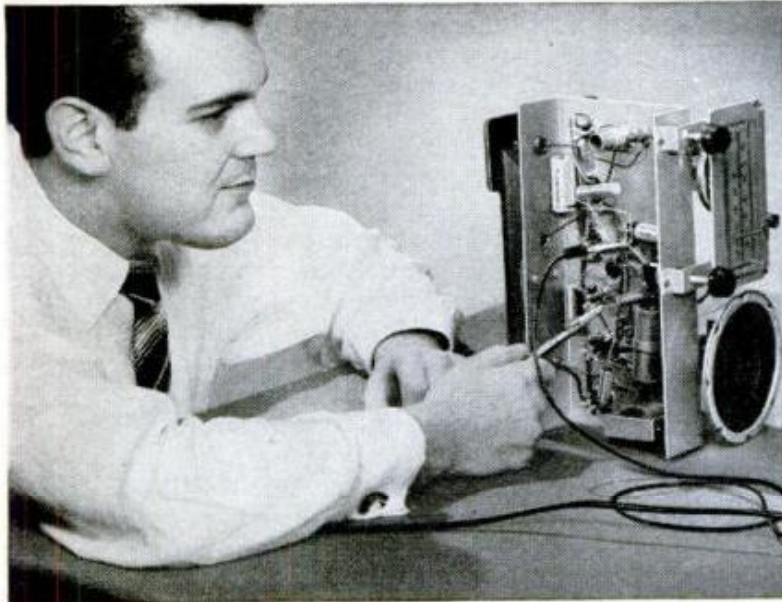
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but your car says "no"



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Home Is the Hunter—In Orange

That red hunting coat may not be giving you the protection you think, according to Army tests in which 30,154 observations were made by military personnel to determine what colors were most visible to the most people. Eight percent of the observers were color-blind in varying degrees, but even they could see the winning color, a fluorescent "blaze orange." Second was a fluorescent "neon red," with the traditional red and yellow scoring lowest of any colors used. In the nonfluorescent colors, the bright shades of orange and red were found most visible—the brighter the better. The yellows tested were found to be even dangerous when hunting deer, since many hunters mistake light color for white when it is seen briefly through brush, and a deer hunter looks for the fleeting white tail of a running deer. The tests, run at Fort Devens, Mass., are to be followed by another series under snow conditions.

How Much Energy Is She Using?



Authenticated News photo

Student-teachers at Bwiru Girls Secondary School in Mwanza, Tanganyika, Africa, wear portable breath-collectors strapped to their backs while doing chores. The purpose is to find how much energy is used during manual labor. The results will help establish nutritional needs. As she works, each volunteer wears a clamp on her nose and breathes through a mouthpiece into a bladder. About .3 percent of each breath is collected during the 20-minute tests. The amount of oxygen mixed with the carbon dioxide and nitrogen helps calculate how many calories of energy have been burned up during the test.

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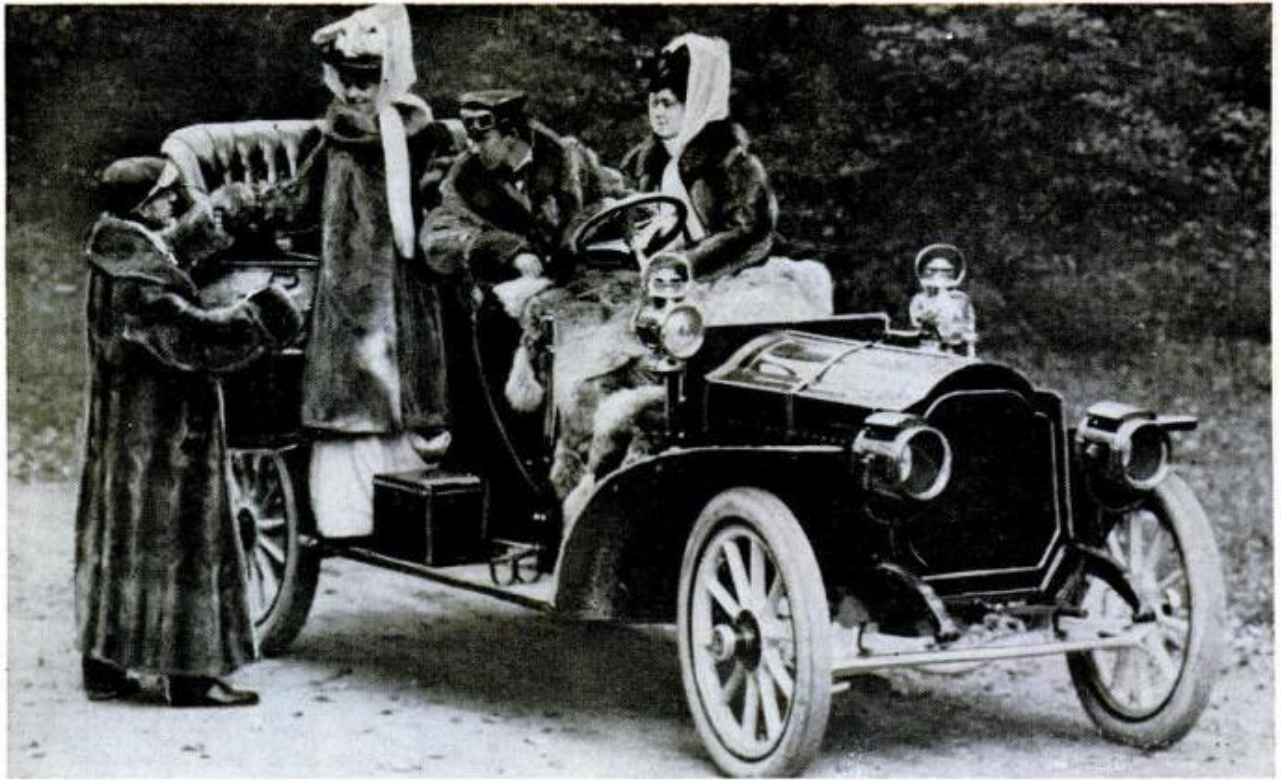
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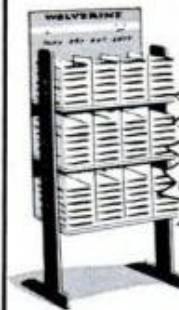
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Everybody recognizes this car. One famed feature makes its identity apparent. No, the scene is not Yellowstone and that is not a tame bear begging for food. It's a

normal, richer-than-average man begging his lady to stroll with him through the park. Let's hope they're not mistaken for bears. The car name? See page 298.



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Over the Editor's Desk



To the Editor:

I have been reading your magazine and enjoying it for over 25 years. I have found it to be by far the most popular magazine in my waiting room for the last 10. The reason is the clarity of your photos and text in explaining the new aspects of our world.

In the June issue on page 183 you use the word designwise. Please PLEASE PLEASE don't go Madison Avenue on your old friends. The sentence does beautifully without this word and it mars your always excellent style. The father of one of my patients is an English professor in a technical college and he tells me he always uses *PM* as an example of saying things in a straightforward and easily-read way.

Please run this up the flag pole and see who salutes.

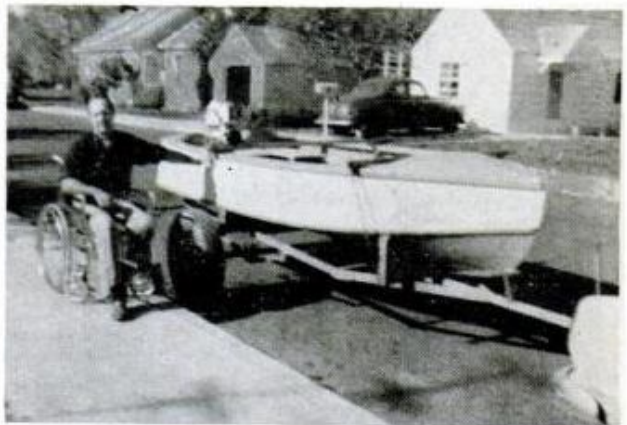
Thank you for many hours of fun and aid to my house, repairwise that is.

Dr. Jack M. Breuer
 Ossining, N.Y.

☆☆☆

To the Editor:

I feel that I owe *PM* many thanks for the plans of the "Crusette" in the May 1954 issue. You see, I lost the use of my legs from a broken back caused by a falling tree. I spent a year in the V.A. Hospital.



After being released I had more time on my hands than I could take. Some friends gave me about six years back issues of *PM* to read. To build the Crusette sitting in a wheel chair was the challenge I needed for mind and body. I borrowed a welder from a friend and built the trailer also.

Vernon C. Henrichs
 Salem, Ore.

Hats off to Mr. Henrichs!

(Continued to page 16)

“Phase detector of the Moving Target Indicator receiver misaligned on the FPS-3...realignment procedure must be followed.”



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To the Editor:

Within the past year or so you have published designs for children's play houses. Recently you published a design for a small kitchen sink with cabinets.

Some of the house designs appear somewhat "boxy" and I felt, therefore, that you would be interested in the enclosed picture of my attempt to construct a miniature house which would have the proportions of a full-scale house. The scale for most details is one-half; the over-all dimensions being 8 ft. by 16 ft. with 4-ft.-high walls.



The living room is 7½ ft. by 10 ft. and has a miniature fireplace, front and rear doors, the latter opening onto a small patio. The kitchen is 4 ft. by 6 ft. and includes a sink with cabinets, having sliding doors, above and below. A stove and refrigerator are located on each side of the window. A garage, 4 ft. by 6 ft., is located behind the kitchen and is provided with an overhead door. The house is of frame construction with Masonite siding and asphalt-tile roof. The floors are linoleum tile.

E. S. Turner
Ottawa, Ont.

☆☆☆

To the Editor:

Just the other evening I was saying to my fiancée, "Y'know, Honey, scrying is a hazardous occupation." From the look she gave me, I could tell she thought I was kidding her, but the look vanished when I showed her those very words printed on page 250 of the June issue of *PM*. We know that it must be true if *Popular Mechanics* printed it, but one thing bothers us a little: Whazzit mean?

Other than this, thanks for conducting the "Owners Report" section. How about more reports on foreign cars?

Forest P. Clark
Bradford, Pa.

Webster says scrying is "to practice crystal gazing."

To the Editor:

I read with interest your very nice feature on trailer parks, Blue Skies, in particular in the July issue of *Popular Mechanics*. It was gratifying to see the photographs of the "Cathay" oriental model and sketch of same used for the cover.

I am the designer of this model and of seven others for this park. I am at present designing an Egyptian model called the "Pharaoh" for clients in the park.

I certainly would appreciate credit given to me in the next issue of *Popular Mechanics*. It would help me considerably.

Polly di Mayle, A.I.B.D.
Palm Desert, Calif.

☆☆☆

To the Editor:

In your January issue you refer to the 1960 Rolls Royce as being the first V8 Rolls Royce. I beg to differ.

The first V8 R.R. was produced in 1906, at which time most of those great ugly egotistical American motor cars were running round in short pants.

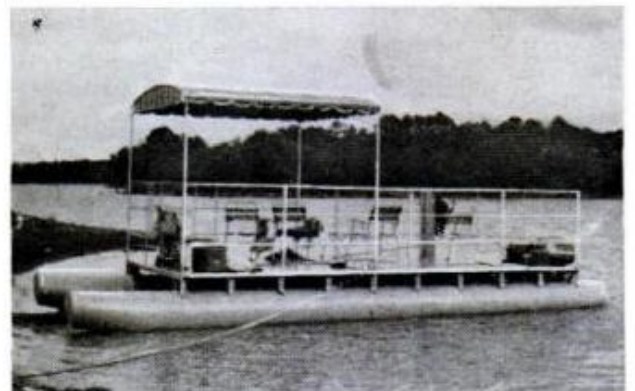
The car in question was a 20 hp. (RAC) V8, producing 20 B.H.P., and governed to a speed of 20 m.p.h., being produced exclusively with Town Carriage coachwork. It was known as the Silent 20.

Harold Hill
Wellington, N.Z.

☆☆☆

To the Editor:

Enclosed are pictures of the pontoon boat I built from *PM* plans of March and April 1959, constructed in three months in spare time. It is powered by a 25 hp. outboard with electric starting and remote control.



Also I built a trailer to transport it to and from Kerr Reservoir on the Virginia-North Carolina border where we used the boat last summer. The construction is very strong and it practically steers itself. The large deck provides ample space for our lawn furniture and we enjoyed weekends swimming, fishing and picknicking.

Richard O. West
Danville, Va.

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By William R. Kreh

SMOG-BOUND Californians, through their tear-stained faces and tortured lungs, may find consolation in the fact that they're helping the Navy guard against submarine attack. A "sniffer" system, being installed on Navy S2F Tracker and P2V Neptune antisubmarine planes, is an outgrowth of an atmosphere sampler developed several years ago to warn Southern Californians when a wave of smog was rolling in. Aboard low-flying planes it can tell if a snorkeling sub is nearby by detecting carbon monoxide given off by its engine. Cruising at about 1500 feet, where surface winds level off, the plane takes about five samples per second. When a photoelectric cell detects the carbon monoxide, the plane dives to attack.

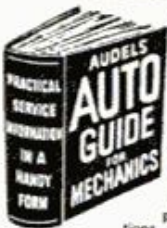
The GI urge to itch may soon be scratched, thanks to a new Army apparatus which can clear a square-mile area of all winged insects — mosquitoes, flies, and the like—in less than 10 minutes. Developed by the Engineer Corps, it throws a poison fog over the countryside. The fog consists of fine particles of DDT or other similarly potent insecticide which is released during favorable winds. The "fogger," driven by a gasoline engine, was developed primarily for sanitation of Army camps in the tropics, but it could also be adapted, the engineers say, for civilian resort areas.

This could easily be misinterpreted, but many wives might agree—it takes 59 rats to equal one man. That's the number of white rats being used to test space capsules because that's the number it takes to use the same amount of oxygen as one human being and give off the same amount of carbon dioxide and moisture in their breath and body heat.

Navy researchers, studying the greatest of all teachers, Nature, have developed a shark

(Continued on page 20)

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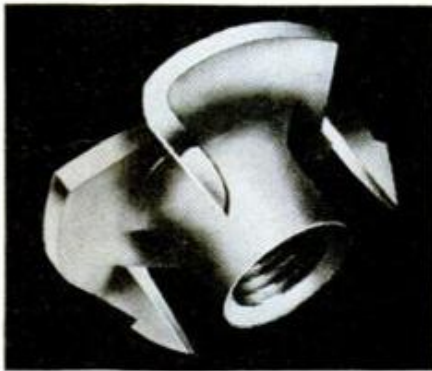
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A "ghost" ship, a robot that can operate completely without crew, is being studied by the Maritime Administration. The ship would sail unmanned from the point where the pilot is dropped on the outbound trip to the point where another pilot boards it at her destination. The ship could operate completely unmanned for at least 30 days and without major maintenance for 90 days.

Speaking of pilots, probably the most difficult ships they have to guide in and out of harbors are the Naval aircraft carriers. It's chiefly because their island bridges are off to one side of the flight deck, instead of dead center, making it awkward to judge the true fore and aft centerline. The problem is so acute that, when one is going through the Panama Canal, a temporary wooden scaffolding is built on the deck's centerline and connected to the ship's bridge by telephone. The Canal pilots give their orders to a talker in the wheelhouse and the entire operation is thus carried out by remote control.

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TUNE IN ON THE INVENTORS

By **John Linkletter**

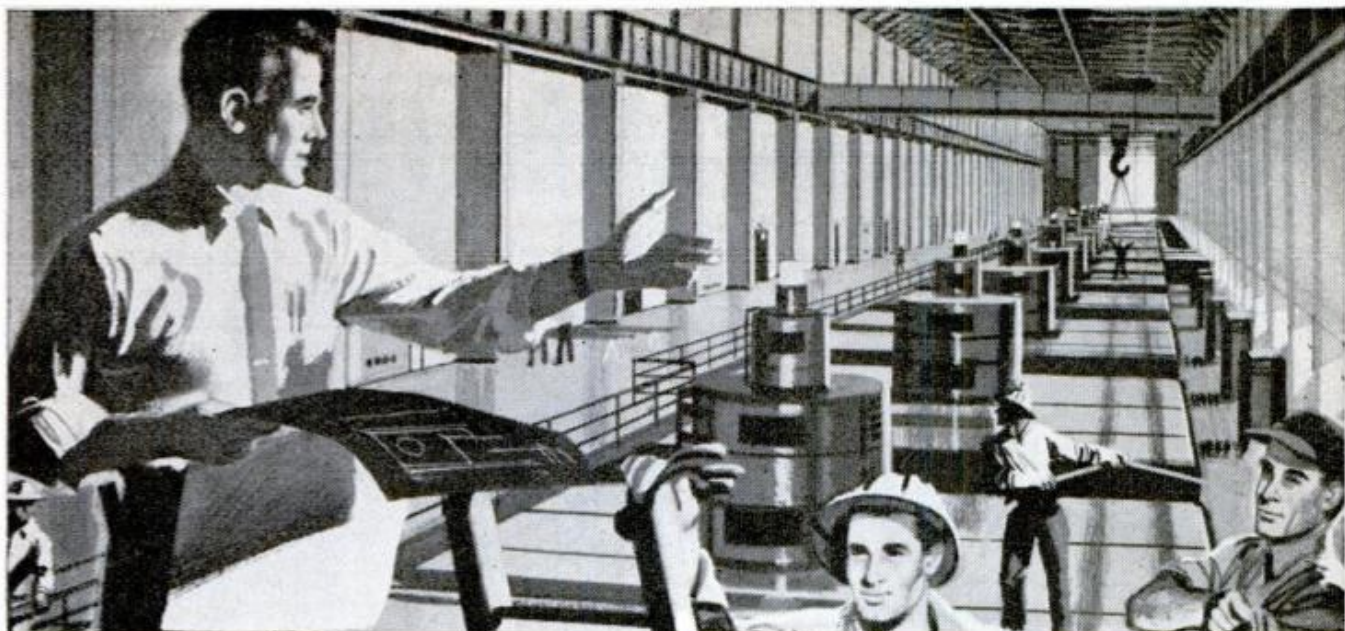
BOMBARDING colorless diamonds with high-energy electrons will color them blue or blue green, according to Ronald A. Dugdale of Harwell, England, who was granted patent No. 2,945,793 on the process. Most natural diamonds have some color, Dugdale points out. The tints seem to be caused by atoms having been forced out of position in the crystal lattice. These atomic displacements are known as Frenkle defects. When the colorless diamonds are placed in an atomic pile or other source of electrons with energies of 500,000 to 2 million electron volts for about an hour, they emerge either blue or blue green. Dugdale assigned his patent to the U. S. Atomic Energy Commission.

Ernst Wild of Zurich, Switzerland, has come up with a back saver for housewives who make beds daily. Around the mattress he's added a frame which pivots into vertical position. The bed maker simply drapes bedclothes over the frame and lowers frame and all over the mattress. The device won patent No. 2,947,008.

A burglar trying to make off with a car protected by a new alarm system will be plagued by the sounding of the car's horn. The alarm, invention of **Otto C. Wehrig** of Seguin, Tex., is a circuit-closing device. Unauthorized activity in the auto causes a steel ball to fall into a funnel-shaped opening in the alarm. The ball forms a contact between two wires—and the horn goes off. Patent number is 2,946,867.

Smoke—the Indians' traditional communication medium—may also be used in modern military signaling. **Bruce E. Del Mar** of Los Angeles, Calif., has invented an airborne smoke bomb that contains a number of smoke capsules which may be set to be released in a predetermined sequence. Patent number is 2,945,222.

And, talking about smoke, **Alexander Konrad** of Parma, Ohio, has come up with a dual-flavored cigar or cigarette that gives the smoker an option of two flavors—depending on which end he chooses to light. Konrad received patent 2,947,310. ★ ★ ★



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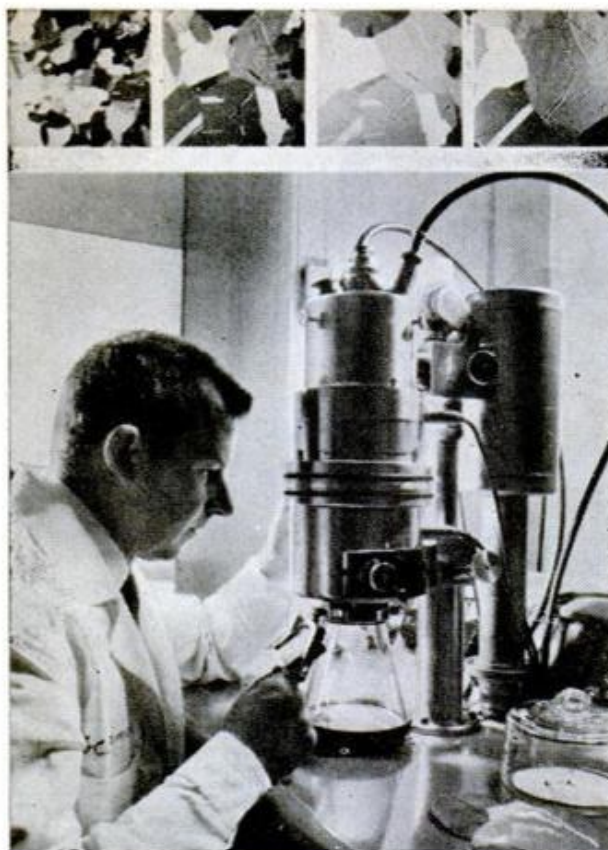
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Microscope's Viewing Screen Shows Effect of Heat on Metal

For observing behavior of metals at high temperature, the physics department of General Motors research laboratories developed a thermionic emission electron microscope: Metal samples magnified up to 3000 times can be watched continuously on the microscope's viewing screen as they are heated in a built-in furnace. The strip of pictures across the top of this column shows microstructural changes occurring in a steel sample at temperatures ranging, from left to right, at 1800 degrees F. to 1950 degrees.

Airplane's Radio Altimeter Measures Depth of Glacier

Investigations of Arctic airplane crashes have turned up a way to measure the thickness of glacial ice. Many of the crashes occurred, Army scientists believe, because the altitude-measuring pulse from a radio altimeter penetrates the glacier instead of bouncing off it. If the plane is actually only 10 feet over a glacier, the altimeter may read about 2010 feet because the solid earth lies 2000 feet beneath ice. Army scientists are now experimenting to learn if, indeed, a radio altimeter can be used as a fast, accurate instrument to measure glacier thickness.

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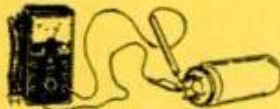
With tester's cord in outlet, current consumption of appliance is read direct on meter when line cord is connected to receptacle on panel. This typical iron takes 7 amperes (Good).



Small electric fan motor indicates 30 ohms (normal resistance).



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Manual supplied with Model 70 shows meter needle moves to right when test leads are connected to pins 3 and 6 of this 6AU6 tube. Procedure for testing all tubes used in TV are detailed in manual.



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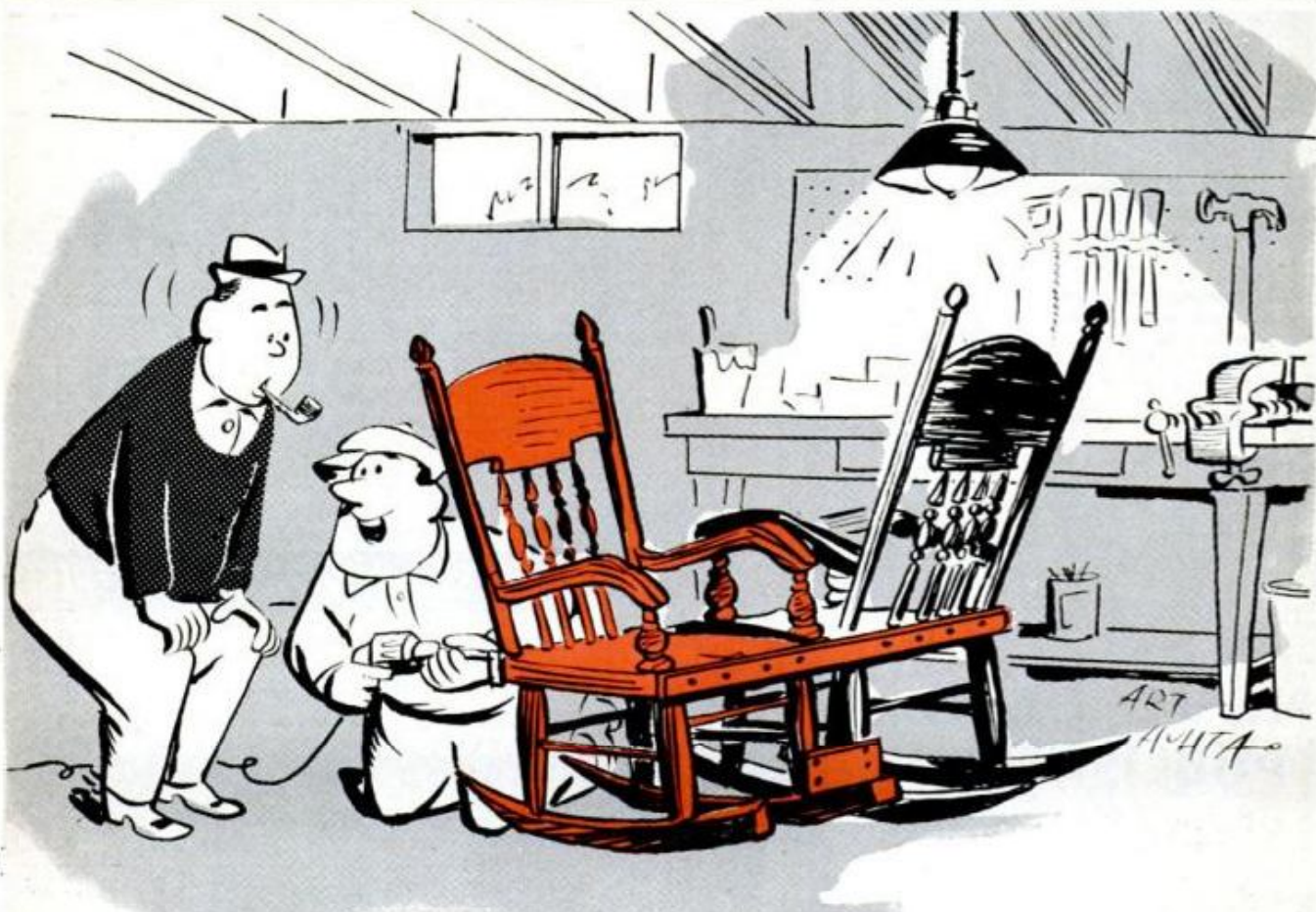
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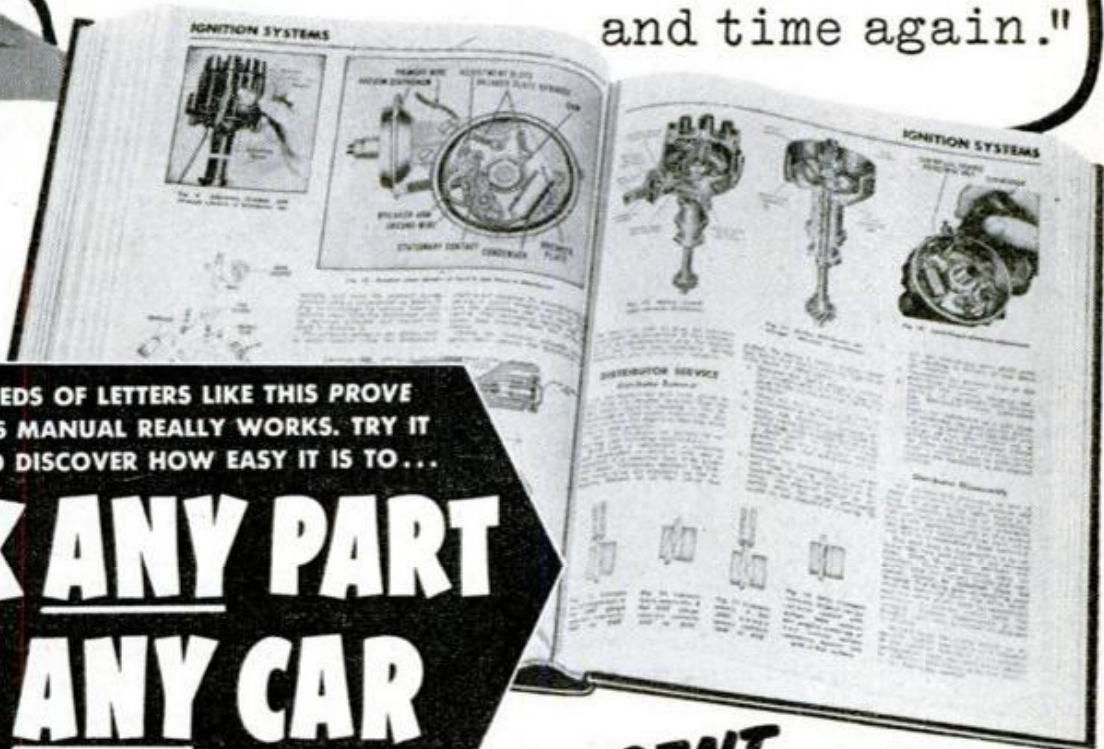
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POPULAR MECHANICS

WHAT'S UP IN THE AIR

By Kevin V. Brown

SUPERSONIC jet fighters are fine fighting machines, but frustrating for pilots who need practice using them for what they were intended—as aerial weapons. Until recently there haven't been targets fast enough to shoot at. In tests at Edwards Air Force Base, Calif., however, an F-101A Voodoo towed a missile-shaped target at Mach 1.25 velocities. The 16-foot target is attached to a short pylon on the underside of the Voodoo. In flight it is dropped and reeled out automatically on the end of a special "stepped" cable, one that gradually reduces in size to permit more wire on the reel and to reduce drag. The target is towed about 40,000 feet, roughly 7½ miles, behind the tow plane. The long separation is necessary to protect the plane and pilot at supersonic speeds. The target contains radar and special scoring devices to record hits. Besides its speed, it has another advantage over subsonic drone planes, previously used as targets. It can be reused as many as five times, and it even has a parachute to float it to earth safely in case the cable snaps. After a normal mission, however, the pilot, who operates the target from the cockpit, reels it in and it automatically refastens to the carrying pylon.

That great American invention, the mail-order house, is replacing an even greater American invention, the airplane. It's happening in Alaska where bush pilots have been the only means of communication with the outside world for some wilderness settlers. Improved mail facilities, however, have put many of them out of business. Now the Last Frontier's pioneers just thumb through the catalog and write away for supplies.

Tail gunners, the loneliest of all airborne soldiers, recently rejoined their fellow airmen in the forward part of the ship. Closed-circuit television has been installed in all B-52G Stratofortresses which allows the tail gunner to sit up front and watch what's going on behind through a special optical system that scans the entire area back of the plane. He aims and fires his guns by remote control. The move forward places the tail gunner closer to the bomber's center of gravity where less turbulence and vibration make it easier to focus guns. ★ ★ ★

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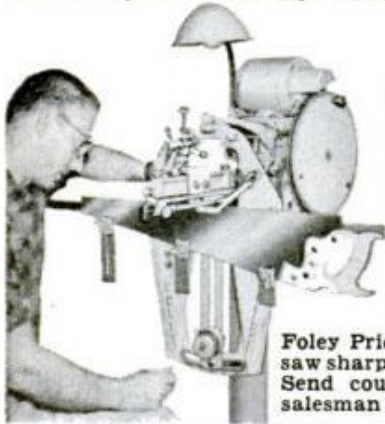
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Keeping up with the ATOM

By James Biery

AFTER WARMING UP for one hour, the world's most powerful atomic accelerator recently speeded a beam of protons to an energy of more than 30-billion electron volts, the highest energy achieved on Earth by a man-made device. The machine at Brookhaven National Laboratory, Upton, N.Y., is of the type popularly called "atom-smashers." Key to its accomplishment is a magnet 843 feet in diameter which holds the protons in a circular course as they race around its outer edge building up the high level of energy. The proton beam is accelerated by 12 radio frequency stations around the ring. Each station accelerates the beam by 8000 volts each time it passes. To reach the final energy of 30-billion electron volts, some 300,000 revolutions must be made by the proton beam in one second. The protons then "smash" into a target, such as the nucleus of an atom, at almost the speed of light. One result is the creation of new atomic particles.

The pattern of radioactive fallout from nuclear test explosions is becoming defined, according to investigators at Naval Research Laboratory. They compared amounts of radioactive tungsten-185 and strontium-90 in the air at various times after the 1958 Pacific tests and concluded fallout is "considerably lower" in Southern than in the Northern hemispheres.

Radioactive contamination of milk will probably be the most widespread hazard resulting from a nuclear accident or explosion which deposits fission products on agricultural land, according to an English study. Milk taken from 40 cows allowed to graze three weeks in a field contaminated with strontium-90 showed a 500-percent increase in radioactivity.

Researchers at Los Alamos, N.M. Health Research Laboratory are studying familiar objects which might be used to find quickly the amount of radiation a person might receive from an accident or explosion. Locks of hair, coins and, especially, gold wedding bands have proved to be good neutron collectors. ★ ★ ★

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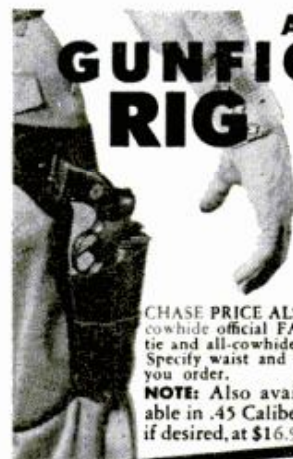
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POPULAR MECHANICS

BULLETINS *from the world of* SCIENCE

By James Biery

HARD AS SAPPHIRE, a fiber developed from aluminum oxide may find use as a skin for space vehicles to prevent them from blazing like meteorites when re-entering Earth's atmosphere. The fiber was created by Horizons, Inc., a Cleveland, Ohio, research firm. It is said to be so resistant that a man wearing a suit of it could stand having a flaming welding torch played over his back. One fiber will withstand a pull of three-million pounds per square inch and temperatures of 3750 degrees F. This is 25 percent higher than the temperature which turns steel to white liquid.

Out of the laboratory of Prof. Robert B. Woodward, Harvard University chemist, has come one of the world's greatest achievements in chemistry — the total synthesis of chlorophyll, the green pigment that captures energy from sunlight for the making of food for all living things. Professor Woodward has also synthesized quinine, cortisone and rauwolfia.

Stony meteorites may provide Moon explorers with oxygen for breathing. Dr. Kurt Komarek has explored this possibility at New York University, assuming that early Moon parties will take along algae or other green plants which will breath in the members' carbon dioxide and give off oxygen, and that this closed system would be subject to oxygen leaks. Dr. Komarek heated stony meteorites, which contain about 36 percent oxygen, in the presence of hydrogen. He got a yield of three to four pounds of oxygen for each 100 pounds of meteorite. From this, it was estimated that a five-man crew could replenish oxygen losses indefinitely by processing about 200 pounds of meteorite a month. The process would boil out oxygen from iron oxides in the meteorites, would use hydrogen to pull off oxygen in the form of water vapor. The water would be separated into hydrogen and oxygen by electrolysis.

An earthbound space explorer, Dr. Rudolf Minkowski, has photographed two galaxies in collision some 36 billion miles out in space, using the 200-inch Mt. Palomar telescope. The speck of light, moving away from Earth at about 90,000 miles a second, may, upon further study, help prove the universe was born in a huge explosion and has been expanding ever since. ★ ★ ★



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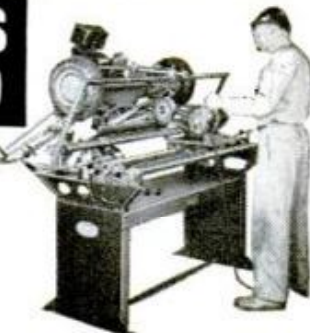
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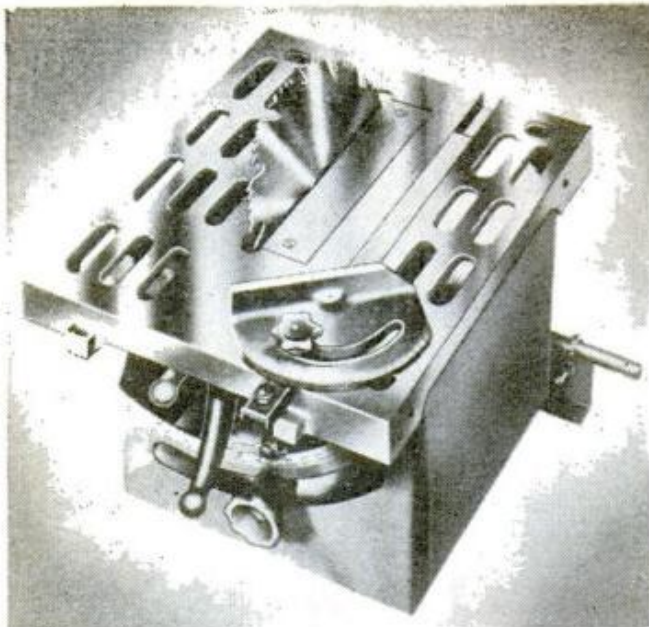


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ITEMS FROM ALL OUTDOORS

By Dick Kirkpatrick

FISHING TACKLE IN OCTOBER? Sure—why not? Fishing's better now than it was during your vacation this summer, anyway. But that's not the point. Late summer and early fall are when your sporting goods dealer buys his fishing tackle to show you next spring. And the dealers are buying some very interesting new gear . . .

Bait casters who've been struggling to cast with monofilament line intended for spinning reels will be happy to see the new monofilaments especially designed for rotating-spool reels. At least three manufacturers, Western, Cortland, and Gladding, are coming out with flat and oval monofilament that will lie smoothly on an open spool without digging into the line below it, and which spools off smoothly without springing, ballooning, or backlashing. As a bonus, the new lines take up less room on the spool, increasing line capacity, and have higher knot strength than round line.

While rotating-spool reel fans rejoice, spinning is moving into one of their last retreats—surf casting and heavy-duty fresh water fishing. The new Zebco 89 is an extra-big closed-face spin-casting reel designed for straight-handled rods. It'll give the surfer and musky fisherman the backlash-free distance he needs without sacrificing the needed strength of straight-handled rods. The same company will also introduce a new fresh water model, the ZeeBee which uses the new Kralastic MH plastic to produce a reel with all the spincasting features that sells under six bucks.

Reels with gear shifts will begin showing up next year, too. At least three—the big Langley "Dyna-Flo" salt water models, the Denison-Johnson "Sabra" spin-casting reel, and the South Bend "Sup-Matic" spinning reel, will let you shift from high gear for a fast retrieve into low gear for more power for playing heavy fish.

Probably the newest idea at this year's trade show, though, came from the Instant Bait Company of Mattapar, Mass. Its new line of artificial baits is impregnated with fish-attracting scents, activated when the bait hits the water.

Looks like next year, as usual, it'll be almost as much fun to browse through the tackle shops as it is to go fishing. ★ ★ ★

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by B. Richard

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(Continued to page 46)

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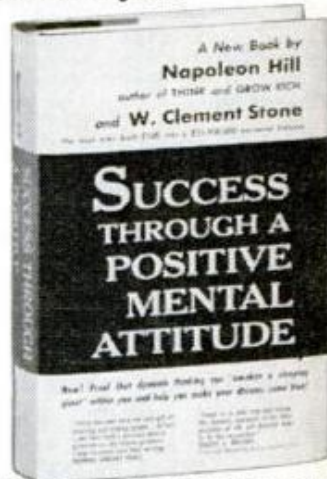
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In addition to practical operational training, private schools often offer technical courses in such subjects as engineering, maintenance and blueprint reading so that students can get the technical background they need to prepare them for the top jobs in heavy equipment operation.

In most cases young men interested in getting started as an operating engineer find their initial training is highly informal. Men without school training ordinarily start as an oiler or helper or are assigned the job of operating simpler machines such as air compressors.

Men without previous training are usually advanced as they gain experience and as openings occur. They proceed gradually until there is a chance for them to operate more complex equipment for which the pay rate is higher.

Because of the informality of this type of training, men who have learned how to operate a variety of equipment in a good school training program can expect more rapid progress and better earnings.

Men who have school training in blueprint reading, maintenance and other technical subjects already have a good deal of the knowledge ordinarily necessary for supervisory jobs. This gives the trained school graduate an added advantage over the man who picks up all his training on the job.

Job opportunities for operating engineers are not limited to large-scale construction projects. One of the advantages of this field is that operating engineers can find employment in a variety of industries. For example in factories and mines, machine operators handle cranes, hoists and other power-driven machinery.

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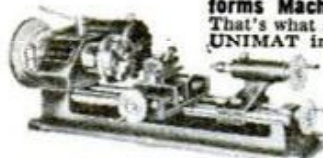
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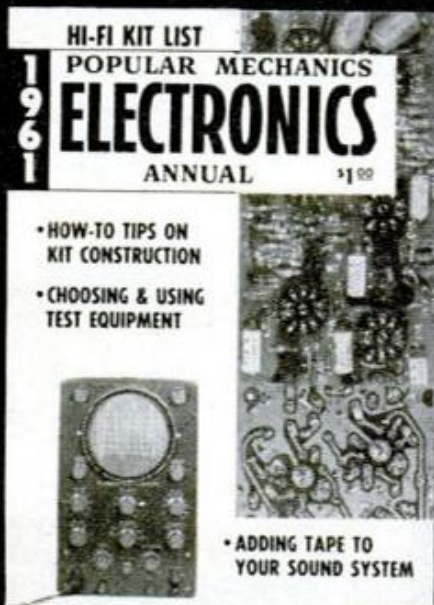
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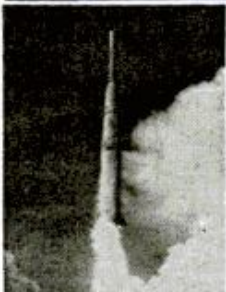
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By Theodore Berland

IF YOU'RE LIKE many Americans, the first thing you do after waking each morning is flip on the radio. Not that you necessarily hanker for rise-and-shine music—it's the weather you're interested in.

Unless you're a resident of Honolulu, where you know each day will be a pleasant one, or a Los Angeles squinter who is sure the smog will rise with the sun, you've come to rely on some announcer to tell you how to dress for the day.

Now from Chicago, a town in which the weather changes as quickly as a woman's mind, comes the comment: "tsk, tsk."

The head-shaker is Prof. Horace R. Byers, head of the Department of Meteorology at the University of Chicago.

Trouble is, says Byers, we just don't look around anymore. If we bothered to watch the sky for weather signs as our grandfathers did, we'd be calling up the radio stations and giving them *our* forecasts!

How do you do it? Well, here are nine simple rules to follow each morning:

1. Throw away your barometer, or at least regard it as only an attractive ornament. You've probably never used it anyway. Just as well. "A barometer, no matter how finely calibrated, can only give you one small clue as to what the weather is like *now*. It responds to nothing more than the pressure of the air currently around you," Byers explains. "It can't tell you what the weather is going to be like, unless you sit there and measure how fast or slowly the needle is moving."

2. Watch the clouds. Notice the direction in which they're traveling; this will tell you from which direction the wind at their level is coming. Also, note the type of cloud.

If it's summer and the clouds are the puffy variety that look like cotton candy, you can be sure of scattered showers. Tricky, those last two words. "Scattered showers" means that it's going to rain here and there. Not even a professional meteorologist can tell you, though, if the rain that's coming will fall where you are.

However, you can tell if the possibilities of rain already have passed you by. Easy. Watch for lightning or for those towering majestic clouds with thin caps known as

(Continued to page 52)

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thunderheads. Note the direction in which the clouds right over you are moving. If the lightning is flashing from the east and the wind is coming from the west, for example, you know the storm has passed.

3. See if the sun is out. If it is, and the season is summer, you're in for a blisterer. If it's winter, and the sun is alone in the deep-blue sky, it's probably the coldest day of the week and is not likely to warm up right away. "Clear winter days represent cold air. The sun is not a powerful heating factor then," Byers points out. "On the East Coast, particularly, the sunniest days are the coldest because the winds sweep down from the Appalachians, leaving the clouds behind."

4. Keep track of the wind. In the winter, winds from the west and northwest mean it's going to get colder (except just east of the Rockies, where the famous snow-melting chinooks sweep down from the mountains); southerly winds (from the south) mean warmer days are coming. In the summer, southerly winds always mean the humidity is going to rise; southwesterly to northwesterly winds (except at the Pacific Coast) tell you the air will get drier.

5. If, after the sun is supposed to have risen, the morning is so gray you have to turn on the lights, and there is a stiff wind blowing, you're in for a storm. If there's no wind, or if the morning is just lightly gray, there probably will be no rain or snow.

It may be difficult to gauge how dark the morning is because your eyes adjust themselves to darkness. The most reliable guide is a photographic light meter, suggests Byers. On a genuinely rainy morning, point it at the horizon (or, if you're a city dweller, toward where the horizon should be) and record the reading so you'll be able to predict by meter reading the next time.

6. Look around as you walk your dog before retiring. If it's spring and the night is still, expect a drop of 10 degrees by dawn. Look at the sky. It can tell you something about tomorrow. For instance, if there are a jillion stars out and you notice that a mild wind is coming off the land, you can be sure that tomorrow's top temperature in winter will be 10 degrees higher than the morning temperature, or in summer, 20 degrees higher. If you live in the mountains or desert, add another 10 degrees.

7. Don't pay attention to the relative humidity figure you are given. It tells you

(Continued to page 56)

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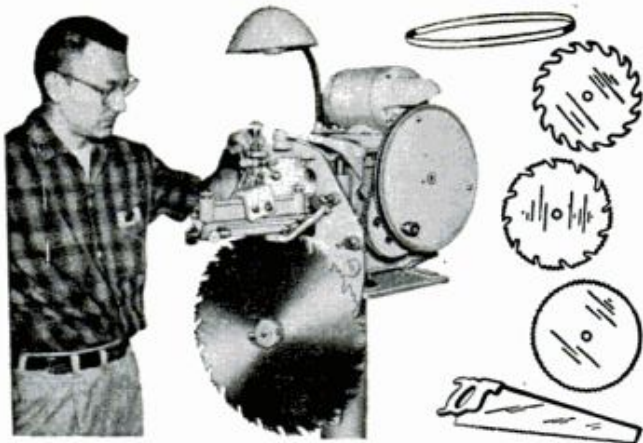
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nothing about comfort. The new temperature-humidity index tells a little more, but the dewpoint is the real indicator. That's the temperature at which the moisture in the air will condense or form dew and then fog. Some radio stations reveal it with aviation forecasts. Any local weather bureau will give it to you over the phone. The general rule is that 55 or lower is comfortable. You can take your own reading by swinging a wet-bulb thermometer around your head (to induce evaporation of the thermometer's wet wick, Byers explains). The rule here is that below 60 is comfortable.

8. If you live near the South or East coasts of the United States, and the wind is pounding and gusty, and you're sure a storm is brewing, act quickly. Flip on the radio and listen for advice to evacuate or stay put. Those are the symptoms of a hurricane, which usually strikes in late August or September. If you live in a "tornado alley" where people still talk about the tornado of a few years back, be wary of violent spring thunderstorms. They often breed twisters during March to June and the funnels often follow the same routes.

9. What about rheumatism and corns? Sure, says Byers. Both are good gauges of humidity. So is human hair (which is used in humidity gauges). If your hair is naturally curly or naturally straight, high humidity will tend to return it to its original state. "As for myself, I can always tell when the humidity is rising by an ache in my neck," he says.

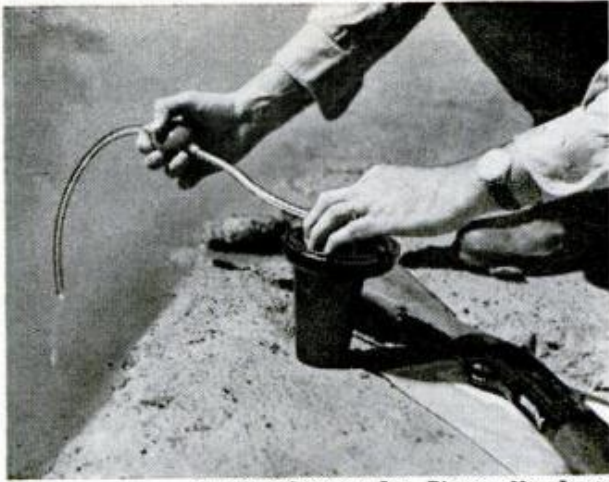
Those are the basic rules. All you need are open eyes, although a thermometer and light meter will help. If you're interested in pursuing the science of meteorology further, you can buy combination wind-direction, wind-speed, barometer and rain-fall gauges in a range of prices, from a few to a few hundred dollars. There also are plenty of books available that will teach you to read weather maps, explain what weather "fronts" are, help you identify cloud types, and assist you in becoming an amateur meteorologist. The one to start with is "Weather Forecasting." It's available for 25 cents from the U.S. Government Printing Office, Washington 25, D.C.

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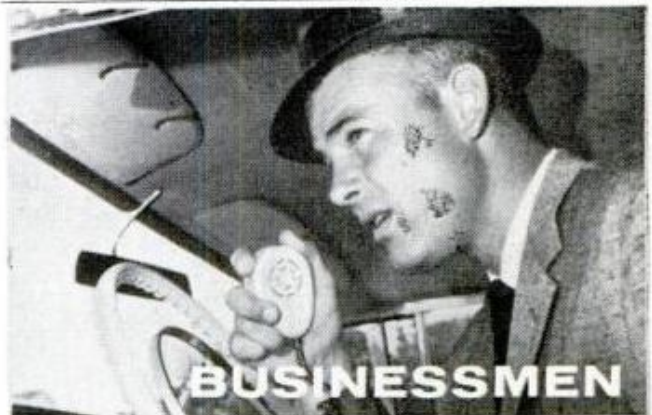
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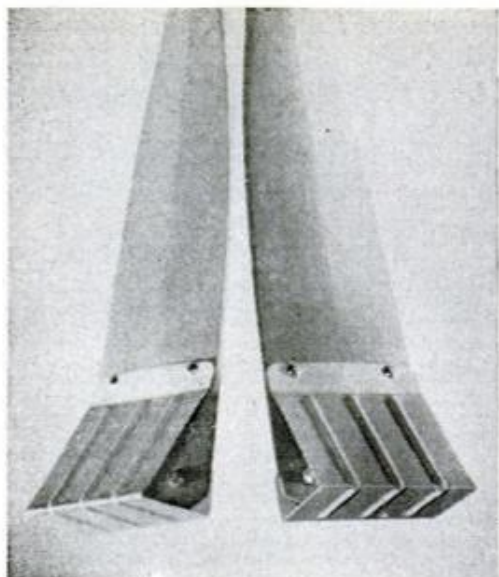
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NEW Car thief signal. Lightning seller. Thirty day trial. Northwest Electric, 505, Mitchell, South Dakota.

ANSWER Ten ads, ten seconds. Personalized postcards carry your message. You just address. Sample free. Rafters, North Boston 10, N. Y.

MAKE Big money selling famous Swami polishing cloths, treated with General Electric Silicone oil. Over one million sold. Write Swami Cloth, Box 11, Great Neck, N. Y.

SELL Electric chord organs to homes, churches, clubs. Multivox, 565 Sixth Avenue, New York 11.

\$300 WEEKLY Selling electronic overhead door controls to garage door dealers. Transmatic Co., Sedalia 3, Mo.

AGENTS—300% Profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 1217-D West Newport, Chicago.

NEW Sleeping comfort means generous profits with Electro-Warmth. Beats electric blankets 10 ways, costs less. Adds no top covering you sleep on it. Best season starting. Patented Products Corp., Dept. PM-1060, Danville, Ohio.

CHRISTMAS Cards—with customer's name imprinted. Personal and business designs—all in one album. These deluxe cards pay deluxe commissions. Earn \$300 to \$500 (plus bonuses) easily this season, even in spare time. Sales experience unnecessary. Free sales kit includes sample album and easy-to-follow selling instructions. Send for kit now; pocket profits next week! Write: Process Corp. (reliable for 39 years), Dept. PM-4, 1954 S. Troy, Chicago 23, Ill.

MEN-Women agents: Sensational new moneymakers—beautifully hand-pointed, plastic personalized photo enlargements, compacts, rings, bracelets, lockets, etc. Simply take orders, pocket 40% commission. We deliver and collect. Sales outfit free. Novelco, 3343 North Ave., Chicago 47.

SEEKING New products? Get my outfit 47 money-making specialties. Latest conveniences for home, car. Send no money. Just your name. Kristee, 76, Akron, Ohio.

"FOG-STOP" Windshield cloth. Instantly removes blurry mist, frost, sleet, snow. Stops windshield fogging. Samples sent on trial. Kristee 75, Akron, Ohio.

\$25 DAY Easy with 60% profit: Friends, neighbors will thank you for demonstrating new beauty secrets and glamorous ways to use famous Studio Girl Hollywood Cosmetics. Information I send quickly qualifies you as beauty advisor. \$5.00 hour for spare time alone or \$25 day full time. Send name on postcard to me personally for free samples, details. Harry Taylor, Studio Girl Cosmetics, Dept. 12010X, Glendale, California.

FAST-Selling specialties—Jewel Cleaner, Bouquet-Magic, many others. Excellent profits. Free catalog, special offer. Shaklee Products, 300 12th St., Oakland 7, Calif.

YOUR Own business—Used suits \$1.50; overcoats 65¢; mackinaws 35¢; shoes 12½¢; ladies' coats 30¢; dresses 15¢. Enormous profits. Catalog free. Nathan Portnoy Associates, 2109-AA Roosevelt Road, Chicago 8, Ill.

AUTOMATIC Fire extinguisher. Salesman costs \$3.95. Out-O-Matic, 1737B East 31st Avenue, Denver 5, Colorado.

REAL Diamond rings. Nationally advertised. Sell direct. Make big middleman's profit. No investment. Experience unnecessary. Free catalog, details. Gleamlight, 111-B9 North Columbus, Mount Vernon, N. Y.

NEW 29¢ Kitchen gadgets. 300% profit. Sensational sellers—housewives, stores, mail. Catalog free. Two samples 25¢. Dohn-MN-Marks, Broadview, Illinois.

100% PROFITS From new sensational birthday candle. Free details. Mayflower House, 14401 Shadywood, Plymouth, Mich.

BE The Popular Mechanics representative in your neighborhood and earn big profits in your spare time. Write Popular Mechanics, Room 10-A, 250 West 55th St., New York 19, N. Y.

PRINTING. Advertising salesmen—Excellent moneymaking sideline selling decalomania name plates, small quantities. Automobile initials, sign letters. Free samples. Ralco, XL, Boston 19, Mass.

SELL Champion, AC, Autolite spark plugs. Reconditioned, electroplated, guaranteed 10,000 miles. 100% profit. Free sample. Lee Plugs, 1608-E Roberts, Houston 3, Texas.

START Making money now. Earn top commissions taking orders for all magazine subscriptions. Friends and neighbors are your prospects. No experience needed. Write for free money-making kit. McGregor Magazine Agency, Dept. 5A, Mount Morris, Illinois.

RUN A spare-time greeting card and gift shop at home. Show friends samples of our new 1960 Christmas and all-occasion greeting cards and gifts. Take their orders and earn to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. Regal Greetings, Dept. 79, Ferndale, Mich.

MAKE Up to \$50.00 a day soliciting delinquent accounts. Terrific commissions. Write today. National Credit, 304Y Pickwick Bldg., Kansas City 6, Mo.

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FREE! Beautiful Mexican curios! Rush 30¢ stamps mailing. Sylviak, Apartado 9036, Mexico City.

MAKE Profitable men's-women's wear. Sample free. Sunmade, Brockton 64, Mass.

SELL Amazing glow-in-dark pictures. Big profits. Samples free. Madison Mills, 303 Fourth Ave., New York 10, N. Y.

SPARETIME Profit. New household item. Every housewife a customer. 10¢ information. B. Schueter, 1600 Decarie, St. Laurent, Quebec, Canada.

YOUR Ad in this space will get some good agents for you. Yes, I'll prove it. Write for Folder "A" right now. P. W. Johnson, Classified Advertising Manager, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill.

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2,000 PAGES Wholesale catalogs! Write: Mosaser, Box 47-B, Newark, Ohio.

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WHOLESALE Catalog. You profit. Free details. Loeber, 224-E Wyatt, Lincoln, Ill.

FACTORY Prices! Thousands nationally advertised products. Typewriters, housewares, jewelry, watches, appliances, television, cameras, etc. New factory buying plan saves up to 40% below wholesale. Details free. Factory Supply Company, Bloomfield 2, New Jersey.

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WHOLESALE! World's largest supply. Buy from 679 American, European, Japanese wholesalers. Tailormade suits from Hongkong. 123 dropship catalogs. Rock-bottom prices. Free details. International Buyers, 216-M Jackson, Chicago 6, Illinois.

NEW DeLuxe Multicolor wholesale catalog, automobile catalog, and others. Nationally advertised merchandise. Housewares, appliances, refrigerators, freezers, washers, dryers, television, radios, rugs, furniture, sewing machines, clothing, luggage, binoculars, phonographs, musical instruments, recorders, cameras, projectors, typewriters, power tools, toys, notions, sporting goods, watches, jewelry, novelties, vitamins, drug sundries, cosmetics, books, school supplies, practically everything. Famous brands. Huge discounts up to 40 to 70%. Postcard: Selbyco, Decatur 5, Illinois.

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BUY Direct from factories. Appliances, cameras, watches! Free details! Cam, 116 Malden Street, Worcester, Mass.

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DUPLICATING Machines. Write: Debbie-Lynn, 4425 E. 57th St., Maywood (B), California.

WHOLESALE Typewriters, business machines. Free catalog. Continental Distributing Company, Box 71, Temple City, California.

MIMEOGRAPH! 3500 Copies hourly—in colors! Details. Scheetz's, Sellersville, Penna.

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PHOTO-Offset, samples, prices free. Litho, 53 Laurie, Fort Walton Beach, Fla.

1000 2-COLOR Business cards (3 ply), 6 lines \$3.50 postpaid. Free value packed catalog. Emco Printing, P. O. Box 4322, Dallas 8, Texas.

1,000 BUSINESS Cards. Raised letters \$3.95. Samples. Pioneer, PM-10, Island Park, N. Y.

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LOWEST Prices. Personalized printing, labels, rubber stamps. Miller, Box 859, North Miami, Florida.

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PRINTING Unlimited, postpaid! Free catalog. Cargman Press, 5925 Franklin, Hollywood 28, California.

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LETTERHEADS: 500—\$4.50. Free sample, Carlayne, 1803 Fremont, Rapid City, South Dakota.

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MIMEOGRAPHING Service U.S.A. Swanson, 834 (X) Harvey Road, Toms River, New Jersey.

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INDEXED, Cushioned 3 line stamp \$1.00. Each additional line 25¢. Stock stamps, novelty stamps, stamp pads. Rubber Stamp Service, 109 North Hyatt St., Tipp City, Ohio.

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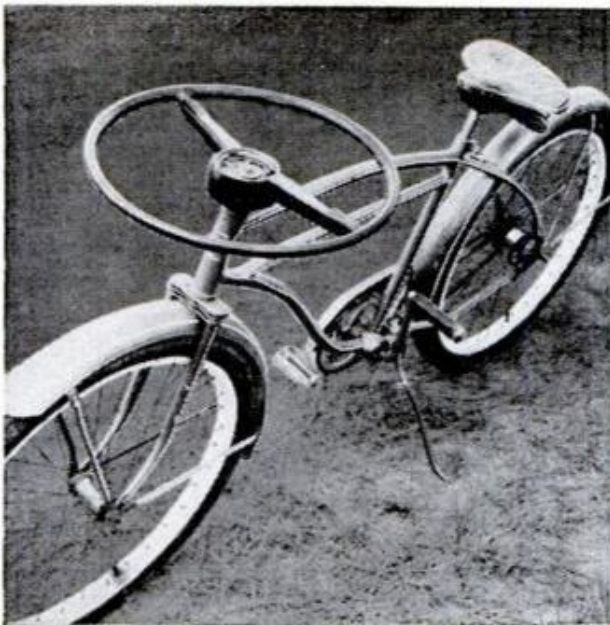
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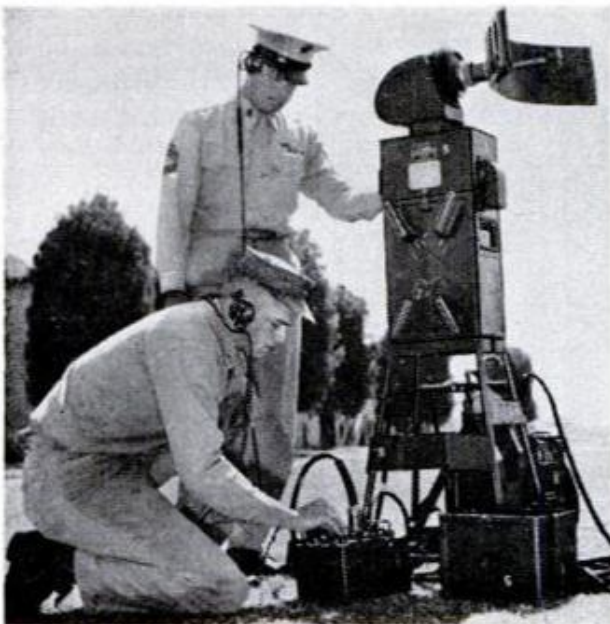
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OCTOBER 1960

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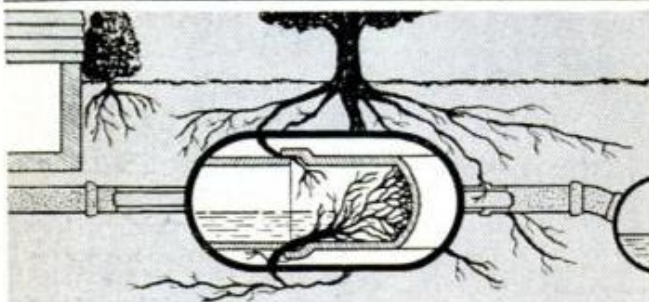


Convair Division, General Dynamics Corp., 3165 Pacific Highway, San Diego 12, Calif.

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the tail. Another version has only the two nuclear engines. Stabilizers and rudders are on the wing tips, and the elevators near the nose. This canard configuration places the crew 100 feet from the atomic power plant. It's expected to fly 600 miles an hour.



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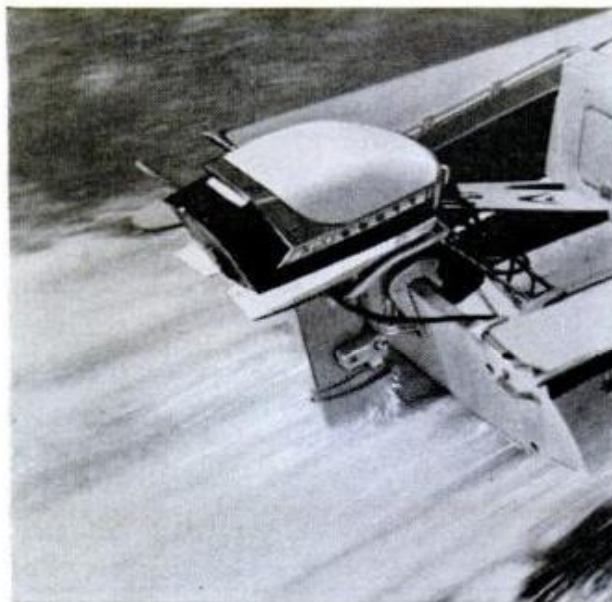
1961 OUTBOARDS-



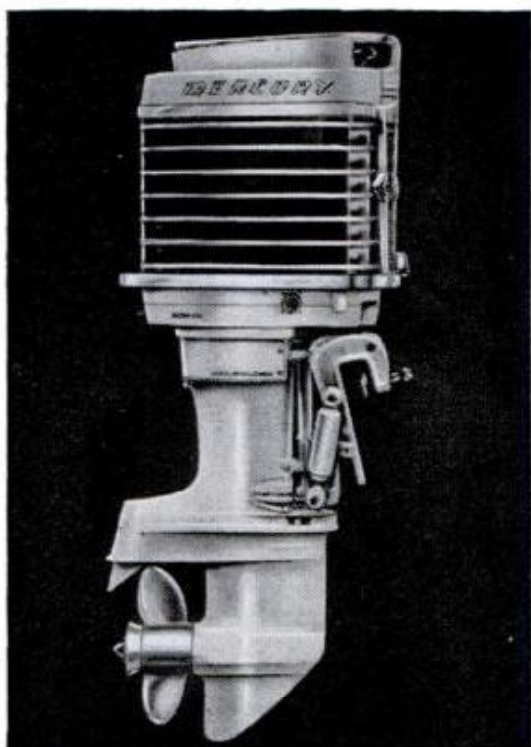
NEWEST OF THE NEW MOTORS for '61 is the West Bend Tiger Shark 800, above right, a tall, four-cylinder in-line rated at 80 horsepower. Its introduction gives West Bend the broadest horsepower range in the business, with motors rated at 80, 40 (above center), 25 (above left), 18, 12, 7½, and 2 horsepower. Two innovations in the line are a full year's warranty on all motors and no fuel tank, so the customer can pick either the six or 12-gallon tank or none if his tanks are built into his boat (the motor prices are cut accordingly). And the little two-horse "Shrimp" features an unbreakable nylon prop

JOHNSON MOTORS' Super V-75A for next year features many refinements led by a transistor-regulated a.c. generator rectified to convert to d.c. to operate all sorts of electrical accessories—ship-to-shore phone, depth finder, refrigerator, lights, or even a baby bottle warmer. Other developments are fixed high-speed carburetor jets, new remote controls, improved soundproofing, permanent power cable connections, starting in gear at low speeds, and panel lights

SCOTT'S BIGGEST, the Flying Scott, remains the smallest and lightest motor in its power range—engineering improvements raise the horsepower of the '61 model from 60 to 75.2 with no increase in weight. With a carburetor on each of the three cylinders, it gives faster acceleration, but a 15 percent fuel saving over last year's Flying Scott. Scott de-emphasizes horsepower by removing numbers from their hoods, but motors rate at 75.2, 43.7, 27.7, 14.1, 7.5, and 3.6



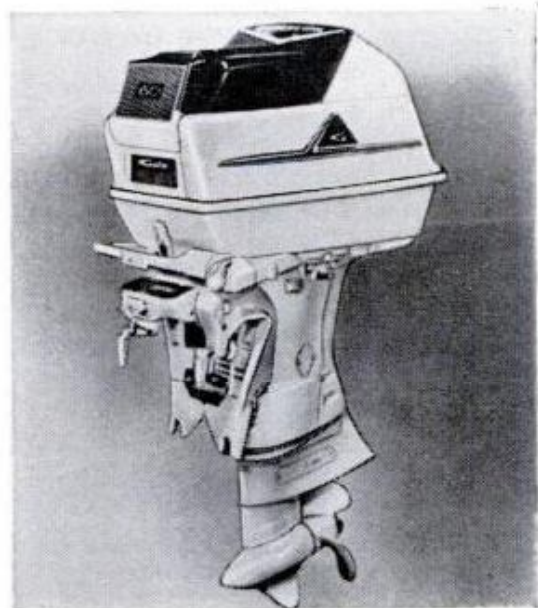
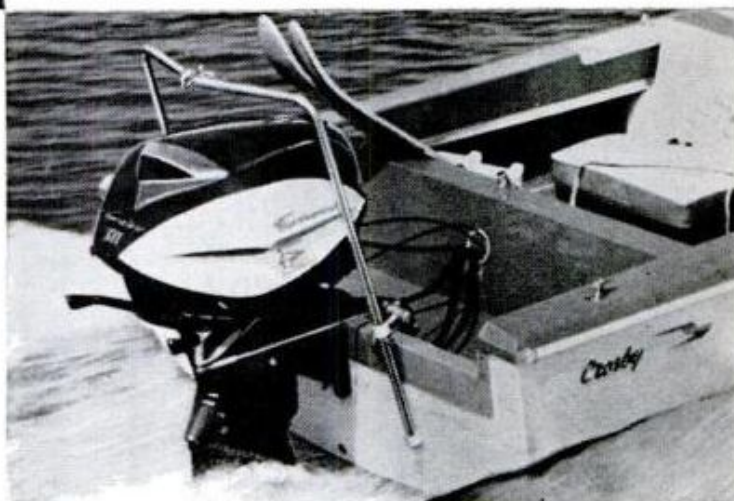
THE BIG KICKERS



Here's a look at the future for big outboard fans—the leaders from the "big six" manufacturers for next year...

BIG NEWS AT THE KIEKHAEFER CORP. is a full forward-neutral-reverse gearshift on their six-cylinder Mercury motors, the 80-hp. Merc 800 (left) and 70-hp. Merc 700. (The old direct-reversing models, preferred by many experienced outboarders, remain in the line). Also new are the 50-hp. Merc 500, 40-hp. Merc 350, and an entirely new fishing motor, the 6-hp. Merc 60. Others in the line are the 45-hp. Merc 400, 22-hp. Merc 200, and 9.8-hp. Merc 100. Accessories, like a choice of ten props for some motors and remote controls for all motors, offer the industry's widest choice of options

EVINRUDE'S new shroud, created by designer Brooks Stevens for sound control, has no flat "talking surfaces" and no abrupt angles, plus a new sound-absorbent material inside, so their quiet 75-hp. Starflite III is even quieter. Other features include fixed-jet carburetion, a.c. generator that charges at idle speed, dash-panel warning lights, and others. Other motors in the line rate at 40, 18, 10, 5½, and 3 hp.



GALE'S '61 line features styling and engineering changes—the most noticeable will be the addition of bright "Buccaneer Orange" as highlight color on the Buccaneer models (40, 25, 15, 5, and 3 horsepower), and new "Mariner" styling on the whole Gale Group. The big Sovereign motors, the 60 (left) and 40 Electric, feature quick-disconnect electrical systems for easy installation and service, the advanced "torpedo" lower unit with a new half-spoon sized exhaust to reduce water disturbance, and the universal-type motor mounting bracket, cast in one piece and adaptable to any transom



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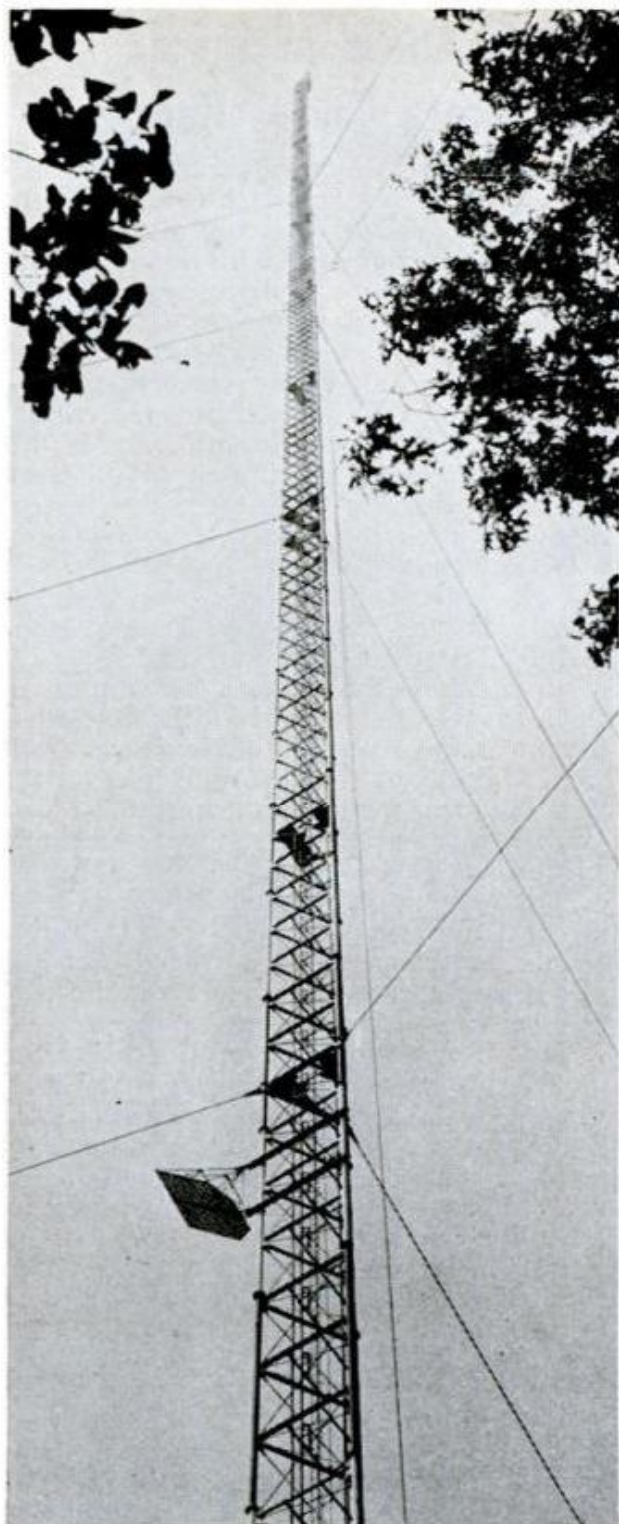
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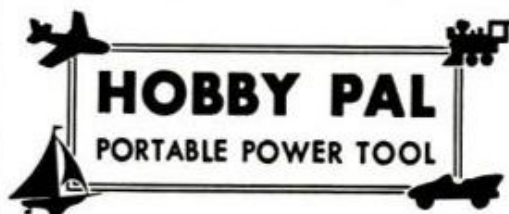
Mighty Tall Tower

Up, up, up—the television tower of Station KFVS, Cape Girardeau, Mo., reaches 1676.55 feet into the sky. It is 204 feet taller than the Empire State Building, the world's tallest building. The new tower is constructed of nickel-alloy steel in 30-foot triangular sections and stands on a concrete base supported by 18 guy cables. Weight of tower and guys exerts two-million pounds of pressure on the base, or a pound for each person in the six-state area who now receive KFVS' programs.

OCTOBER 1960



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Who's Ahead in Space? It's Like a Caucus Race

In "Alice in Wonderland" the Dodo tells Alice about a race in which everyone runs around in circles, starting or stopping whenever they choose, with no real beginning or end. And everybody wins.

The race for space resembles a caucus race. It began Oct. 4, 1957—when Russia launched Sputnik I—but since then it's a little confusing. The contestants (satellites) are all going off at different times in different directions, all aiming at different goals and using different means (instruments) of reaching them.

Who's ahead?

Well, everybody is, so everybody is equal. But, as they say in Russia, some people are more equal than others.

Russia certainly was first in some areas, the first satellite (Sputnik I), the first satellite to carry something alive (Sputnik II with Laika), the first satellite to orbit the Sun (Lunik I), the first to hit the Moon (Lunik II), and the first to produce pictures of far side of Moon (Lunik III).

But we're ahead, too, and perhaps even more ahead than others.

Our satellites have:

Discovered radiation belts around Earth, perhaps most important discovery to date.

Used Sun's rays as source of indefinite power. Vanguard I, which may orbit 1000 years, is still sending signals with its solar battery nearly three years after launching.

Discovered Earth is pear-shaped.

Made first pictures of Earth from space. Studied weather, sending back thousands of pictures of world's cloud cover.

Set up navigation signals for ships, a forerunner of world-wide navigation system.

Detected missile launchings from Earth, a forerunner of defensive satellites.

Broadcast first voice messages from space, using both active (sending) and passive (echoing) satellites, forerunners of world-wide communication systems.

Recovered first satellite from orbit, a forerunner of what must be done with manned space ships.

And made additional studies of Earth's magnetic field, environmental conditions in space, solar X rays and cosmic rays, all preliminaries to successful space travel.

Beginning next month, to bring some order out of this apparent chaos, PM's space writer, Dr. Dan Q. Posin, will focus his "Eye on Space" column on the satellites and explain their significance. His series may help make up your mind about who's ahead in this race for space.



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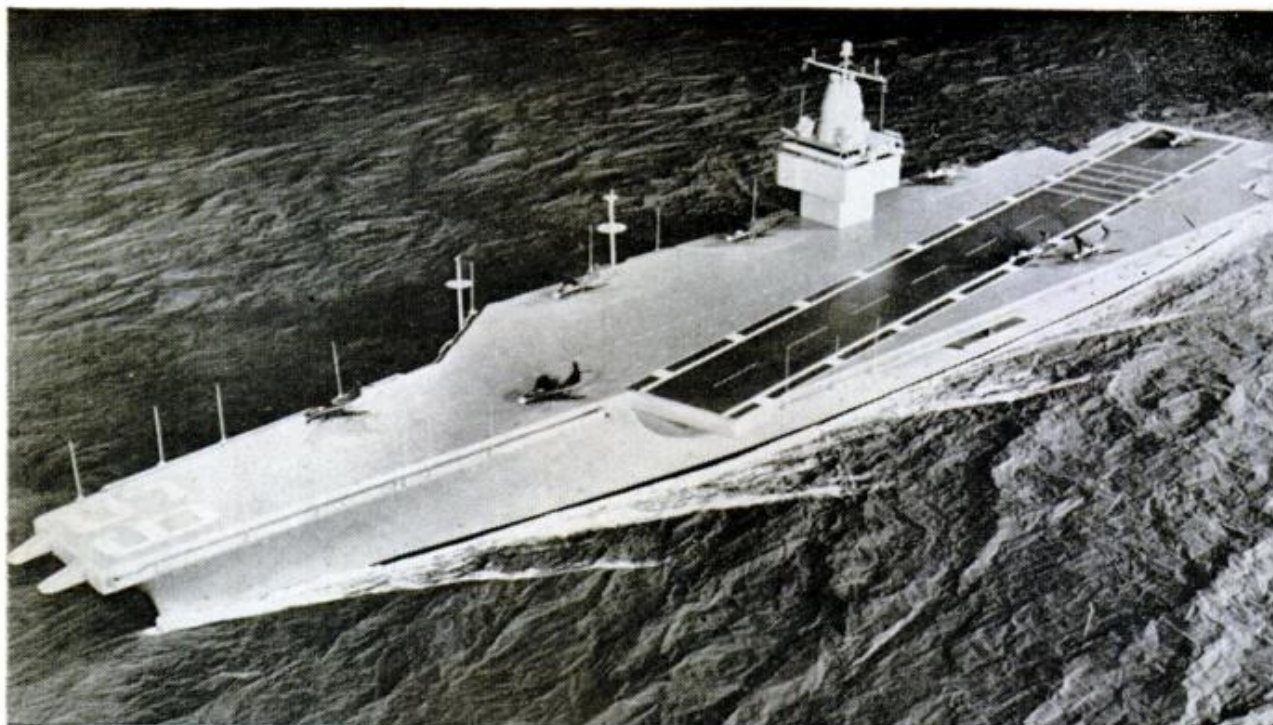
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Nuclear Supercarrier Hits the Water

Largest ship in the world, and the first nuclear-powered aircraft carrier, the USS *Enterprise* was launched last month in Newport News, Va. The flight deck is 1100 feet long and 252 feet wide, and can handle takeoffs and landings at the same time,

making the 86,000-ton supercarrier a mobile air base. Its eight nuclear reactors can operate for five years of normal service use on their first charge of fuel, and can drive the ship at 30 knots for practically unlimited periods.



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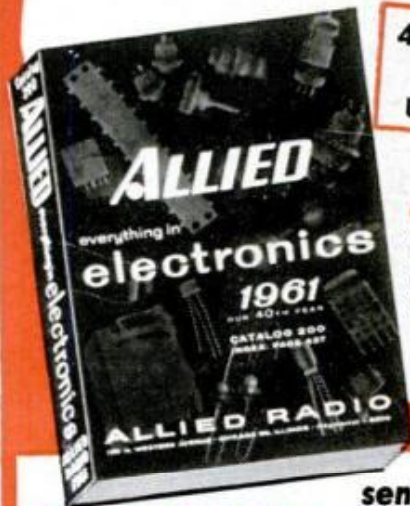
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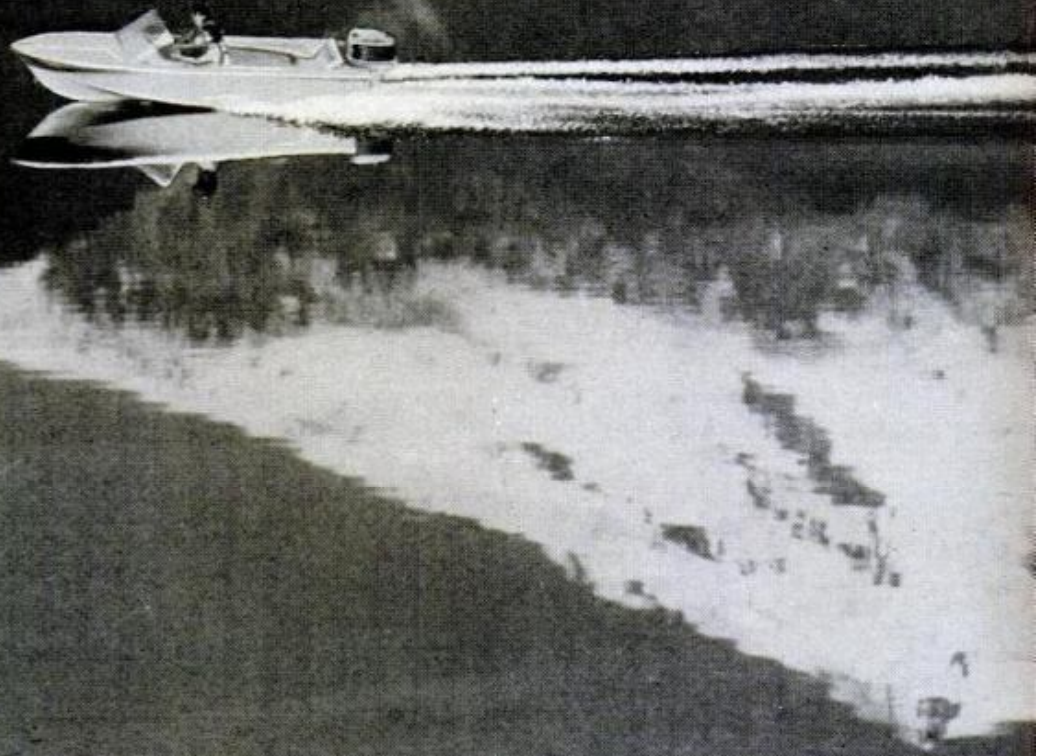
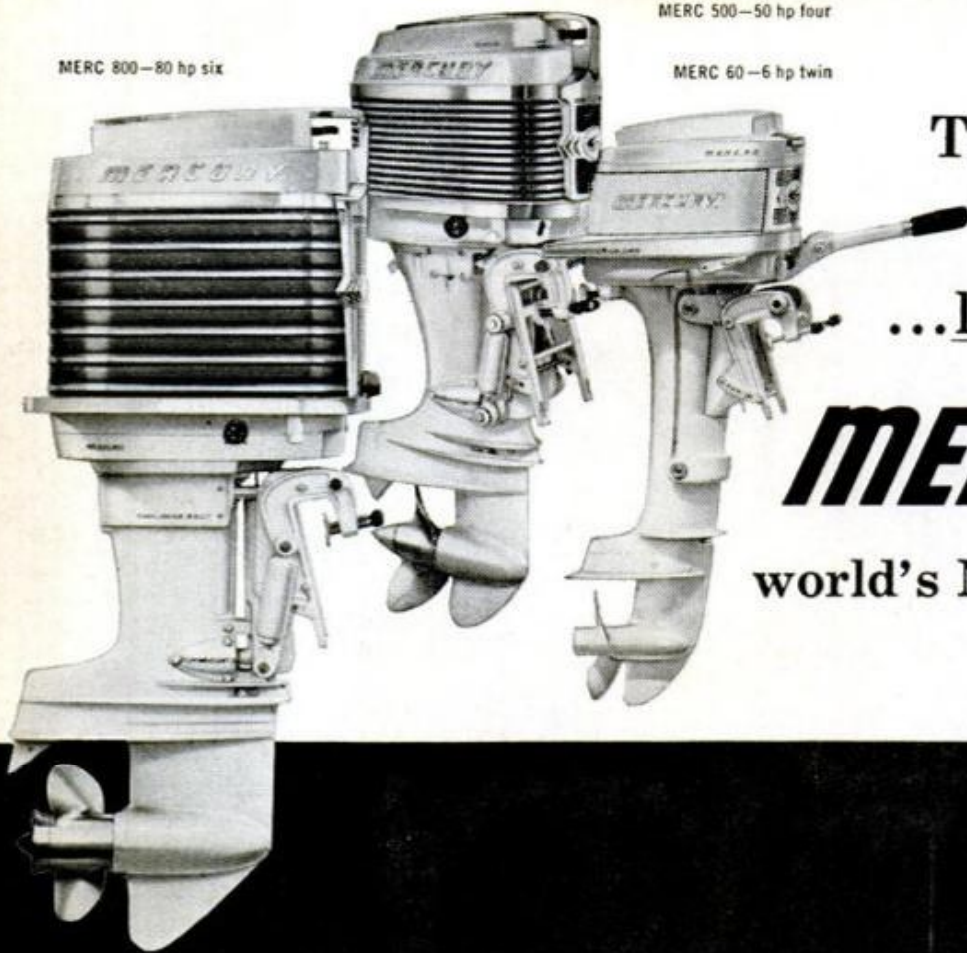
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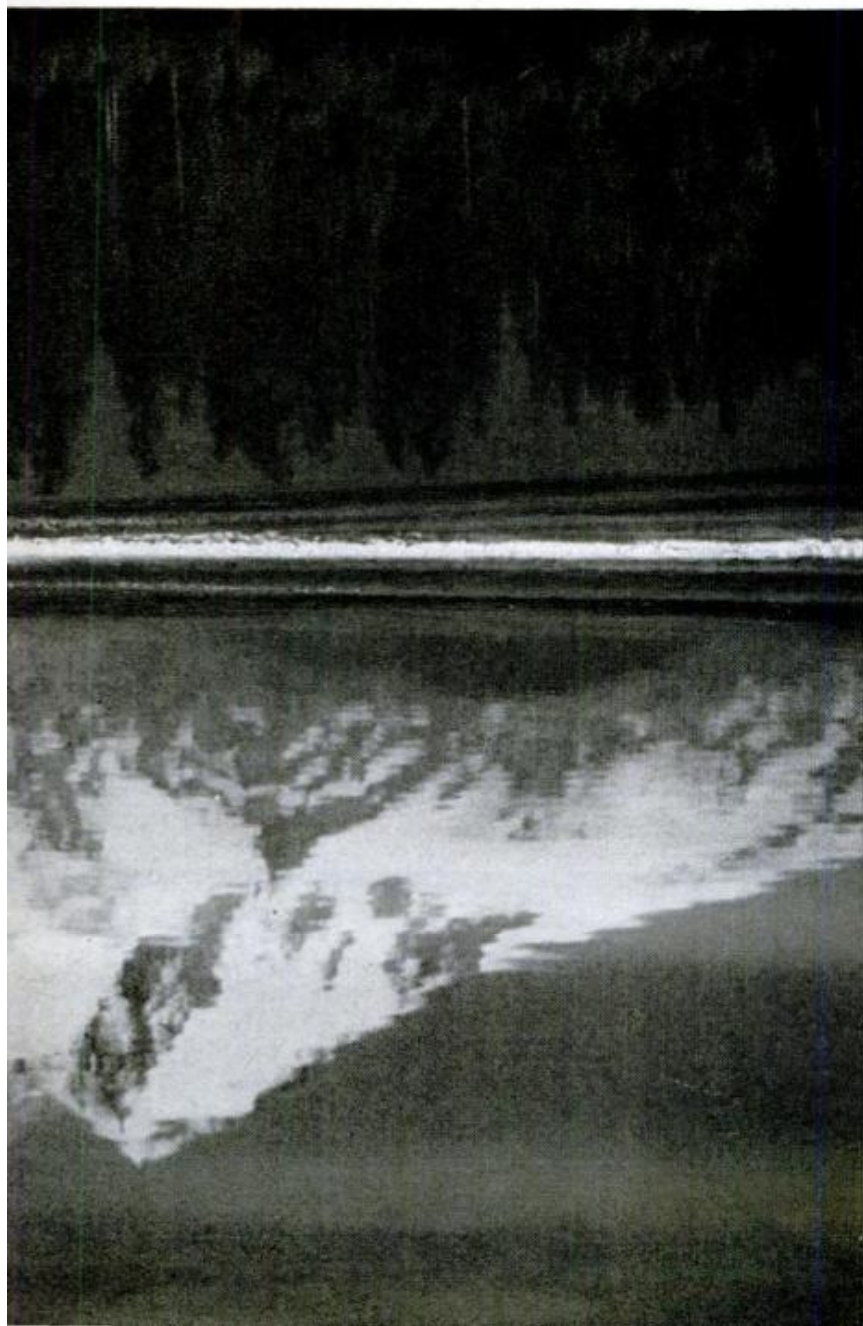


Only 12 years ago Mercury introduced the 10 hp "Lightning" It blazed a new trail for the outboard industry, sparked a family recreational revolution, cracked the inboard monopoly in cruising and skiing power.

The industry's old heads had dismissed the idea of family outboarding, or of a market for motors larger than 7½ hp, when Mercury's "Lightning" struck its new concept: (1) More power, not less; (2) More compactness, less weight and bulk; (3) More durability, with slower-moving, smaller, tougher reciprocating parts; (4) More advanced engineering, using proved aircraft and automotive design principles. Mercury leadership helped boat builders design roomier, safer boats to make family outboarding a reality . . . helped to make water skiing a national sport.

Today, other outboards have "caught on" to Mercury's concept—but they haven't caught up! The motor that started it all, leads them all! See 1961 Mercury and you'll know why.

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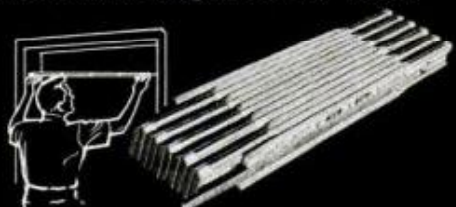
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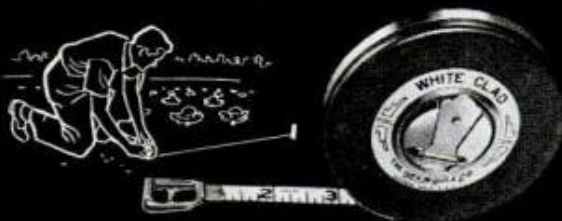
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Spotlight on the **TRIUMPH HERALD**

By Jim Whipple

IF YOU ENJOY driving a sports car like an MG, Triumph TR-3, or Austin Healey, you've probably wondered if the trigger-quick handling and rocklike roadability of these nimble two-seaters could be incorporated in a four-passenger sedan with roll-up windows and a really useable trunk.

Family cars from Europe and Detroit are getting nearer to this ideal every year, but the closest yet for my money is a new economy car called the Triumph Herald. This intriguing two-door sedan is manufactured in England by Standard Triumph Motor Company, Ltd., maker of the justly famous TR-3 sports roadster.

A few other European manufacturers turn out four and five-passenger sedans of near sports-car capabilities, but all are at least twice the Herald's modest price of \$1849 delivered at Eastern, Gulf and Midwest ports.

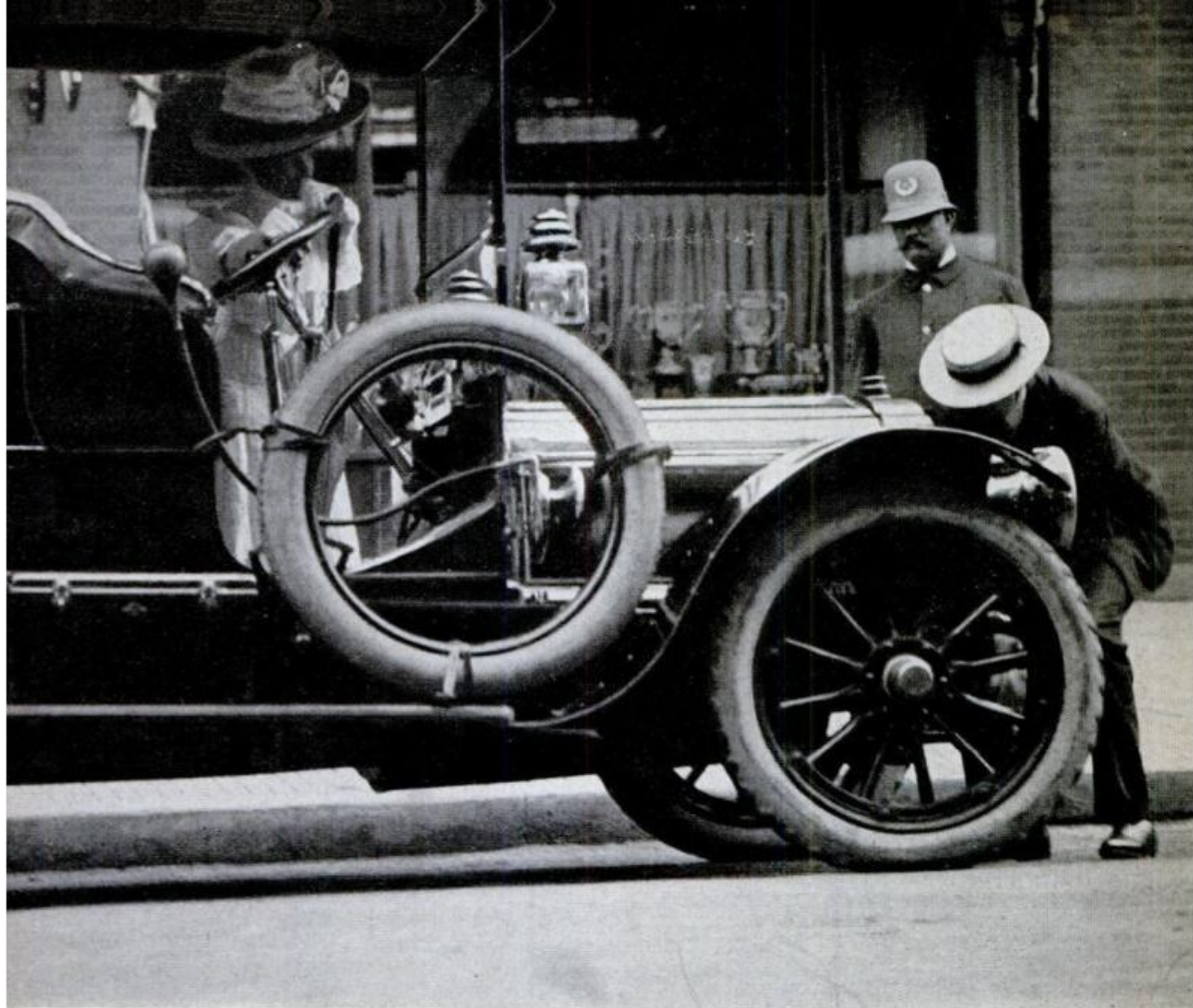
To those who are familiar with the boxy little Triumph four-door sedan that formerly shared salesrooms, but not sales figures, with the TR-3, I hasten to add that the Herald is an entirely different car. It's a fresh design from its rubber-sheathed bumpers—how considerate can you get?—to the crisp contours of its roof line.

Although the Herald is a small car (you might call it a "supercompact") it is by no means in a class with desperately cramped "mini-cars" put out by motor-scooter factories with "big ideas." The Herald is a full, four-passenger car with a respectable 91½" wheelbase, over-all length of 153 inches and a robust weight of 1820 pounds.

Clues as to the nature of the Herald come from the land of its origin and the experience of its maker. It is an economical car

(Continued to page 94)





What torque really means

When grandfather cranked his car, he was applying torque. Torque is simply the twisting effort such as you apply when turning a door-knob.

Grandfather applied torque by pushing down on a crank. (Pulling up was far safer, since it avoided a possible kick-back and a broken arm.) In either case, the torque he generated could have been measured by multiplying the *pounds* of his force on the crank-handle by the length of the crank-arm in feet. Unless grandfather was very husky, his torque probably didn't amount to more than 50 *pounds* times 1 *foot* or 50 *pound-feet*.

Torque is important to you because it, and not horsepower, actually starts your engine and moves your car. Explosive forces

on the pistons of your engine are transmitted by the connecting rods to the crankshaft cranks which generate torque on that shaft. But the largest 1960 passenger car engine generates only 470 pound-feet of torque, which is still not enough to move a stationary car. However, the transmission and differential are able to increase engine torque six or seven times. The rear wheels then convert it into powerful traction at the road surface which reacts to propel the car.

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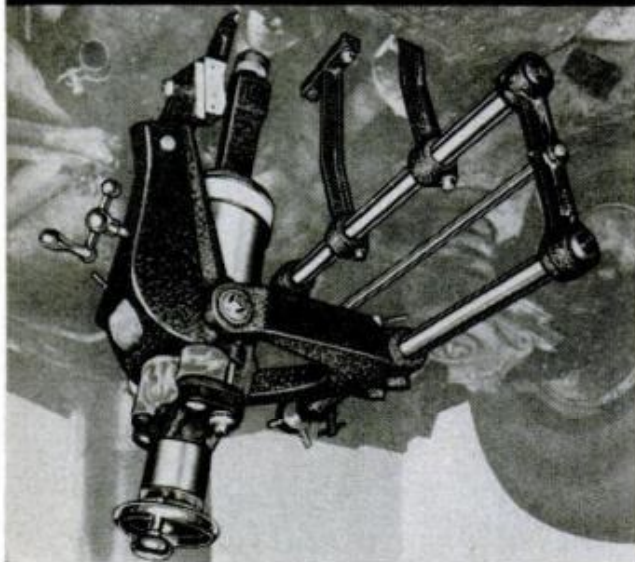
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appealing to buyers in countries where gasoline is very expensive. Thus the small (57-cubic-inch displacement) four-cylinder engine.

This willing little powerplant rolled our test Herald along at 70 m.p.h. with a payload of 400 pounds. On a trip, cruising at 65 m.p.h. for 180 out of 200 miles, gasoline consumption was 30 miles per gallon.

The Herald's designers also had Britain's narrow, winding roads in mind when they packed much of their TR-3's flat cornering and pitch-free stability into the car. These qualities help the Herald's driver maintain a very respectable average speed with as little slowdown as possible on sharp curves.

And yet at the same time Standard-Triumph engineers designed a suspension system that's unusually comfortable on rough-surfaced roads. This makes the Herald one of the top economy choices in countries which lack the smooth-surfaced roads of Britain.

One big reason for the Herald's comfortable ride is the independent rear wheel suspension, similar in principle to that of the tremendously popular Volkswagen and Renault Dauphine.

For secure, near effortless control and nimble action the Herald has rack-and-pinion steering.

The result of this chassis design is a car that gives you much of the roadability and control of the TR-3 sports roadster yet at the same time provides a remarkably bounce-free ride for a small family sedan.

Small though it may be, there's a great deal of useable passenger room built into the Herald. Seats are at a comfortable 12-inch elevation from the floor, yet there's 35 inches of headroom in the front seats, 34 in the rear.

The Herald looks a good deal higher than

(Continued to page 96)

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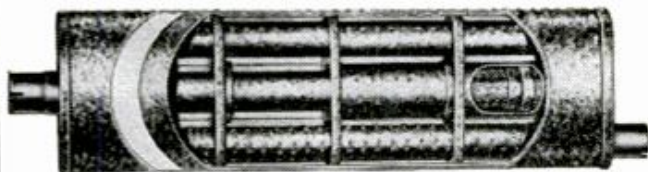


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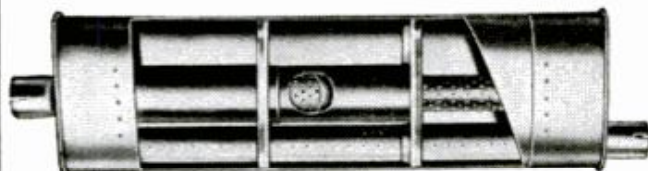


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it is (only 52 inches) because of the crisp, vertical lines of the body pillars and the generous measure of glass area from belt-line to roof. This big "greenhouse" of windshield and windows coupled with short hood and rear deck makes for excellent visibility and easy maneuvering.

Seating is well designed. The individual front seats are both adjustable over six inches of fore-and-aft travel. Vertical adjustment of the driver's seat is made possible by rotating eccentric rubber support blocks around the tubular seat frame thus varying the distance between seat and floor. As a result it's fairly easy to accommodate drivers of many different shapes and sizes.

Seat construction is unique in that interlaced rubber bands replace conventional springwire support for the foam rubber cushion. Upholstery is thick, handsomely tailored vinyl that looks more than a bit like leather. It all adds up to exceedingly comfortable seating, although the non-porous vinyl prompts perspiration in hot weather.

Rear-seat position is comfortable with good back angle and plenty of foot room under the front seats. Knee room is at a premium (just 5¾ inches) when the front seats are all the way back in their tracks. Result, tall rear-seat passengers cannot sit behind long-legged front seat occupants. So, if you plan to travel with more than two six-footers, somebody will be riding with his knees under his chin.

Although the rear seat is narrowed slightly by the encroachment of the rear-wheel housings, the driveshaft tunnel doesn't lump up under the center of the seat, so that three under-teen-age children can ride comfortably in the rear seat.

Incidentally, a considerable plus in the use of the Herald lies in the "station wagon" arrangement of rear compartment and trunk which is made possible by unsnapping the rear seat back. Doing so permits the seat back to swing forward and down, converting it into a board-shod load platform and at the same time revealing a rectangular open hatchway into the trunk. "Converting" the Herald in this manner provides a total of 30 cubic feet of cargo space enclosed behind the driver and front-seat passenger. Thirty cubic feet is approximately half of the capacity of a small American station wagon.

The trunk itself is well laid out with the spare tire countersunk into the floor under the mat. The gas tank is tucked into the left side of the trunk but has a flat smooth side that doesn't threaten scratchable luggage. The trunk opening commences at the bumper level for easy loading.

The Herald is very well equipped, with sun visors, trip odometer, windshield washer, interior light with door-operated switches, full carpeting and an excellent fresh air heater-defroster system, standard.

Owners who choose to do their own maintenance and tuning get a real break with the Herald's one-piece hood-and-fender assembly which is hinged at the front. After a latch on each side is opened, it swings forward to reveal engine, brakes, wheels, suspension and steering mechanism and plenty of room to work on these items.

Ironically, in view of ease of accessibility to the front suspension and steering, you don't need to lubricate anything except the two lower steering spindle bearings and those only every 6000 miles. Considerable bother and expense is thus eliminated for Herald owners.

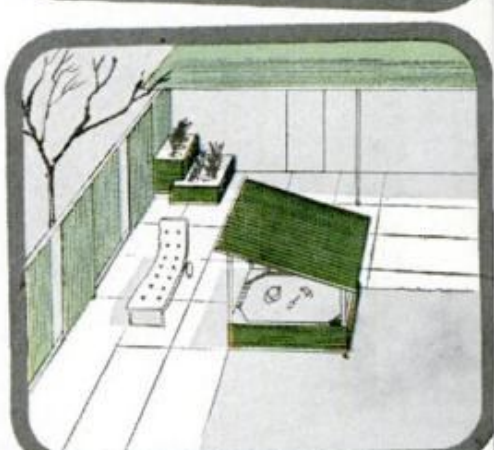
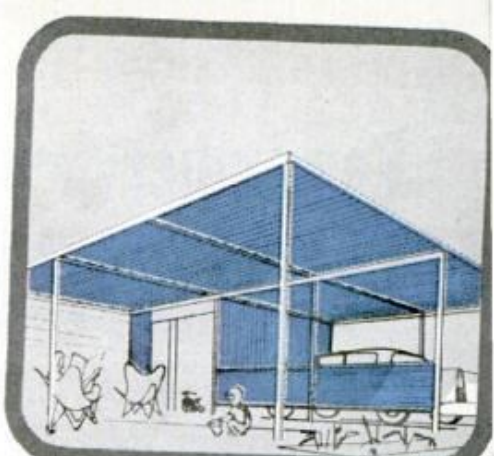
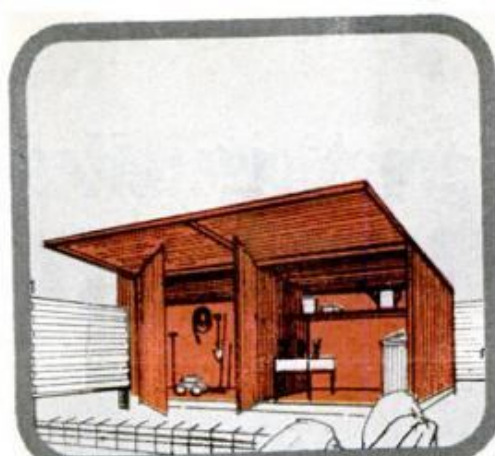
Driving the Herald in traffic is almost as much fun as whipping around on winding country roads, thanks to one of the smoothest four-speed, synchromesh transmissions this side of a Grand Prix racer. The shift control is a proper stick within easy reach of the wheel rim and as quick and crisp in action as any sports car. Synchromesh is on all forward speeds and virtually unbeatable so that you can up or downshift as fast as you can coordinate. The hydraulically actuated clutch is smooth, positive and will take up as fast as you need to.

So far I've built the image of the Herald as a thoroughly enjoyable four-passenger enclosed sports car—a veritable TR-3 or Sprite sedan. Unhappily this picture lacks one important detail; sufficient engine power to accelerate and cruise the Herald at speeds which its really great suspension, steering and brakes would easily permit.

Another 15 or 20 horsepower would permit quieter operation—from the standpoint of engine noise—much pleasanter cruising at higher speeds and plenty of acceleration for traffic and third gear passing.

As a matter of fact Standard Triumph does make a more powerful engine—50 horsepower instead of 40—available on special order at extra cost. This is the engine that is standard equipment in the Herald Sports Coupe and Convertible.

To sum up: The Herald is the most driveable and comfortable of the small economy imports. It is a perfect small car for nimble hopping around town and short trips. With more power it would be almost equally good for cross-country cruising for two adults and a child or two. As it stands it is a well-built, superbly engineered product well worth the consideration of anyone in the market for a car of its type. ★ ★ ★



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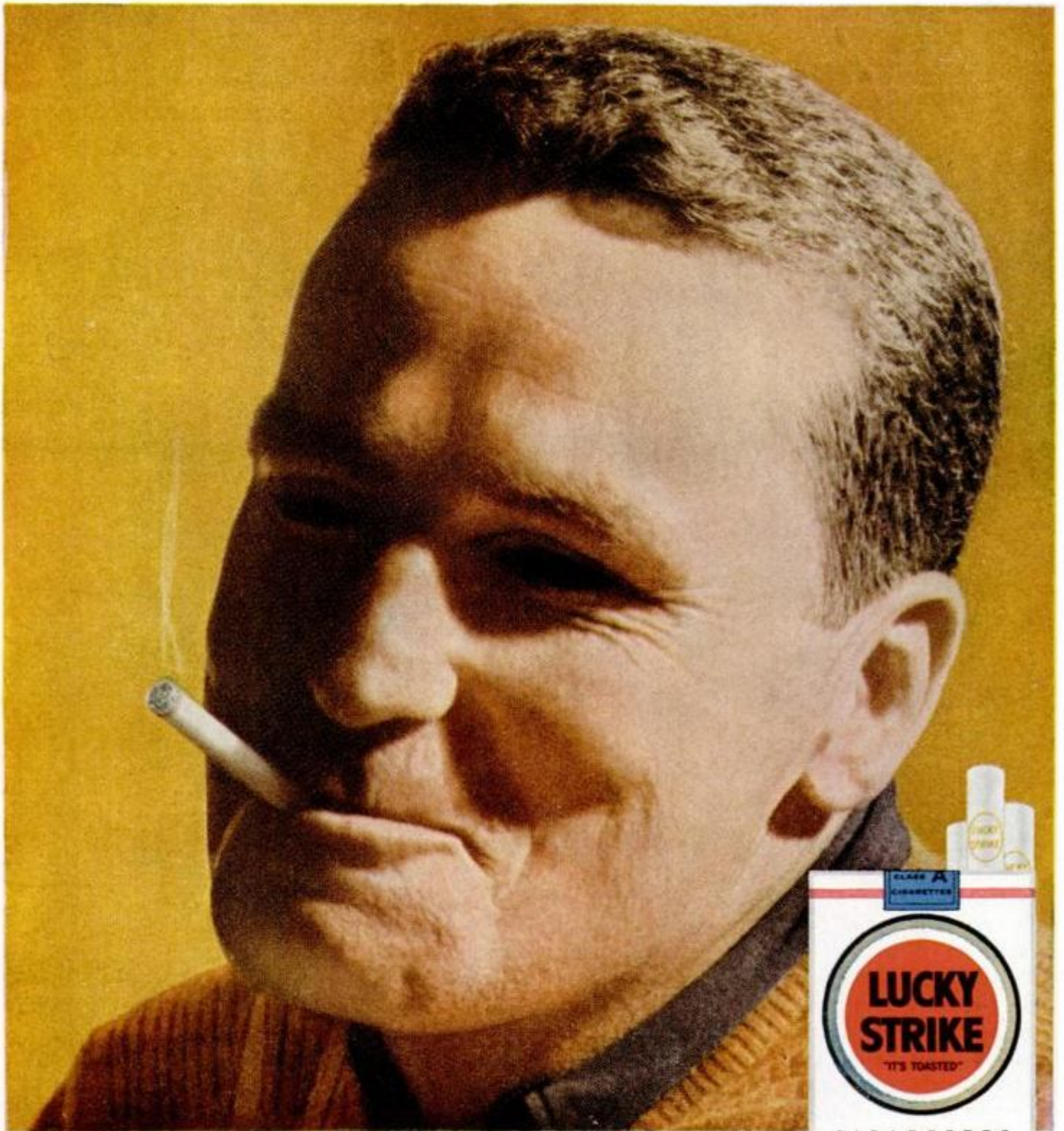
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1961 Special has a different shape, but "portholes" and sculptured panels mark it as indisputably Buick

A Brand New Baby from Buick: The Special

The Special is back and this time Buick has really made it something "special." Not only is this an all new car but it, and its GM companion cars, the Olds F-85 and the Pontiac Tempest, belong in a new and different category.

Compared to the Buick LeSabre, with its wheelbase of 123 inches and over-all length of 17 feet 9 inches, the Special's 112-inch wheelbase and 15-feet-8-inches over-all length would seem to classify it as a compact car. It's smaller too, than the "low-

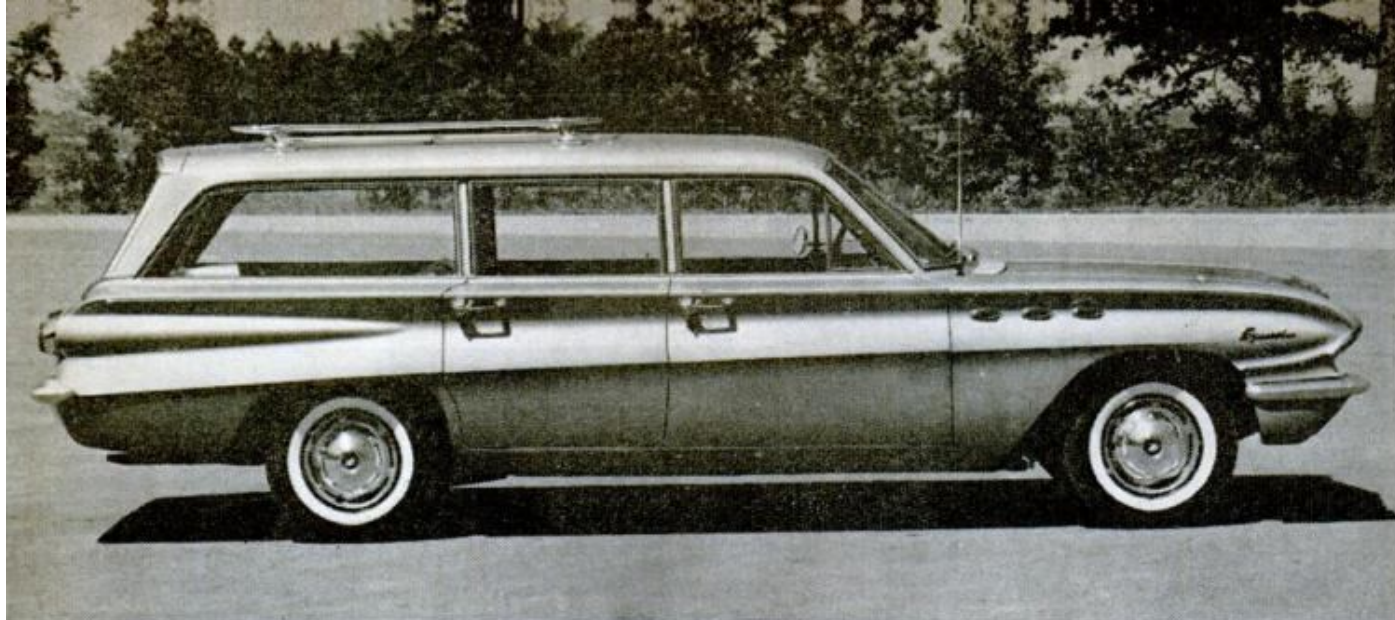
priced" cars like Chevy, which has a 17-foot-5-inch over-all length and 119-inch wheelbase.

Approached from the compact angle, however, we find that the Special is markedly less compact than say Studebaker's Lark which is over a foot shorter.

Semantics notwithstanding—it matters little whether you call the Special a "big" small car, or a "small" big car—it is a bona-fide six-passenger automobile with space inside where the passengers can use it.

The Special has crisp roofline, high windows which make it look taller than its 53-inch over-all height





Special station wagon comes in four-door, six-passenger model only. Tailgate is hinged at top and counter-balanced to swing up-out-of-the-way for easy loading. Chrome-plated roof rack is optional at extra cost

The Special has a brand-new unit construction body in four-door sedan and four-door station-wagon models. Layout is conventional—engine is front mounted, water-cooled and directly connected to the transmission, which in turn, powers a conventional “solid,” unsprung rear axle.

However, within this conventional outline the Special is loaded with engineering innovations.

The all-aluminum engine, for example, is a 215-cubic-inch displacement V-8 rated at 155 horsepower developed at 4400 rpm. Compression ratio is a relatively modest 8.8 to 1 permitting use of “regular” grades of gasoline. In spite of use of iron cylinder bores or “sleeves” cast into the aluminum block, the stripped engine (minus generator, starter, fan, exhaust manifolds, etc.) weighs only 318 pounds.

This engine is of short-stroke design with a bore of 3.5 inches and stroke of 2.8 inches.

Combustion chambers are typically Buick in design with centrally located spark plugs and valves set high on the “inside” or intake side of the heads. Identifi-

cation of the engine is easy because it has the narrow, uptilted valve rocker covers that have marked the Buick V-8 since it first appeared.

The aluminum V-8 has an intake manifold with cast-in water passages that collect the hot water from the cylinder heads and convey it to the radiator top tank. On the way the coolant serves to heat the intake manifold for more efficient operation in cold weather. This eliminates the need for any exhaust crossover passage and thermostat valve to heat the fuel mixture.

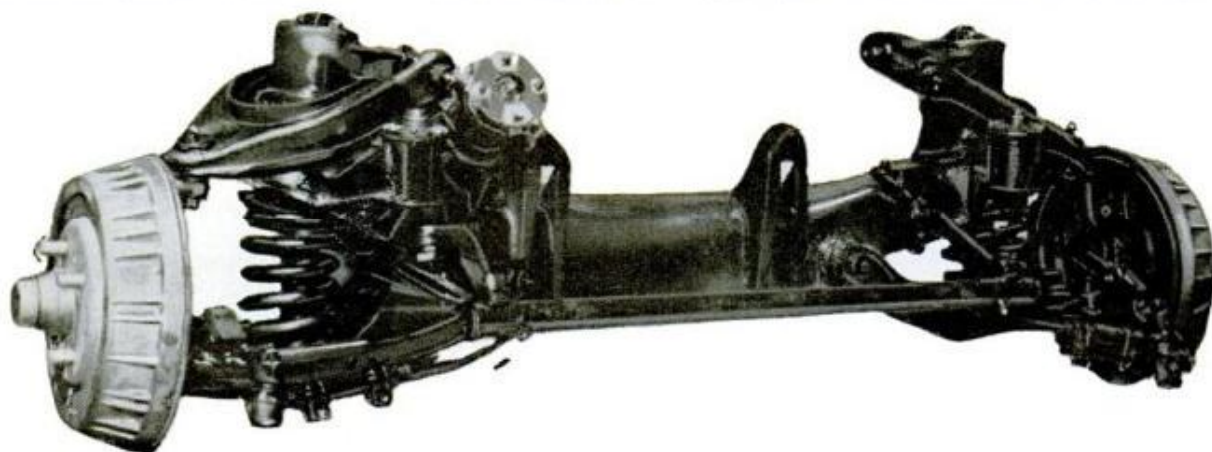
Carburetor is a single, dual-throat model with automatic choke. The exhaust line is also single with a “Y” to each of the four-port manifolds.

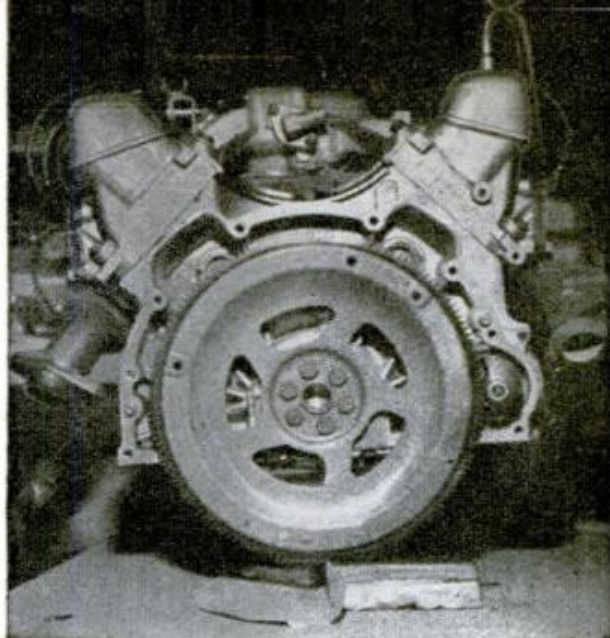
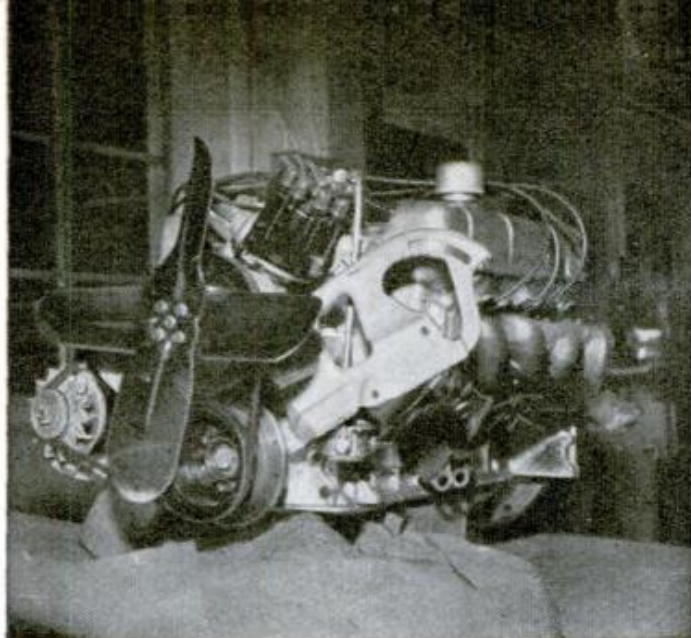
This is “the” engine. There are no options or power packs at this time or are they contemplated in the near future. Engine specifications are the same for both three-speed manual and automatic transmissions.

The automatic, incidentally, is an all-new unit combining two-speed planetary gearing with a 2.4-to-1 ratio torque converter.

This transmission is unique in that after

Complete “package” front suspension for Buick Special is built around heavy, stamped crossmember. It includes springs, upper and lower arms, steering gear and linkage, shock absorbers and rubber mounts





Two views of Buick Special's 215-cubic-inch displacement aluminum V-8. Front, at left, shows accessible distributor and spark plugs. Rear view, at right, shows unique angular valve rocker covers

the planetary gearset has shifted from "Low" to "Drive," the engine's input torque is split—with 36.6 percent going through a mechanical path (converter clutch to output shaft) and 63.4 percent through the hydraulic path of the converter itself.

As a result the transmission is a "semi-direct" connection between the engine and rear wheels and greater efficiency (i.e., less hydraulic slippage) and gasoline mileage is the result.

The Special's suspension and drive line is a radical departure from traditional Buick practice and embodies several features new to U.S. cars.

Front suspension is coil spring independent with ball-joint spindles. Upper and lower "A" frames, springs, shock absorbers,

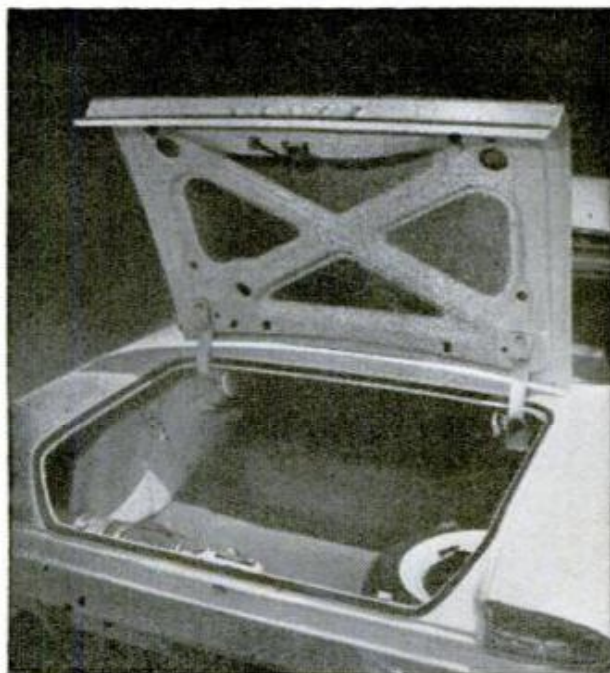
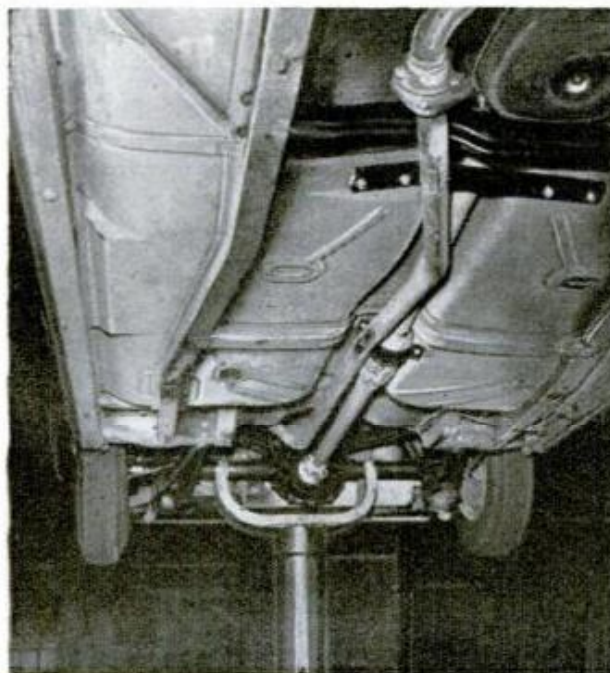
steering gear and linkage are all mounted on a single, heavy stamped-steel cross-member.

This crossmember in turn is mounted to the unit body structure on three rubber pads or "pucks." This helps to further isolate the body from harsh surface vibration. The steering column connects to the steering gear by means of a fabric coupling to prevent vibration from traveling up to the wheel.

The Special has a two-piece driveshaft that enables the body designers to minimize the tunnel in the floor to such an extent that it does not cause any discomfort or inconvenience to center-seat passengers.

(Continued to page 308)

Underside of Buick Special's unit body and frame below left, is strengthened by built-in "frame rails" as well as outer body sills. Trunk, below right, is average in accessibility, has fair amount of room





Clean, sculptured lines of Olds F-85 have little or no chrome. The 13-inch wheels make car look larger

Olds F-85: Another Rocket Hits the Road

General Motors is doing its level corporate best to make sure that no compact-car buyer will have a chance to walk up or down his town's automobile row without running into a showroom containing a GM compact or smaller-size car. Perhaps it's only fitting that America's largest automaker should now have twice as many new compacts as any of its competitors.

For those who want a smaller compact at lowest cost there is the Corvair. For a larger, more powerful car at just a few dollars above the Corvair there will be Pontiac's lively Tempest. A couple of hundred dollars up the scale comes the difficult choice between a well-matched and attractive pair, the Olds F-85 and the Buick Special.

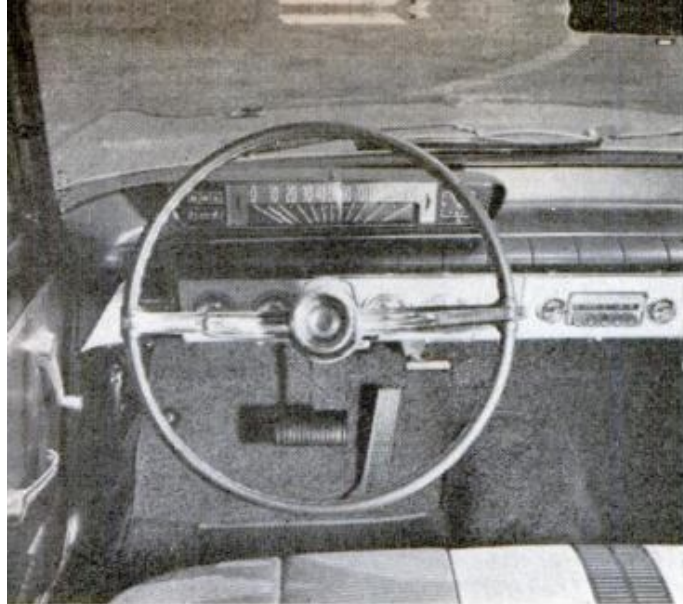
Here are four cars in what we strongly suspect will be three different price ranges all within the budget of anyone who can afford a Chevy Bel Air with average equipment.

Choice between the F-85 and the Buick Special will be a real teaser for most interested buyers because the two cars are very nearly identical in body size and chassis yet offer enough differences in engine, styling and automatic transmissions to make the choice more than just a coin flip.

The F-85 comes within a fraction of an inch here and there of equalling all dimensions and within a few pounds of equalling the Buick's weight. Both cars have 112-inch wheelbases and over-all lengths of 188 inches.

Here is a direct comparison of the space in passenger compartments and ease of entry between the Olds F-85, left, and the "big" Olds Super 88, at right. Only difference is slightly less legroom in smaller car





Olds F-85 instrument panel is neat, simple, readable and attractive. Forward vision is excellent



High-swinging lid provides good access to F-85's trunk which is roomy, and has fully useable space

Like the Special, the F-85 has the same unit construction four-door sedan and wagon bodies with front-mounted water-cooled aluminum V-8 engines of 155 horsepower.

Suspension systems too, are similar except for shock absorber calibration. The F-85—a name that sounds as if it were stolen from the Air Force—has four coil springs. Up front, the independent suspension is mounted on a single large pressed-steel cross member which in turn is isolated from the body frame by three rubber spool mountings arranged in a broad-based triangle.

Similarly the rear axle is attached to the frame by four links, all rubber bushed.

The drive shaft is a two-piece job, like the Special's with a constant-velocity double universal joint between the two sections and a midship ball bearing mounted in a rubber sleeve insulator.

Although sharing the same bodies and appearing quite similar, no one should have trouble telling the F-85 from either of its sister cars—the Buick Special or the Pontiac Tempest—as all three have different front fender and rear quarter panels as well as different hoods, grilles, deck lids and bumpers.

Careful inspection will reveal however that all door panels are identical, it's just the individual treatment of the quarter panels that makes them appear different.

With equal interior dimensions the F-85 has the same comfortable seating package for six passengers as the Special. Luggage compartments, too, are vitrually identical in dimension and layout.

Although based on the same iron-sleeved aluminum cylinder blocks, the Olds F-85 engine has cylinder heads as well as manifolds, valves and pistons of its own design.

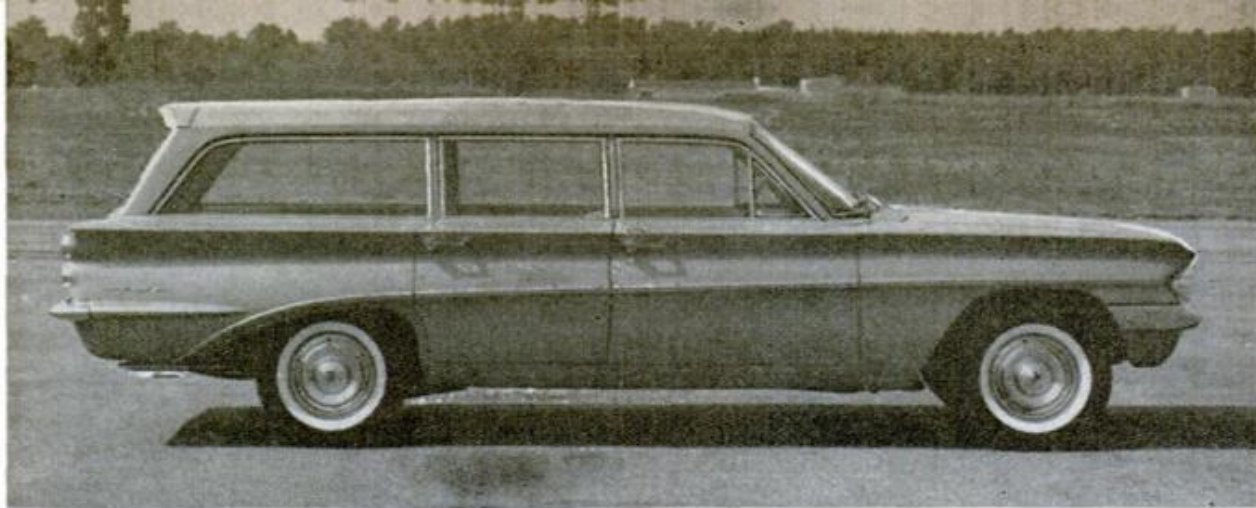
Like the Buick Special's engine, the F-85's power plant has a water-heated, in-



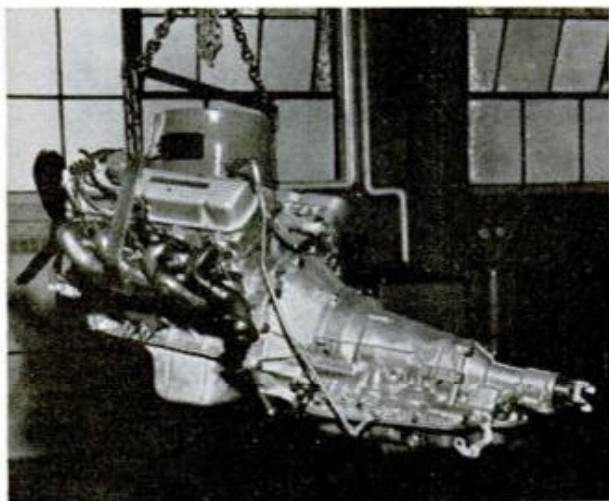
Tapered rear deck of F-85 is smooth and uncluttered and shows the sculptured contours of the car's body

Broad hood swings up to reveal F-85's engine which has "most serviced" items easy to reach





Six-passenger, four-door wagon is just same height as sedan, has total of 75 cubic feet of load space. Engine and transmission, left, is almost all aluminum



take manifold. A unique feature of the Olds engine however, is the air-cleaner cover that covers not only the polyurethane plastic filter element but the entire carburetor as well.

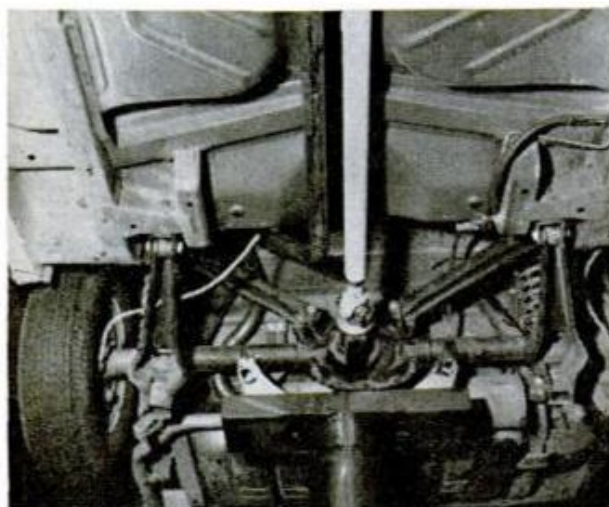
This setup is intended to provide a flow of fresh, cool air around the carburetor body at all times during warm weather and prevents percolation and vapor lock. In cold weather this same arrangement aids in warmup and helps prevent carburetor icing.

The automatic transmission used on the F-85 is a brand new version of the Hydra-Matic that Oldsmobile pioneered over 20 years ago. This transmission has the same fluid coupling as current Hydra-Matics except that there is an inner torque multiplying turbine member in the fluid coupling.

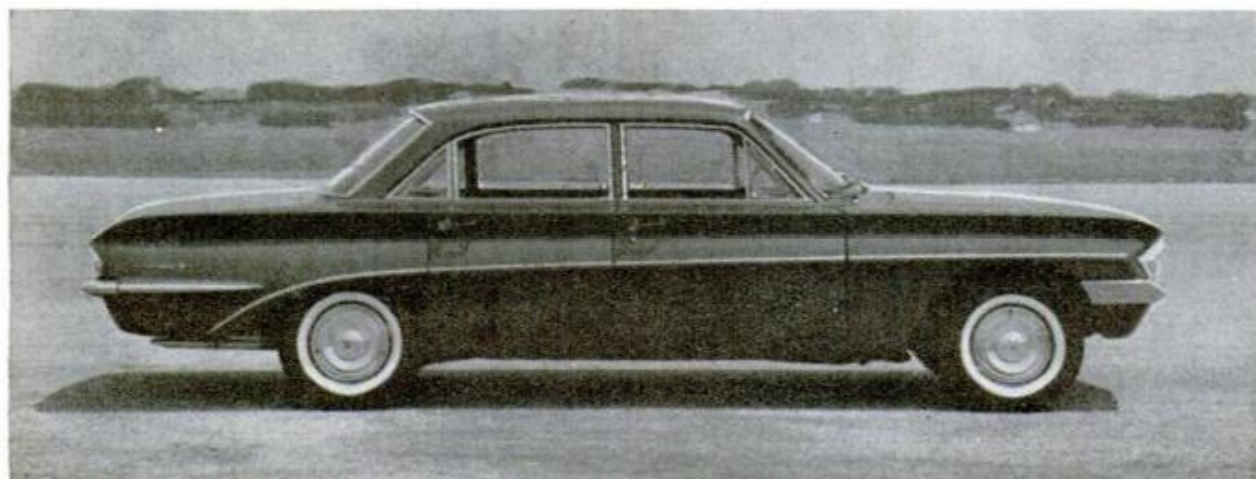
Olds calls this device the Accel-A-Rotor. It provides torque multiplication only in starting, i.e., "Low" gear. This gives a starting or stall ratio of 3.64 to 1.

As the car speeds up from a standstill the fluid multiplier phases out of operation and the ratio is reduced to 3.03 to 1, where-

(Continued to page 310)



worm's eye view of F-85's rear suspension reveals four links connecting axle to chassis. Side view of F-85, below, shows well balanced proportions





Side view of 1961 Buick Electra sedan shows clean, sculptured lines, familiar "portholes," wider rear door

Big Buicks Have New Bodies, Frames, Suspension for '61

The big Buicks, LeSabre, Invicta and Electra have been changed in every respect except the engine, transmission and basic details of the front suspension. Their ride and handling, ease of entry, and interior comfort have been improved so much as to make them vastly different cars.

Perhaps the most precedent-shattering change is the elimination of the torque tube—a Buick engineering trademark dating back to the first World War.

In doing away with this heavy tube which connected the rear axle to the transmission, Buick engineers have been able to remove some of the jounce-creating unsprung weight and switch to a thin, two-piece drive shaft with a double, constant-velocity universal joint.

This in turn has permitted a lower drive-line and smaller tunnel under the floor and seats. Buick has also switched to a cruciform or "X" frame with the midship universal joint mounted in the hollow center of the "X" member.

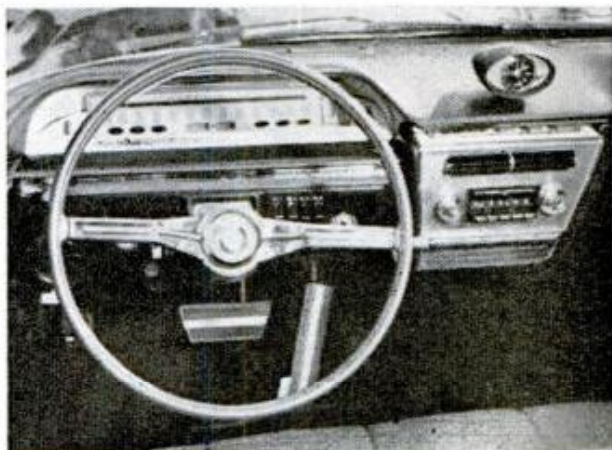
This new frame has enabled the body designers to make the floor lower and flatter. Seating positions are high and comfortable and there's more than enough headroom, yet the cars are not overly high—an inch lower than the '60 models in fact.

Rear suspension retains coil springs, but positions the axle with a linkage that's unique with Buick. In this new system two trailing links support the springs and take driving torque, a track bar positions the axle laterally and a short, upper link between differential and frame controls axle "windup."

Engines remain unchanged, with a 364-cubic-inch, 250-horsepower V-8 used on the LeSabre and a 401-cubic-inch, 325-horsepower version on the Invicta and Electra models.

★ ★ ★

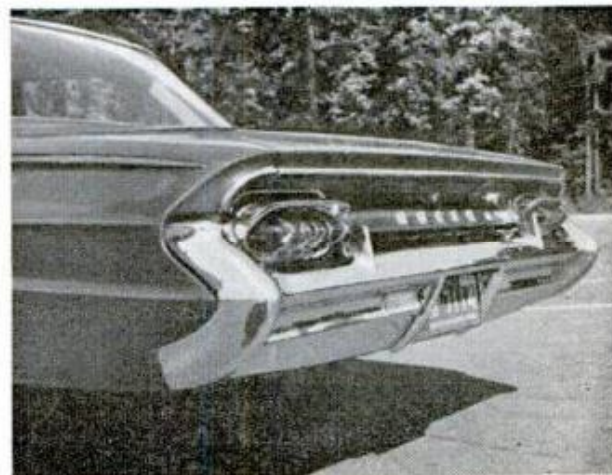
Rear deck lid is wide and flat. Gone is the "gull-wing"-look of '59-'60 Buicks. Trunk is much larger



Instrument panel retains adjustable mirror-image speedometer introduced in 1960. Control setup is new



Grille, hood and headlamp arrangements are changed, yet over-all appearance, above, is typically Buick





Although Lancer shares body and fender sheet metal with Plymouth's Valiant, it manages to have an identity of its own, thanks to a longer hood and "V" grille, top, and trunk lid without dummy spare, above

Now Dodge Gets a Compact All Its Own—The Lancer

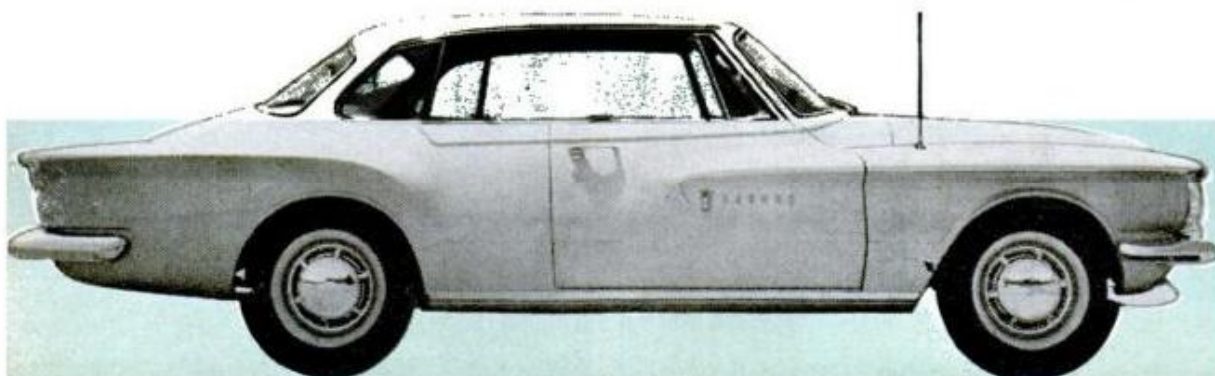
As a follow up to the successful introduction of Valiant, Dodge Division has brought out a similar compact called the Lancer. This car is available in four-door sedan, four-door station wagon and two-door hardtop.

Lancer shares the basic unit body and chassis with the '61 Valiant, has the same

torsion bar independent front suspension, semi-elliptic rear suspension, engine and transmissions.

Wheelbase of 106.5 inches is identical to Valiant's but overall length of 188 inches is four inches greater, due principally to Lancer's extended "V" grille and front sheet metal. ★ ★ ★

A new body style for Lancer—also shared with Valiant—is sporty looking two-door hardtop, below





Fairlane above is plainest, lowest priced '61 Ford. Door handles are countersunk into the body panels

Ford Gets a Conservative Restyling Job for 1961

The success of the squarish, conservative and highly successful 1959 Ford line a little less than two years ago has had a definite influence on the styling of the '61 Ford.

This new Ford is the 1960 body shell with new sheet metal below the window line which adds up to a plainer, more conservative car than the swooping, flat-backed '60.

The hood line has been raised to make room for a more conventional concave grille. At the rear end, overhang has been shortened so that the over-all length is 3.7 inches less than on '60 models.

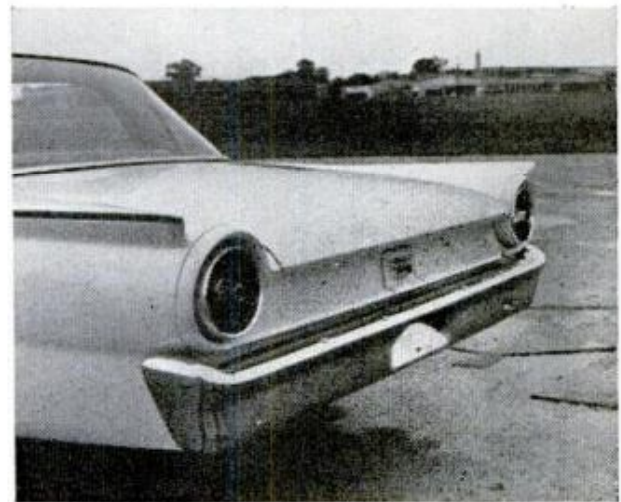
The tricky, narrow, depressed center section of the trunk and rear window has been replaced by a conventional, flat trunk lid that's 10 inches wider for easier access.

The modest, low fins used on '57 and '59 Fords are back, as are the big, "bullseye" tail lamps that seem to have become a Ford trademark.

All lubrication points on the front suspension and steering linkage are prelubricated at the factory with a special molybdenum-disulfide grease and sealed with screwed plugs.

These plugs are to be replaced "after an extended period" with conventional grease fittings and the lubricant replenished. Unofficially, as *PM* goes to press, this "extended period" is reported to be 30,000 miles, a long ride between grease jobs!

The simple, mechanical, self-adjusting device pioneered on Mercury brakes is now standard on all Ford models. Engines remain 226-cubic-inch displacement six plus 292, and 352-cubic-inch V-8s. Also a "super" 390-cubic-inch V-8 has been added as a "power package" option. ★ ★ ★



Rear end of '61 Ford shows clean uncluttered lines, familiar, big "bullseye" taillamps and wider deck lid

Beefier new bumper, more prominent headlamps and a simple, mesh-type grille mark front of '61 Ford





Total change of appearance from the '60 model is the result of new grille, hood, fenders, rear quarter panels and rear deck. Fury model, below left, no longer carries dummy tire cover on rear deck lid



Plymouth Is Sleek, Finless

The 1961 Plymouth retains its basic unit-construction body shell with front stub frame, while changing all exterior sheet metal except for the roof, glass and doors.

Hood and rear deck are flat and rounded off with the only trim a raised, bright metal highlight in the center of the rear deck.

Windshield has been simplified by the elimination of the compound curve at the top. Biggest engineering change is adoption of alternator used on 1960 Valiant.



Valiant's handsome new two-door hardtop, above, shows the small trim changes on sculptured knife edges of front and rear fenders. Grille was changed from '60 by painting center of squares black



Valiant Gets a Hardtop

Valiant has slight styling changes with some detailed improvements such as cable-controlled ventilator doors. Biggest change is addition of a two-door hardtop model.

This is a unique hardtop in that it uses the same roof and rear quarter as the four-door sedan, which enabled designers to combine roomy sedan seating with hardtop's coupe styling. There is also a two-door sedan model.



The '61 Comet is changed in appearance by the switch to a new grille made up of short horizontal bars. Also new are chrome chevrons on front fenders. Rear view, below, remains virtually unchanged

Comet Has Bigger Engine

Comet has been given a much-needed lift in the way of a healthy power increase. An optional version of the basic 144-cubic-inch displacement Comet engine has a longer piston stroke, displaces 170 cubic inches and develops 112 horsepower compared to the smaller engine's 90.

Either engine will be available in any of the two and four-door sedan and station wagon models.



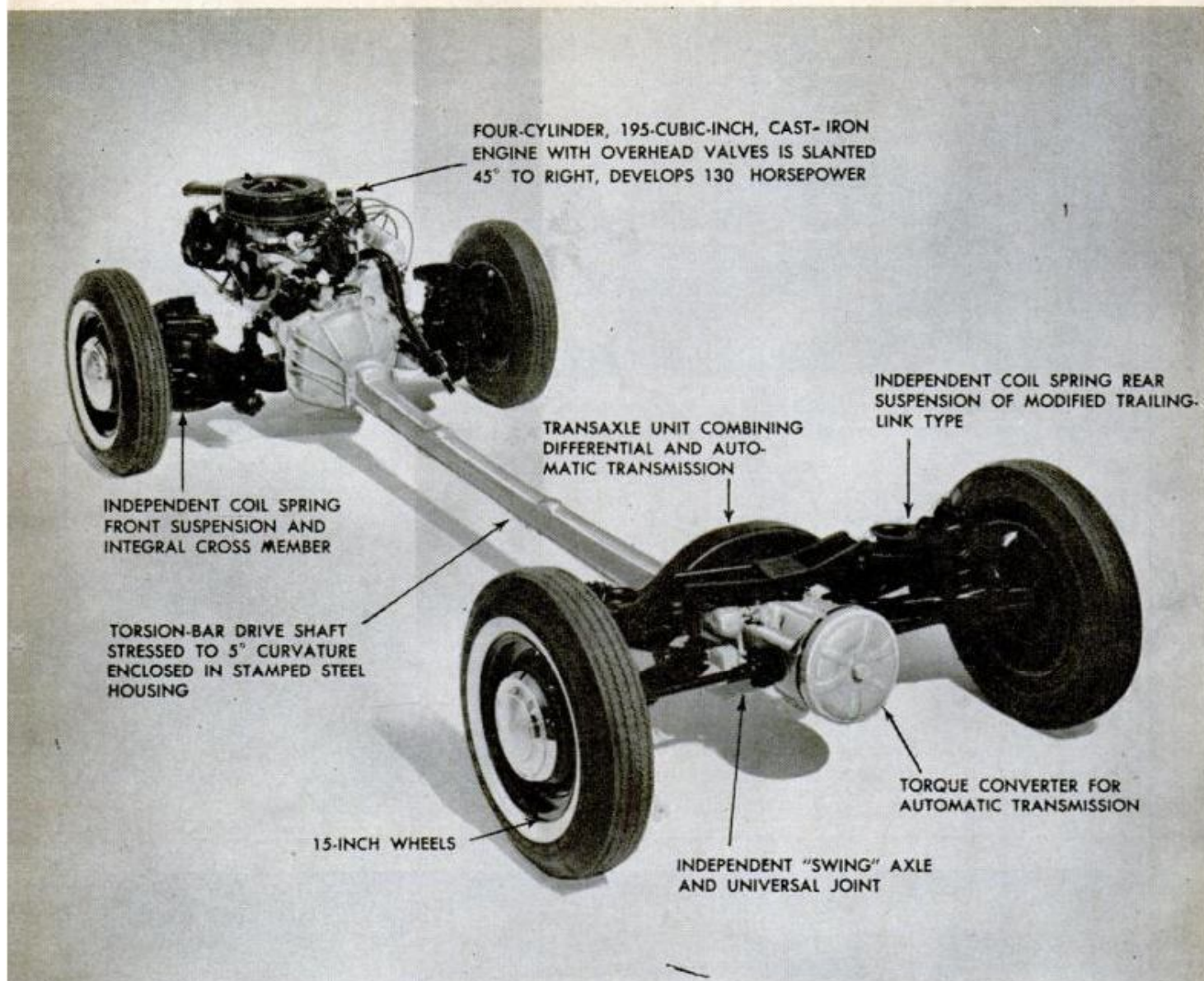
Falcon's sculptured side panels are highlighted by stainless-steel trim strips, above, handsome new convex grille, below, which changes car's personality. Falcon continues use of single head lamps

Face-Lifted Falcon For '61

Ford's Falcon compact has been little changed for 1961. A new, more attractive grille has been added and the sculptured areas on the side panels on all models have been trimmed with a narrow bead of stainless steel.

A 170-cubic-inch displacement version of the Falcon six-cylinder engine developing 112 horsepower is available as an option to the 144-cubic-inch standard engine.





"Chassis" of Pontiac Tempest consists of engine, front suspension, drive shaft, transaxle, rear suspension

Pontiac Tempest: The Engineering Story

Public announcement date of the 1961 Pontiac Tempest automobile occurs after the publication date of this issue of *POPULAR MECHANICS*. However, as the release date for engine and chassis details of the new compact precedes the release of the full Tempest story by several weeks, we are able to bring you pictures and the complete story on the mechanical components of the car.

For an approximate idea of how the car itself will look, study the Buick Special and Olds F-85 (pages 97 through 102), as these cars share the same basic bodies—four-door sedan and four-door wagon—with the Tempest. Next month *PM* will show the Tempest in color and black-and-white photos.

From an engineering standpoint Pon-

tiac's Tempest is without doubt the most imaginative of all the 1961 automobiles. In fact, of all the cars built since the close of World War II, only Chevy's rear-engined, air-cooled Corvair could top it.

For example, the Tempest is the only car around with a front-mounted engine and the transmission in the rear. It has the first "transaxle"—transmission-differential combination—seen on an American car. (True, Corvair has the engine, transmission and differential in one unit, but this isn't a "pure" transaxle.)

The Tempest is also first in the U.S. to have independent suspension on all wheels combined with a forward engine location. It has the first four-cylinder engine to appear on a General Motors car since 1928. It has no universal joints on the drive shaft

and transmits power through a curved torsion bar. And, oh yes, its engine is slanted 45 degrees to the right!

The Tempest engineering story begins with the objective of Pontiac Division to produce a compact car of the same dimensions as the Buick Special and Olds F-85 to sell at several hundred dollars less. (As *PM* goes to press no prices have been announced for either the Tempest or other GM compacts.)

Inasmuch as the integral body-and-frame structure used on the Tempest is virtually identical to that of the F-85 Olds and the Buick Special, it is evident that cost cutting was impossible in that area.

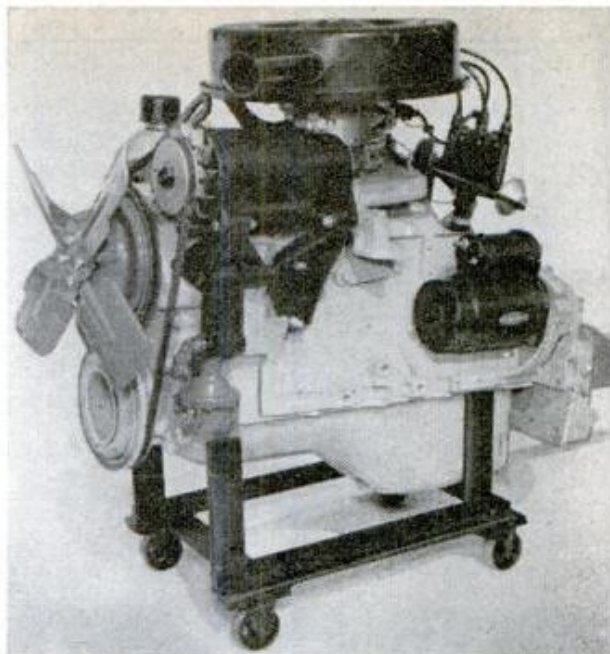
The savings, then, must come in reduced tooling and production costs of the engine, suspension and drive line. Here's where Pontiac's ingenious engineering department went to town.

Chief engineer E. M. Estes and his associates started out with the premise that one half of a big engine already in production should be cheaper than tooling up for a brand-new, small-size V-8 of approximately the same displacement and horsepower. Accordingly, Pontiac made some special molds enabling the foundry to cast the right bank of the big Pontiac 389-cubic-inch V-8 without the left bank. This made for a somewhat lopsided four-cylinder engine, but permitted Pontiac engineers to machine it on the same production line used for the V-8, using the identical tools to drill the four-cylinder engine as are used to drill the right bank of the V-8.

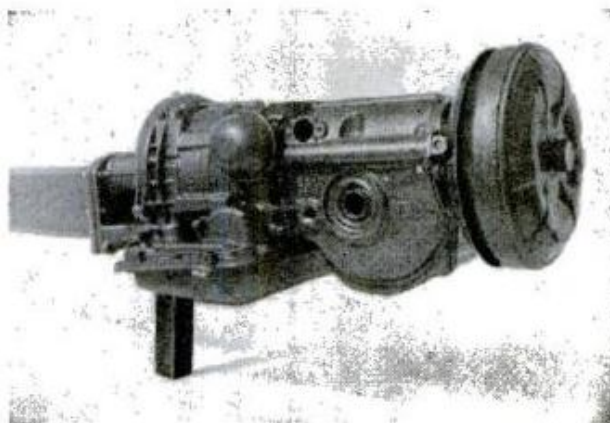
As a matter of fact, fours and V-8s alternate on the production line and are handled automatically in any sequence. The four-cylinder engine, displacing 195 cubic inches, uses the same cylinder heads, valves, pistons, connecting rods and exhaust manifold as the V-8. Only the crank and camshafts, intake manifold, water pump, fan and carburetor are different. Result: A big, muscular four-cylinder engine at less than the cost of any new engine!

Further economies were gained by using basically the same front and rear coil-

(Continued to page 312)



Left-hand side of Tempest's four-cylinder engine with water pump, generator, carburetor, intake manifold and distributor sitting above crankshaft as cylinder block is tilted 45 degrees to the right of center



Here's Tempest's transaxle minus axleshafts and universals. From left to right; transmission gearing, valve body, differential (hole shows where axle shaft fits), torque converter. Many parts are aluminum

Tempest's power train with engine connected to transaxle by curved torsion bar shaft in tubular housing





A smooth, flat hood with a definite down curve and a wide, concave grille make a complete change in '61 Dart's appearance. Hood panel is adorned with dummy louvers near cowl opening

Dart Has a New Look

Dodge Division's Dart series became the automotive success story in its price class in 1960. However Dodge isn't resting on its laurels. Result, a complete restyling job on three series of Darts.

Only the door panels and glass areas remain unchanged. Under the hood there are numerous improvements, one being the use of the alternator in place of conventional d.c. generator.



Dodge can be told from Dart by ornamental medallion in grille, lower trim strip on side panels, and rocket tube tail lamps

Revamped '61 Dodge

The "big" 122-inch wheelbase Dodge Polara has been restyled from roof to rocker panels as has its 118-inch wheelbase companion car, the Dart.

The Polara has unique, rocket-tube tail lamps faired into the side of the fenders while the Dart's lamps are just above the rear bumper. Standard engine is a 361-cubic-inch V-8 of 265 horsepower.





Restyled Chrysler Adds an Economy Line — The Newport

For 1961, Chrysler Division has reshuffled its lineup, broadened its price range and restyled all its cars. Top series remains the New Yorker with its 126-inch wheelbase. The Saratoga, middle line of the 1960 Chryslers, has been discontinued.

The 122-inch-wheelbase Windsor continues in its position as a medium-priced car with four-door sedan, and two and four-door hardtops.

The Newport also on 122-inch wheelbase, and new for '61, comes in five body styles: sedan, two and four-door hardtops, convertible and a four-door hardtop wagon. New Yorker has same model lineup.

No prices have been released as *PM* goes to press, but it is expected that the Newport will sell in competition with lower-medium priced cars.

Engine in the Newport is a 361-cubic-inch V-8 of 265 horsepower designed to run on "regular" gasoline. Standard transmission on both Newport and Windsor will be a new three-speed manual with floor shift.

★ ★ ★

Rear treatment of Chrysler for '61, right, brings the tail lamps down from the fins and molds them into the body. Newport, below, has plainer grille, different side trim, than the New Yorker or Windsor

Chrysler New Yorker, above, has silhouette similar to 1960 model. Big change is on front end, below





Sleek DeSoto two-door hardtop, above, retains those sweeping, "Forward Look" fins that have become a Chrysler Corporation trademark. Grille, below, is now two-piece with aluminum mesh in upper section



DeSoto Keeps Its Fins

A brand new face for the '61 DeSoto comes in the form of a dual section grille and interestingly canted pairs of headlamps.

Basic body shell is same as on '60 models. DeSoto has two models, a two and a four-door hardtop in the 122-inch-wheelbase Fireflite series.

Appearance from the rear has been changed considerably by moving the tail-lamps from the trailing edge of the fins down into the body itself. Major mechanical change is the switch from d.c. generator to Chrysler Corporation's new alternator.



Big Imperial still has distinctive two-section roof paneling, shown above, but adds a totally different front-end treatment with thin-barred grille and chrome-plated pairs of free-standing headlamps



Imperial Gets Novel Front

The big luxurious Imperial continues with its separate body and frame construction and basically the same body shell used on the 1960 models.

Biggest change lies in the radical restyling of the front end where the two pairs of head lamps have been removed from the body sheet metal and now stand free as separate units in bullet-shaped housings on the bumper apron.



DETROIT LISTENING POST



By Jim Whipple



Twenty-eight new cars on the market for 1961. An almost bewildering choice awaits buyers.

As the new-car announcements pour out, it becomes evident that the automotive industry is in an even more fluid condition—if that's possible—than it was during the '60 model year just closed.

Everybody's getting in the compact game. The great, "economy car" gamble has paid off for those who looked at **Rambler's** healthy sales during the 1958 recession and said "Let's go!"

Studebaker was first to follow with the **Lark**—a long shot that put the company back in the black.

Then came the big three with **Falcon**, **Corvair**, **Valiant** and now for '61 the rest of the pack. As of this moment we have 11 separate and distinct compacts, either on the market or just coming out. They range from **Rambler's** doughty little **American** to the sleek, powerful **Buick Special**.

What makes it even more startling is to check down the list and find that there are just 17 of the so-called "full-sized" cars, ranging from **Ford**, **Chevy** and **Plymouth**, to **Cadillac**, **Imperial** and the new "compact" luxury car, **Lincoln Continental**.

In other words, between 35 and 40 percent of all makes of U.S. cars being marketed are compacts.

With a total of 28 cars (not counting the two-passenger **Corvette**) the buyers' choices become bewildering. Furthermore, so many compacts are pegged in a narrow price range that the buyer will find that he has at least half a dozen all within a \$100 bill of each other's price.

Lark, **Rambler**, **Falcon**, **Valiant**, **Lancer**, **Corvair**, **Pontiac Tempest** and **Comet** are all expected to overlap in price at about \$2000 to \$2100.

For the favorite player, the guy who votes the straight **GM**, or **Ford** or **Chrysler** ticket, this intramural competition can make choice of a new compact a really puzzling venture. Should the **Chrysler** fan go **Valiant** or **Lancer**? Which way should the confirmed **Ford** product owner jump, to **Comet** or **Falcon**? And what is the dedicated **General Motors** buyer to do when faced with **Corvair**, and **Pontiac**

Tempest, with a compact **Buick** and **Olds** just a few hundred dollars farther up the scale?

Similar difficult choices lie in wait for the full-sized car buyer who has such combinations of similar sized, priced and engineered cars as **Ford** and **Mercury** overlapping in two out of three series, or **Dodge Dart** and **Plymouth**, identical in size and basic engineering.

Familiar landmarks are fading in the medium-price field too, with the new economy medium **Chrysler Newport** expected to sell against the most popular models of **Pontiac** and **Oldsmobile**.

Pity the poor dealer who no longer knows who his competition is or where the next big buying wave is going to hit. As he tosses in sleepless quandary, the dealer asks himself such questions as "Will **Lancer** repeat in the compact field what **Dodge Dart** did in the 'low-priced' field last year?" or, "Will **Mercury** find new life as a 'low-priced-three' car as **Dart** did?"

There's plenty of method behind all this seeming madness; Detroit is out to catch the new generation of auto buyers (as well as old established buyers who've changed their tastes) and pin them down by offering compact and full-sized cars at ever more attractive prices.

By down-grading large cars and up-grading small ones, the harassed auto makers will be trying their best to solidify the market, hoping that these groups of buyers with their varying needs, wants and prejudices will sort themselves out and give the industry a settled market pattern once again.

It's something like a tremendous game of musical chairs, except that the manufacturer who guesses wrong too many times winds up on the floor when the music stops.

That music incidentally, is made by you, the new-car buyers all over America, when you scratch your pens across those sales contracts. ★ ★ ★



Photos by the author

Pat the Pig delights three visiting youngsters when he addresses them by name in a Minnesota supermarket

Talking Animals

By Ken Berglund

MOBILE ANIMALS that answer questions and call youngsters by name are appearing these days in St. Paul and Minneapolis, Minn. retail stores—to the benefit of merchants and the delight of small fry.

The talking-animal promotional displays have been developed by Alec Seymour, St. Paul display man. Animals include a donkey, pig and poodle.

The animals talk with the aid of the operator who stands nearby wearing a throat microphone and holding a control cable. The operator's voice is transmitted to the animal, while his hands control movements of the mouth, ears and tail.

The mobile attractions do not have to be plugged into an electrical outlet. Thus they have great freedom of movement indoors and out. A battery-operated loudspeaker built into the animal's mobile platform amplifies the voice.

A switch connected to the throat microphone enables the operator to channel his voice through the animal's mouth. When



Alec Seymour, St. Paul display man who developed the talking-animal attractions, chats with the donkey



It doesn't take long for Roger, a talking dog, to find someone his own size to have conversation with

the switch is off, his voice is heard in the normal fashion.

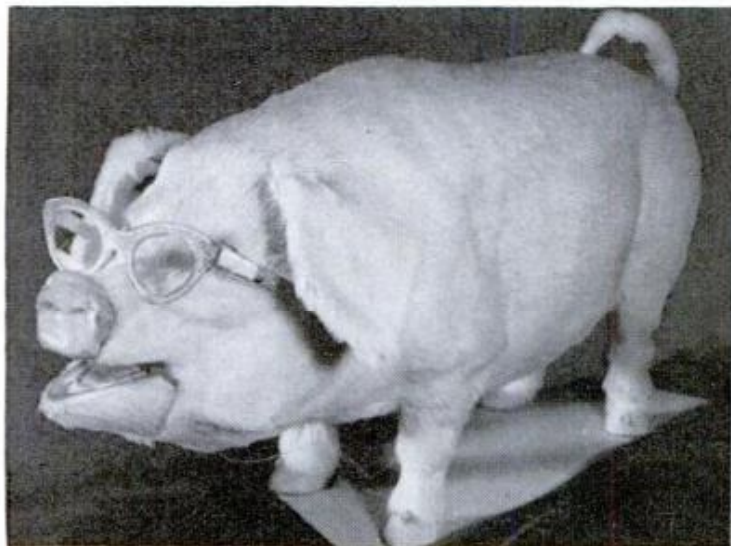
The animals were originally imported from Germany and adapted by Seymour for voice effects. They have been popular in the Twin Cities and surrounding areas for use in supermarket promotions and other retail sales efforts.

The pig has been a prime favorite with children. Parents often whisper the name of their child to Seymour, who then has the animal call the child by name—much to the youngster's surprise.

One supermarket manager reported that business increased 10 percent over normal while the pig was exhibited. ★ ★ ★

Close-up shows how pig's hinged lower jaw swings open as he talks with passersby. Amplifier is concealed under platform

An offbeat character is the talking frog with striped bathing suit and saxophone





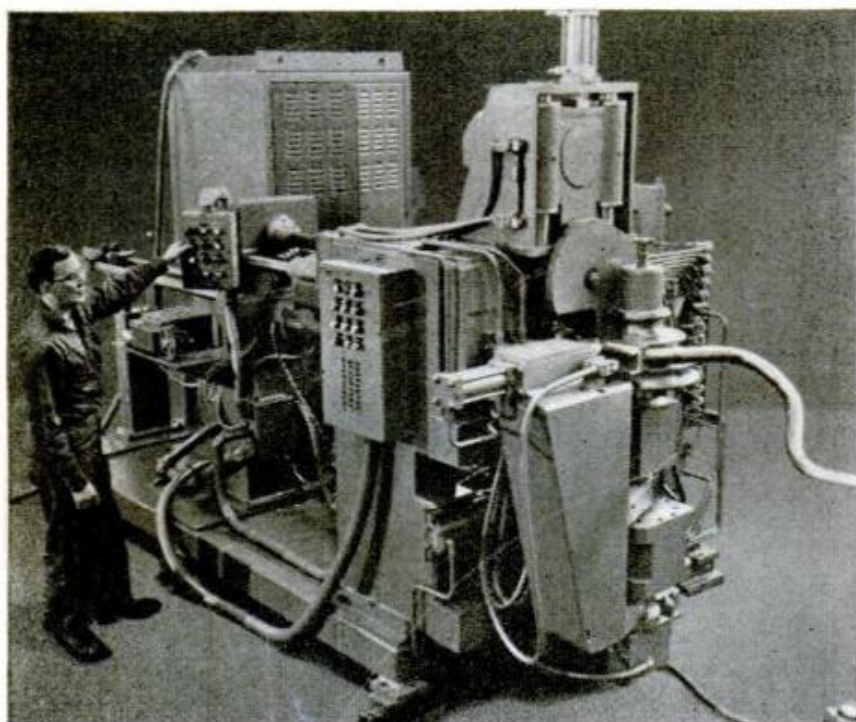
Look! No Splash!

New York's Department of Sanitation has placed 30 no-splash flushing trucks into service. They are equipped with 15 nozzles that spray water vertically onto the street, eliminating the horizontal sprays that used to spray nearby pedestrians as well as the street. The trucks, which can also be equipped with blades for snow removal in winter, carry 2500 gallon tanks.



Compact Projector For Slides With Sound

Built for any kind of slide projection—with sound—from a desk-top sales talk to a group showing, a compact projector with a built-in phonograph fits into a 13½ by 13½ by 7⅜-inch case and weighs only 10½ pounds. The phonograph takes records from 7 to 12 inches at 45 or 33⅓ r.p.m. The outfit includes a short-range screen built into the case and a lens that has been modified for close-up projection.



Custom Tail Pipes From Straight Pipe

Auto-parts distributors can replace large stocks of different model tail pipes by installing a new machine that automatically bends straight pipe into custom-made tail pipes for any make automobile. A punched tape, coded for each car model, is inserted in the machine. The proper diameter of straight pipe is set in place and the starting button pushed. The rest is automatic. In less than two minutes as many as 12 bends are made in the pipe, according to specifications punched into the tape.



Glen Canyon Dam, shown in artist's sketch, will be world's third tallest when completed in 1964. It will create world's fourth largest reservoir and open up vast new, and virtually unknown, areas for development

The Dam That Spans the Canyon

By Thomas E. Stimson, Jr.

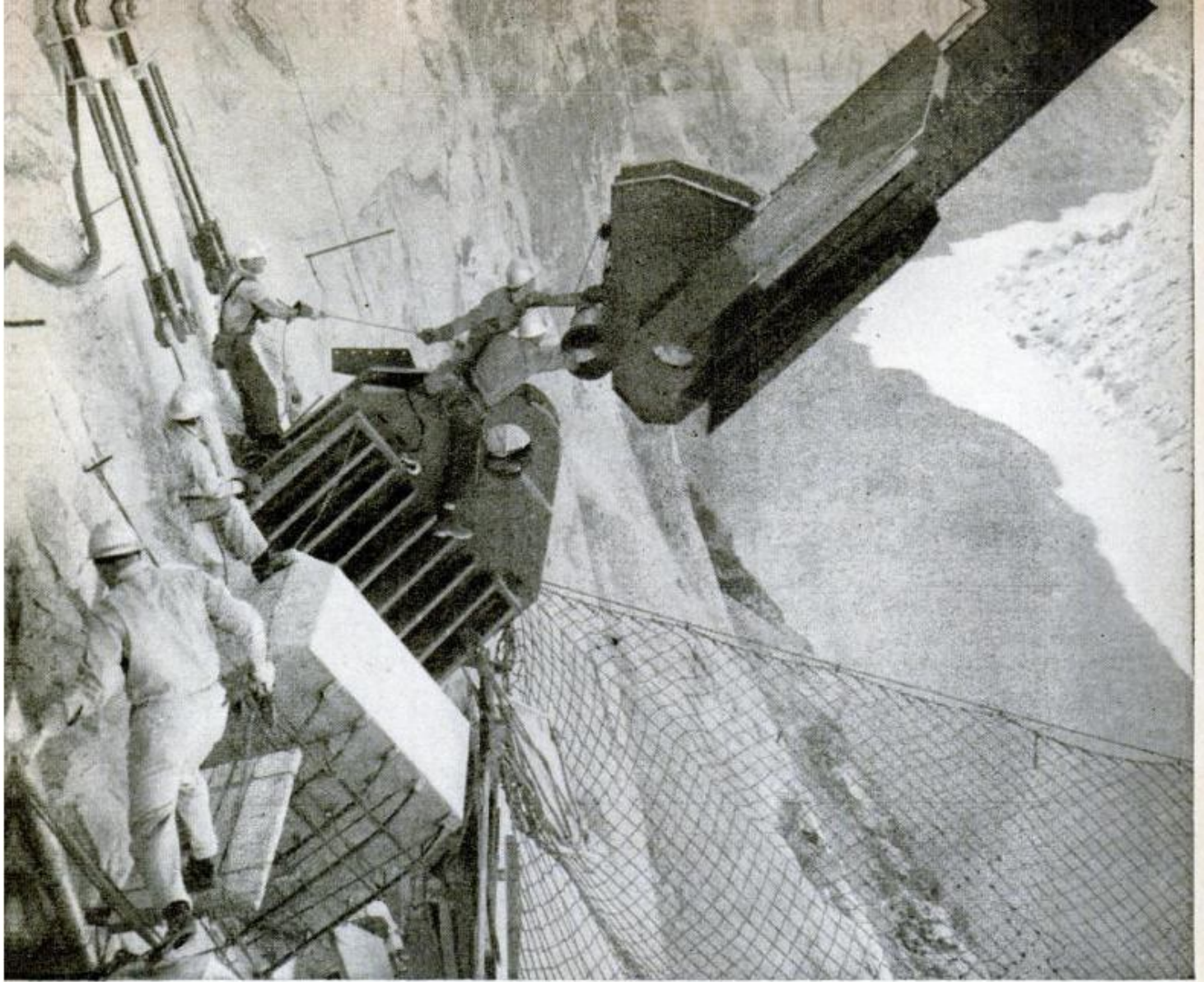
ONE OF THE world's major dams is under construction in an almost unknown part of northern Arizona. The new Glen Canyon Dam is part of a big scheme for extracting every possible bit of use from the mighty Colorado River.

Glen Canyon is a spectacular vertical-walled gorge 1000 feet wide and 700 feet deep that cuts across flat tablelands. At the start of construction it was necessary to make a 200-mile detour to move a car or truck from one side of the canyon to the other. There were no roads in the area, no inhabitants except a few Indian families.

For a time the contractors used light planes to shuttle back and forth across the canyon.

Vertical walls were one problem scaled by construction crews





The region is so remote and the dam project is so huge that four years have been spent simply in preparing to erect the dam. Not until this past summer was the first concrete poured into the forms.

To begin with, it was necessary to build heavy-duty roads into the area, then construct a small city from scratch on an adjacent mesa. Today the city of Page has paved and lighted streets, a shopping center, schools and churches. It has a hospital, golf course and airport. At the peak of construction its population will swell to 8000; it is to have a permanent population of around 4000.

Another adjunct was the construction of the world's highest steel-arch bridge, a \$4.5 million structure that spans the top of the gorge a few hundred feet downstream from the damsite. It was impractical to erect falsework from the bottom of the deep canyon to support the bridge during construction, so the builders started out from each canyon wall, using tie-back cables to hold the steel in place and a pair of cableways to swing new steel into position. Eventually the spans were joined in the center, then a flat 40-foot-wide roadway

was installed across the top of the span.

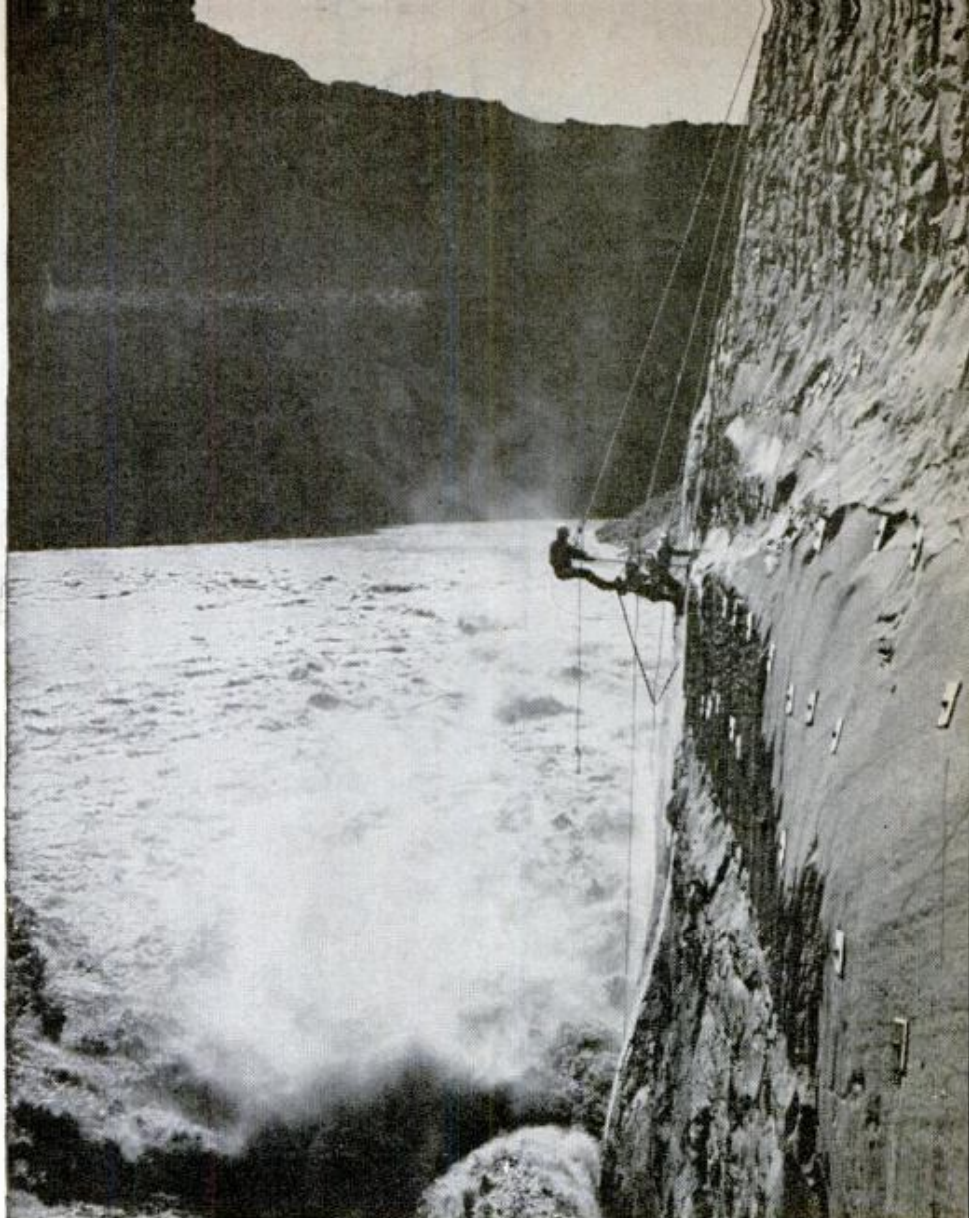
With the new main road that has been built from the south, and the new highway that goes west to Kanab in Utah, the bridge is now part of the main route from Flagstaff to Kanab.

Not only was it impossible to cross the canyon at the start of construction, there was no way to descend to the canyon's floor. This was solved by stringing a pair of cableways from one rim to the other. With these, heavy trucks and equipment could be swung out over the canyon, then gently lowered to its bottom. Men descended in cages attached to the cableways and also by a "monkey slide" elevator that dropped out of sight from one rim.

Eventually a road was built to the bottom, an underground road in the form of a two-mile-long tunnel 50 feet inside one of the canyon's walls. Expensive as it was to blast the tunnel it was still cheaper than trying to pin a road to the clifflike wall.

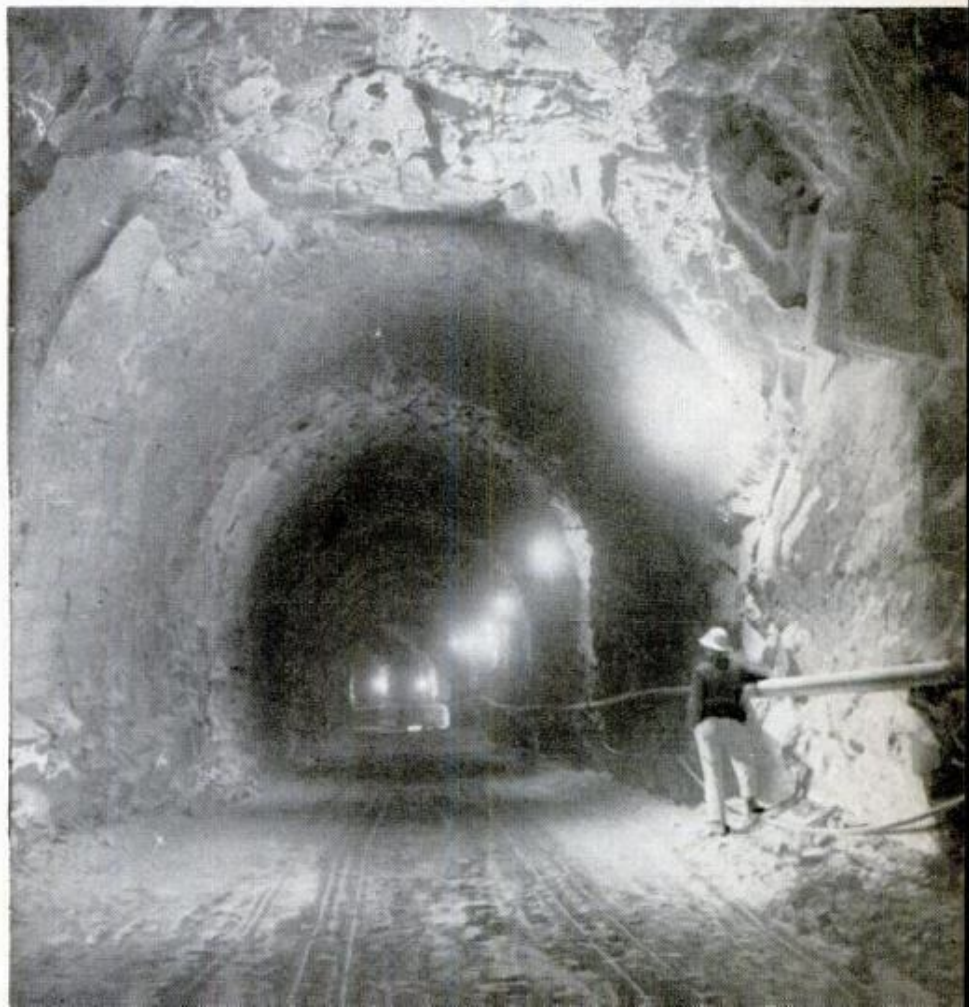
New industries had to be created in the area before the dam could be built and some of these industries will be permanent parts of the economy. For instance, a giant cement mill was constructed at Clarkdale,

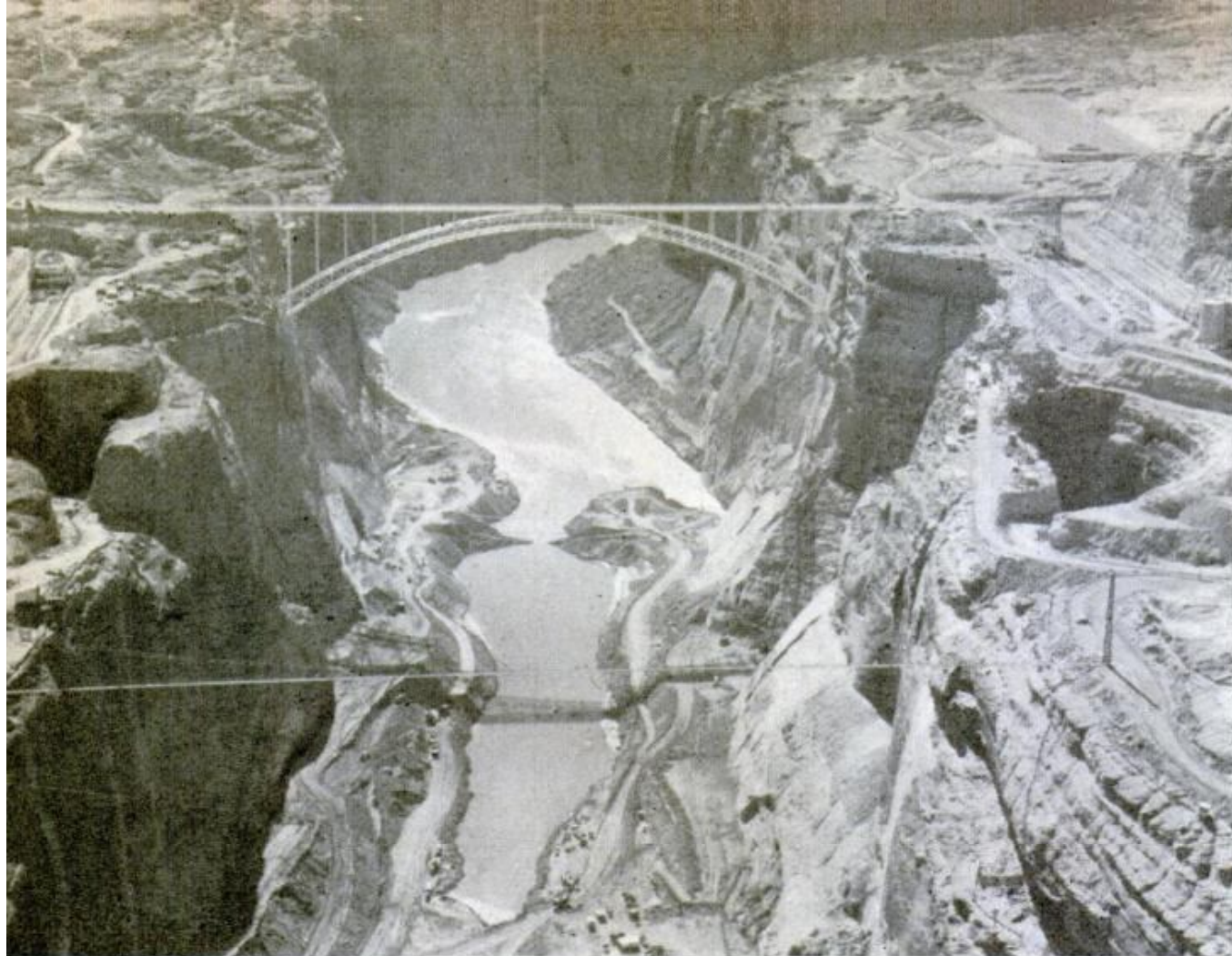
Workers scramble along wall face to install first chord member of Glen Canyon arch bridge. Too high for ground support, bridge was built entirely from above by using overhead cables



High scalers, suspended above outlet of diversion tunnel, drill holes for long bolts that pin surface rock and prevent it from falling away. Some of the bolts are visible in foreground

Problem of easy access to river bed was solved by digging two-mile-long tunnel inside one wall of canyon. Large enough for trucks, it's used for delivering equipment to construction area





Cofferdams, which help turn river into diversion tunnels and give crew dry area to work in, are raised from river bed above and below damsite. Upstream cofferdam (foreground) is complete; downstream cofferdam (center) is nearing completion. Steel arch bridge, the world's highest, is in use at this stage of work

Ariz., 140 miles away, to supply the three million barrels of cement that will be used.

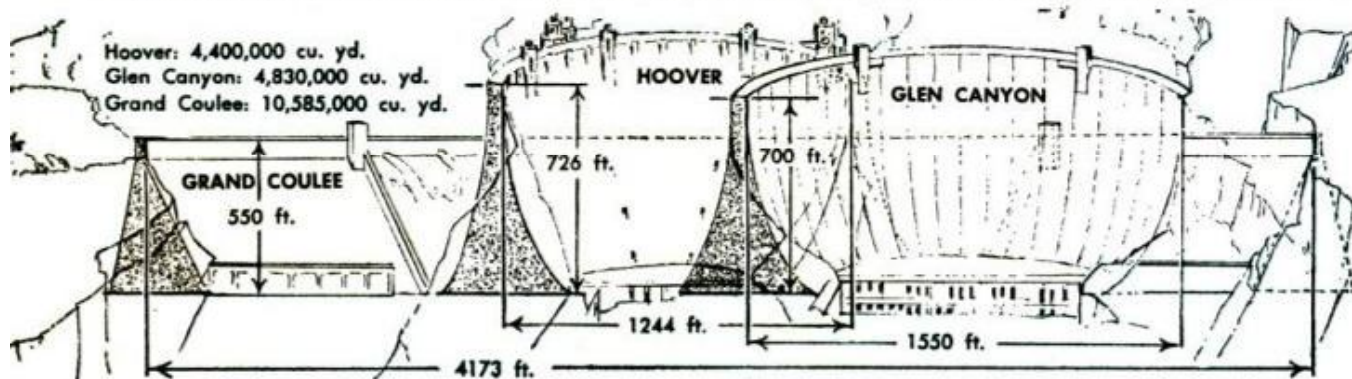
Near Flagstaff, a quarter-million tons of pumice are being ground into flour to provide the pozzolan that is used as an additive in the concrete. Pozzolan reduces the amount of cement required, is cheaper than cement and reduces the amount of heat that fresh concrete generates.

Glen Canyon Dam is a Bureau of Reclamation project and is being built by Merritt-Chapman & Scott under a prime contract amounting to \$108 million. This represents

only a portion of the whole cost. Counting the new bridge, the city of Page, the highways and the new industries, the full cost of the project is estimated at \$325 million.

The dam is to be a concrete-arch structure containing nearly five-million cubic yards of concrete and rising almost to the top of the canyon, some 700 feet above bedrock. Its mass of concrete will be about half that of Grand Coulee Dam on the Columbia River and will be greater than the amount in Hoover Dam, 370 miles downstream on the Colorado. Glen Canyon

Scaled drawings show comparative dimensions of Glen Canyon and two other important American dams. Only Hoover and Mauvoisin Dam in Switzerland (780 feet) are taller; only three others in world have larger reservoirs



will be the third highest dam in the world, and will create the largest reservoir in the United States, extending 186 miles upstream. Its hydroelectric powerplant will be the seventh largest in the U. S. and at full capacity will produce 900,000 kilowatts of power.

The purpose of the dam is to provide holdover storage capacity so that downstream needs can be met. It also will collect much of the silt that is now reducing the capacity of the reservoir at Hoover Dam. Other benefits include power production and the opening of a vast new recreation area.

Engineers have developed an almost routine procedure for building a big dam like this. First, diversion tunnels must be cut through the canyon walls to detour the river around the damsite, and keyways must be cut into the walls of the canyon to receive the ends of the dam. The material that is removed from the tunnels and keyways is then used to build a high cofferdam barrier across the river, forcing the water into the diversion tunnels. A smaller cofferdam is built downstream to prevent backflooding. The site of the dam is then pumped out and loose materials are removed until solid bedrock is exposed. To strengthen this foundation, deep holes are bored into the bedrock and cement grouting is forced into the holes under high pressure. The grouting permeates any seams or cracks in the rock. Finally, forms are erected and the actual job of pouring concrete to create the dam begins.

This simple explanation doesn't begin to tell the whole story. It doesn't tell of the ingenious methods that are invented by the engineers to solve their day-to-day problems. It doesn't suggest the adventures of the "high scalers," the men who nonchalantly drill holes or set steel into the vertical rock, hundreds of feet above the river, while dangling in bosun's chairs or standing on scaffolds.

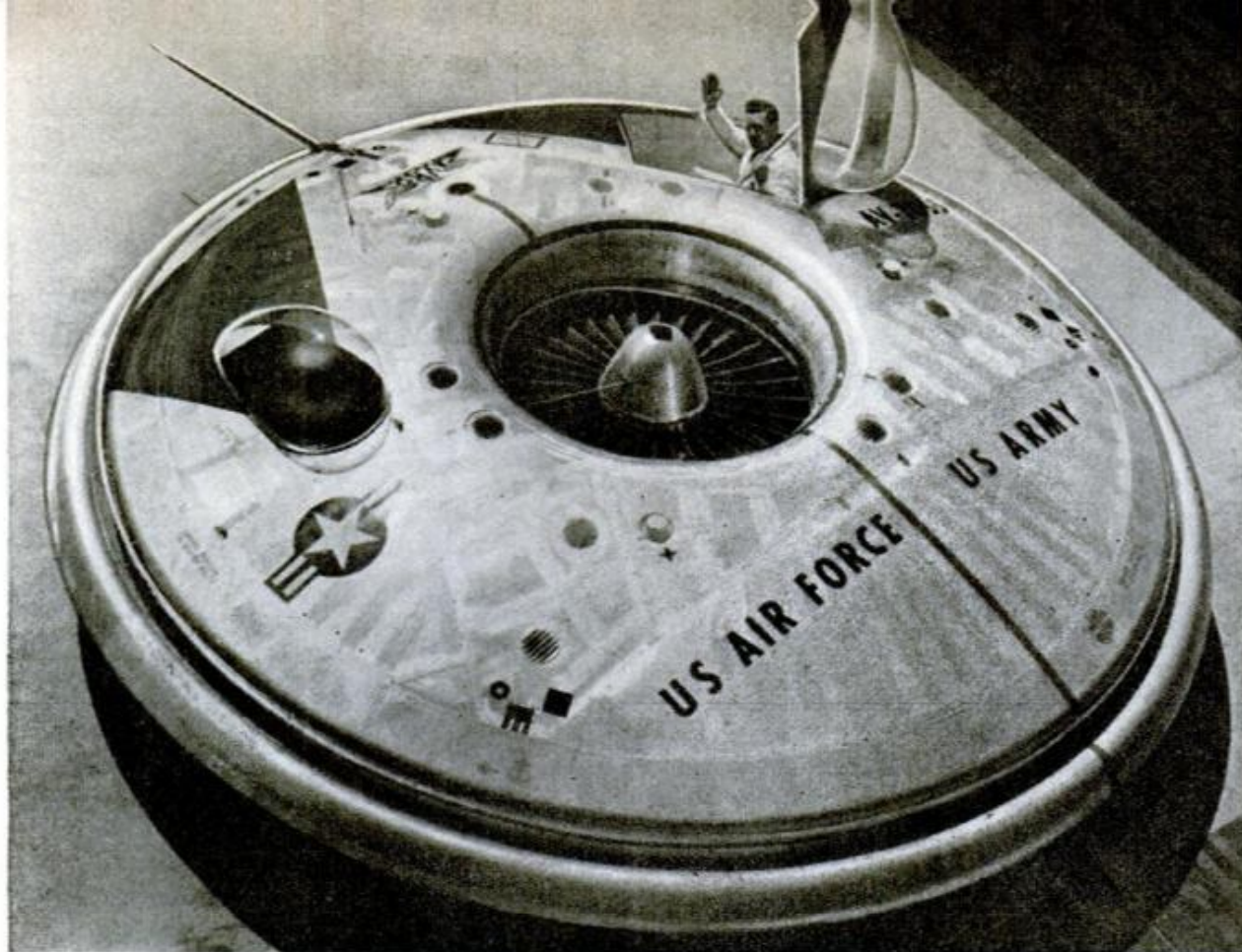
And this explanation doesn't give any idea of the magnitude of the project. At Glen Canyon, for instance, each diversion tunnel is 41 feet in diameter and represents a major construction job in itself. The explanation doesn't even

(Continued to page 314)



Before tunnel was built, trucks were lowered to river bed by cables. Below, concrete mixing plant rests on canyon shelf





Flying Saucer? Well, Yes and No

It looks like a saucer and it flies, but it's not really a flying saucer. It's a new air car developed jointly by the Army and Air Force for transport of troops over any kind of terrain, even water. It takes off verti-

cally, like other air cars, but once it attains minimum velocity, it functions as an aircraft, getting lift by aerodynamic forces generated by its forward motion. Details of its performance are still classified.

Double-Duty Pump Handles Liquids or Air

Versatile enough for almost any household or outdoor pumping job, a new lightweight plastic pump is equipped with two hoses and double fittings. With the larger hose, it will pump water from a boat or do

light industrial jobs such as moving chemicals from open vessels into smaller containers. With the smaller hose, which has an air-valve attachment, it will pump air to fill tires, mattresses or pneumatic toys.



Knighted by Queen Elizabeth after he became the first man to climb Mt. Everest, in 1953, Sir Edmund Hillary of Auckland, New Zealand, next became co-leader of the scientific expedition that crossed the continent of Antarctica in 1957-58. This month he is leading an expedition sponsored by The World Book Encyclopedia into the high Himalaya Mountains.



My Most Exciting Moment

By Sir Edmund Hillary

THE MOMENT that gave me my biggest thrill was not when I stood atop Mt. Everest, but when we got our three farm tractors up the Skelton Glacier to the Polar Plateau, at 8200 feet. One of my duties on the Antarctic expedition was to establish a route from McMurdo Sound to the Plateau and on to the South Pole. Originally we were going to do this with dog teams as we did not have Sno-cats, the ideal vehicle for our purposes. We did have three light tractors, and I decided to use them if we could, for a satisfactory performance by the tractors would give us a strong second line of support to the Beaver aircraft we also were using. The tractors were ordinary rubber-tired machines with a belt running over their wheels, improving their ability. We spent time trying to improve their performance but when they struck heavy snow they bogged down. They had no heated cabs so we put up canvas awnings.

We set off on October 14, 1957, and crossed 180 miles over the Ross Ice Shelf. We had some trouble with soft snow but managed to keep going over it, and established a depot at the foot of Skelton Glacier. Our job then was to make our way up the Glacier. It's 90 miles long, heavily crevassed and rises from 1000 to 8200 feet. We did manage to drag our loads up the glacier but we had a few frights. There were areas where the crevasses were bridged with snow. The snow would support the front wheels of the tractors, but when the back wheels went over they sank in and we doubted sometimes whether we could get them out. We crossed one area of 60 or so crevasses and crashed into many. If we had been unlucky we could have crashed down, although we had the tractors roped together to break the fall if one went down. The weather was bad, the visibility was very poor, so we were always afraid of straying into the bad crevasse areas.

I had arranged for a ski plane to fly into a spot on the Plateau. It was to bring three or four men and a couple of dog teams. Our objective was to reach this depot. We made our way to the head of the glacier and were still about 30 miles from the depot position. We were having strong winds and drifting snow and it was difficult to navigate, but we drove on, navigating as best we could, relying on the sun and surrounding peaks. It was difficult to be accurate due to the poor visibility. We went through fog and drift, getting cold and miserable and, finally, after what seemed a lifetime, we came through a wall of mist. It was astonishing. We passed through the edge of the mist and two miles beyond was a black triangle—the tent of the depot.

This was the moment I believe that gave me my biggest thrill. As far as I was concerned, getting the tractors to the depot determined whether we could get to the Pole. I knew, when we accomplished this, we could go on.

AN EYE ON SPACE

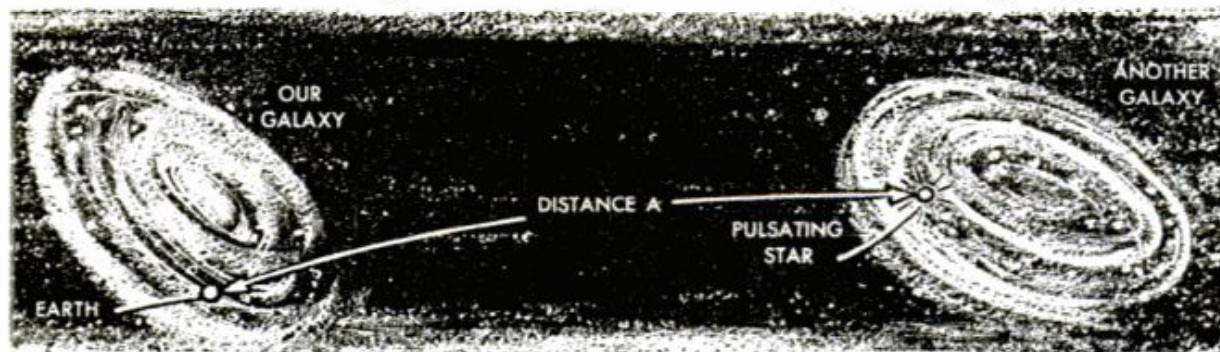
By Dr. Dan Q. Posin

PROFESSOR OF PHYSICS, DE PAUL UNIVERSITY
SCIENTIFIC CONSULTANT AND ADVISOR, COLUMBIA BROADCASTING SYSTEM

LAST MONTH we showed you how to measure the distance to a far-away star by forming a triangle, using the Earth, the Sun and the star. If, however, the star is very, very far away, the two long sides of the triangle are almost completely parallel, and it's hard to make a reliable measurement. So what to do?

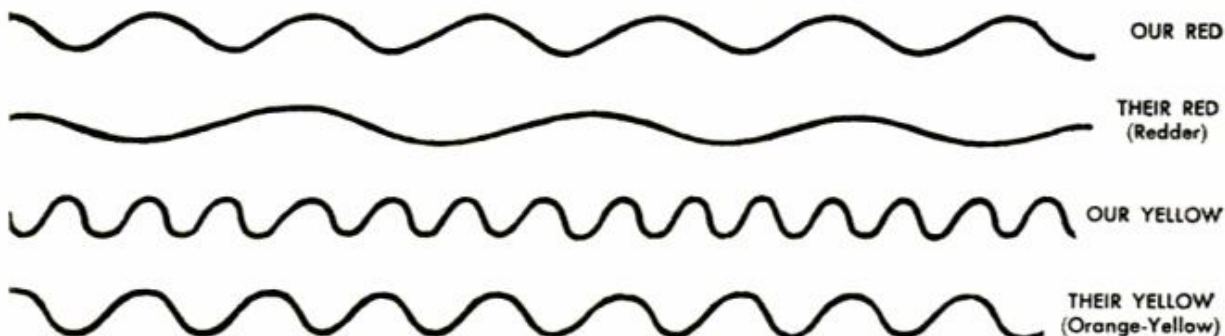
Try this: go back to the nearby distances where you *can* draw a good triangle and find a pulsating star, one that expands and contracts, and measure how bright it is. Now find exactly the same kind of pulsating star very far away (say the kind that goes very bright, then dim, then very bright again in five hours, repeatedly). If the light from this distant star is four times weaker, then this star is twice as far away. If the light from the distant star is 100 times weaker, then the star is 10 times farther away.

You might even find this particular type of star (the five-hour period) in some other galaxy. You would measure the light intensity of that star, and *calculate* the distance of the star. Then you would know how far away the other *galaxy* is.



Now while you are having these remarkable successes, do one more thing:

Study the colors coming from this other galaxy. I mean, let the light from that galaxy pass through a prism. Then you'll get a spread of colors. Now all these colors will be of longer wavelength than the corresponding colors of light on Earth.



This "red shift" is believed to be due to the other galaxy's running away from us. But what has this to do with *distance*? Here is the payoff: Say you study very, very distant galaxies, and they are so far away that you cannot see a familiar type of pulsating star to measure its intensity and therefore calculate its distance. So what do you do? You study the wavelengths of the various colors. And if the change in wavelength is twice as much as it was in the previous case (where we got the distance A), then this galaxy is running away from us twice as fast as the other, and is also twice as far away.

So it's not so hard to measure distances to planets and stars and galaxies. It's a little harder, however, to *travel* these distances. ★ ★ ★



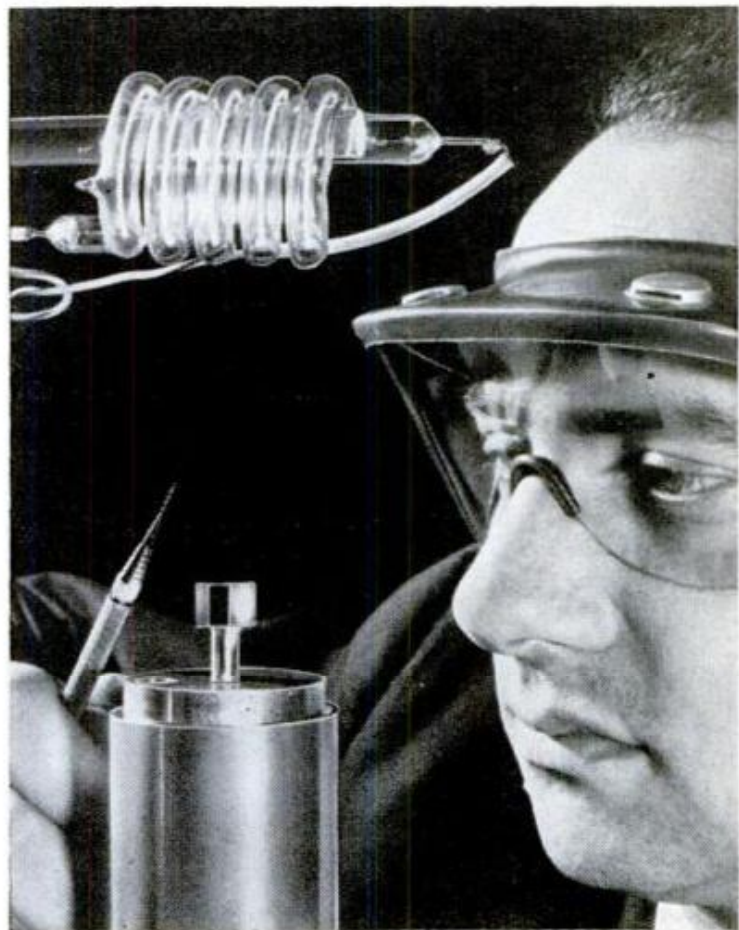
Arrestor System for Jets Remodeled for Air Transports

Successfully used to slow down high-speed Air Force jet fighters (*PM*, April, 1957), a runway emergency arrestor system has been enlarged to accommodate huge air transports. Designed to prevent overshoot accidents, the system works on the "water squeeze" principle. A hook drops

from the tail of the aircraft and catches a cable strung across the runway. The cable pulls two loose-fitting pistons through 1400-foot tubes, which are buried on either side of the runway and partially filled with an antifreeze mixture. "Squeezing" of the fluid can stop a fully loaded 707 Jetliner.

Projects Light Beam Brighter Than the Sun

Called a major breakthrough in the search for a "coherent" light source—one that coordinates the light radiated from each of its atoms—a new device jumps the frequency gap from 50,000 million to 500,000 billion c.p.s. and produces a narrow beam of light brighter than the sun at its core. Called "laser" (from light amplification by stimulated emission of radiation), it has important applications in space communications, in photographing astronomical bodies, and in medical diagnosis. A light source (top, right) irradiates a synthetic ruby crystal (on pedestal), raising its atoms to a higher energy state. The excited atoms are coupled to an atomic resonator and stimulated to radiate together, or coherently. Atoms in ordinary light sources radiate individually at random, or incoherently. A laser beam, projected from a satellite 1000 miles up, could be focused within 200 feet.





Irving Amen prefers to stand when making a woodcut. He first sketches his idea in ink and then transfers it to the woodcut block with carbon paper. He makes the sketch loose so he can further create in the wood

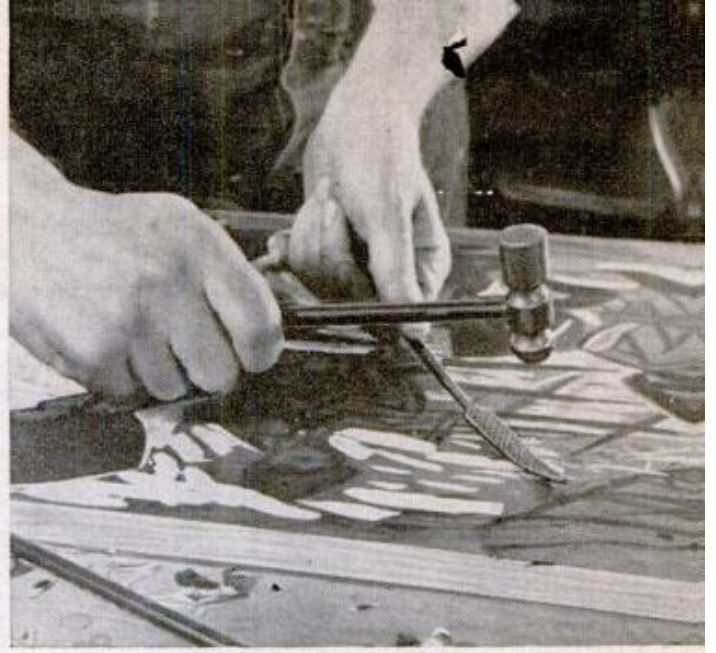
Master of The Woodcut



GOUGING AND RIPPING, artist Irving Amen plunges his knife furiously into a slab of white pine and, in a day, a woodcut is carved into being. The print, transferred by placing handmade Japanese paper against the inked block, may go on display in the Metropolitan Museum of Art, the Museum of Modern Art, or in any number of respected galleries. For New Yorker Amen is a master of the woodcut whose special distinction is that his prints reflect the creative process—the battle of wood, knife and man. Amen slashes at the soft wood. He works rapidly and never takes more than a day for a five-color woodcut. His ideas are roughed out in India ink and roughly transferred with carbon paper to the wood. This looseness allows him to create further with knife, gouge, and the rasps and ballpeen hammer with which he adds texture. When a print is pulled from the hewn block, it must reflect the struggle with wood or, to Amen, it is a failure.

Amen inks sections of stencil paper and lays them on the print paper to give areas of color. The forms of the print will be printed over these areas. He then inks the block with a roller and puts paper on it





Holding his knife like a dagger, Amen outlines the forms distinctly. He gouges out other areas at a furious clip, taking no more than a day to make a five-color print. He uses a rasp (right) to texture the wood

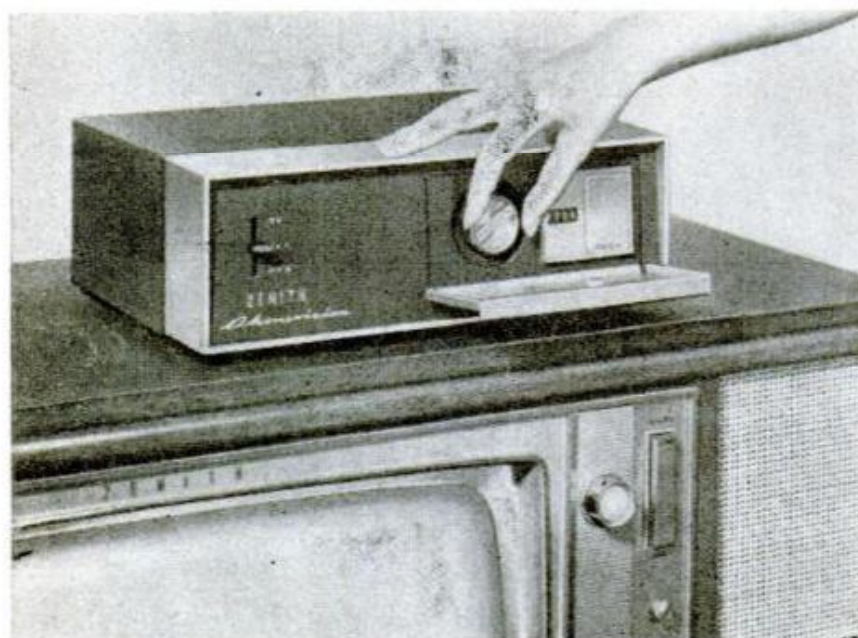
The finished print. It's called "Shadow Play" and is shown on the opposite page. Museums collect Amen's work





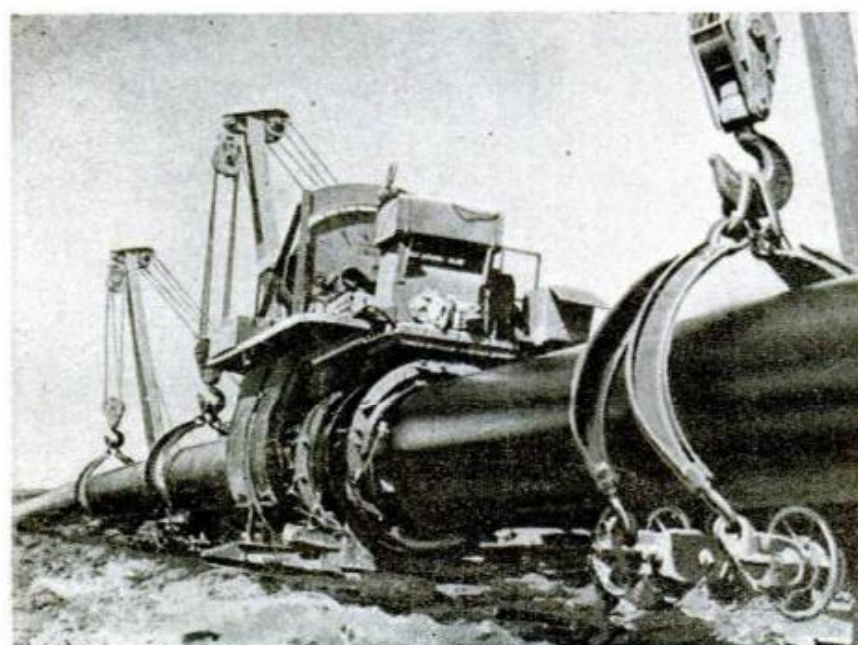
Boating on the Railroad

When heavy rains flooded parts of Luke County, Mich., with two feet of water, the Duluth, South Shore & Atlantic Railroad switched to old steam engines as the water shorted out the diesel equipment. One section crew, with no such alternate for its stalled motor car, made it through by rigging a transom mount on the "stern" of the car and attaching a 7½-horsepower outboard motor. They plowed between Soo Junction and Hulbert, Mich., at five to six miles an hour.



Pay-TV Decoder

Designed for a new pay-TV system, a decoder unscrambles subscription telecasts. The little box is placed atop the TV set. The viewer turns a single knob until a code number, provided in a listing of advance programs, appears in a window. Opening the decoder door automatically switches the TV set to the Phonevision system. The unit records the viewing time, thus providing information for billing the subscriber. The system may be tested in the Hartford, Conn., area.



Big Pipe Cleaner

Crawling along a Russian gas pipeline, two new self-propelled machines clean, prime, insulate and wrap the three-foot, four-inch pipe automatically at speeds from 300 to 2000 feet per hour. Six big jib cranes lift the pipe on roller hooks while the machines do their work, then lower it carefully into its trench. A team of one cleaning machine and one insulating machine, with six, or seven cranes, can **clean and lay about 3300 feet of pipeline** in a working day.

Russ Cone with Daniel Boone. In 145 searches, the dogs have found 90 percent of the victims in less than 24 hours



Photos: Cliff Essex and Russ Cone

Mister Rescue and His Bloodhounds

By Cliff Essex

THE HUNTER crawled through the forest brush, clawing it aside with bleeding fingers. Completely lost for two days, he was weak from exhaustion and a savage hunger, and his clothes were shredded. Suddenly, rounding a bush, he came face to face with a bloodhound, and looking it right in the eye, he groaned, "Thank God you're here, but where've you been?"

Russ Cone, who had the bloodhound on a ten-foot tracking leash, didn't feel slighted that the man ignored him and spoke to the hound. There are no social errors in rescues, and Russ was already busy unlimber-

ing emergency rations as he walkie-talkied news of his find to a base camp.

Russ has saved dozens of lives in 145 rescues, 80 of these in the past three years. With his methods and his mobile Rescue Unit, he can direct search parties that may include 1000 men. His services are used mostly in California, where there are 23,400,000 acres of forest land available to the public seeking outdoor life each year. The value of his service was officially recognized last year when the Assembly of the California Legislature passed a resolution congratulating him, and noting that 90 per-

cent of his missions have found the lost person alive within 24 hours.

Few people know that this man is completely self-trained, and that ten years ago he had never even seen a bloodhound! The search project was long regarded as a hobby, but an absorbing one that kept the Cone family broke trying to support it.

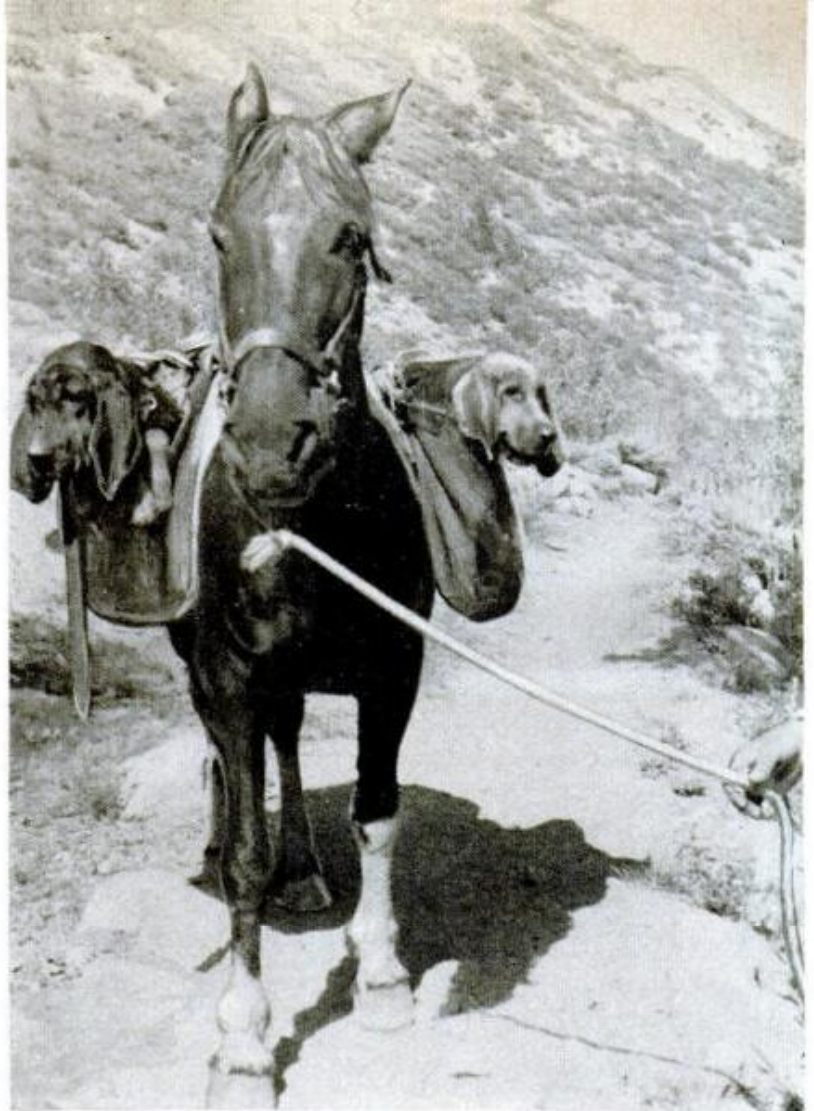
The Cones came to their present home in Los Gatos (which means The Cats!) in a house trailer, and lived in it five years on their patch of ground along an old stagecoach trail in the hills. Work was scarce, but Russ, a master patternmaker, found a job as an appliance repair man. Now they wouldn't live any place else, for this is the kind of country that smiles back at you.

On his job Russ heard of a bloodhound pup that was for sale, and eventually bought it, sight unseen, by telephone. He still can't explain this yen for a hound, but he was mightily impressed when it was delivered—the "pup" weighed 85 pounds and had a tail-wag that dented the sides of the trailer.

A deputy sheriff saw him exercising the pup one day and suggested that a trained bloodhound would be of value in tracking the many people who get lost in the area. Russ and his wife, Thanis, trained the hound, called Daniel Boone, without any previous experience, or even any advice. They coaxed him around corners and over terrain with bits of food. Then they tried articles of clothing *plus* food, and at last got the pup to follow any scent.

It was strictly trial-and-error, and Russ believes that if the dog had not been a "natural," they would have failed. More than half the dogs that have since come to him have been dismissed because of "failure traits," like a tendency to lie down on an unfinished job when tired.

Today he devotes six months and 150 miles of hiking to train each dog, but Daniel Boone only had two months' schooling before they went on their first case, successfully trailing an elderly woman 14 miles into the hills. Holding the powerful hound on a hand leash, Russ suffered severely from shoulder strain, so he designed a body belt by which he could hitch the dog to his waist.



On long, rough mountain trips, dogs ride horses—and love it

Radios in Cone's home and car keep him constantly available





Found! Tracked down by the dogs 43 hours after he wandered away from a mountain camp, boy gets hot meal

Typical of excellent cooperation Cone gets from the armed forces, a helicopter from Alameda Naval Air Station



In the past, Russ says, hounds have been used on searches only when all else has failed, which is unfair. They were given a footprint to sniff, then were roundly criticized when they failed.

But hounds follow a scent that floats in the air, not one that lies on the ground, he points out. Pieces of the lost person's clothing or bedding are ideal scent guides, though a toy or some other recently-handled object will also work. Whoever calls Russ in on a case is asked to obtain a scent guide, handling it only with a clean stick or a pair of clean pliers, and to put it in a clean paper bag or carton to avoid contaminating the scent.

He cautions officials to be certain the scent guide is that of the right person, for a mistake—and there have been some—could cost a life as the wrong scent means the wrong trail or no trail at all.

Hounds are also criticized when they are in the vicinity of a find, but do not actually go right to a victim. Russ points out that they follow a scent in the air, which is often

shifted about by wind. Even so, he said, the dogs point out the correct direction for a search when, without them, rescuers might have to try all points of the compass.

When enough men are available, Russ actually directs that a party go ahead of the dogs. Hounds travel about eight miles per hour on trail, and in particularly rough country may have to be lifted over rocks and other obstacles, which slow them down. The forward party often gets credit for a find, even though they were directed that way by the canine smellers.

On his biggest job, Russ was out for eight days in the Mendocino National Forest seeking a lost boy. Flood conditions, 18 inches of snow on the ground, and high winds kept the dogs from working efficiently, and the victim was eventually found only after a foot-by-foot search was made, using a "string corridor" procedure.

Balls of string one mile long were used here. Starting where the victim was last seen or could logically be placed, helpers unwind the strings, staying fifty feet apart,



Five-year-old boy, lost for 18 hours near Big Bear Lake, is reunited with his parents as members of the successful search party look on

Leash belt saves handler's arms; the pockets hold survival equipment

Cone's employers, Calo Pet Food Company, provide this complete mobile rescue unit as a public service





Jeeps, summoned by walkie-talkie, winch in through snowdrifts to bring medical aid to a rescued boy

so that a corridor, or series of corridors, is formed over the terrain. Going down these lanes, four men, evenly spaced, look under every bush, scan each tree, and move all debris. Nothing is overlooked, and ten feet behind this group comes an observer who makes sure the others miss nothing. No log, no possible hiding place is overlooked.

On the Mendocino case, the boy's body was found at the very end of the sixteenth corridor, and being well covered, it might never have been found by any other search method.

The 12-year-old victim in this case had only been missing about four hours before a hunt was organized, which emphasizes the importance of quick action when someone is lost. This lad, who was not in robust health, had apparently died within 24 hours, and was only two miles from where he lost his way, but there was no way to tell how far he might have circled.

This case was a fine example of the cooperation always found on searches, Cone said. In addition to personnel from the Sheriff's office, this mission was also served by the Forestry Service, fire crews, Air Force and National Guard units, a doctor and clergyman each day, a county road crew, Senior Boy Scouts and executives of their Council, and the sheriff's mounted posse.

The amount of work involved is shown by the jobs performed by these and other volunteers. There were mounted and foot

searchers, crew leaders, portable-radio operators and radio technicians, an Indian tracker, bus driver, truck driver, airplane and helicopter pilots and observers, Paramedics, cooks, dishwashers, water haulers, woodcutters, a horse shoer, Civil Air Patrol liaison officer, bulldozer and grader operators, Weasel operator, repair mechanics, observation and lookout posts, road blocks, supply coordinator, hay haulers, cowboys and packers, waiters, Rangers and Foresters, telephone repairmen, guides, and stringers for laying out corridors.

Averaging 3700 miles a month on his job, Russ is kept in touch with home, office and officials by modern radio and sound equipment. He uses a radio telephone that operates two ways on two channels. This instrument is tied into his car horn circuit, a bell and a light. If he's leaving the car to enter a restaurant, for example, he switches the phone to "horn." If a call comes in, the horn blows. After seven seconds the horn stops and a bright light turns on and must be turned off manually. So, if he doesn't hear the signal, the light will still let him know that a call is waiting for him when he returns.

Radio equipment includes an HF transmitter on 4585 kc, or Civil Air Patrol's Channel 5. There are two portables that operate on the car's frequency so they can maintain contact in the field. They cover about eight miles. There is also an air-to-

(Continued to page 272)



Tank Trucks Load Fuels From Pipelines

Automatic and unmanned, a tankless terminal allows fuel trucks to load directly from underground pipelines, eliminating long round trips to remote storage areas and, in fact, eliminating storage. On arrival at the terminal, the driver telephones the central dispatcher to make sure the fuel

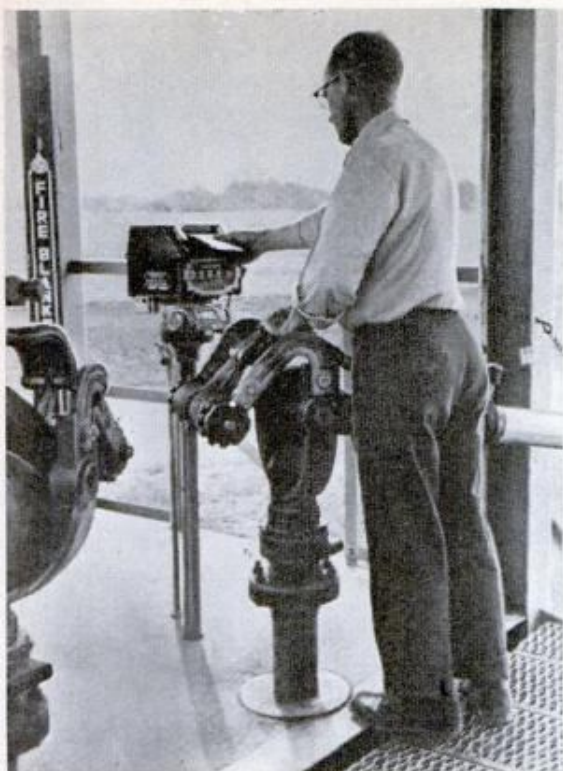
he wants is flowing through the line on schedule. (At different times, different fuels flow through the same pipeline, including regular and premium gasoline, kerosene, heating oil and diesel fuel.) If the right fuel is coming through, the dispatcher releases a valve at the terminal by dialing

Tactical jet fighter blasts off from short runway, helped along by a jet-assisted takeoff system. Runway aids jets in supporting infantry



Jets Use Runway Three Days Old

"Marines have landed and jets are using the beach!" This unusual communique was given out during a recent drill on Formosa, where the Marines constructed an aluminum runway, called a "Short Expeditionary Landing Field," in three days. Jets landed and took off as soon as the last of 9852 aluminum planks was bolted in place. The strip was 3400 feet long and 60 feet wide. The planks from which it was made measured 12 feet long, two feet wide, three inches thick and weighed 160 pounds each. Planes were stopped with an arresting gear.



a code number from the central office. The driver then inserts his delivery ticket into a printing meter and, with a special key, unlocks both the meter and the valve and loads his tank. When his order is filled, valve closes automatically.



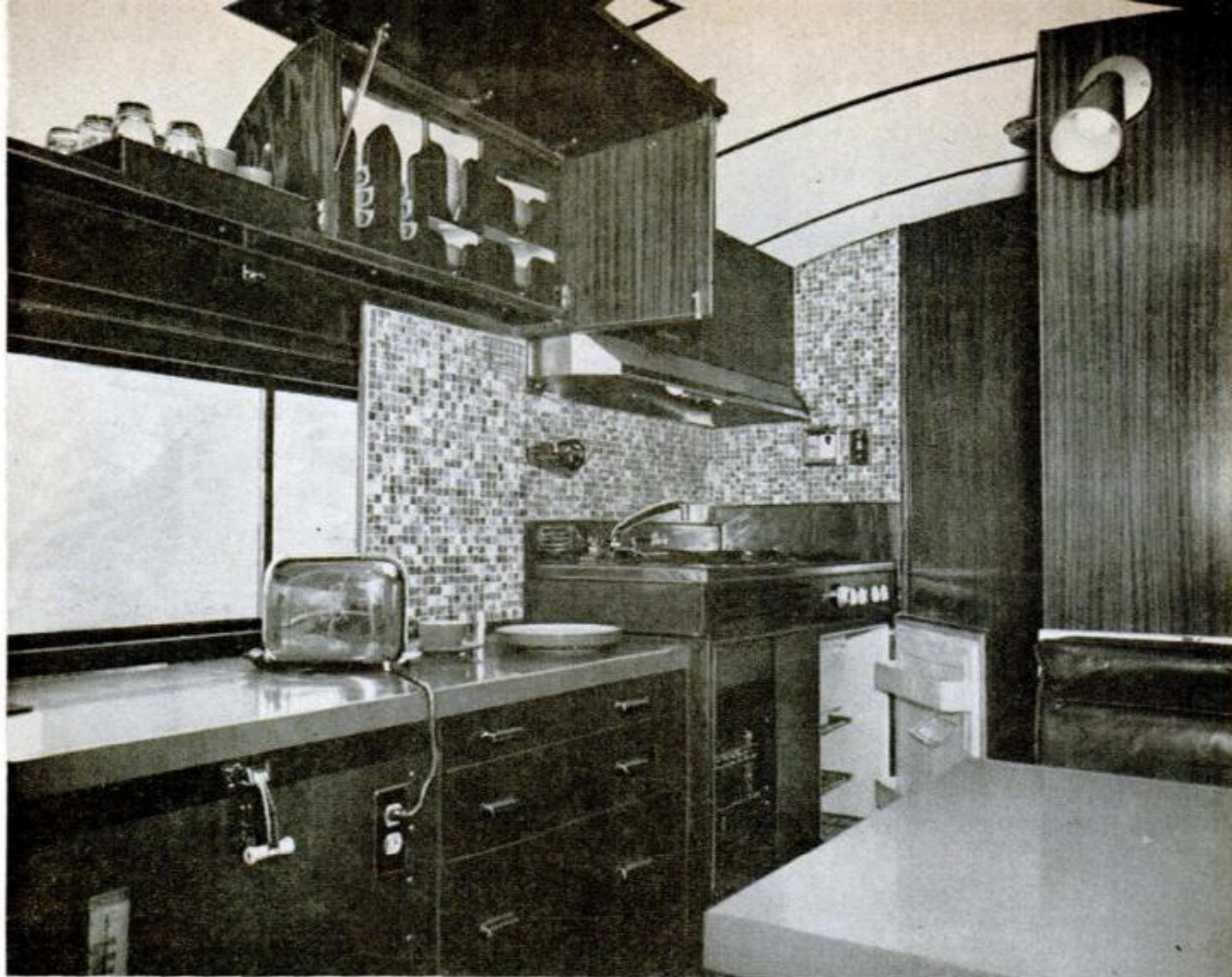
Atomic Rocket Launcher

Appearing in U.S. Army exercises is the launcher of the Davy Crockett rocket designed to deliver a low-yield nuclear punch at close range. The portable weapons system packs an atomic warhead with a small destructive radius so troops using it would not be endangered. Weight, size and shape of the warhead are classified.

Field is designed to be used no more than 30 days, or until a landing strip is taken

Engineers bolted together 9852 aluminum planks to form the 3400-foot strip in about 50 hours. Each plank weighs 160 pounds





Galley has the convenience of a swanky motel. It is walled in mosaic tile, paneled in Honduras mahogany

Luxury Home for the Road

HIGHWAYS SHOULD BE happy ways indeed to occupants of the Bower Land Cruiser, the latest of the elegant mobile homes. First of all its owners could afford the \$40,000-plus charged by manufacturers Frank and Ralph Bower, a father-and-son pair of luxury lovers in Goshen, Ind. The Cruiser's appointments should go the rest of the way toward providing kicks on any route. Designed for six, it complies with all national road rules and enjoys the privilege of curbside parking. Finished in green, gold and cream, the prototype body was specially designed and is mounted on a General Motors chassis. No expense was spared in decorating the interior—since these are custom-built jobs, only the purchaser's sense of expense limits the decoration—and beyond the chauffeur's seat the swank begins. A partitioned dinette converts into a double bunk. Table top and counters are of flame-colored formica, and dishes and table service for eight are stored in handsome cabinets of Honduras mahogany.

The galley holds a four-burner stove, a deep freeze, refrigerator, oven with hood and ventilating fan, sink and disposal unit.

Both galley and bath are walled with green and white mosaic tile. All accommodations can be used during travel. Bath facilities include tub and shower; hot water is supplied from a 125-gallon tank, heated by an automatic, gas-fired heater.

The rear of the bus is a lounge with two 80-inch couches convertible to 36-inch-wide beds; two berths drop from the ceiling over them. A counter unit opens to form an illuminated vanity. Other features include a television set, air-conditioning, and bar. The ceiling is insulated and a rich, gold, wall-to-wall carpet covers the floor. The galley and bath are floored in gold vinyl. The striking note of opulence is the soft, olive-green, horsehide upholstery cut from seven oversize skins imported from Germany. Tinted and curved panoramic windows are draped in blending fabrics, linen in the lounge, glass fiber in galley and dinette. Electric power is furnished by a 5000-watt gasoline-powered generator delivering 110 volts from an outside-serviced compartment in the rear. A 12-volt heavy-duty battery provides alternate service.

The cruiser gets six miles to the gallon, should run a million miles.



Frank Bower, builder, views TV in lounge of Cruiser. It is upholstered in opulent, olive-green horsehide

Body is finished in green, gold and cream and is of stretched steel riveted to a welded frame

Chauffeur's compartment, lower left, is padded with sponge rubber covered with soft leather. Behind it, lower right, is a dinette that converts into a double bunk. Cruiser measures 35 by 8 feet on outside



OUR MOON PROGRAM STARTS NOW

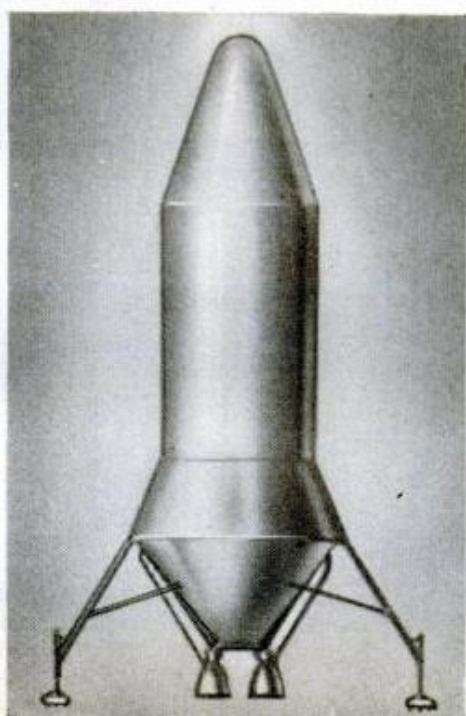
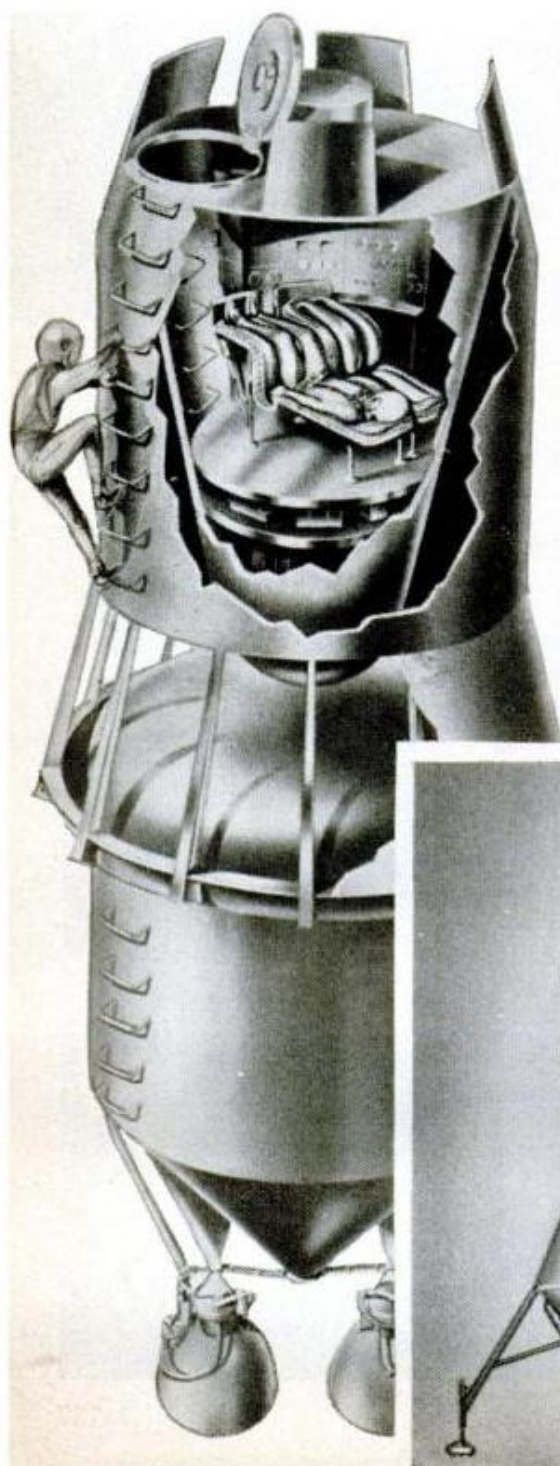
THIS FALL the United States begins a stepped-up campaign to learn all it can about the Moon. The purpose, of course, is to prepare for the time when men will land on the Moon and later return safely to Earth. There's no telling when this will be achieved. It may happen in less than 10 years, it may not.

First on the immediate program and scheduled for this year is an attempt (backed by a spare) to put a satellite in orbit around the Moon. Space Technology Laboratories of Los Angeles is in charge of the project under a contract with National Aeronautics and Space Administration, but that's about all that's known about the orbiter. STL hasn't been allowed to give any details.

Next, in mid-1961, Caltech's Jet Propulsion Laboratory will begin its Ranger series of Moon shots. The first two rounds are intended to be near-misses, to check out techniques and learn more about conditions in space. The last three Rangers will carry capsules that are to be landed on the Moon to detect moonquakes and gather other information. The first of these should be launched in 12 to 18 months from now.

Spending many millions of dollars to study moonquakes is not as silly as it sounds. The information will tell scientists a great deal about the composition of the Moon, whether its interior is solid or molten, whether it has a crust and the kind of rock that predominates. The same seismometer that registers the quakes will also obtain information about the frequency and size of meteorites that strike the Moon.

With this big program in front of them the people at Jet Propulsion Laboratory have designed a basic



◆ Moon program involves three series of launchings, Ranger, Saturn and Nova. Saturn series (final stage of vehicle shown at left in exterior and cutaway views) will be first to put man on Moon and return

Ranger series will do preliminary ◆ exploring, eventually place capsule of instruments on Moon. Capsule (right) drops away from its spacecraft (bottom of picture) and, using retro-rocket, slows down for landing. Nova series (far right), last and most ambitious of program, could send expeditions of settlers to Moon and even beyond to other planets

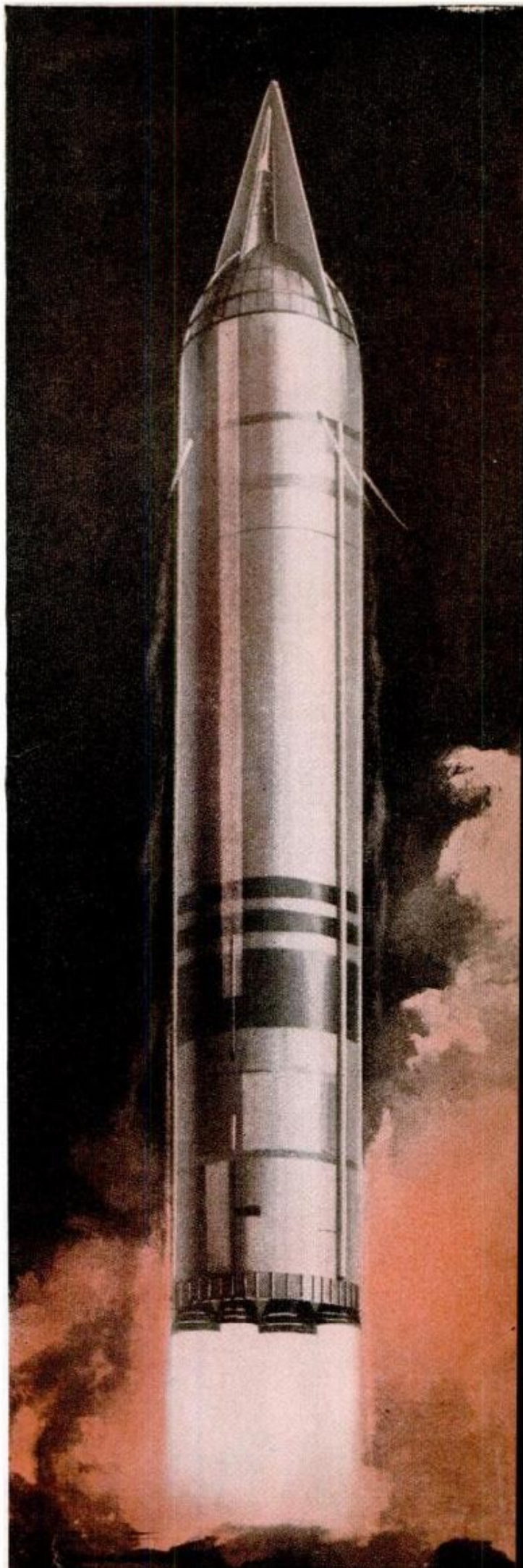
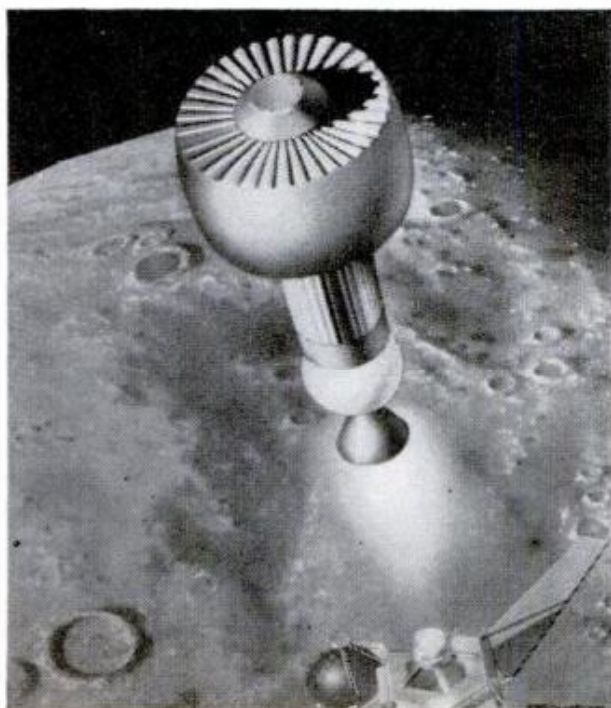
By
Thomas E. Stimson, Jr.

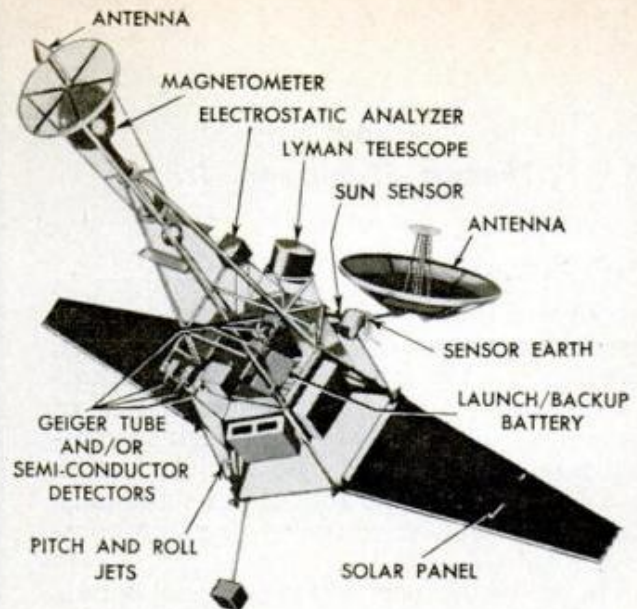
"space bus" that can carry passengers in the form of numerous instruments, or a few instruments plus a 300-lb. lunar capsule. The bus is an ungainly collection of hardware assembled for a specific job instead of for looks. There's no need for sleek streamlining in empty space. The vehicle has its own logic circuits so that it can take care of itself as well as respond to radio commands from Earth.

The space bus carries two six-foot panels coated with solar cells for converting solar energy into 190 watts of electrical power. It has a 50-lb. thrust hydrazine rocket motor for in-course guidance maneuvers, plus small jets for changing attitude and stabilization. It has long-range-radio facilities, a back-up battery and other equipment. For the Ranger shots the bus and its cargo will be accelerated to escape velocity by a rocket consisting of an Atlas booster and an Agena-B second stage.

After the bus with its instruments and lunar capsule leaves the Earth it is designed to shed its outer protective covering and extend its solar panels and its antenna dish. Then its logic circuits take over, in effect saying "Start tumbling on your long axis while your solar sensors look for the Sun. Good. Hold it! Stabilize yourself and continue pointing at the Sun so its rays fall on the solar panels.

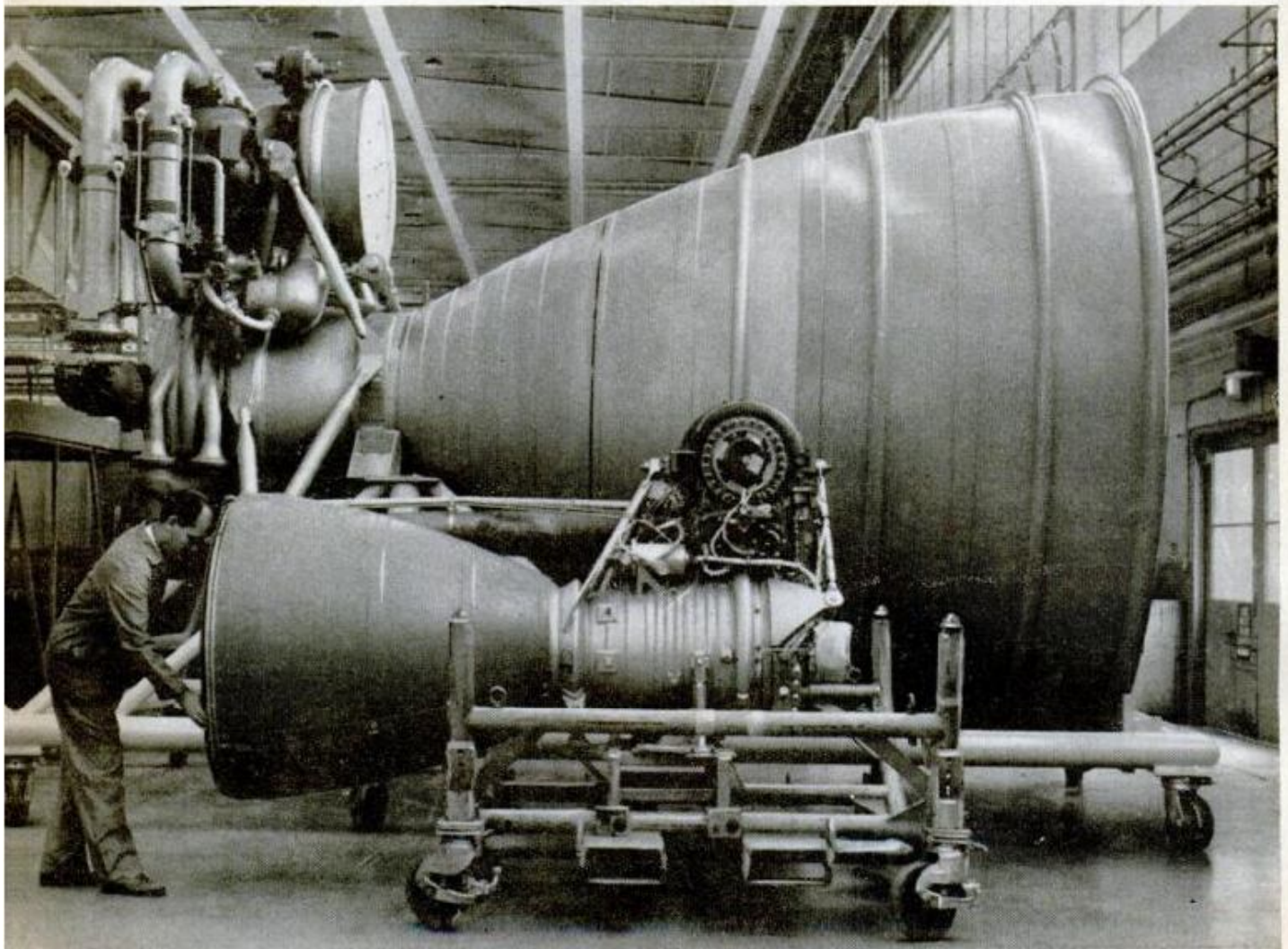
"Now rotate until your infrared Earth-seekers find the Earth. Hold it! Tip the antenna dish until it homes on the signal

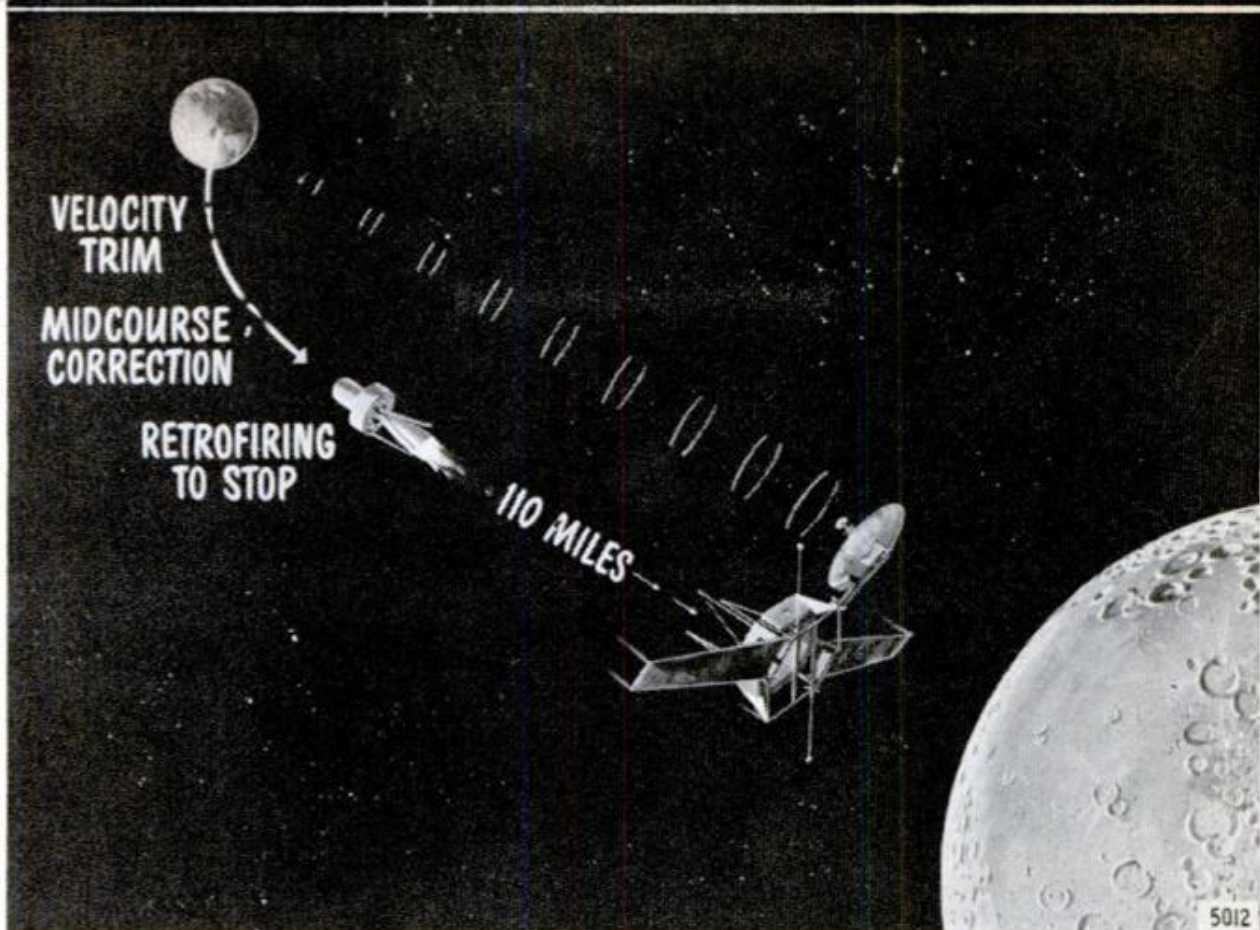




Mockup of Ranger One and Two spacecraft is studied at Jet Propulsion Laboratories (left). Diagram (above) shows instrumentation. Solar panels, folded up at launching, unfold in flight. Rangers Three, Four and Five will be modified to include Moon capsule

Dramatic difference in size and power between Saturn and Nova: Saturn engine (foreground) will be used in cluster of eight to power first stage. However, huge Nova engine (rear) will develop as much power as all eight Saturn engines. Using cluster of these engines, Nova will produce 12 million lb. of thrust





View of Moon flight by Ranger Three, Four or Five. Moon capsule, after separating from spacecraft, uses retro-rocket to slow down to safe landing speed of 200 m.p.h. Spacecraft continues coasting at 6500 m.p.h.

from the Goldstone tracking station in the California desert. Good! Stay in this attitude!"

Close to the halfway point on the 66 or 67-hour journey, computers on Earth will come up with a course correction that must be radioed to the space craft so that it will hit within a predetermined 100-mile target area on the Moon's northeast portion.

The guidance command may say "Roll 28 degrees, pitch 55 degrees and turn on motor for 19 seconds." After this is accomplished the craft's logic circuits will again restore the craft to its previous cruising attitude, locked on to the Sun and Earth.

An hour before impact and in response to another radio command the craft's attitude jets will turn it so that it points base-first toward the Moon. At this point a television camera will go to work, transmitting high-resolution pictures of the Moon's surface. A gamma-ray spectrometer will switch on to analyze and transmit information on what kinds of metals exist on the surface, what the rocks are made of.

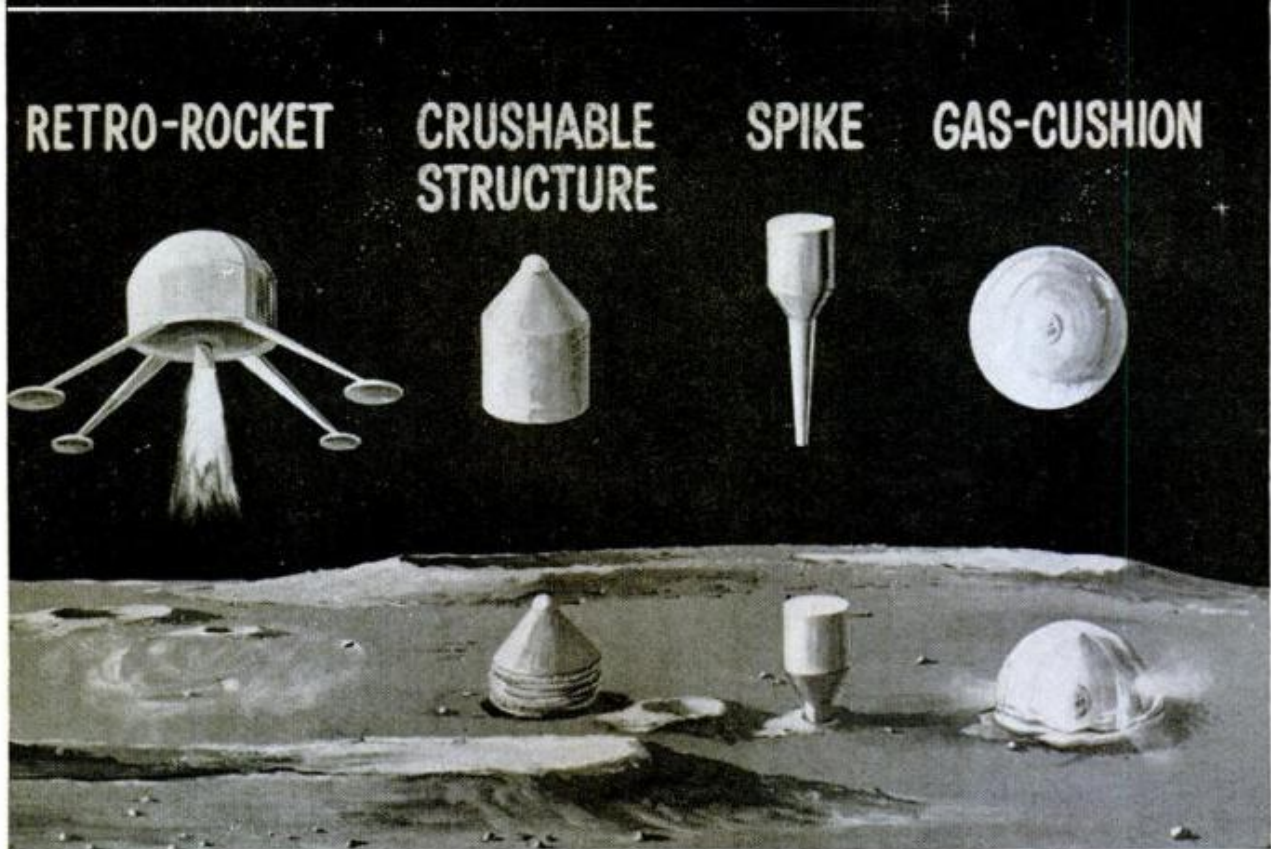
Meanwhile a radio altimeter begins measuring the distance to the surface and when the distance is down to around 20 to 30 miles the altimeter triggers a retro-rocket attached to the landing capsule. The capsule backs off from the bus and slows down to around 150 miles per hour. The bus continues on and hits the Moon at 6500 miles per hour while the capsule, picking up a little speed because of gravity, "coasts" in at around 200 miles per hour.

The capsule is a pretty marvelous thing, a complicated mechanical organism. It can protect itself from injury even though it smashes into a moon mountain at 200 m.p.h. After impact it can move or turn itself over so that its radio antenna points up toward the sky. It can keep itself at a comfortable operating temperature through the bitter lunar night when the temperature drops to 250 degrees below zero and during the torrid day when the temperature is above the boiling point of water. The capsule can measure vibrations on the Moon's surface and radio a record of them back to Earth. It is designed to remain "alive" for 30 days or more.

To create a device that will do all these things, JPL first studied the ideas submitted by 14 different companies and then paid three of them (North American Aviation, Hughes and Aeronutronic) to make additional studies. On the basis of these studies the award for building the capsule was given Aeronutronic, a division of Ford Motor Company.

It's hard to think of how a mechanism can do all the things the capsule is to do but it seems simple after you learn how the Aeronutronic engineers solved the problems.

First of all, they are protecting the capsule with a thick outer coating of balsa wood, honeycomb or some other crushable material that will absorb the tremendous impact of the landing without transmitting too great a strain to the instruments.

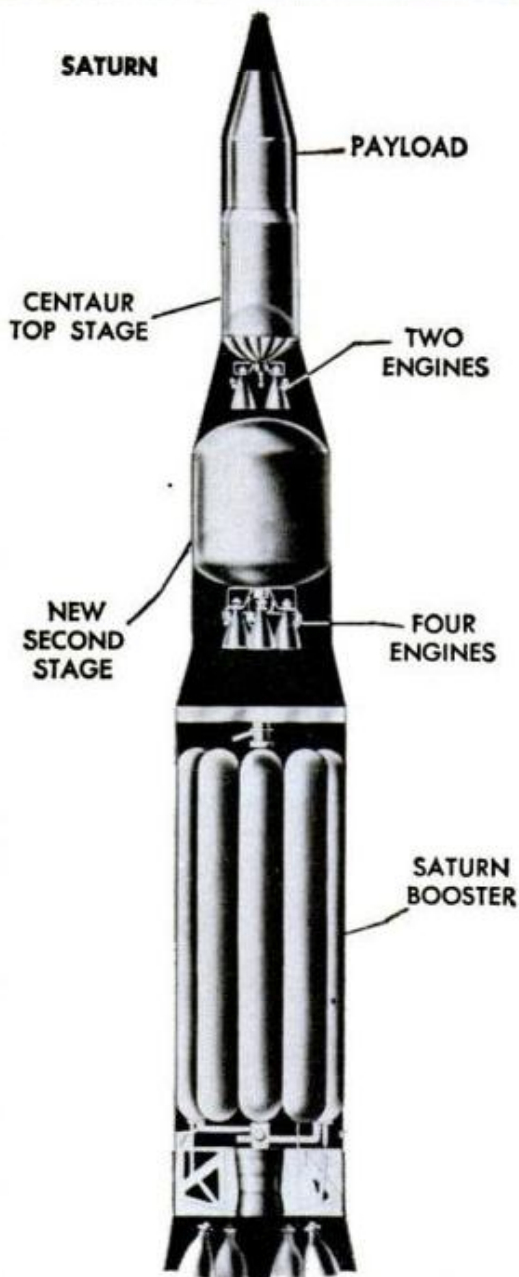
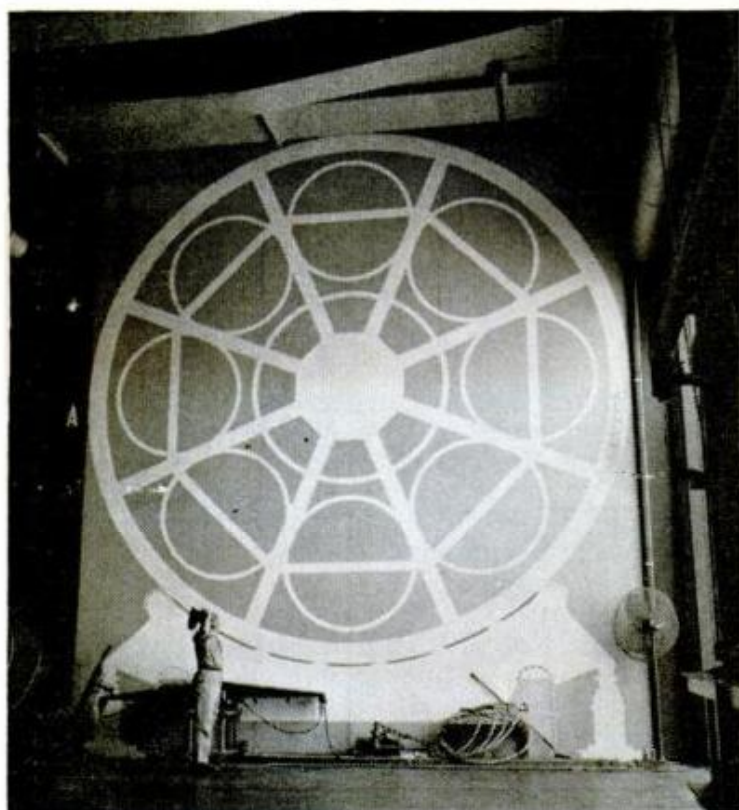


Four landing systems are under study for safely placing instruments on Moon. Ranger Three will combine first two

The capsule itself will consist of two spheres, one inside the other and separated by a liquid so that the inner sphere floats in the liquid. The inner sphere contains all the instruments and purposely will be built out of balance so that its heaviest portion is opposite to the part of its surface that serves as the radio antenna. This allows the inner sphere

(Continued to page 276)

Saturn sketch (right) shows three-stage configuration. Full-scale cross section (below) shows size of Saturn booster





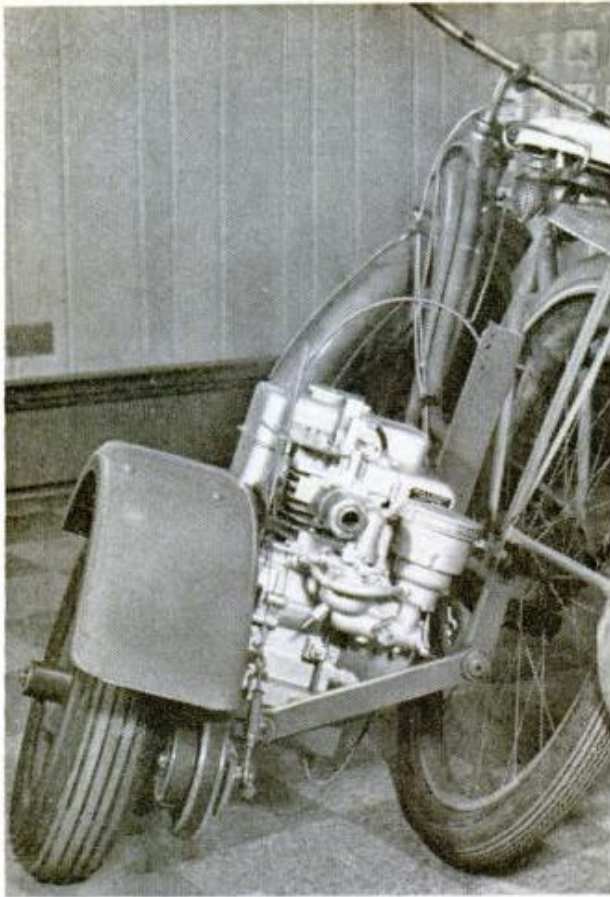
Simple Chemical Treatment Restores Old Books and Manuscripts

Age and careless storage are the biggest problems facing book collectors, and countless books, prints and manuscripts are lost as art treasures because of stains, mildew spots and "foxing" (rusting of bits of iron in the paper). Since the old paper is brittle and weak, the handling necessary for cleaning often results in damage or complete disintegration.

David Resnick, Los Angeles chemist and book collector, tackled the problem and, after 10 years of work, has developed a chemical process that not only cleans and

restores the paper to its original whiteness, but also preserves it from future damage.

In his process, single sheets can be dunked in a pan, then allowed to dry, then treated with the preservative, for about 15 cents. Bound volumes are treated with a dry method, with the book hung in an airtight cabinet and the vaporized chemical blown over the pages as they are flipped by a fan. After that treatment they are finished by hand. The chemicals used in both processes are relatively inexpensive and harmless, according to Resnick.

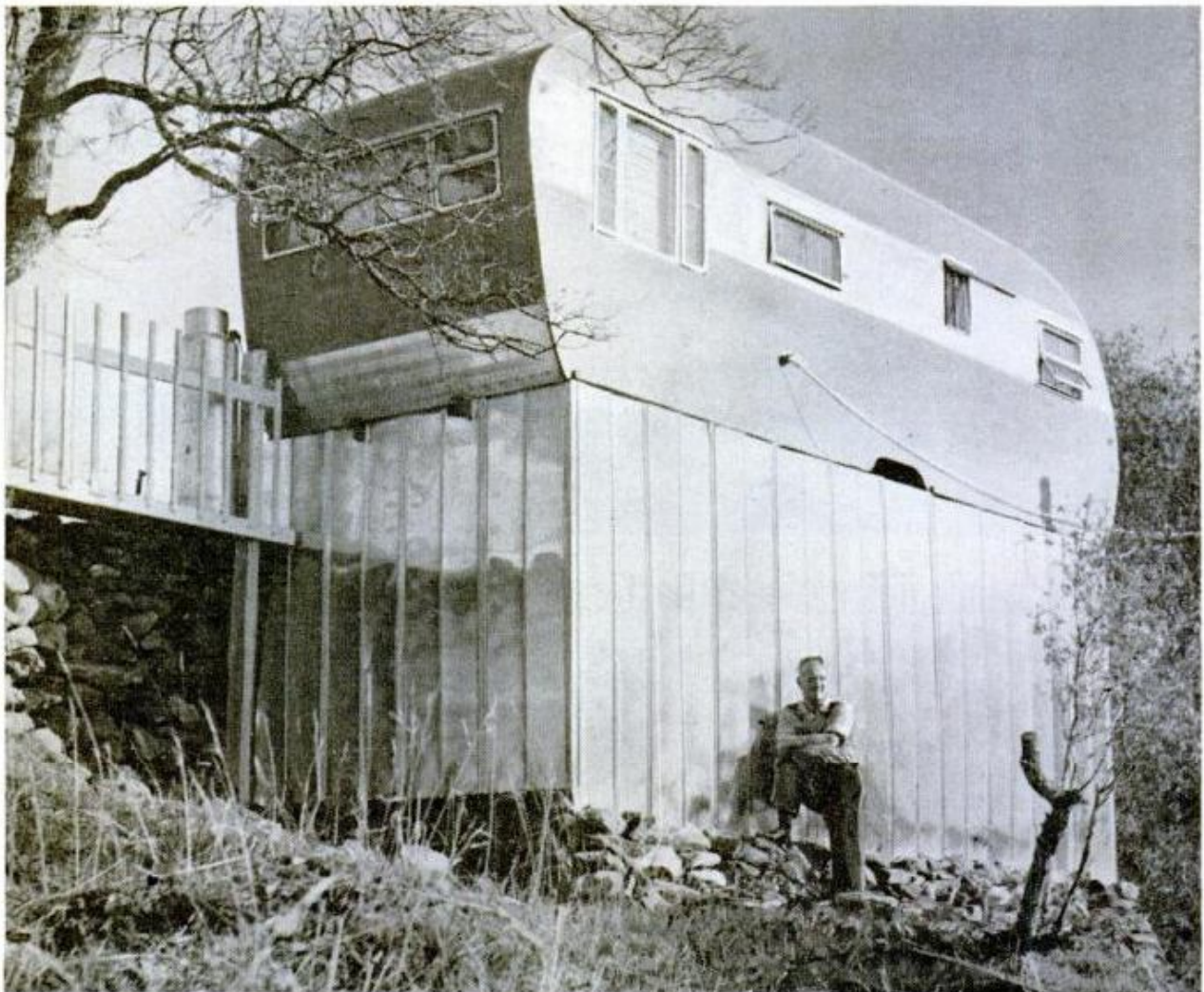


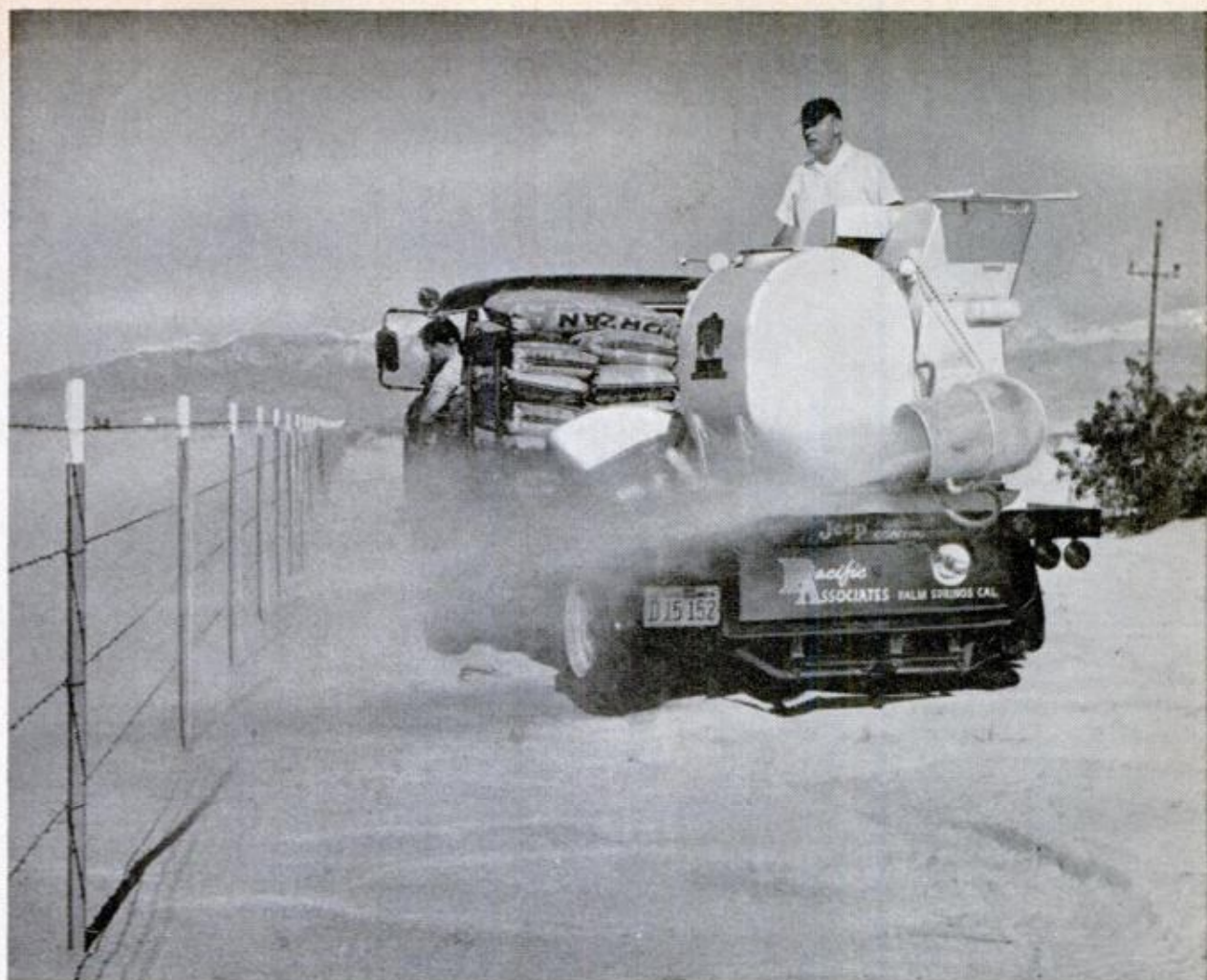
"Power Wheel" for Bicycles

Attached to the rear frame of any 24 or 26-inch bicycle, a new three-horsepower drive unit will move the bike up to 25 miles an hour with an average gas mileage of 100 miles per gallon. Double-hinged and pivoted, the 15-pound drive wheel does not restrict bike movement. It includes a hand-controlled grip-lever clutch, twist-grip throttle, and automatic free wheeling. The motor is air cooled and drives the wheel through a series of belts.

Trailer With a "Basement"

Short of parking space in his yard for his three-room mobile home, John F. Carter of Sonora, Calif., built a parking platform out over a rock ledge bordering the property, then enclosed the platform framework to make a "full basement" under a trailer. The framework is the same length as the trailer but twice as wide, and is enclosed with standard aluminum siding buttressed with random-laid fieldstone. The trailer was moved into place on rollers cut from two-inch pipe, and can be rolled easily off the "basement" for road trips.





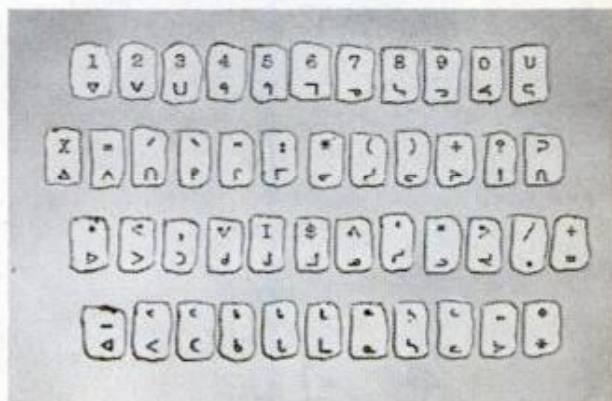
Chemical "Glues" Sand Down

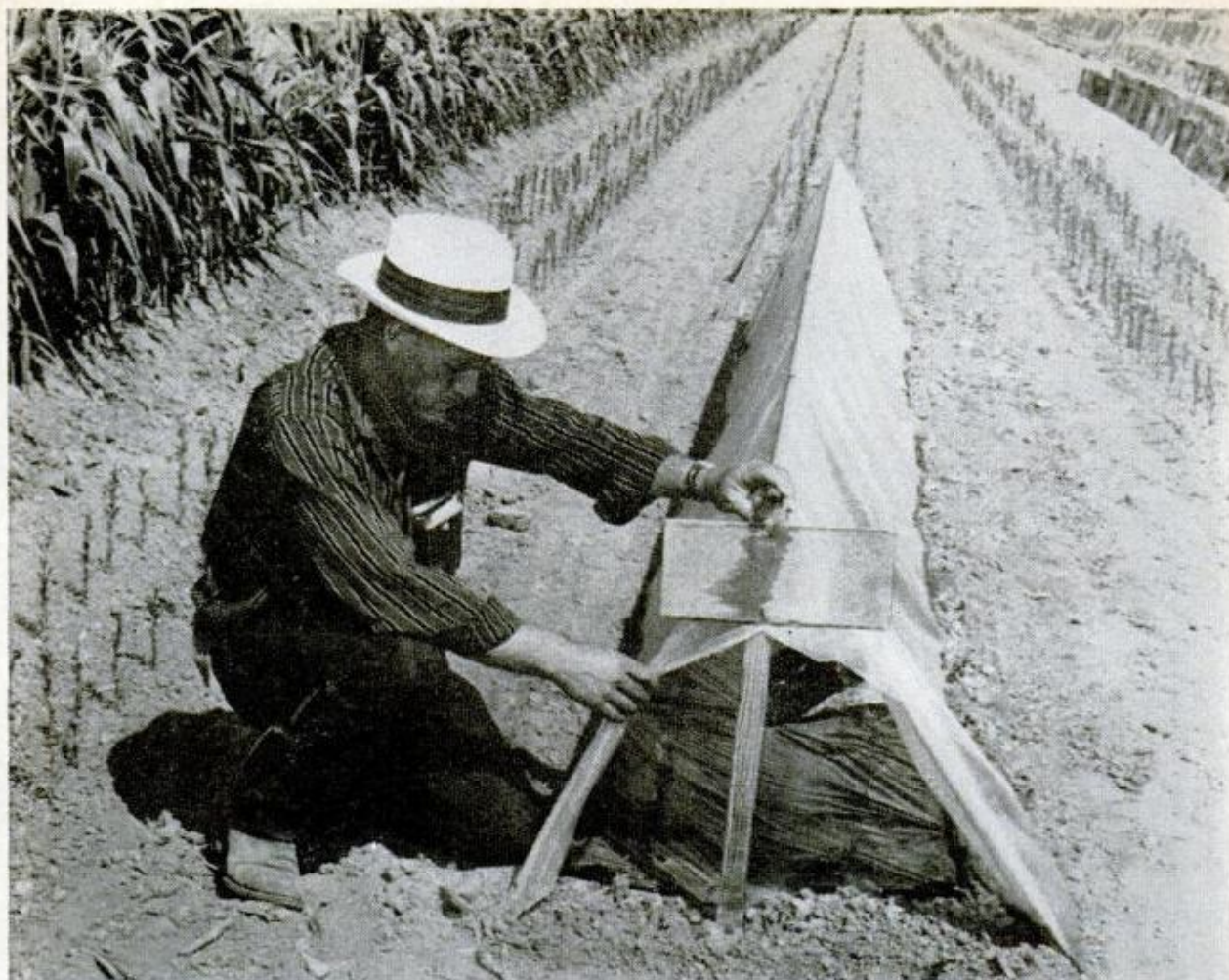
Like oil on choppy water, a new chemical spray, Turbozan-14, stabilizes blow sand along highways, airfields, rail lines and pipelines to prevent it from blowing, even in high winds. The chemical, a paper-mill waste product, is applied by a high-velocity turbine sprayer mounted behind a truck, which throws the stabilizer over a 100-foot swath at a velocity of 180 miles an hour. Sprayed over loose sand as thinly as three ounces to a square yard (at a cost of two cents), Turbozan hardens to form a crust-like heavy frost (right), effectively "gluing" the surface in place. The blower can also be used to plant grass in sandy areas.



Typewriter for Eskimo Dialect

Ever seen anything written in Inuktitut? The 46 sets of characters at right are the keys of a typewriter designed by Leo Manning, Eskimo linguist, for writing the difficult Eskimo dialect in syllabic characters. The typewriter will be used in preparing a new quarterly magazine published by the Canadian Department of Northern Affairs for 3500 Eskimo families scattered over half a million square miles. Delivery will be by plane, boat and dogsled.





Troy Gary shows ultimate use of polyethylene: clear sheets for sides and roof, black sheets for mulch covers

Two rows of young trees dramatize results of experiment. Vigorous trees on left were grown with plastic mulch covers and windbreaks. Smaller trees on right were planted at same time but without polyethylene



"Poly" Coddles Plants

By Thomas A. Dickinson

INEXPENSIVE polyethylene plastic has been successfully tested as a substitute for greenhouses for nursery stock.

A citrus grower, Troy Gary of Santa Paula, Calif., used both black and clear polyethylene sheets as mulch covers for the earth surface and as lean-to windbreaks above the ground.

Primary purpose of the plastic is to store up heat from the sun. Resulting temperatures around the roots and foliage was 5 to 12 degrees above prevailing temperature.

(Continued to page 252)



Gary indicates black plastic sheets on ground which serve as mulch covers for young citrus seedlings. The covers help increase the temperature around the plants, help the soil retain irrigation water and protect it from harmful mineral deposits, and also help prevent the growth of weeds around the plants

Plastic windbreaks became more valuable for increasing temperatures at ground level than for protecting plants from strong winds. Chief windbreaking was done by tall corn in background, because plastic sheets were not always strong enough to stand up under stiff breezes. Clear plastic allows sun's rays to penetrate





During the evening, astronomer Richter divides time between service station and observatory in nearby field

Operator Services Cars and Observes the Stars

WHEN amateur astronomer Henry Richter is not working at his Cecil, N. J., service station, he usually can be found around back, in his observatory, tracking a star.

Richter, 55, combined his work and hobby when he built the observatory. In many cases, for example, he substituted auto-

mobile parts for expensive equipment. The cost of the telescope—nine feet long, with a 12½-inch reflecting mirror—totaled \$562.

“The whole observatory actually was built from junk and contributions from friends and neighbors,” he says. It has a revolving dome 16 feet in diameter set on a 20-foot-square building with six-foot-high walls.

Three brake drums from wheels of Richter’s 12-year-old Chevrolet were used in mounting the telescope. One is used for vertical tracking; another for horizontal tracking; the third, offset and filled with 70 pounds of concrete, is a counterbalance. A motor and gearbox from a washing machine drag a bicycle chain which turns the 900-pound dome. Dome and base are covered by Fiberglas salvaged from a local manufacturer.

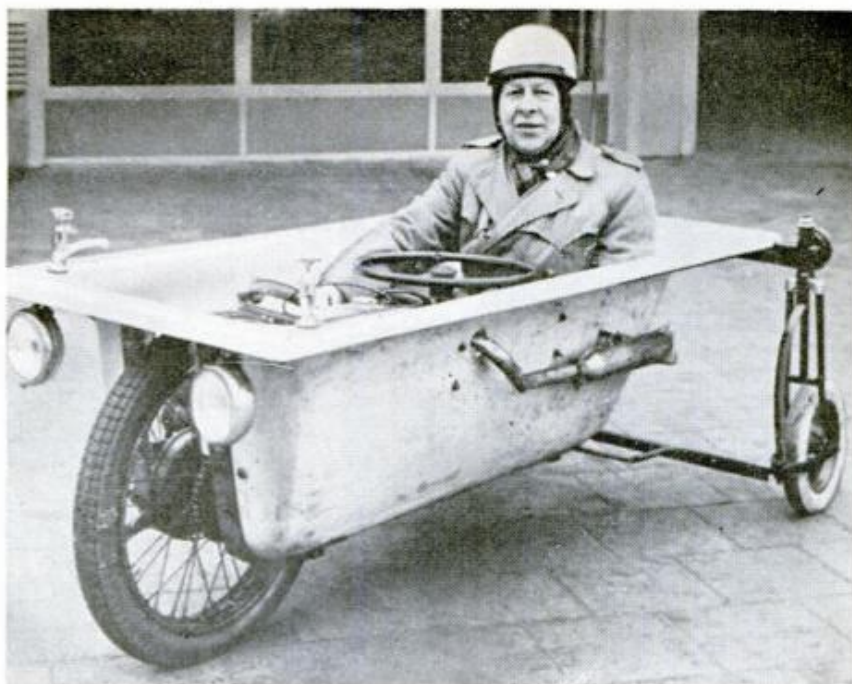
Richter, a member of the Rittenhouse Astronomical Society of Philadelphia, keeps his service station open until midnight. His observatory keeps longer hours.

Three brake drums from an old automobile form telescope mounting which rests in one ton of concrete



Rub-A-Dub-Dub, A Motorized Tub

Some people sing in their bathtubs and let it go at that, but garage owner Jaap Swart, of Wormerdam, Holland, cruises around the streets of Amsterdam in his. He built it from old motorcycle parts and, of course, a bathtub. There's a chain drive to the front wheel, which is mounted through a cutout. He steers the strange vehicle through the two rear wheels, and has the headlights mounted under the original faucets, which he has polished and left in place.



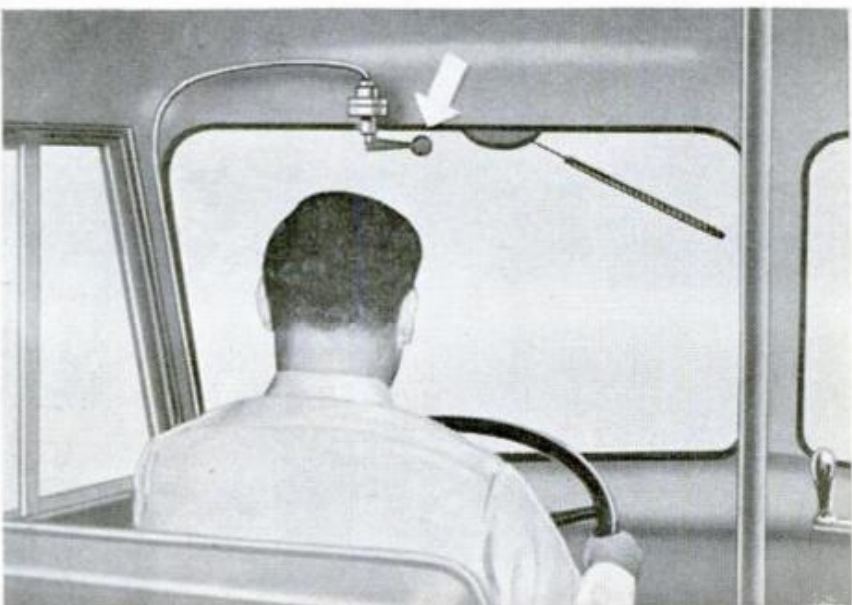
Alarm System Maps A-Blasts

First phase of a one-second national alarm system for detecting and reporting possible sneak-attack nuclear explosions on U.S. target areas is now operational. Air Force Col. Joseph Hannah (pictured at right) said the system, built around a device that senses the blast and transmits the signal to a central headquarters where it is mapped, is designed never to transmit a false alarm. Eventually 100 areas in 48 states will have sensors.



Wigwag Warns Driver Of Unsafe Air Brakes

Warning bus and truck drivers of brake failures due to loss of air pressure (or vacuum failure), a new signaling instrument mounts above the driver's line of vision above the windshield, but drops instantly into view when there's trouble. The signal is connected to the brake system in the engine compartment, and cannot be reset until the brakes are safe.





Leap

**for
Life!**

Happy-landing technique here is demonstrated by Capt. Burnett S. Lillard of the Santa Monica, Calif., Fire Department. He lands on the small of his back just about on the belt line



By Eugene M. Hanson

WHAT YOU LEARN on these pages could save your life if you are ever trapped on an upper floor of a burning building. With smoke and flames roaring up the elevator shafts and stairwells, there's sometimes no way out but to jump into a lifesaving net—then this knowledge almost certainly will save you.

Many have been saved by lifesaving nets, but a great many more have leaped to their deaths. A little-known statistic is that only about five percent of those who leap toward the nets are saved. It's a useless loss of life,

however, because the 95 to 5 ratio could be reversed. At least 95 percent of those who jump, firemen insist, *could* land safely—it's all a matter of knowing how. Experience has demonstrated that leaping into a lifesaving net can be actually enjoyable.

Every fireman is taught the technique of jumping into the net in the early part of his rookie training and is required to make practice jumps periodically as long as he continues working as a fireman. These practice jumps by firemen run into hundreds of thousands every year—and it is unheard-

Many parents panic when trapped in burning buildings with small children. Few will wait for the big net

Children, falling relaxed, have a good chance, but they must be thrown outward, face up, to land flat





WRONG: Don't try to break your fall with arms or legs—let the firemen cushion the impact with their arms



of for a fireman to be injured in a jump.

Chief Charles Carrell of the Santa Monica, California, fire department, whose firemen assisted with these pictures, takes his jumps right along with the rest of the men, although he is under no obligation to do it. He enjoys net jumping as a sport. Firemen keep in good physical condition, but that's not the reason they can cheerfully jump several stories into a 9½-foot net held by ten buddies.

There was a case of a woman more than 70 years old leaping from the sixth floor of a Chicago hotel in October, 1957, into a lifesaving net without injury. She was unhurt, not because of athletic ability, but because she happened to jump correctly and land in the right position.

Landing in just the right position, you see, can make all the difference in whether you are killed, injured, or hardly shaken at all by your desperate leap.

Trained net crew in their special stance—arms flexed and legs positioned to move in any direction



RIGHT: A perfect landing, with arms and legs up and the body nearly flat in a relaxed, half-sitting position

But first, you must make sure you land in the net at all. Worst possible mistake, of course, is to miss the net altogether, and this is the cause of most of the rescue attempts that fail, yet, it is the error which is easiest to remedy. To be sure of hitting the net, simply jump as far away from the building as you can. Firemen are trained to move the net quickly and catch the leaper like a baseball player fielding an infield fly ball. But if you timidly slide off the window ledge, falling almost in contact with the side of the building, the firemen are nearly helpless. They can't get the net close enough to the building to break your fall properly.

They have a trick in these cases of leaning the net against the building, slanting it down against the ground so the fall is at least partially cushioned when the body hits the slanted net and caroms off to the ground. It may save a life but can hardly avoid injury.

When you leap out boldly as far as you can jump, the firemen, who stand ready to

move in any direction, will see that you land exactly on target.

Firemen hold the net, too, to absorb the shock with their muscles so you won't be hurt at all—if you land properly.

Landing properly means, specifically, on the small of your back with your arms and legs up. Jumping to land feet first is the common mistake, for this means broken legs or worse injuries. If you land on your feet with knees flexed, the knees can be rammed up against the face with bone-shattering impact. Still worse, from extreme heights, the thigh bones might be driven right through their sockets and into vital organs of the body.

But just lift your legs and arms and lean back as you fall, as if you were trying to make a big splash in a swimming pool—and don't try to break your fall with extended arms, either—and you'll live to tell about your leap for life.

And as you tell the story over and over through the years, you might even be tempted to try it again some day. ★ ★ ★



Newark Airport Gets 150-Foot Control Tower

Standing like a jet-age lighthouse between Newark Airport's two active runways is a new, 150-foot-high control tower that is crammed with \$1,000,000 worth of electronic equipment. The 13-story struc-

ture—it will be topped by a "radome" to protect radar equipment—will house some 90 Federal Aviation Agency employees. On a round-the-clock basis, they will operate radio transmitters and receivers, direction finders and air-surveillance radar. In addition, navigational aids including two instrument-landing systems, associated approach lighting systems and a telecommunications network will be operated from the tower. It is located near the center of the 2300-acre airport, which served 3,000,000 passengers last year and expects to handle 6,000,000 by 1965. It will give controllers the best possible view of runways, taxiways and ramp areas.



Electrocutor Kills Insects

Wherever insects are abundant—at swimming pools, beaches, patios or terraces—getting rid of them often can be a losing proposition. One ingenious way of solving the problem is an insect electrocutor that attracts insects—by a special black light—to a high-voltage grid and kills them instantly. A metal guard protects against a nonlethal but unpleasant shock if the grid is touched. The electrocutor can be mounted on a post or the side of a building out of human reach, however. Costing no more than a light bulb to operate, it controls flies, mosquitoes and nearly all night-flying insects.

Truck Reaches High To Unload Cargo

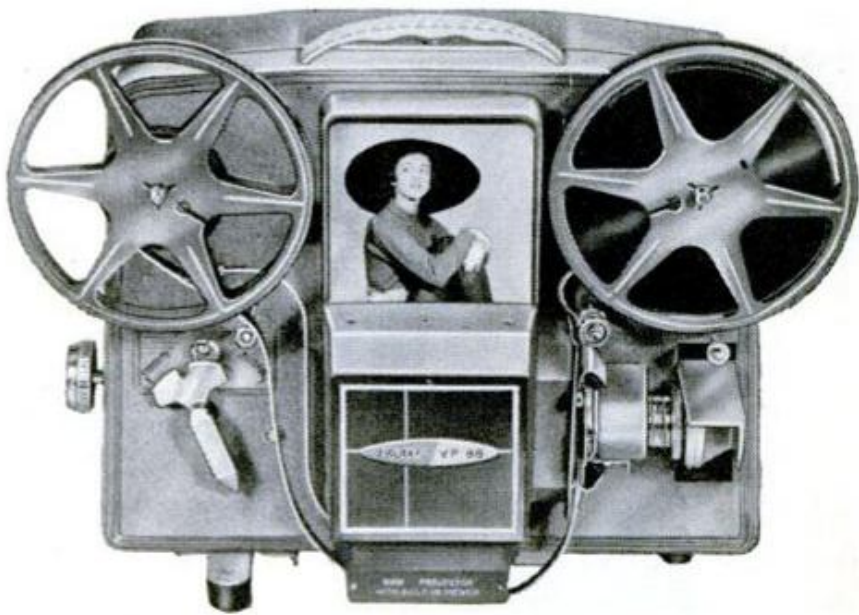
For tilting bulk cargo directly into railway cars or hoppers, an East German dump truck has a three-way dump body mounted on a hydraulic scissors-action elevating frame. It can raise a 2.8-ton load 10 feet above the truck chassis. The standard four-ton truck body is braced and stabilized at the rear by hydraulic legs that extend to the pavement during operation.

☐ A group of Italian firms plans to build an underwater pipeline to transport gas from the Sahara to Sicily.



Movie Projector Is Also a Viewer

As an aid to home movie editing, the manufacturer of a new 8-mm. projector equipped it with a viewing screen. The screen measures $2\frac{1}{4}$ by $3\frac{1}{8}$ inches. At the flip of a lever, the picture can be instantly switched from the distant projection screen to the built-in viewer while the projector is in operation. Families now may preview movies or edit film without setting up a screen or darkening the room.



King-Sized Vacuum Unloads Boat Hold

Speeding the unloading of shiploads of copra at the Cargill copra terminal in San Francisco, Calif., a giant vacuum hose sucks up the dried coconut meat with the help of only one man, who loosens the packed cargo with a pick. The big "sucker" inhales the hard-to-handle copra and shoots it quickly into the Cargill plant ashore, where its coconut oil is extracted and processed into food and oils.





New York Times photo

Many employes of the UN meet once a week with teacher Sophia Delza to practice the exercise's 108 movements

T'ai Chi



Milwaukee Journal photo

Miss Delza glides into the posture called "The Snake Creeps Down." The exercise was set in its final form around 1000 A.D.



"The Brush Knee Twist Step" describes this action. Performers of the movements never strain themselves

Milwaukee Journal photos
They move easily from one position into the other. This one is "The Golden Cockerel Stands on One Leg"

for Your Muscles

By James Biery

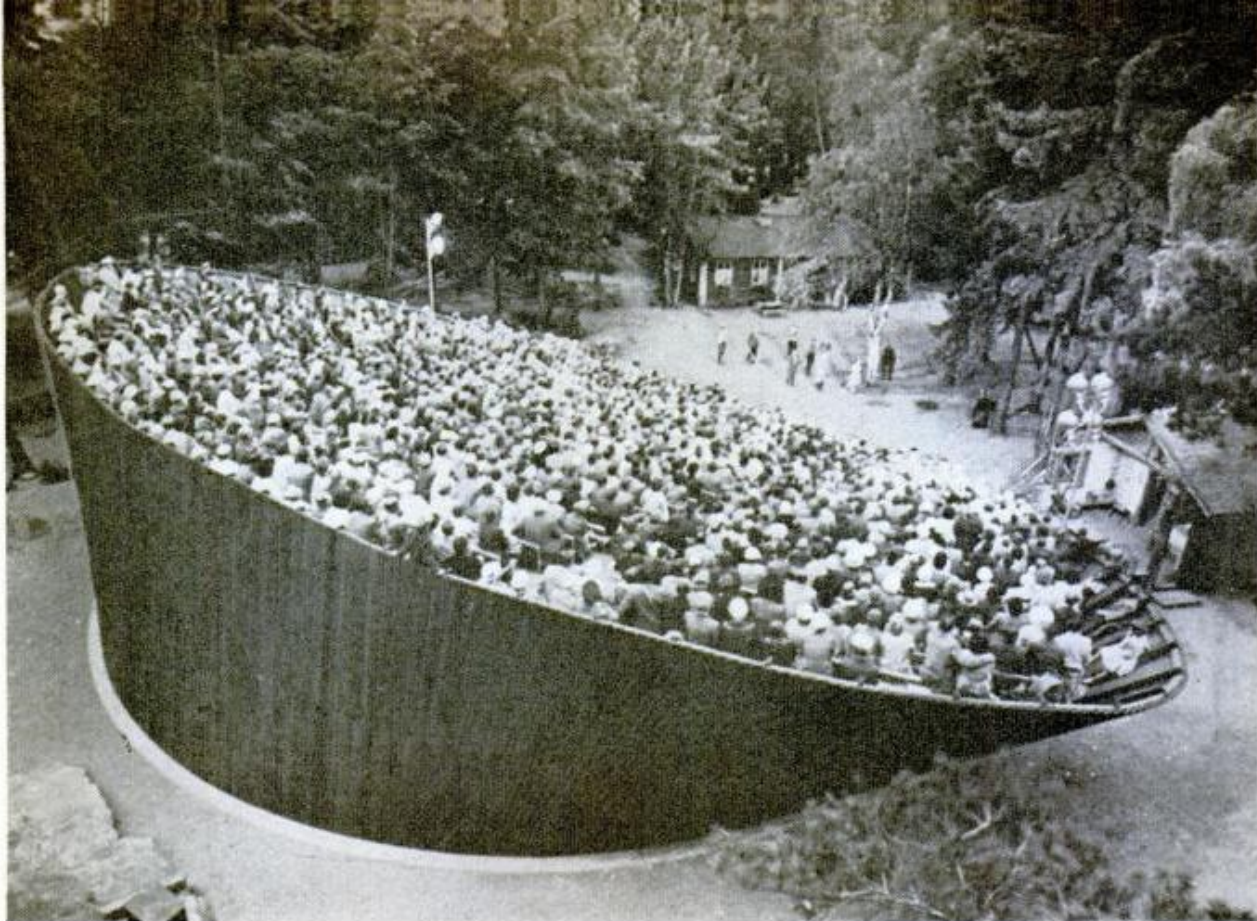
HERE AND THERE throughout the United States a growing number of people are setting aside at least 20 minutes a day to perform an ancient graceful Chinese exercise called T'ai Chi Ch'uan. The name, pronounced "taw-jee-twawn," may be translated as "The Art of Gymnastic Movement" and is one of many branches of physical culture that come under the heading of Chinese boxing. The present form of T'ai Chi dates back to 1000 A.D. and is the culmination of experiment and thought on exercise by boxers, surgeons, monks and rulers.

T'ai Chi differs from similar exercises such as toe-touching and push ups. It not only develops flexible muscles, it is also claimed to activate the body for the development of physical, emotional and mental

well-being. When it is mastered there is no sense of strain, nor is there the hustle and bustle of repeating the exercise, as in push ups, with a vigorous one-two, one-two movement. Instead, it resembles a graceful, solitary dance. The performer moves slowly and with ease from one to another of 108 positions without stopping.

"We in the West are apt to overexert ourselves in exercise and sports, believing that a hard, tense movement indicates strength, and that power comes from the ability to expend energy violently," says Sophia Delza, the leading teacher of the exercise in this country. "Contrary to such a point of view, it is in the philosophy of T'ai Chi Ch'uan that true energy can be controlled, strength balanced, vitality stabilized, only

(Continued to page 256)



Audience Turns Toward Action in Seating Bowl

Spectator "pan" like a movie camera to follow the action in the outdoor auditorium at Tampere, Finland. A seating bowl, mounted on tracked rollers, can be turned from scene to scene or to follow moving

actors. While spectators are turned to one setting, stagehands can prepare new scenes behind their backs. As the bowl turns to the new scenes, a narrator can work on foot in front of the audience.

Cars Slide Sideways in Parking Garage

Ramps that move sideways on a guide rail are the key element in a car-parking system that is designed to pack garages to capacity. In use in London, England, the system consists of rows of ramps which may be moved by hand or by electric

power. The back row of the garage is parked solid. In all the other rows, one ramp is omitted. The remaining ramps may be rolled to one side or the other until the opening, or series of openings if there are more than two rows of cars, appears.

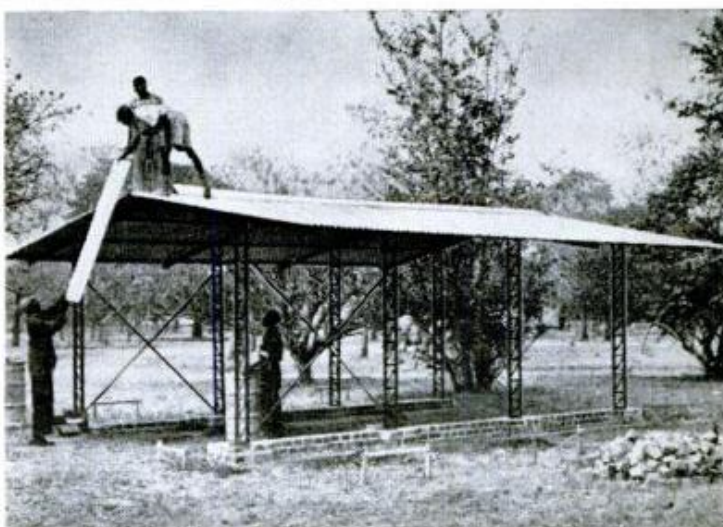




Marine gun crew, using dummy ammunition, shown drilling with the new XM-70 fieldpiece at Quantico, Va.

Rapid-Fire Field Gun for Marine Corps

First American automatic field artillery piece, and considered the most important development in artillery since 1940, the Marine Corps' new XM-70 "Moritzer" can fire six 115-mm. rounds in 2½ seconds—about the speed of a good pistol shooter. The weapon uses ammunition that fires like a conventional shell, then is boosted by a rocket propellant that ignites after it leaves the barrel.



Do-It-Yourself House Kit

To help African tribal natives raise their housing standard above their traditional mud-walled, thatched huts, the government of Northern Rhodesia has developed a do-it-yourself home-building kit. It permits a family to erect a weatherproof, fireproof, and insect-tight three-room home for as little as \$450. The kit consists of a steel framework that can be bolted together, a corrugated steel roof and prefabricated steel window and door units. The buyer can carry the kit home on his bicycle (in several trips), have the frame built and roofed in a day, then use any material such as native brick to fill in the walls.



With considerable pride, we lead off the Eighth Annual Home Section—60 pages devoted to your home of today and tomorrow—with the

PM HOUSE of BUILT-INS

- **Build it from our plans (page 162)**
- **Adapt the built-ins to your existing home (page 170)**
- **Build in the electronic equipment (page 236)**

*I*MAGINE A HOME WHERE:

- The kids can make up their beds and slide them into the wall, leaving uncluttered play space.
- Each member of the family has a complete wardrobe wall, tailor-made to his own needs.
- The built-ins throughout the home require only a minimum investment in furniture.
- Stereo, hi-fi, an intercom system and rotating TV are built into the wall.
- Further, imagine that this home has an inner garden court and glass walls to bring the outdoors inside, yet offers privacy from every angle.

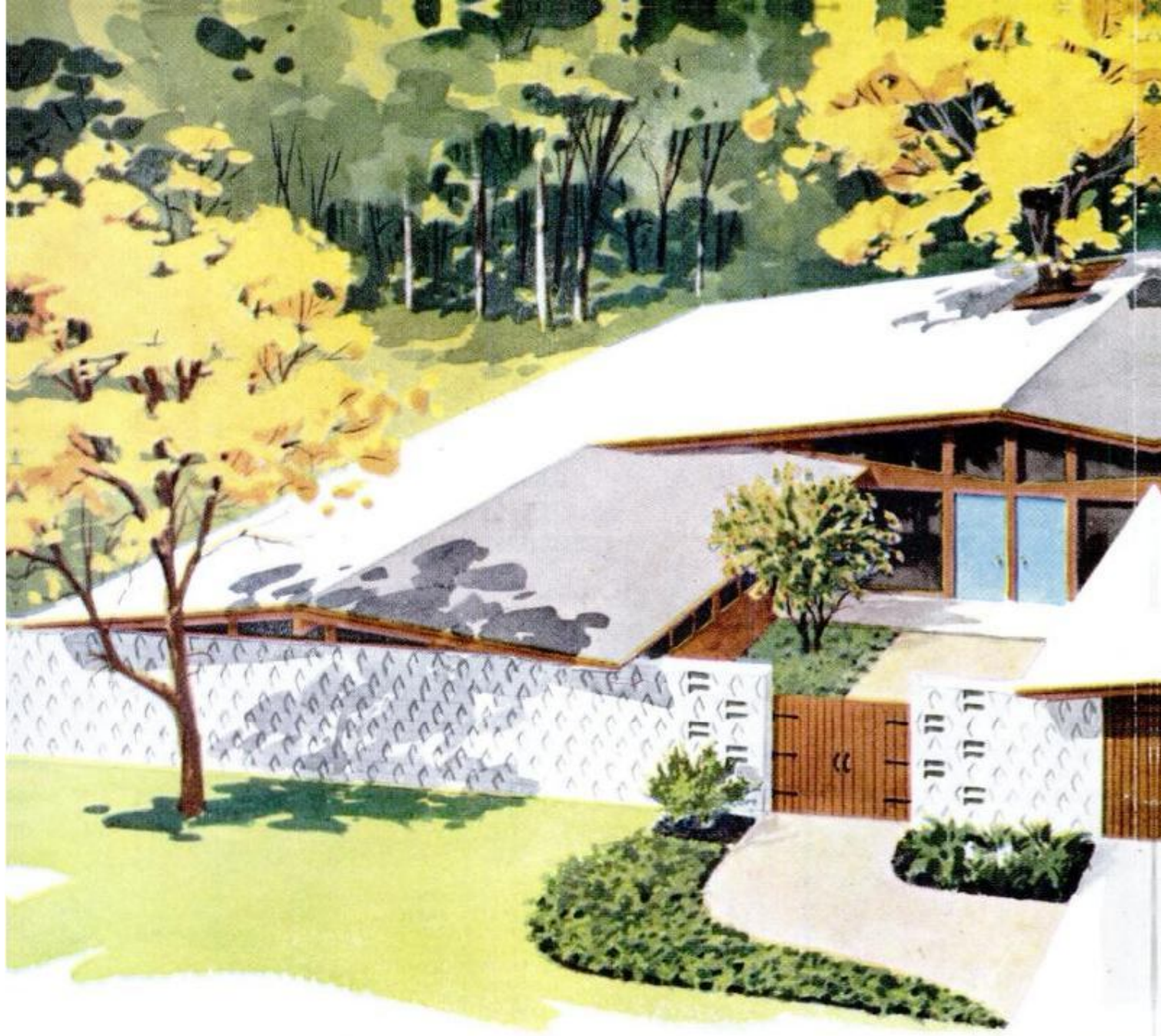
Imagine, finally, that the house has a broad, sweeping exterior that hugs the ground; a beautiful home you'd be proud to own.

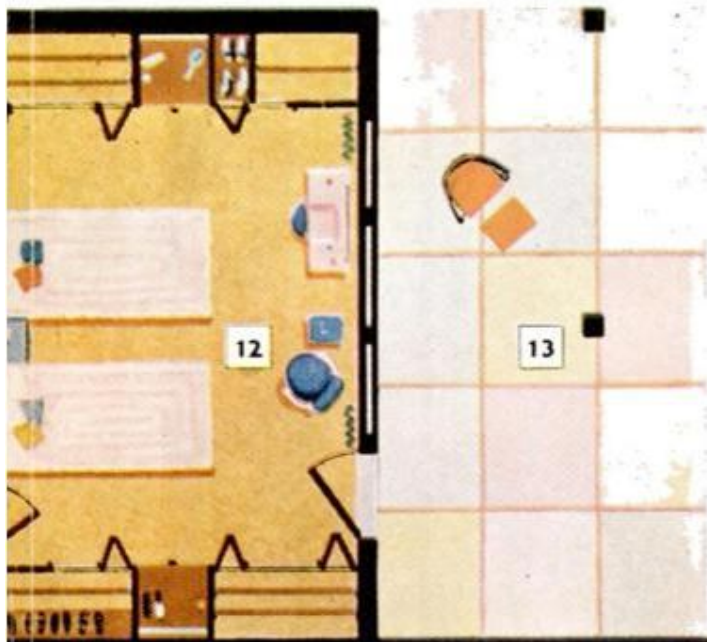
That's the *PM* House of Built-Ins.

More than a year ago the editors of *Popular Mechanics* made a broad survey of the trends in housing and concluded that built-ins were the biggest news in the home-building field. A house full of built-ins, including built-in privacy, was obviously the kind of a house most families wanted.

To design the home, we selected Milton A. Schwartz of Honeymead Farm, Barrington, Ill. Schwartz is a relatively young but experienced architect with a crew-cut head full of ideas. There's a touch of freshness in everything he does. Most important, his prize-winning homes are filled with built-ins designed to make easy living still easier.

(Continued to page 284)





1. LANDSCAPED ENTRY COURT

Size: 20' by 23'.

Features: Privacy behind masonry wall and decorative gate. Optional intercom speaker at gate.

2. ENTRY AND DINING AREA

Size: 8'-9" by 9'-6".

Features: Double entry door, guest closet, dining area adjacent to kitchen, yet isolated from it, china storage.

3. LIVING ROOM

Size: 12' by 16'.

Features: Complete built-in entertainment wall, two walls of glass overlooking patio and interior garden court. Stereo hi-fi equipment and intercom built into end of entertainment wall.

4. FAMILY ROOM

Size: 13'-5" by 18'.

Features: Complete built-in entertainment wall, fireplace wall, direct access to kitchen, glass wall with access to patio-pool area.

5. KITCHEN

Size: 10'-4" by 13'-6".

Features: Built-in range, oven, refrigerator and dishwasher; shallow storage for canned goods; double sink beneath window; eating bar at normal table height.



6. UTILITY ROOM

Size: 5'-7" by 19'-2".

Features: Built-in laundry, mud closet, furnace, water heater, optional air conditioner.

7. TWO-CAR GARAGE

Size: 21'-4" by 22'-8".

Features: Raised curb, built-in workshop, built-in garden storage with access from yard.

8. BEDROOM

Size: 9'-4" by 19'-2".

Features: Disappearing bed, complete wardrobe wall, hobby or toy storage, fold-down study desk.

9. BEDROOM

Size: 10' by 19'-2" (with doors open).

Features: Disappearing bed, wardrobe wall, hobby storage, fold-down desk. (Linen adjacent to desk.)

10. BATH

Size: 6'-8" by 8'-4".

Features: Built-in lavatory, tub.

11. MASTER BATH

Size: 8'-4" by 8'-8".

Features: Built-in lavatory, shower.

12. MASTER BEDROOM

Size: 12' by 19'-2".

Features: Two wall-length wardrobes with built-in clothing storage and adult-hobby storage; glass wall.

13. PRIVATE PATIO

14. INNER GARDEN COURT

15. FAMILY PATIO

Features: Access to living room and family room, ideal spot for pool.



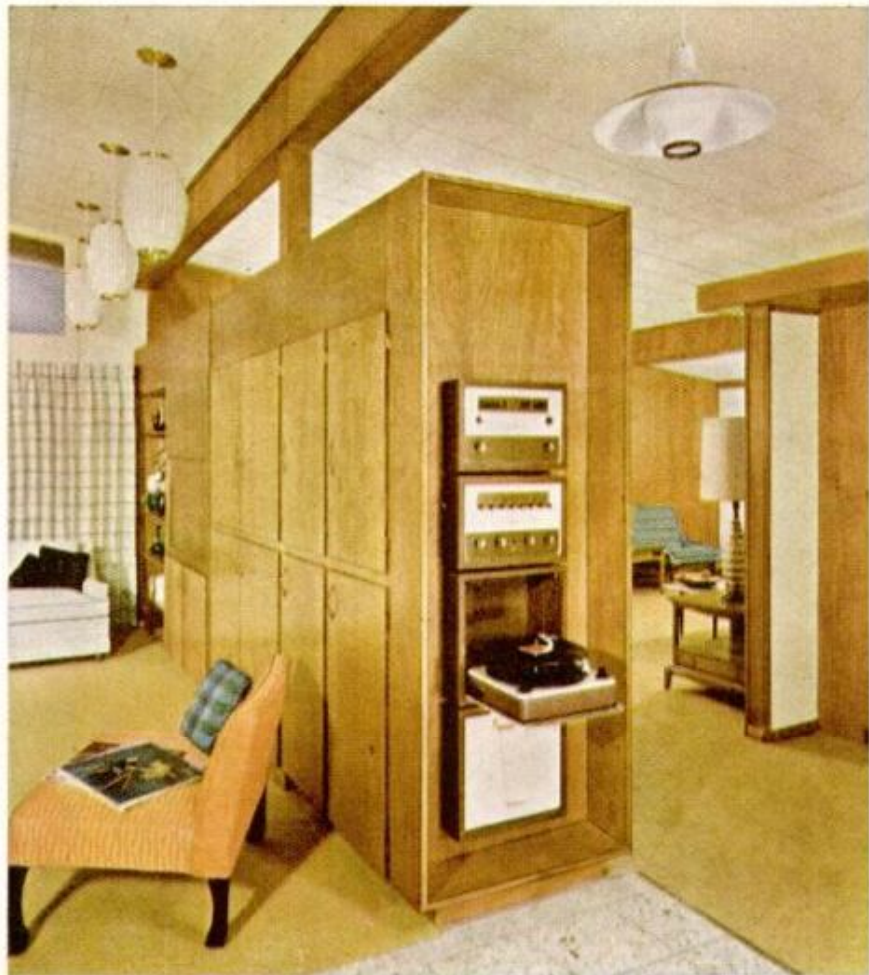
View from center of the kitchen shows built-in natural-charcoal barbecue and table-height eating bar. More formal dining area is on the other side of the barbecue wall



Kitchen is compact yet efficient. There's a long window above the sink, and shadowless strip lighting above the eating bar. In addition to the built-in dishwasher, there's an in-the-wall oven, a countertop range and a shallow, no-reach cabinet for canned goods



↑ Family-room side of the entertainment wall has all the warmth and beauty of natural wood. The wall features plenty of storage space—both open and hidden—a pull-down desk, and a TV set that can be pivoted for viewing from the living-room side of the wall



Inner garden court flows → into the house beside the glass wall of the living room, offering a beautiful view from inside or out

← Built-in electronic components are at the end of the entertainment wall. The record player folds into the wall when not in use

From the rear, the home → glitters like a jewel at night. Fluorescent tubes inside the skylights wash the chimney with light





Fireplace stretches along one entire wall of the family room. Key blocks, recessed one inch, cast interesting shadows in the light of the skylights. The wall is a fine example of what can be done with ordinary concrete blocks and an architect's imagination. Behind the drapery is the sliding door to the patio



As you open the gate, you are greeted by this private court. Walk through the door, and you are met by the inner garden court flowing in from the back of the house



Of all the built-ins, perhaps the most novel is this wall separating the two smaller bedrooms. On each side, a made-up bed glides into the wall. Above the bed is storage for pillows, and display space for those items dear to the heart of every child. Beside the bed is a large wardrobe closet. The two rooms are basically identical, though reversed

See It
In Your
Area—



THE *PM* HOUSE OF BUILT-INS

CHICAGO, ILLINOIS

Barrington Summit (5 miles west of Barrington on County Line Rd.)
Built by Barrington Development Co.
Furnished by John M. Smyth Co.

CHICAGO, ILLINOIS

2335 Robertson Lane, Flossmoor (In Golf View Manor—Western Ave. and Flossmoor Rd.)
Built by Burnside Construction Co.
Furnished by John M. Smyth Co.

DENVER, COLORADO

30th and Taft
Built by Clarence Cosman, Builder, and Garrett Patty, Realtor
Furnished by Del Teet Furniture Co.

FORT WORTH, TEXAS—*NOT BUILT*

4308 Lanark Avenue (Loop 217 to South Drive—North to Lanark)
Built by W. W. Couch Construction Co.
Furnished by Monnig's

LOS ANGELES, CALIFORNIA

5241 Del Moreno Drive, Woodland Hills (From Los Angeles take Ventura Freeway to Winnetka turnoff, left to Ventura Boulevard, right one block, left on Del Moreno.)
Built by Construction Management, Inc.
Decorated by Benter and Healy Interiors

LUBBOCK, TEXAS

2111 68th Street
Built by Cicero Smith Lumber Co.
Furnished by Fairmart Furniture

PORTLAND, OREGON

10750 Southwest Wedgwood, Cedar Hills
Built by American Builders, Inc.
Furnished by Sieverts For Modern (Beaverton)

SAN ANTONIO, TEXAS

1) 8411 Laurelhurst Drive
2) 245 Rockhill Drive
Built by Tom McGovern Associates
Furnished by Honigblums

SEATTLE, WASHINGTON

Northlake (In Kenmore)
Built by Albert Balch Community Builders

SOUTH BEND, INDIANA

19470 Widener Lane, Fellows Wood
Built by McCracken Homes
Furnished by Decor Interiors, St. Louis, Mo.

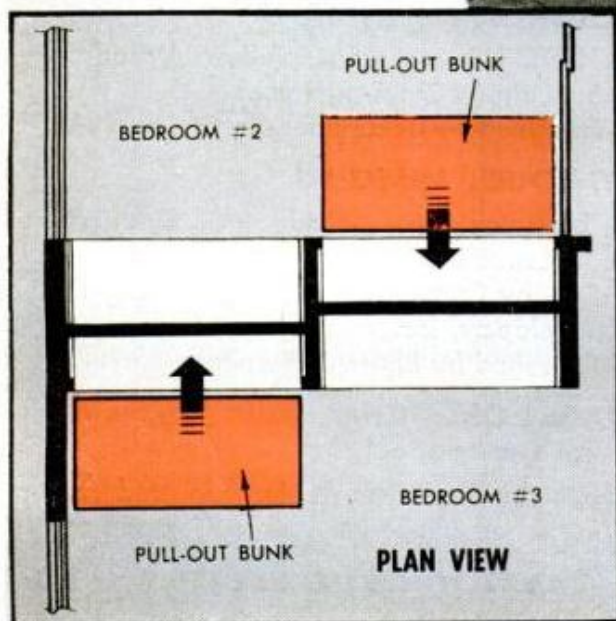
ST. LOUIS, MISSOURI

Tealbrook Drive in Ladue (Off Lindbergh between Ladue and Olive Road)
Built by Carouthers & Lee Community Developers, Inc.
Furnished by Bly-Moss Furniture

TULSA, OKLAHOMA

6052 E. 57th Street
Built by Royal Homes, Incorporated
Furnished by Bull Furniture Company

HOW TO BUILD THE SLEEPING WALL



THERE'S NO wasted space here. An island wall is organized to serve two bedrooms, back to back. The wall not only conceals the bed, but it also provides ample storage, wardrobe, closet and desk space.

The bedrooms serve the dual purposes of sleeping and study areas. There's a place to tuck away everything, and even the beds can be scooted into the wall whenever more floor space is desired for converting the room quickly to rainy-day play space. And it gives mother a break, too, because the rooms are easy to tidy up.

The ideas used in the sleeping wall can be changed to fit the needs of each family. Except for the bed and two or three chairs,



everything else is built in to give maximum flexibility and economy. In an existing house a large room can be divided by the sleeping wall, or a non-bearing wall between two bedrooms can be removed and the dual sleeping wall installed.

The permanent walls are built as in the plan at the left. The off-center dividing walls clear the floor just enough to allow the beds to slip under, as shown in the sec-

tional detail, A-A, Fig. 1. Space for the sleeping wall should be approximately 4 ft. deep by 13 ft. long, giving enough room for 39-inch beds to slide underneath into separate compartments. Otherwise the plan can be adapted to meet individual needs.

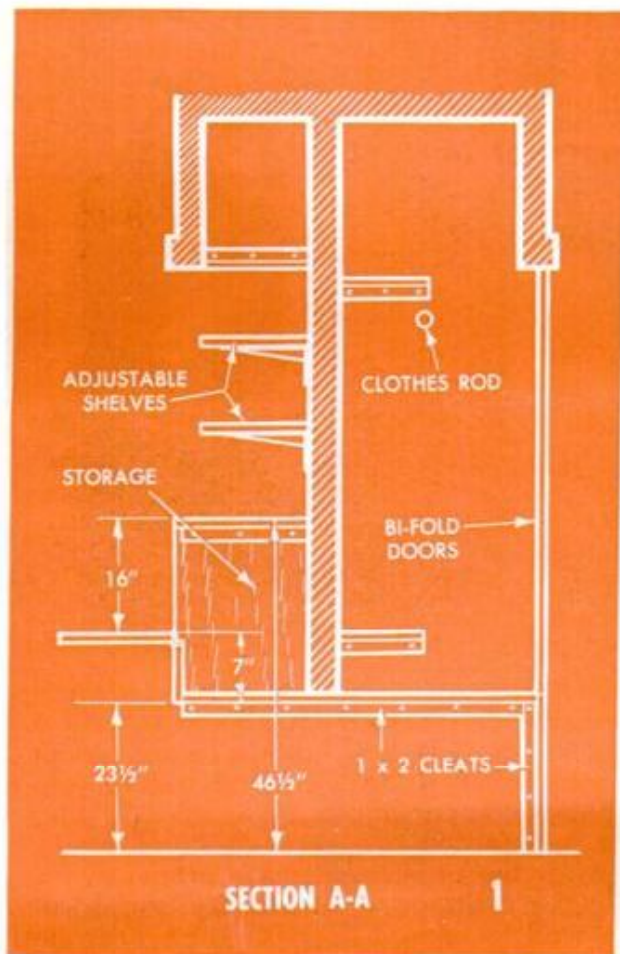
After the permanent walls are in place, plywood is fitted the full width of the sleeping wall to form a floor for the wardrobe closet in one room and the desk-storage

unit in the opposite bedroom. Cleats support the plywood floor at the ends and nails also are driven up through the panel and into the bottom edge of the short dividing walls. On the wardrobe side of the wall (the side with the greatest depth), box in the space between the room floor and the closet floor with plywood to make enclosed compartments for the beds. The beds slide in place from opposite rooms. Enough space should be allowed for the bedding. Before starting the project it would be wise to measure the height of the bed (including casters) plus a normal amount of bedding. Then you can allow the proper clearance.

On the wardrobe side of the wall a clothes rod extends the full width of the closet opening, supported by two pole brackets or notched wood cleats. Shelves for hats and shoes are added above the clothes rod and near the wardrobe floor. Standard bi-fold doors using track-type folding-door hardware cover the wardrobe compartments.

On the opposite side of the wall, in the second bedroom, a fold-down desk is built 30 in. above the floor. A facing panel fills the space between the plywood floor and the let-down desk. A continuous hinge and two supporting metal braces support the fold-down writing surface. The desk may extend back to the wall and the space be-

tween the closet floor and the desk used for drawer space, or the space may be left open, as in Section A-A, to provide more storage space for pillows and blankets. The top of the desk is about 16 in. above the writing surface and is supported by cleats and ver-



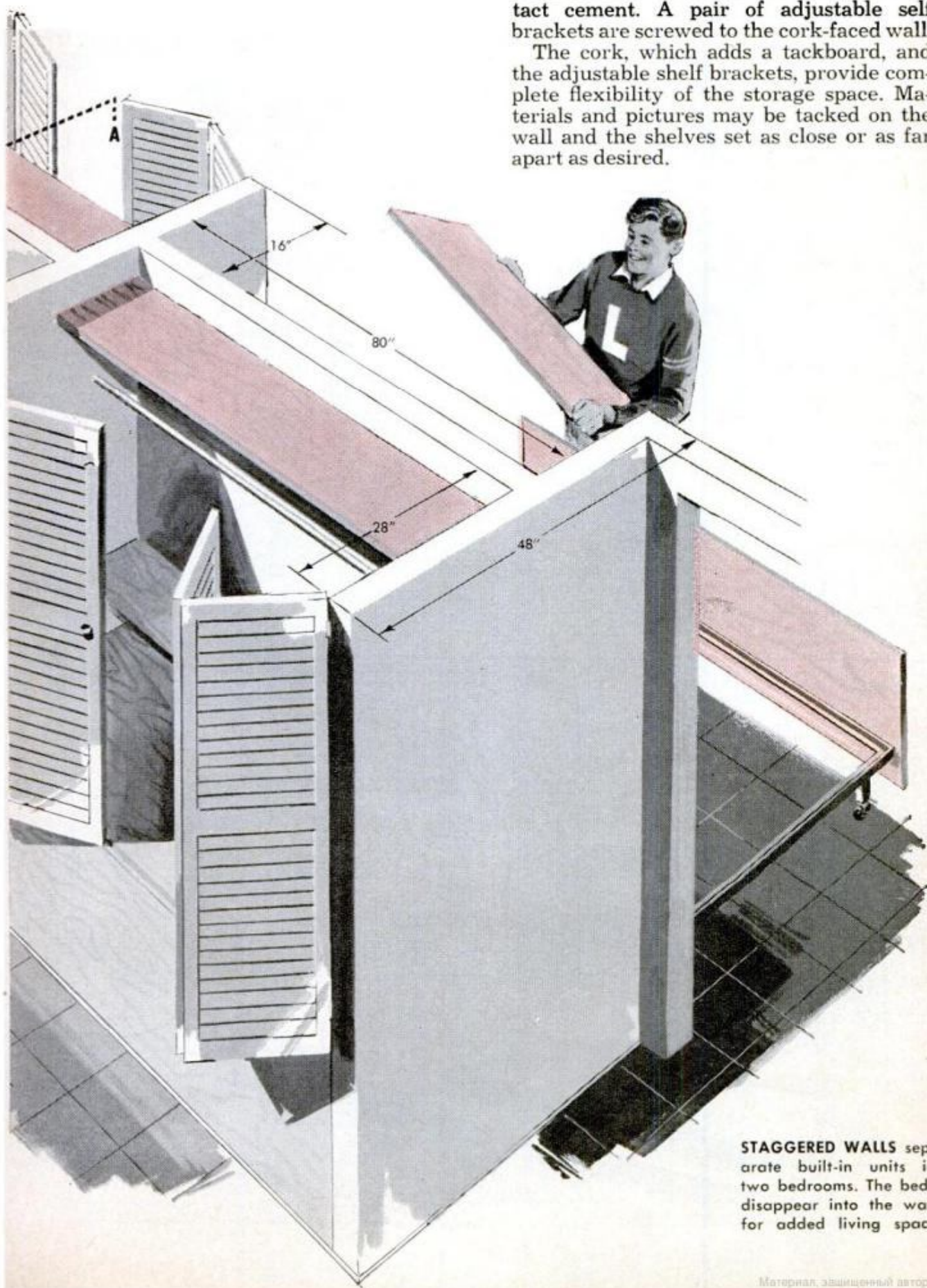
tical end pieces. Both sides of the sleeping wall are alike but simply built in a reverse position. Magnetic catches hold the hinged desk in the closed position. Add a drawer pull to complete each desk.

A plywood panel is cut to the size of

the bed opening, attached to the bed frame, and used as a finish board to hide the bed after it has been pushed into the wall. If a double bed is used, omit this board and use the section of the bed that extends into the room as a sofa or couch.

The wall above the desk is faced with sheet cork cemented to the wall with contact cement. A pair of adjustable self brackets are screwed to the cork-faced wall.

The cork, which adds a tackboard, and the adjustable shelf brackets, provide complete flexibility of the storage space. Materials and pictures may be tacked on the wall and the shelves set as close or as far apart as desired.



STAGGERED WALLS separate built-in units in two bedrooms. The beds disappear into the wall for added living space

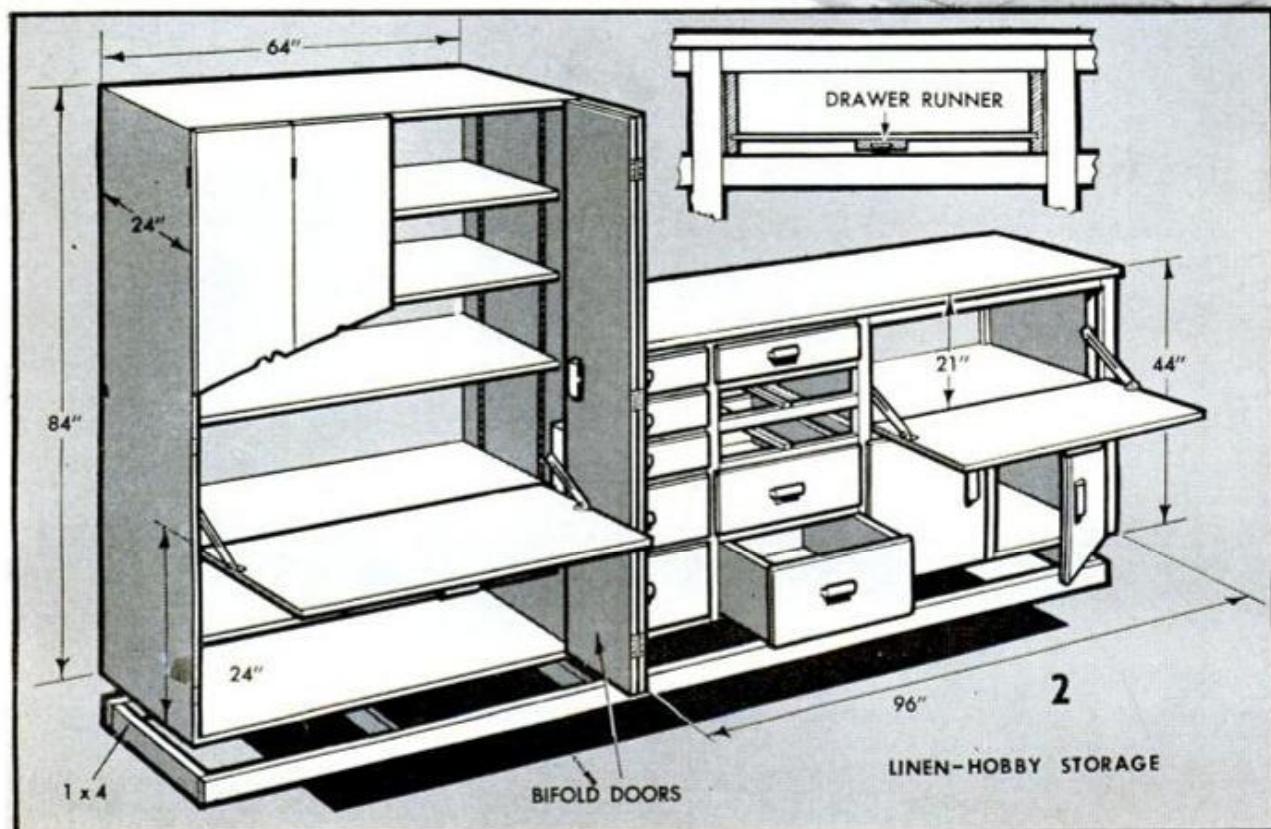
BEDROOM BUILT-IN MAKES IDEAL LINEN STORAGE AND HOBBY UNIT

The study areas in the two small bedrooms for the House of Built-Ins provide ample storage space for books, bed linens and personal possessions. And the fold-down desks are perfect to use as private corners for studying and working on hobbies. The ideas shown in these cabinets can be adapted to individual needs and the dimensions changed to fit the spacing of the walls. This built-in is designed particularly for young people. It provides a usable wall that the individual can arrange as he wishes.

The built-in storage units and desks eliminate moving the furniture around and the need for dusting under the dressers, desks and in hard-to-get-at corners, as the unit fits snugly to the floor and along the entire wall, Fig. 2.

Framing for the cabinet and desk is plywood and 1-in. lumber. The built-in units fit directly against the wall and do not require wood back panels. Exposed plywood edges present a better appearance if covered with thin hardwood facing strips that match the rest of the cabinet. However, if the cabinet is painted, the facing strips can be omitted if desired. The framing which separates the drawers and cabinets are made of 1x2's.

Drawers for the cabinets are of standard construction. Dimensions of the drawers should be carefully planned for using the





space to the best advantage. The fronts are rabbeted to overlap the 1x2 dividing strips in the cabinet. Bottoms of the drawers fit the grooves cut in the side and end pieces, and the backs dado into the side pieces. A grooved runner attached to the bottom of the drawer rides a strip of wood in the cabinet frame.

If a natural wood finish is desired such as the finish on the birch cabinets in the House of Built-Ins, obtain top-grade match-

ing lumber and plywood. Partitions, framing and drawer sections that are hidden most of the time inside the cabinet can be cut out of inexpensive fir plywood and construction-grade lumber.

The bi-fold plywood doors in the tall cabinet swing on three hinges that are set into the back of each panel. Magnetic catches hold the doors closed. The fold-down desks have continuous hinges and folding metal braces to support them. ★ ★ ★

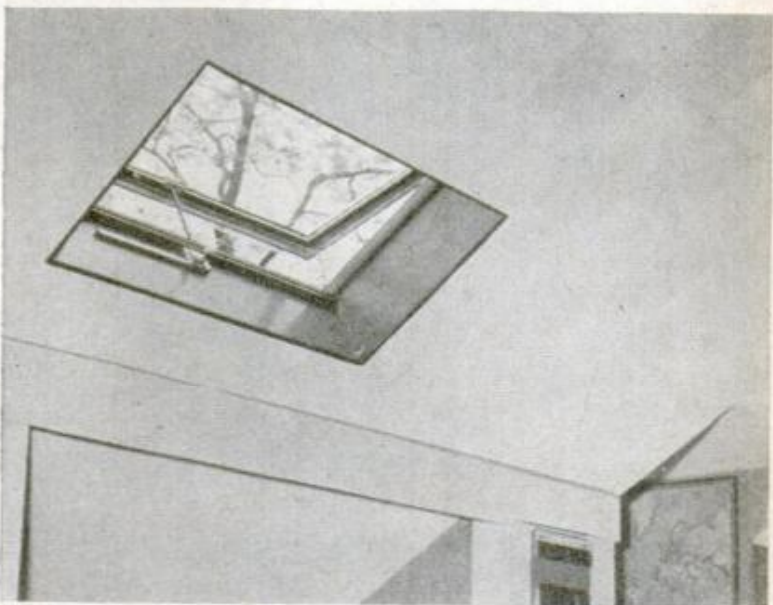
LOTS OF AIR

IT'S NEW...



One of the biggest headaches for homebuilders, the warping and peeling of vulnerable exterior roof overhangs, can be solved with aluminum soffit. Economical and easy to install, the aluminum soffit will not rust, rot or warp, and is immune to termites. And, best of all, it leaves no ugly paint peelings

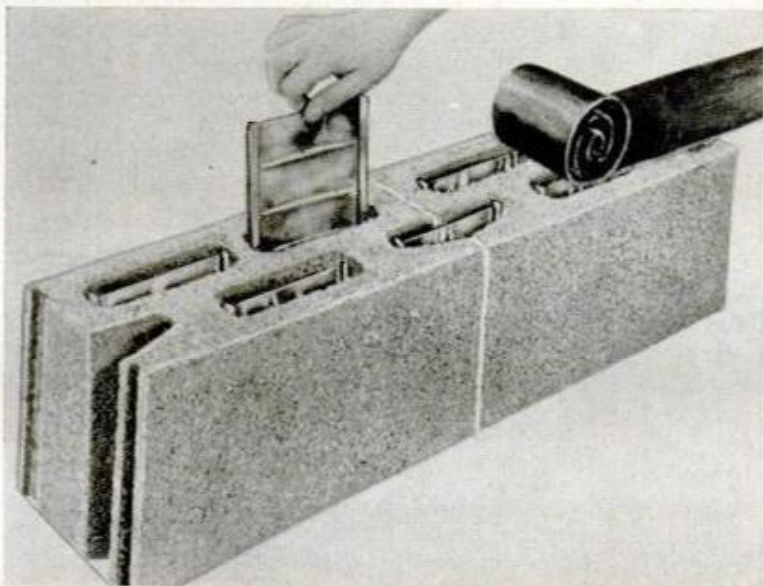
LOTS OF LIGHT



Designed for use on pitched roofs, domelike skylight offers high ventilation, excellent light and minimum alteration expense. Especially useful for one-window attic bedrooms, windowless bathrooms, or unlighted stairways, it is sold as package unit with screen, flashing and operator handle and can be easily installed by one man in a few hours. Also available for use in office buildings

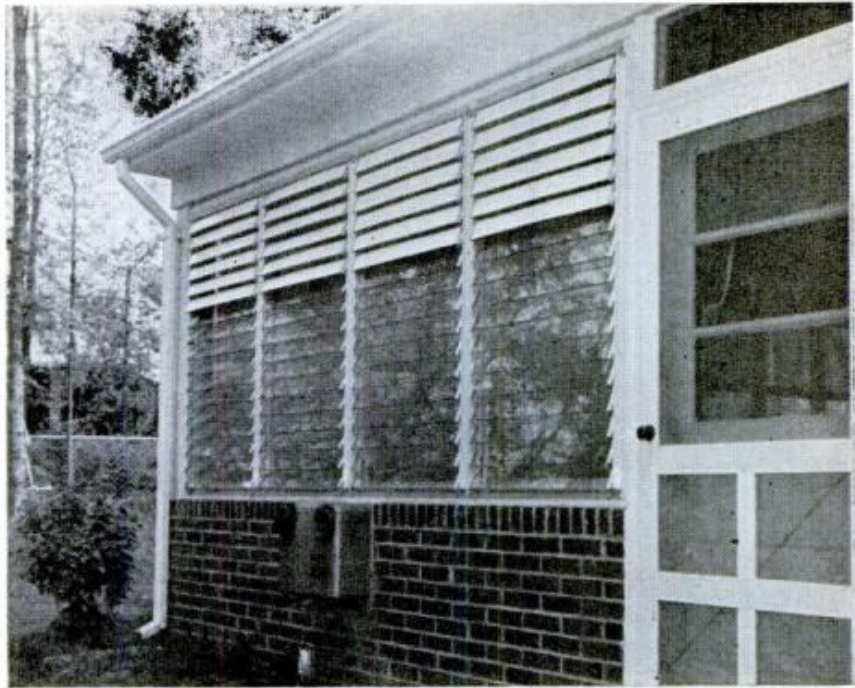
LOTS OF INSULATION

Triple-wall concrete blocks with staggered air cells, into which aluminum-foil insulators are inserted, reduce wall building and insulating costs and keep heat loss to a minimum. Insulators are sealed in with strips of asphalt paper. Exterior stucco or interior plaster can be applied to block



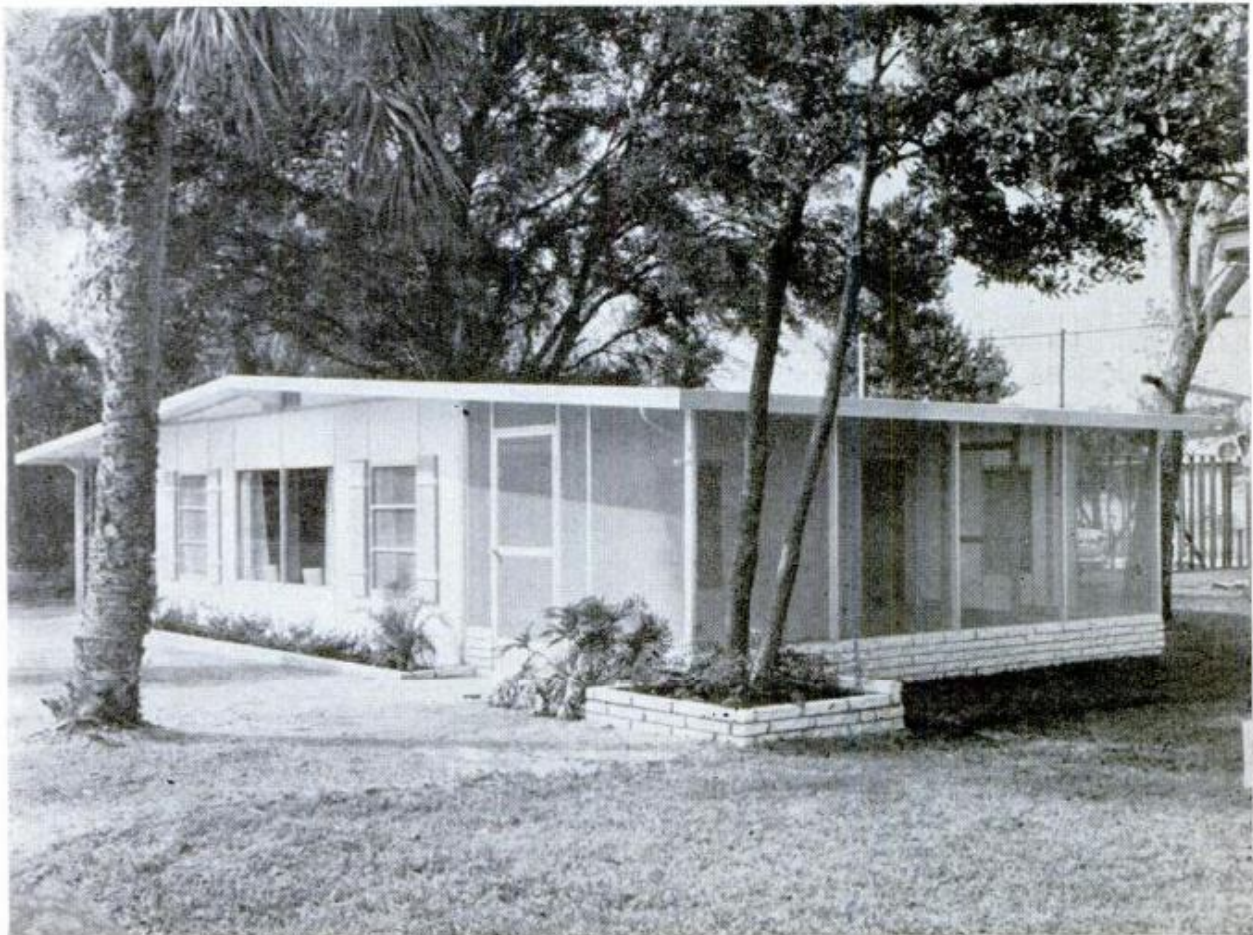
LOTS OF SHADE

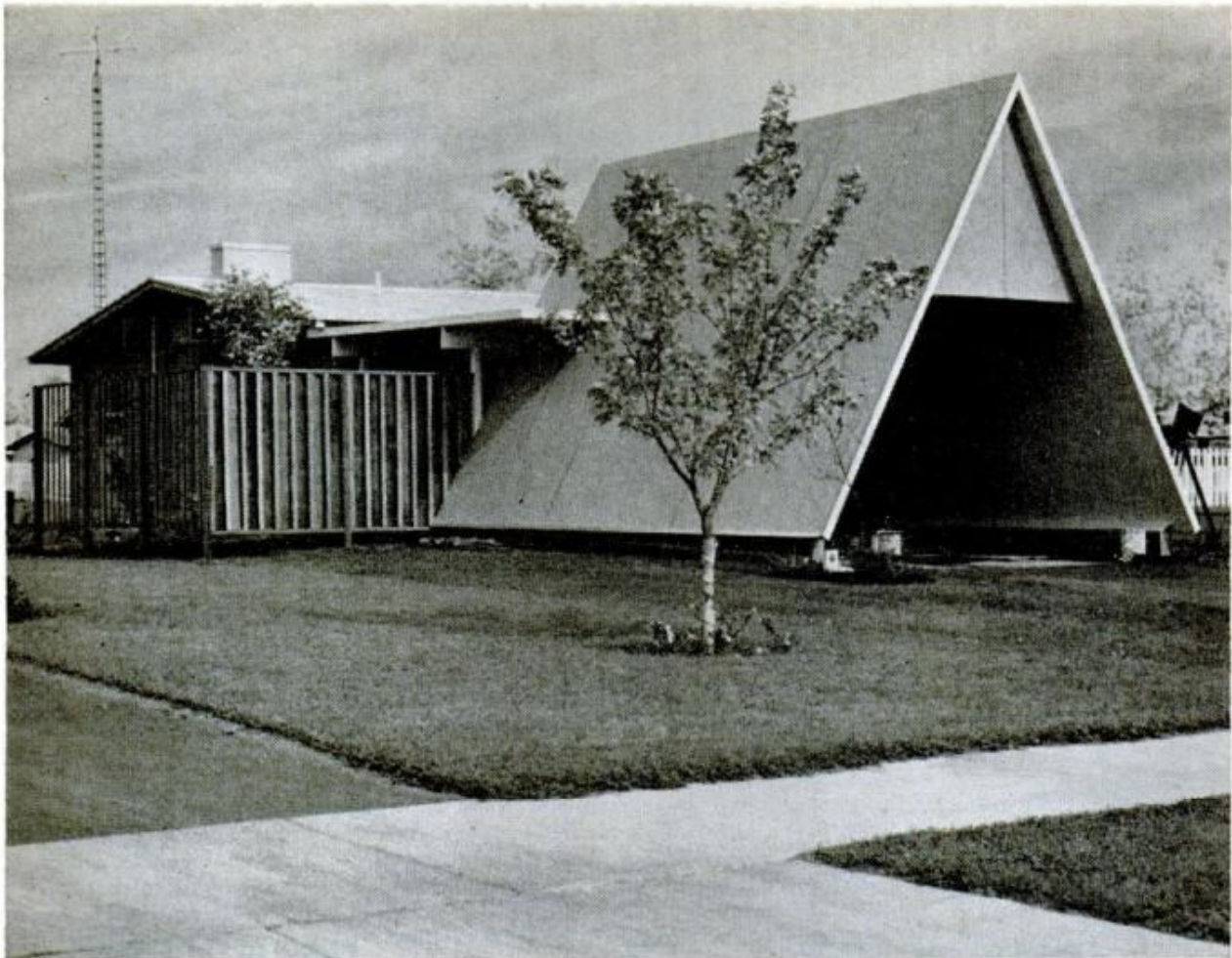
Opaque aluminum panels that clip to jalousie window panes serve as economical shades. Simple enough to install in minutes, the shades open and close with windows and are maintenance-free. They come in three colors—white, green and blue



Do-it-yourself, all-aluminum cottages, retailing from \$3500 to \$5500, can be erected in five days. They are made of aluminum panels, which are faced on two sides by aluminum and insulated with a thick cushion of Styrofoam. The panels interlock, just like children's building sets, and are completely interchangeable. Electricity and plumbing are easily coordinated with house plans and, after the slab is prepared and plumbing roughed in, two semiskilled workers can finish the home

LOTS OF HOUSE





Built two years ago, NAHB research house has pointed way to new techniques, may be typical home of future

THE HOUSE YOUR KIDS WILL LIVE IN

QUESTION: *Twenty years from now, do you anticipate bubble houses of new lightweight plastic and aluminum being flown by helicopter to the site and set down?*

JOHNSON: I think this is a possibility. It depends on the progress in other areas, such as our ability to solve foundation and mechanical and electric equipment problems. It also depends on solving transportation problems.

What changes in general configuration may we see in 20 years?

JOHNSON: We have to remember that 20 years from now children of the space age will be buying the houses. They'll be conditioned to accept shapes and materials that the people of today might not accept.

In other words, we are not going to be limited by the basic rectangle just for tradition's sake?

JOHNSON: No, except that the basic rec-

tangular shape has evolved for important reasons. It produces more house for less cost than any other shape. It is practical to build and sell.

BARTLING: If you can make a dramatic reduction in cost, people will accept the change in shape.

JOHNSON: The big volume, in style and appearance, lags about a generation behind. Children tend to buy the kind of houses that represented status when they were young. The status house of a generation ago was a house on a hill with a detached garage. Now the modern house with swimming pool and automatic equipment is the status house.

Designs for the American Institute of Architects' competition get more extreme every year. This year the houses all had movable interior partitions; or glass walls, drape covered; or dividers instead of walls;



Panel members King, Johnson and Bartling say new materials will radically change homes in next 20 years

We wanted no flights of fancy. We wanted to find out the kind of home the next generation will live in, based on today's research. Here are the answers from the organization that will be most involved in tomorrow's building patterns—the National Association of Home Builders. Panel members were Martin Bartling, President of NAHB; Ralph Johnson, Director of NAHB's Research Institute; and John King, Assistant Director of the Research Institute.

sweeping cathedral ceilings, curved or arched instead of straight. Isn't there a likelihood that future homes may go in this direction?

BARTLING: That's true if brought about by a saving in cost. If they are purely for architectural innovation, they will not become the house of the future. These houses at present are more expensive. They are specialty houses.

Aren't contemporary design houses all over America today the specialty houses of 15 years ago?

BARTLING: Yes. Progress is always made by a few pioneers.

KING: My general feeling about the design of houses is probably more optimistic than others. We are gradually improving design. This is reflected in two ways. First, there's a gradual change in the attitudes of the home buyer, who is now more willing to accept innovations. Second, to achieve econ-

omies the builder must make the best use of materials and equipment. Often the most efficient use reflects itself in clean design. In the AIA houses the design is often expressed by the structural use of materials—self-supporting cathedral ceilings, panelized construction. In Europe people are willing to accept the articulation of panel joints. In the U. S. you have to cover them up, particularly on the exterior.

BARTLING: My personal experience is that as long as the total effect is pleasing, most people don't mind visible joints. In our research house in Knoxville, where there were many joints, no one complained about them. Surveys showed they liked the effect.

JOHNSON: In our Kensington and Knoxville research houses some joints had a function. They helped with organization of storage, for efficient use of space, for a place to hang shelves, lights, and so on.

"Lower costs...by completing the house in the factory..."



Foam-core, load-bearing wall has face of lightweight powdered brick, reconstituted to resemble brick veneer



Prebuilt electric panel will be one component of future wall. Other panels will "plug into" this one

If we should go to more radical designs for the custom-built house, do we go to new shapes for the industrialized low-cost house of the future, too?

KING: There is a difference. But a component system of panelization offers distinct advantages in providing flexibility in the design of larger, custom-type houses. In the lower cost houses I feel there will be distinct advantages in providing a more standardized product, with variations in finish materials, and limited variations in floor plans and fenestration. But this house would be turned out more as a complete unit. Lower costs will be achieved by completing the whole house in the factory and transporting it to the site in one or two pieces.

A refinement of the trailer as we know it?

KING: Different structurally-shaped houses could be brought directly to the site by helicopter, trailer or some other means of commonly used transportation. In this lower cost house, which is standardized to a greater extent and built in larger component units, home buyers will be more willing to accept new innovations in structural shapes than buyers of custom-type houses.

BARTLING: People may very well accept changes in the interior sooner than on the exterior. Inside they seem to have no in-

hibitions and will accept all kinds of shapes and forms. Modern inside, traditional outside.

What directions do you believe interior design will take?

BARTLING: Privacy is important. Architects know you need open planning as an element to get the effect of more space, but this isn't accepted by women when it loses privacy.

JOHNSON: You arrive at the best compromise. Take the concept of the interior door. Instead of a six-foot, eight-inch door placed in the opening in our research houses, we used an eight-foot-high door placed on the opening. This has important benefits. It is difficult for children and aged people to grasp and turn a smooth round knob. Our design makes it possible to open and close the door from either side by hooking a finger and pulling or pushing. This door improves the circulation of air. There is more uniform temperature in the house and it opens up the appearance of the small house. As one woman said, it looks 'modern.' It provides privacy and is lower in cost. There are lower trim costs. You can prefinish the door and put on the hardware.

Isn't this entirely contrary to what the architects are doing in the competition houses? They go for open planning with eye-high curved brick walls, open floor areas, and island dividers that slide back.

"Open design is a matter of personal taste."



Fibers of these real wood tiles are stretched and dried, making tile flexible and dimensionally stable



Basic building material of tomorrow probably will have plywood or other faces laminated to foam core

JOHNSON: You can still provide open areas in certain parts of the house. The two are not incompatible.

BARTLING: An architect friend of mine in California built a large house with no partitions higher than an ordinary door. They were all on rollers so they could be moved. But in order to control sound, he had to introduce noise as an element of design. So he had an intercom system playing music at different decibel levels 24 hours a day to cut down on transmission of sounds—like footsteps and conversation—so the place could be lived in.

JOHNSON: Open design is a matter of personal taste. Both kinds of houses are sold. Open design should be confined to the living area as opposed to the sleeping and bath area. The big question is whether the work area—the kitchen—is open to the living area in the usual sense. Obviously, all of the parts of the house are open to each other if you leave the doors open. It's a matter of degree.

BARTLING: It might be useful to talk a little more about the industrialized house of the future. There's a trend among manufacturers of basic building materials to produce more and more large parts that go together to form a house. This may be tomorrow's house in the truest sense. What I am talking about, we call component construction.

Does this mean, for instance, that you would have complete factory-built walls instead of pre-cut rafters and studs?

BARTLING: That's right. One example is a material we have used in two of our research houses to date. It is a foam-plastic core with different types of faces. It makes our structural panels completely self-contained—exterior, interior, finish and insulation—produced in one continuous process.

JOHNSON: It produces a whole wall in one layer instead of 12 or 13 conventional layers.

Mr. King wrote an article not long ago in which he discussed component construction. In it he referred to extruded panels made entirely of plastic. Would all this come out in one piece—like toothpaste from a tube?

KING: We are talking generally about two or three materials. One is the core which forms an insulation. The structural part of the panel forms the faces. This is a laminated type of construction, so we can envision assembly line methods of laminating the faces to the core or conversely forming in place a material that adheres to the faces. This could be done in a continuous process so you could extrude or weld panels and cut them off at required lengths. These would form the solid portions of exterior walls, interior partitions and structural roof panels. We

(Continued to page 290)

WHERE DOES THE

HOW MUCH DOES IT REALLY COST to build a house? Is the contractor pocketing too big a wad of your hard-earned, long-saved dollars? What percentage of your nest-egg actually goes into materials, from concrete to finishing nails? What percent into labor?

The typical house on these pages would cost about \$26,500 in some areas. While costs may be higher—or lower—in other areas, the breakdown of cost percentages is about the same whether it costs \$10,000 or \$100,000. So to see where the money goes, imagine yourself building this house. If the story sounds grim at first, don't be depressed—there's an upbeat ending!

The bill for materials on your \$26,500 house will be \$6000. In general, the cost of concrete, lumber, fixtures and other materials will be a fourth to a fifth of the total. So, in effect, you pay \$26,000 for \$6000 worth of materials. Where does the rest go?

First, the building site will average \$5000 for a house of this size. Your architect's fee for the plans and specifications will be about \$1500. That leaves \$14,000 for assembling the raw materials into a home. About \$9000 of that amount goes for labor; about \$5000 for the overhead and profit of the general contractor and his subcontractors. Many builders will take exception to these figures—and there are exceptions—but these proportions are a good rule of thumb.

The overhead of each specialist repre-

sents his expense of doing business—fees, tools, phone bills, transportation and a score of incidentals. The profit is the wage that each one pays to himself. For example, a concrete subcontractor may add five percent for overhead and ten percent profit to the cost of the concrete and labor of pouring and finishing it. The sheet-metal man may add 10 percent overhead and 15 percent profit.

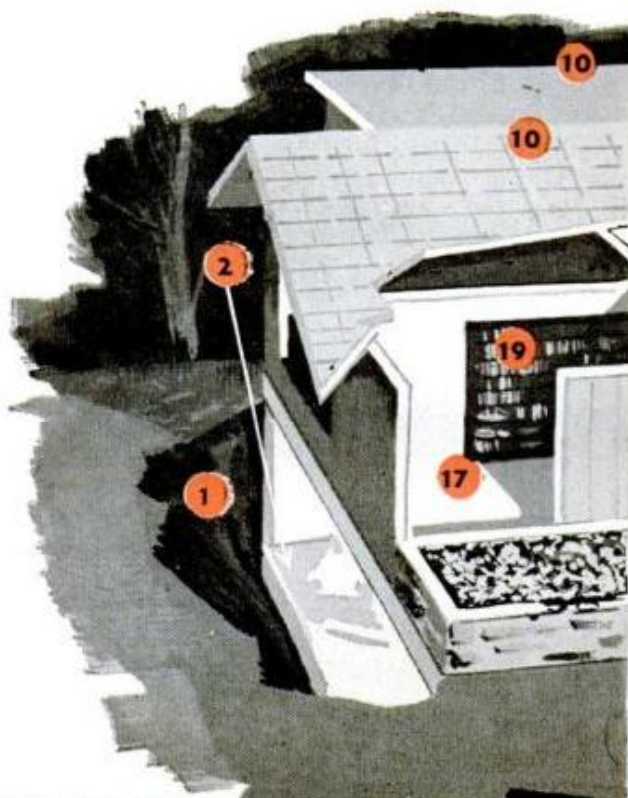
The general contractor who oversees the entire job adds his own five percent overhead to the net cost, then adds his ten percent profit. He gets the big bite—but it isn't a very big bite at that. On this job his profit is \$1785. It will take about four months to build this house, and the general contractor must be on the job or on call a good part of the time; his profit here amounts to less than \$112 a week.

As recently as 10 years ago, the average contractor handled most of the work himself. He had his own concrete men, carpenters and painters, and subcontracted only such major items as plumbing and electrical work. Today, specialists can usually do the work cheaper—and better—than he can. Excavation machinery, automatic nailing devices, stapling machines, pneumatic plaster guns and other new tools require the specialists. Without such special tools, building costs would be greater.

Overhead charges and profits, in general, are pretty fair. The stiff competition in home building determines the profit rate.

HOUSE—\$26,500 (\$5000 lot—\$1500 architect's fee)

JOB	PERCENT OF COST	COST IN DOLLARS
1. Site clearance, excavation.....	1%	\$ 200
2. Concrete work	7	1400
3. Lumber	5½	1100
4. Rough carpentry	3	600
5. Plumbing	10	2000
6. Electrical work, fixtures	6½	1300
7. Sheet metal	2	400
8. Masonry	3	600
9. Heating, air conditioning	5	1000
10. Roofing	3	600
11. Lath and plaster	11	2200
12. Sash and doors	3	600
13. Painting	4	800
14. Tile	3	600
15. Hardware	1	200
16. Resilient flooring	1	200
17. Carpeting or hardwood flooring	3	600
18. Finish carpentry	2½	500
19. Cabinetry	4	800
20. Kitchen built-ins	1½	300
21. Miscellaneous (lawns, fences, etc.)	5	1000
	85%	\$17,000
General contractor's overhead	5%	\$ 850
	90%	\$17,850
General contractor's profit	10%	\$ 1,785
	100%	\$19,635
Balance in building fund		\$ 365
		\$20,000



MONEY GO?

By
Thomas E. Stimson

These figures may help explain why \$6000 worth of materials adds up to \$26,500 in the finished house. But there are a good many other factors yet to consider. It's a trite saying that a home is the biggest investment a man ever makes. The fact is that the average man doesn't realize just how much his home costs him. The job table on page 182 shows \$365 left in your building fund after all the bills were paid. This sum is about to vanish, along with a lot more of your money. So far we haven't discussed financing. And few can pay cash.

We'll suppose you owned the \$5000 site and have paid the architect. The lot will serve as your down payment, so all you need is \$20,000. We'll assume that you can borrow the money at six percent interest—higher in some areas, lower in others, and it changes from time to time.

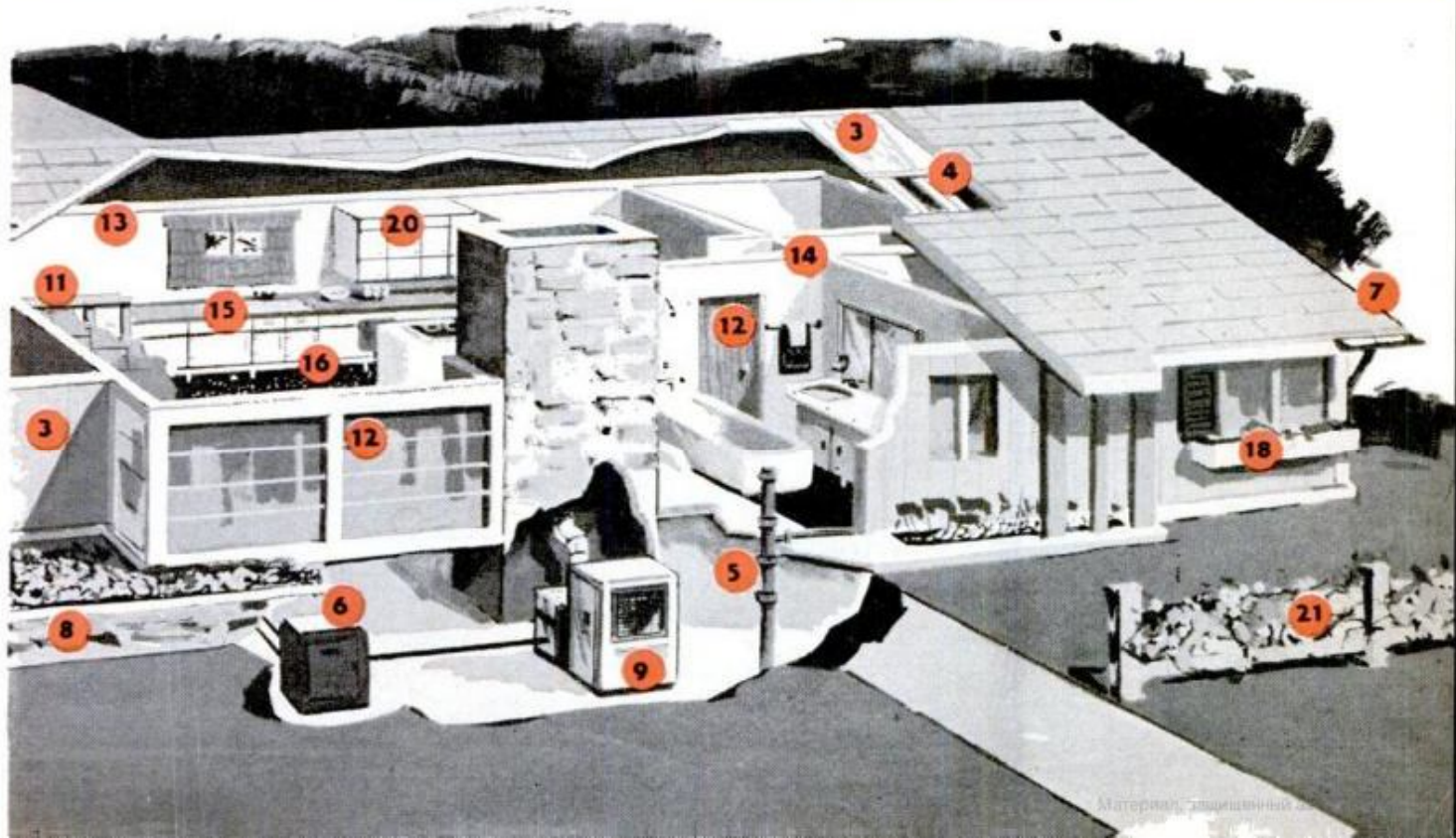
One common way of financing a new home is by a short-term construction loan that is later converted into an ordinary long-term loan. The construction loan will cost you around \$900, including brokerage, interest, title insurance and escrow charges. Deducting the \$365 left in the building fund, this means that your \$26,500 home actually costs \$27,035 by the time it's built. If you buy a new home instead of building it yourself, similar charges are included in the price. Even if you buy a tract house in a large subdivision, you are paying for construction financing, no matter what the salesman says.

In any event, you are finally ready to move into the new home and start paying off that twenty grand. It's a six percent, 20-year loan; your monthly payment will be about \$143.

Now multiply \$143 by 240, the number of months in 20 years. The answer you'll get is \$34,320. That means that in addition to repaying the borrowed money, you also are paying about \$14,500 in interest. (Of course, you can hedge on that figure if you get a raise or come into an inheritance by increasing your monthly payment. On this house, a \$40 increase to \$183 per month would shorten the pay period by 4½ years, cutting the interest to about \$11,500; a saving of almost \$3000.) Add the \$14,320 to the \$27,035 cost of the house, and you find that you are paying a total of \$41,355 for what started out as \$6000 worth of materials and a \$5000 lot. And when you move in you can start paying for insurance, taxes and maintenance costs.

Sound grim? Not really. If you rented the same house for, say, \$200 a month for 20 years, it would cost you \$48,000, and the equity in the house you own is as good as money in the bank.

Right now, millions of Americans are saving their pennies and dollars for a down payment on their own home. They want to raise their children in their own home, and to improve or remodel the structure as they see fit. It's the biggest, best and most enjoyable investment of their lives. ★★





Halves of a manufactured 680-square-foot ranch house are hauled by truck to the buyer's building site

"HALF BUILT" RANCH HOUSE

Carried in halves to a building site, a 680-square-foot ranch house can be bolted together and ready for occupancy in 12 hours. Finest Manufacturing Company of Leesburg, Fla., assembles in its plant the halves of the home—with dry walls, kitchen cabinets, light fixtures and other finishing materials in place. A carport and a

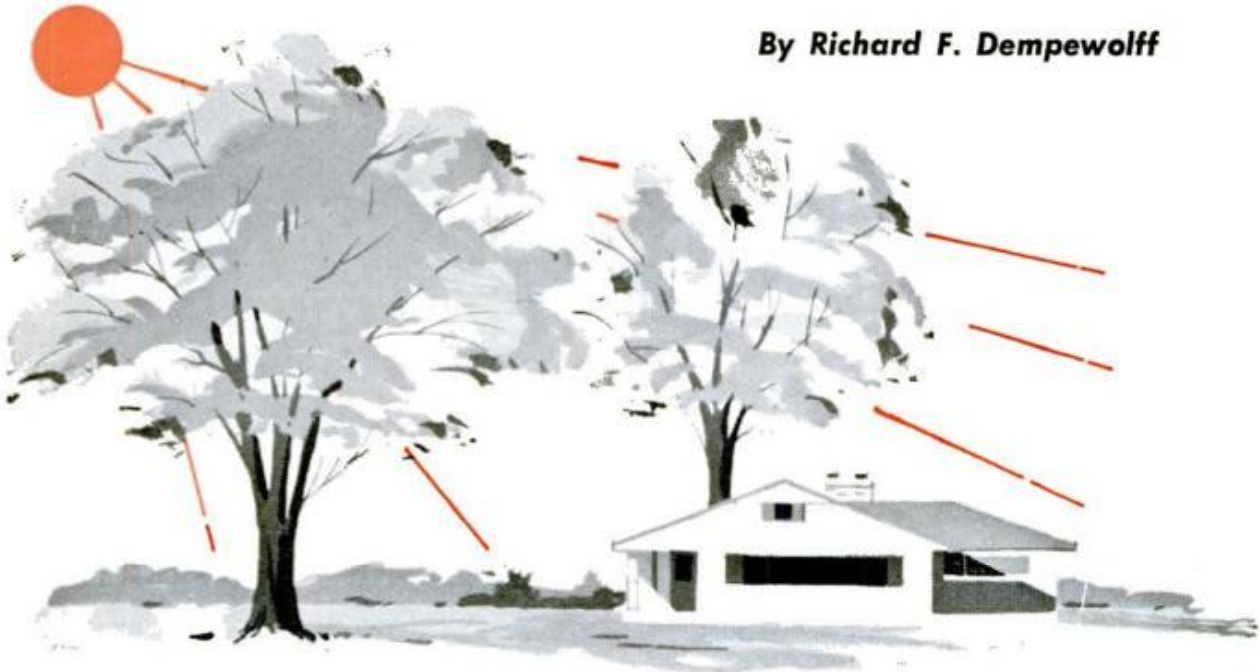
large screened patio also are added at the job site, extending the exterior lines of the 34 by 20-foot home and placing 1502 square feet under roof. The halves of the two-bedroom home are 10 feet wide, making it possible for trucks to transport the manufactured sections over highways without danger or inconvenience.

With the sections bolted together and roof extended over patio and carport, house is ready for occupants



Sun, Shade and Wind Where You Want Them

By Richard F. Dempewolff



Tall deciduous trees, planted on south and west sides of house, block hot afternoon sun which is high in sky during summer months. Thick branches thus help insulate home and yard during hottest season of year

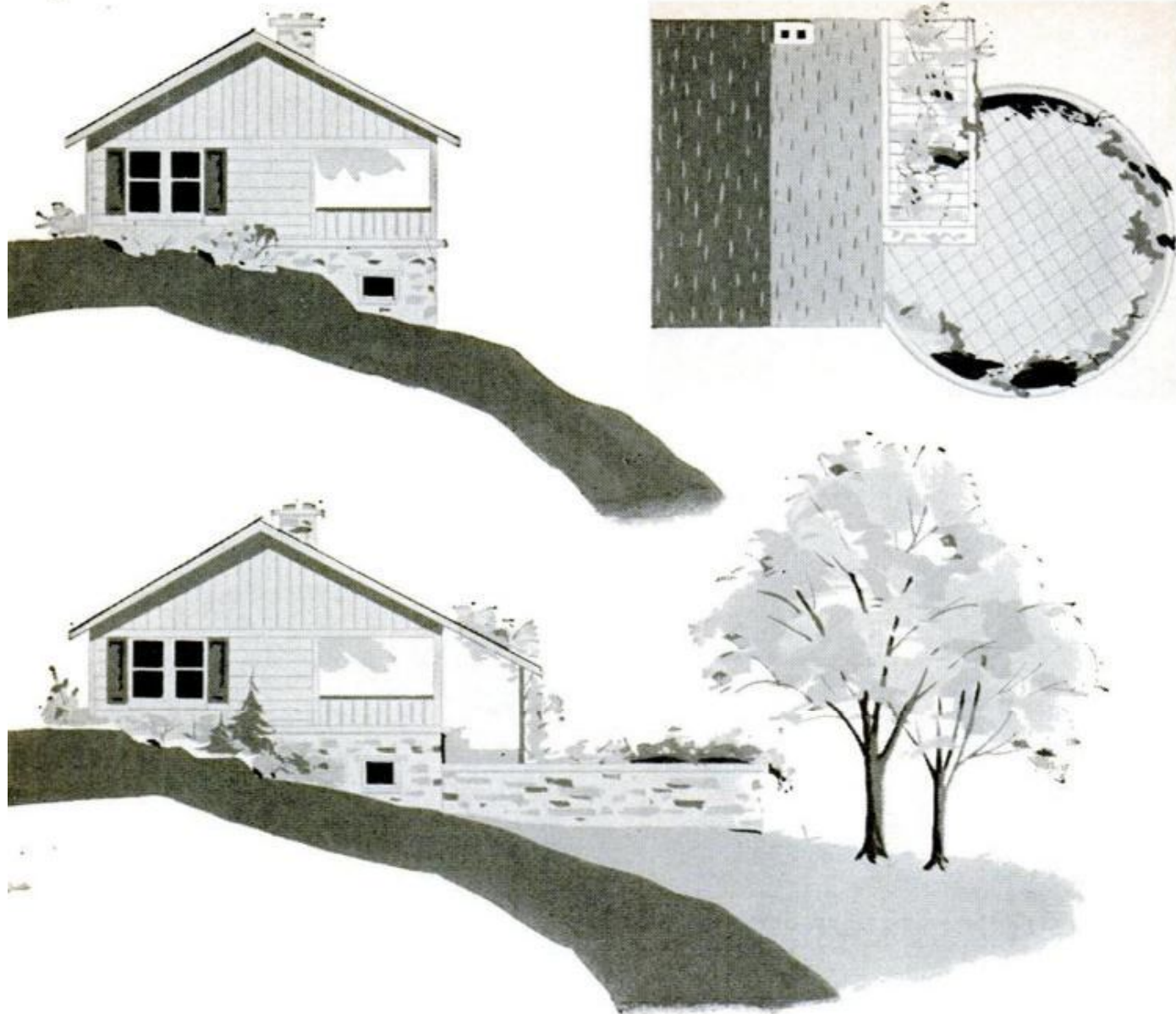
MILLIONS OF WORDS have been written about smart people who built new homes with an eye to "solar orientation." If a house is scientifically positioned on the terrain it occupies, intelligently landscaped, has glass walls in the right places, and proper overhangs, then Nature will help make the place cool in summer and snug in winter. These are established facts and sound practices, if you plan to build a new home on a spacious acre or so.

But what if you, like most people, already have a house fully equipped with flush eaves, double-hung windows, and a mortgage—all squared off on an average lot with no particular reference to prevailing winds or where the sun rises and sets? Is there anything *you* can do to control the climate around the old homestead—besides saving up for air conditioners and installing a bigger furnace? The answer is "yes," emphatically.

Clayton Steen, one of this country's out-

Then, when leaves fall and sun drops lower in sky, its rays penetrate bare branches, bathing house in warmth during coldest months. Deciduous trees are best because their leaves, thick in summer, shed in winter





Hillside lots, spectacular for views, are useless for recreation areas. Home is improved by extending roof line for patio and, with fill, installing paved terrace and shade trees. Upper right: bird's-eye view

standing young landscape architects, has devoted much of his career to correcting the mistakes of builders who were not solar oriented, wind oriented or terrain oriented. There are, he points out, dozens of simple and effective ways to make the sun work for you instead of against you on an average house lot. Certain types of shrubs and trees planted in the right places, an attractive pergola or covered patio, a small pool in a hot corner, a scientifically shaded terrace—any or all of these things, strategically planned with the help of a nurseryman or landscape expert—may be all it takes to make your home more comfortable all year 'round no matter where you live.

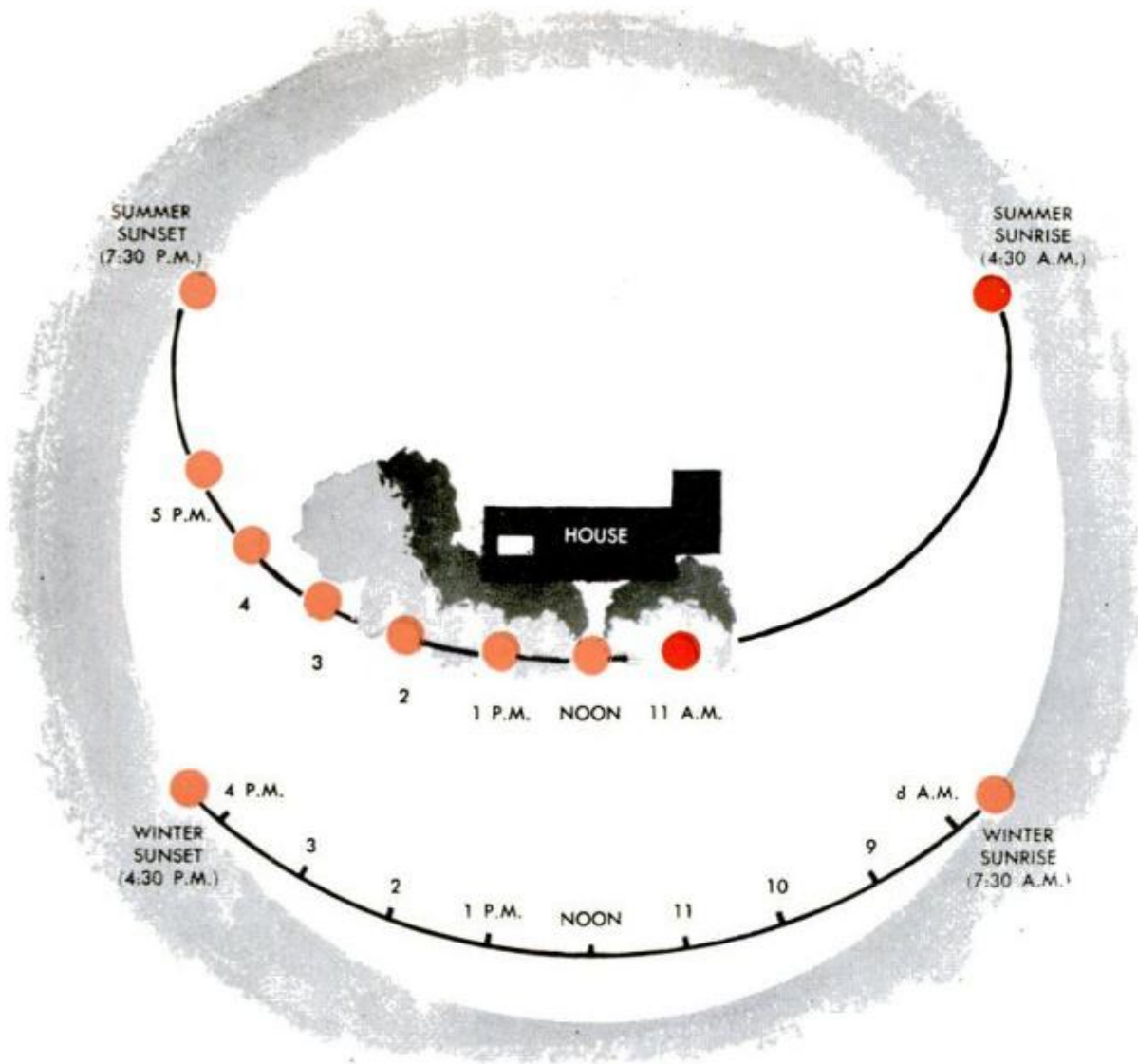
Intelligent planting alone around a poorly situated house has been known to moderate temperatures by as much as 20 to 40 degrees, offsetting the improvement cost in fuel savings, and spelling the difference be-

tween comfort and misery. In homes without shade during the hot summer months, air-conditioner manufacturers report that their equipment must work as much as 40 percent harder. Temperatures of 140 degrees have been recorded on sun-baked roofs.

"There are no hard and fast rules to cover all situations," Steen warns. "Everything is qualified by a homeowner's particular situation, the requirements of his family, what part of the country he lives in, and what particular problem he wants to solve. In chilly country, people may want more summer sunshine, not less."

There are, however, some basic tricks for solving common problems. Where you go from there to increase the comfort and enjoyment of your property, is up to you and your budget.

In temperate zone summers, and southern areas, shade and cool breezes are some-

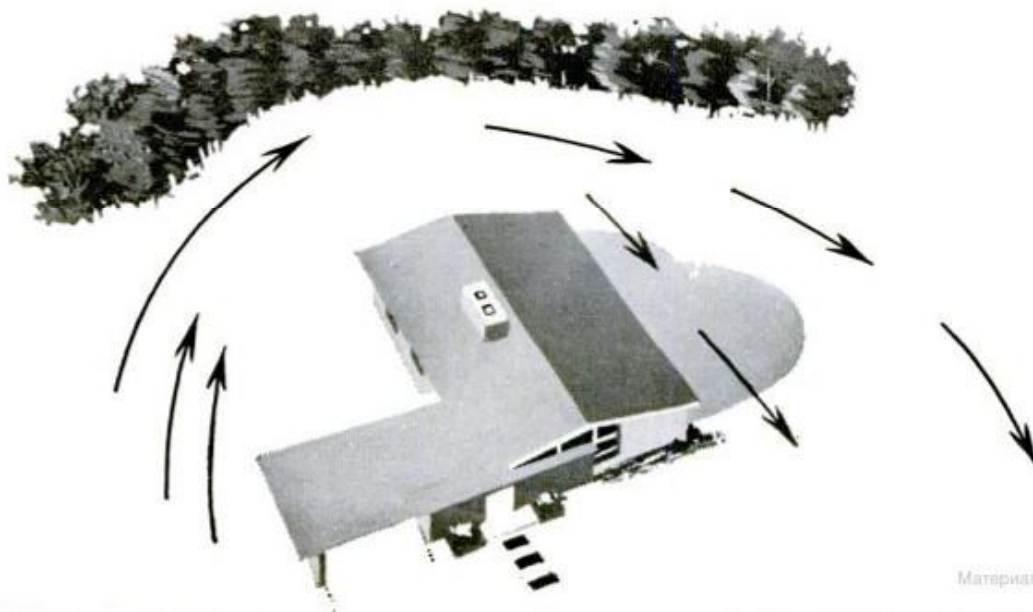


Two paths show sun's long and high arc during summer (top) and short and low arc during winter (bottom)

times worth more than diamonds. The trick is to capture them and put them where you want them *when you want them there*. "Breakfast on the terrace is a delight when warm sun floods the table top," says Steen, "but you'd fry on an unshaded terrace during a hot summer afternoon,

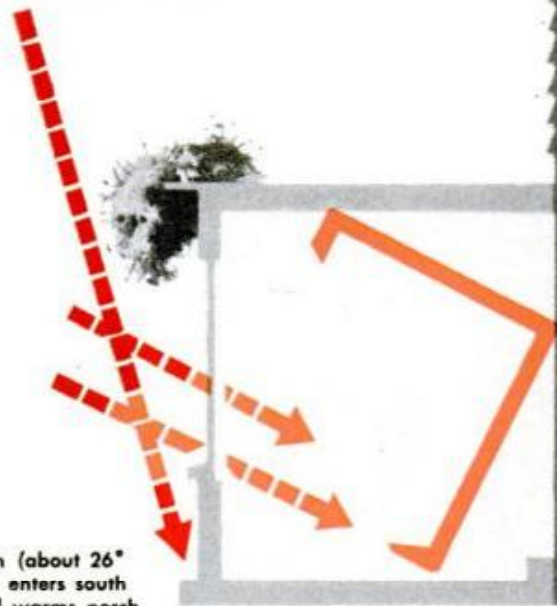
and an unshaded house would, too. So, through the heat of the day, both terrace and house should be shaded. Offhand, that sounds like having your cake and eating it. But thanks to the earth's tilted axis, it is easily achieved with certain types of trees, properly located."

Curving evergreen hedge on north and east traps cool summer breezes, serves as windbreak in winter





Summer sun (about 73° on June 21) is blocked from south windows by 2½-foot overhang of vines



Winter sun (about 26° on Dec. 21) enters south windows and warms porch

Flat-roofed sun porch can be given attractive "plant awning" that will serve as solar overhang. Flowering vines such as wisteria can be trained up a trellis and along wire-mesh support secured to edge of roof. Overhang will shade porch from high-angle summer sun, but allow low-angle winter sun to penetrate

Where do you put shade trees, and why? The summer-winter solar diagram on page 187, provides the clue. Along the 40th latitude, which slices the United States almost in half between Red Bluff, Cal. and Philadelphia, Pa., the summer sun rises in the northeast sky, and sets in the northwest. South of that latitude the setting sun is more westerly; north of latitude 40 it is more northerly. "The hottest part of the summer day," Steen points out, "is early afternoon—from about 2 to 5 p.m.—when

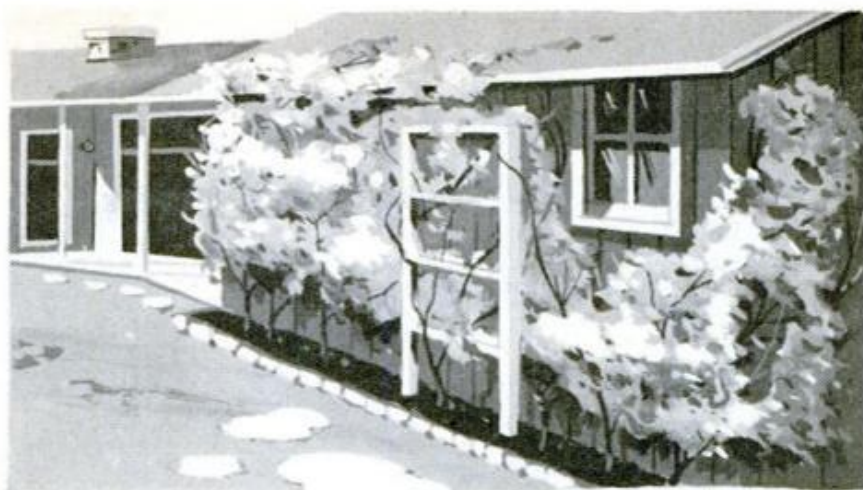
the sun sweeps the southern sky and heads for the northwest horizon. So, generally speaking, the trick is to plant fast-growing shade trees so that, when full grown, they will cast shadows across the roof and walls only during those hours. In most places this will mean perhaps one tall, high-crowned tree on the south side, to act as a parasol against the steep rays of early afternoon sun. A smaller tree with low branches, on the west side, will stop the

(Continued to page 264)

Shaded terraces should have light-colored surface for cool, clean look. In winter it will also reflect low sun's rays through windows, adding warmth. On unshaded terraces, however, bright paving would cause unpleasant glare. Such situations call for cooling lawn, ground cover or dark paving for best results



California-style ranch house keeps its walls cool—and attractive—with variety of trellis climbers that break severity of white expanse. Alternative method uses carefully pruned fruit trees that are trained to grow flat against wall, branching upward like tines of a fork



Shade-giving overhangs can be added to existing houses without spoiling lines, by simple construction of arbor or pergola. Lace vines can be trained up a trellis, across the arbor and along eaves, or open lattices can be patterned to give shade without need for vines at all

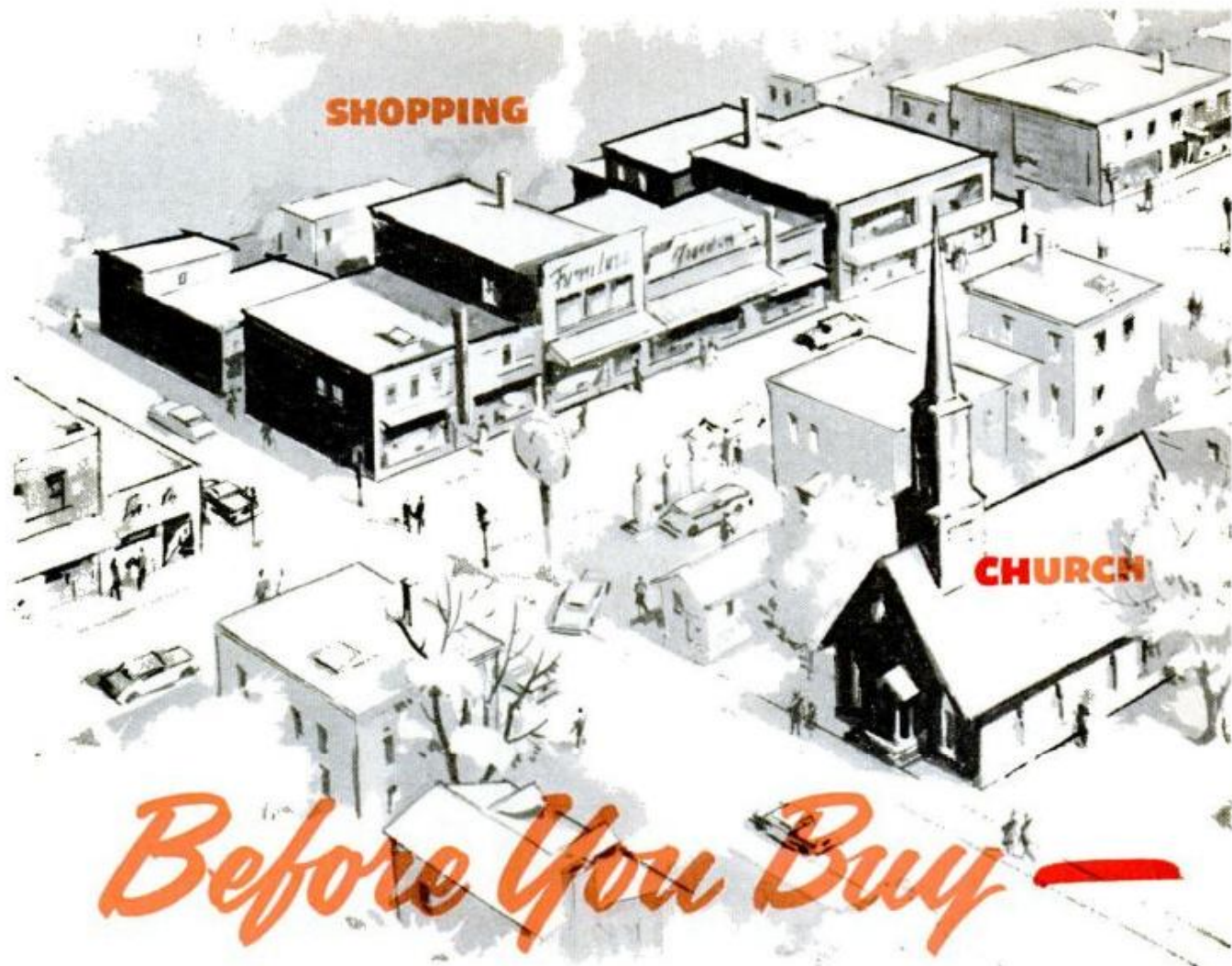


White concrete walks or terraces in open sun, adjacent to house, can reflect considerable undesirable heat through windows. Reflected heat is partially absorbed by thick, leafy planting of giant zinnias along foundation, wired to stay upright—an attractive and functional plan



Even a small pool in part of yard used for outdoor living makes difference of several degrees on hot afternoons and evenings. If trapped with dense hedges and plantings, air in immediate vicinity of pool will be considerably cooler. Water will absorb much of the heat





SHOPPING

CHURCH

Before You Buy —

By Charles D. Neal

IT'S WELL WORTH spending time learning how to get the most for your money in a home. It may be the most important purchase that your family will make. Knowing what to buy can save you money and enable you to choose a home that your family will be happy to live in. Before you start house hunting, think over what kind of family you are. Do you need plenty of yard for games and cook-outs and a corner for flowers? Or doesn't outdoor activity interest you? Will there be room for family hobbies?

A check-list will help you compare and balance the plus features against the drawbacks to arrive at a sound decision. Without such a list it's easy to forget seemingly minor points that later you may regret.

When house buying, you're strictly on your own. No one else is so vitally concerned with finding a home that satisfies your needs. The realtor isn't going to point out the bad features of the houses he's trying to sell.

Is a used house a bargain or a lemon? Only by carefully checking its condition will you be able to know. Actually an older house may have many advantages over a

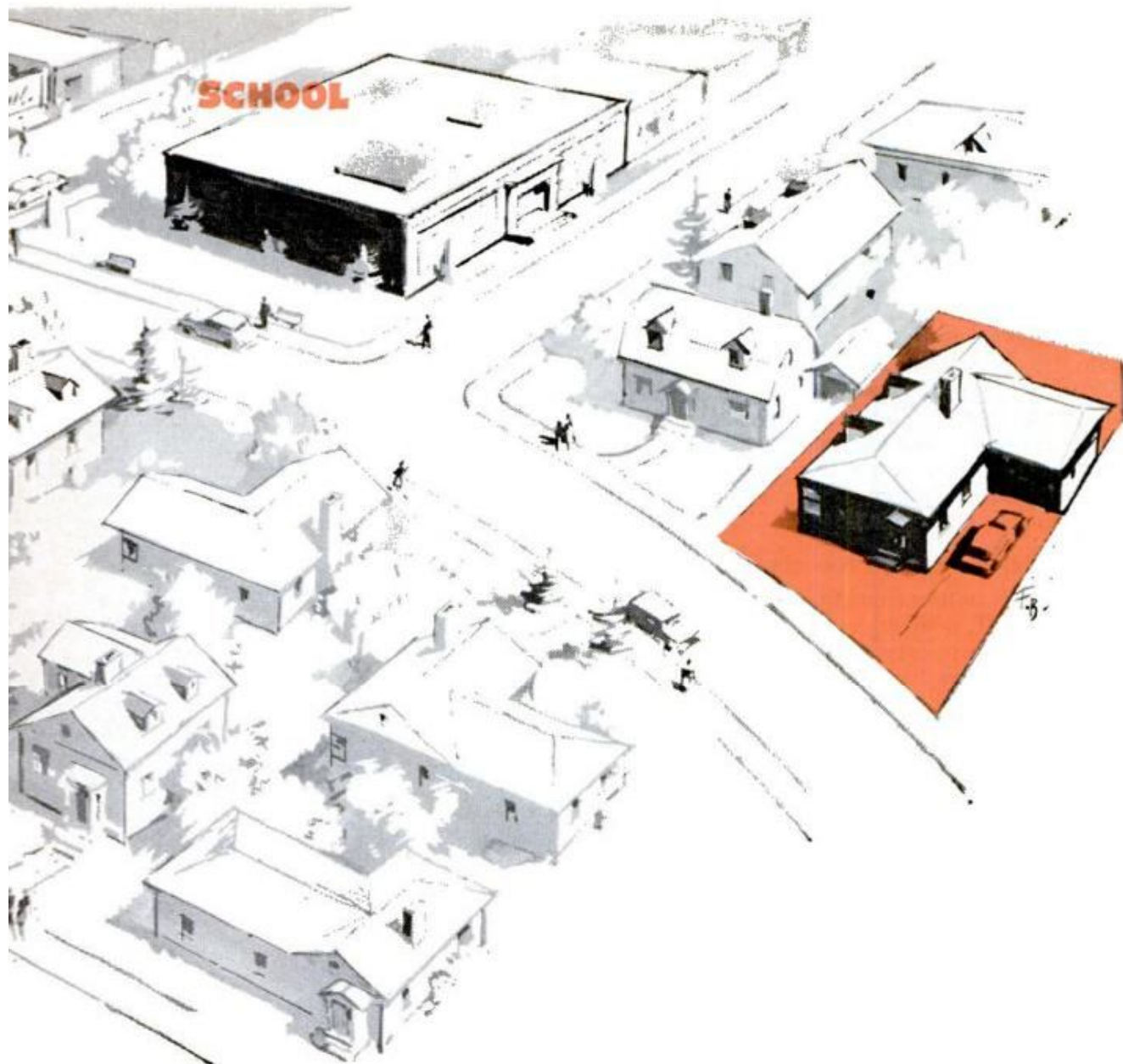
new one. For one thing the older house usually offers a lot of space at a bargain rate, but you will have to decide if your family can use that space to advantage. All utilities will be in, and the chances are you won't have to start from scratch with landscaping, shrub plantings and lawn seeding.

What Does the Location Offer?

Even your dream house can be unsatisfactory if located in a rundown, declining neighborhood. To find out the general appearance of a community, drive or better, walk through the surrounding area. Observe the homes, the grounds and public buildings. Compare values and talk with the people. Is the neighborhood attractive, and will you like your new neighbors?

Locate in a neighborhood that you'll enjoy. The district should have a high percentage of homeowners, a good neighborhood that is increasing in value, because then your property will also increase in value with the years.

You will want to know that the zoning restrictions and building codes protect you and yet meet your needs and desires. Most restrictions are positive protections, which



Purchasing a home means buying a share in a neighborhood. That share is a school for your children, playgrounds, police and fire protection—all that goes with an established community.

should never be considered undesirable. Is the district zoned for residential building only? A property in an outlying, unzoned area may be cheap, but such a neighborhood has a doubtful future. Although you will not want shopping centers and playgrounds across the street, you will want to know they can be reached quickly. But avoid an area where zoning permits all types of commercial buildings.

Desirable residential restrictions place a minimum limit on the cost of a house and on how close houses can be built to lot lines. Since zoning restrictions differ from one residential district to another, be sure that you understand those which apply to the neighborhood you are considering.

Are there any foreseeable condemnation possibilities? Governmental agencies, such as highway departments, public schools, and institutions of higher learning, make expansion plans well in advance. If you don't check such possibilities, you may find a future highway being built near or across part of your property. A trip to the local city planning commission will give you the answers to these questions.

What estimates can safely be made of the future value of the neighborhood properties? Check for the nearest encroachment of industry and low-rent areas.

Because you may be fortunate to have good commercial and public services now, don't take them for granted! Are the util-

ities such as water, electricity, gas and telephone adequate? How about police and fire protection? What provisions are made for trash and garbage removal? What about public transportation?

Are there curved or dead-end streets in the neighborhood to discourage high-speed driving? Try to avoid a location that will require your children to cross heavily traveled streets on their way to school—the less traffic in the neighborhood the better. If the streets are soon to be repaired, find out what the assessments will be, if any.

Schools, churches and shopping centers should be reasonably near and suitable to your family needs. You may want to visit the schools and churches before deciding.

What are the recreational opportunities? Are there parks, playgrounds and other recreational facilities nearby?

Selecting the Property

No house is better than the lot on which it stands. You'll need to know the size and shape of the property. Learn where the boundary lines are located before you buy. If your abstract or title policy doesn't define them clearly, have a survey made. In some locations a lot less than 60 ft. wide will tend to reduce privacy.

A lot is judged according to its public, private and service areas. To some home buyers a corner lot is more desirable than an inside lot. Usually a corner property gets a somewhat higher valuation for tax purposes. The public area in front of the house is best if relatively small—about 30 ft. is considered deep enough today. Such a yard cuts down on the length required for driveways and walks, and it reduces the amount of maintenance. A long driveway, coated with ice and snow, is inconvenient and makes a lot of unnecessary work.

The private, outdoor living space should be the largest area, designed for family living, relaxation and entertaining. Usually this area is shielded from the street, neighbors and service areas by plantings, fences and the house itself.

The third area is the family service or utility area, which should be located near the kitchen and garage. The service area can be relatively small, but there should be room to dry the family wash and space for trash and garbage cans, plus a small outdoor work area.

Good drainage is essential. A close look at the lay of the land will tell you a lot about drainage characteristics of the area.

STRUCTURAL DEFECTS THAT REQUIRE MAJOR REPAIRS



FOUNDATION should be in good condition. Look for water stains and other indications of dampness. Be suspicious of cracks and bulging walls, especially in an area where ground is mostly clay. Repairs can be prohibitive



CHECK CONDITION of joists, bridging and posts from the basement. Then go upstairs to find out if the floors are finished to your satisfaction. Both the bathroom and the kitchen should have modern, easy-to-clean floors



ROOF. An inspection of the roof and attic should be made to determine its condition. Water leaks usually show up as stains on the framing inside the attic. Also, are the gutters and downspouts in good repair?



DO WINDOWS and doors have good weatherstripping? The windows should also raise and lower with ease, and there should be storms and screens for all of them. But check them—don't take somebody else's word for it

Should the prospective lot have poor drainage and possibly need grading, fill or a retaining wall, better check on the cost before buying. Such work can sometimes make a house too expensive. And should the property be in an area that floods occasionally, buy elsewhere. Such a property is too expensive no matter what the price.

Should drainage appear to be a problem, drive past the property during a heavy rain storm. If water runs towards the foundation, you can expect at least some dampness in the basement.

Many a family has fallen in love with an attractive property and bought it before considering all the work that the place would require. Too late they found there was more grass to mow and maintain than they expected. And the garden, which looked wonderful before they moved in, now takes most of their week ends to keep attractive. So take a hard look at the place to make sure your family will be happy with it right from the beginning.

Best House for You

Most important, does the house itself satisfy your family's needs? Will it be large enough for future needs? And is there enough space, or too much? You may

think there's never too much space, especially for a growing family, but a large home can sometimes be inconvenient and include space that's too expensive for you to heat, maintain and decorate.

Never decide to buy or not to buy on eye appeal alone. Any house, especially an older one, will represent a compromise. You can never expect to find all the desirable features that you'd like in one house. Instead, you should first decide what are "must" features. Make a list of these. Add to it those features that should be included and, then, those that your family would like to have but could easily do without, at least for the present.

Probably the most vital consideration is the floor plan. While a family can live happily in a house that has about any style of architecture, the floor plan must be reasonably convenient, or the family will never be satisfied. The floor plan is a personal consideration which your family must decide for itself. It should be arranged for living in the way the family enjoys. If privacy and seclusion are important, the plan should provide rooms for individual activity. Or if relaxed outdoor living is important, the area should be convenient to the house.

CHECK THESE—THEY'RE COSTLY TO REPLACE

HEATING. If there's any doubt as to the condition of the heating plant, have a heating contractor check it. Replacing a furnace is always a major expense, so the value of the house should be discounted accordingly



ELECTRIC SERVICE. Does the house have at least a 100-amp. service entrance? If it hasn't, you may soon need to replace the wiring system to take care of all the new appliances, lights and TV's that are now in use



INSULATION. If there's good insulation in the walls and ceiling, give the house a big plus, for insulation adds a lot to your comfort during both winter and summer. Make sure walls also have a good vapor barrier



WATER HEATER. Find out the age of the heater. Chances are that it will need replacing soon if it is nearly 10 years old. And in the hardwater areas many of the inexpensive heaters give out in less than 5 years





VISIT SCHOOLS in neighborhood to see that facilities are satisfactory and classrooms are not overcrowded



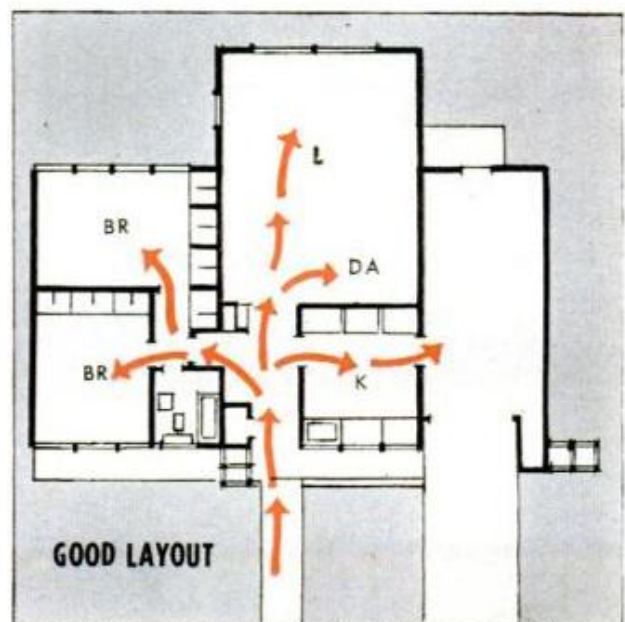
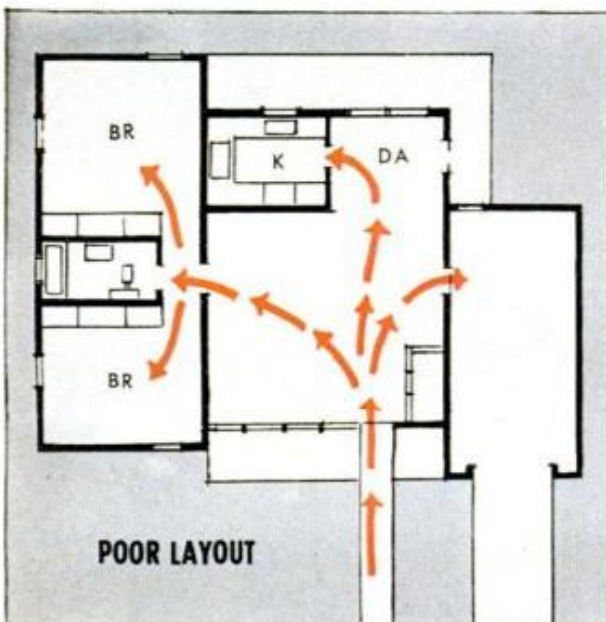
For privacy and quiet the bedrooms should be separated from the rest of the house. And, unless the house is air conditioned, there should be good cross-ventilation. The doors and windows in every room should be located to provide space for satisfactory furniture arrangements.

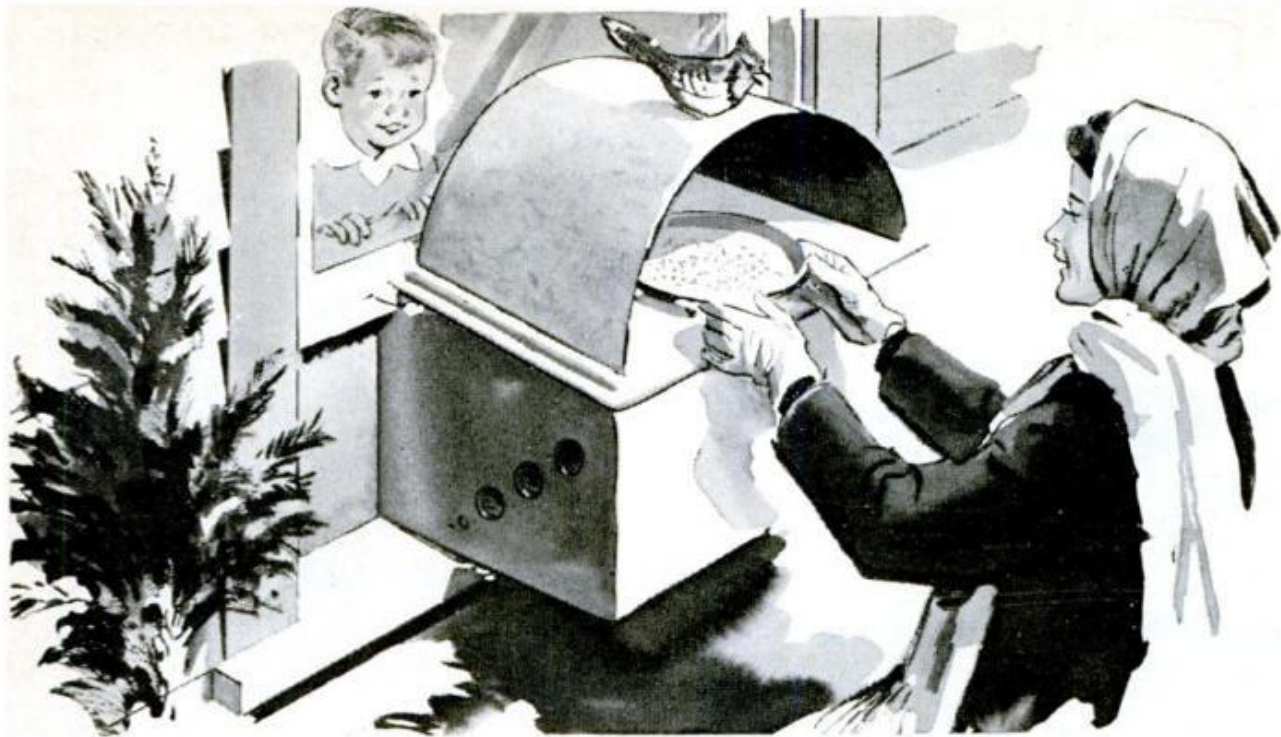
The kitchen should be located conveniently to the living and dining areas. Also, there should be direct access from the kitchen to the outdoor service area and garage to save unnecessary steps.

There is no rigid formula for determining the total amount of storage space needed, other than it should meet your needs.

(Continued to page 298)

TRAFFIC PATTERN that creates hallway through living room reduces privacy and makes arranging furniture difficult. The central entry hall gives direct access to all rooms without going through living room. Direct garage-to-kitchen route is desirable



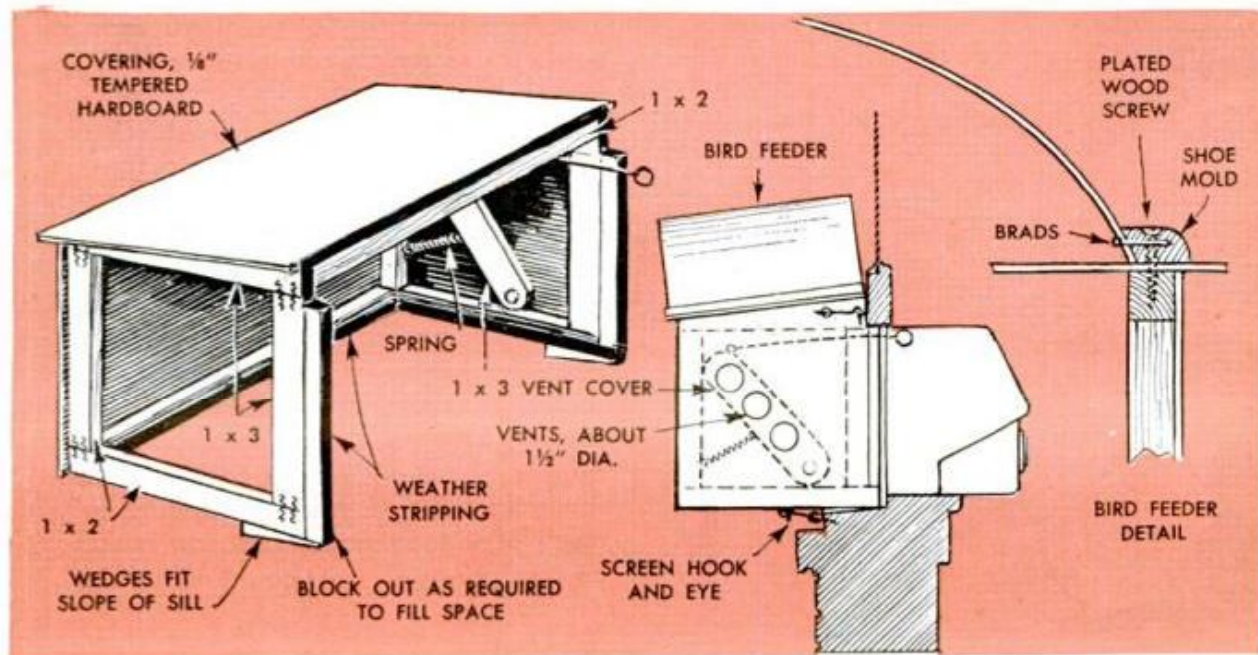


WINTERPROOF YOUR AIR CONDITIONER

THIS HARDBOARD COVER not only protects a window air conditioner from snow, ice and freezing rain, it also serves as a sheltered bird feeding station by the simple addition of a curved hardboard top, or roof. The cover may be installed any time in the fall months without affecting operation of the conditioner during a late autumn warm spell, as the design includes vents which can be opened from inside the house to admit outside air.

The first step in making it is to take careful measurements of the conditioner so that you know how long to cut the frame members of 1 x 2-in. stock. Make an allowance for weatherstripping as in the left-

hand detail. Rip all pieces of the frame to width and square off to length. Then clamp together with glue on the joining and fasten with corrugated fasteners. Add blocks, or strips, to the front uprights to close the space. Then add the weatherstripping and the 1/8-in. hardboard covering panels. Finish up the job by boring three 1 1/2-in. dia. holes in each end panel and fitting the spring-loaded vent covers. Set the cover in place, wedge it as in the sectional view and fit screen hooks and eyes to hold it securely in place. Fit the curved cover which forms the bird feeder with the end supported by strips cut from shoe mold as in the right-hand detail. ★ ★ ★



A bomb is dropped on a key target. But who cares, you live miles away. Fallout can't reach you. But soon you and your family become ill, dangerously ill. Now you wish you had heeded the importance of a family fallout shelter. If you decide to build one, first consult your local building code and the Civil Defense authorities.

Before

WHAT IS FALLOUT?

Fallout is tiny pieces of dust and debris which are made radioactive by nuclear explosions. When a hydrogen bomb is exploded close to the ground, thousands of tons of these tiny particles of dust and debris are sucked upward into the air. They help form the mushroom cloud which is always seen with one of these explosions. Some of this radioactive matter spills out of the cloud near the explosion. Most of it, however, is carried by the wind for many miles. Eventually it settles to earth where it pollutes the air you breathe and attacks the vital organs of the body. You can't feel or see fallout. But if you are exposed to much of it long enough, it can make you seriously ill. It could kill you!



the Siren Sounds

CALL IT fallout apathy if you will, but chances are that less than one in fifty will bother to provide in advance adequate shelter against radioactive fallout—if and when. However, the fact remains, every family should have a safe hideout prepared in or near their home where they can go to escape the deadly after effects of fallout.

Where is the best place to go and stay? Underground, says the Office of Civil Defense. An underground shelter having at least three feet of earth or sand over it, plus an adequate door and air filter, will give you almost complete protection. Any mass of material placed between you and the fallout cuts down the amount of radiation that reaches you. Where's the next best place to go? In your basement. Merely staying in the basement will reduce your exposure to about $\frac{1}{10}$ the outside exposure. Sandbagging the basement windows will reduce the amount further. And a special refuge built in the basement, with a mass of material around and above it, can reduce exposure to about $\frac{1}{100}$ of the outside exposure. A point to remember is that the best protection is not good enough if you cannot stay in your shelter until told to come out. In the case of a basementless

home, an underground shelter outside the home would have to be considered. A basement shelter is generally the least expensive and easiest type for the homeowner to build, since two walls of the shelter are already formed by existing basement walls. Solid, 8-in. concrete blocks provide enough density for adequate shielding. If hollow blocks are used, they should be filled with concrete to provide the equivalent protection. Or, a brick wall 10-in. thick will give as much protection as a wall made of 8-in. solid concrete blocks. Such a shelter could be incorporated in the plans for a new house. The shelter might double as a hobby, storage or darkroom, but emergency equipment and supplies would need to be kept in the shelter at all times. For a family shelter 10 sq. ft. of floor space per person is considered adequate.

The shelter area is first laid out on the basement floor. Along the guide lines set into mortar a row of solid concrete blocks. Build up the corner section about six blocks high and lay up the rest of the wall to the same height. Again, build the corner up about six blocks high and raise the walls to an equal height. Continue this construction until the desired height is reached. At



BASIC ESSENTIALS for living as long as two weeks in family fallout shelter should always be kept on hand

least 16 in. should be left overhead between the walls and the joist to allow enough space for building the roof. The open entranceway together with a series of small vents installed in one layer of blocks near the floor give the necessary ventilation.

Fasten the supporting studs for the roof to the basement walls with anchor bolts. The ledger board nails to the studs and wall. The two studs on the other wall should be the same height as the main block walls.

Before laying the roof, allow the mortar in the wall to dry for at least a day. The roof joist rest on the inside 4 in. of the block wall, and the outside 4-in. space is filled with a row of blocks set on edge in mortar. Nail the joist to the ledger and add headers at both ends of the joist to hold them in place. On the entrance wall, the headers set flush with the inside wall surface.

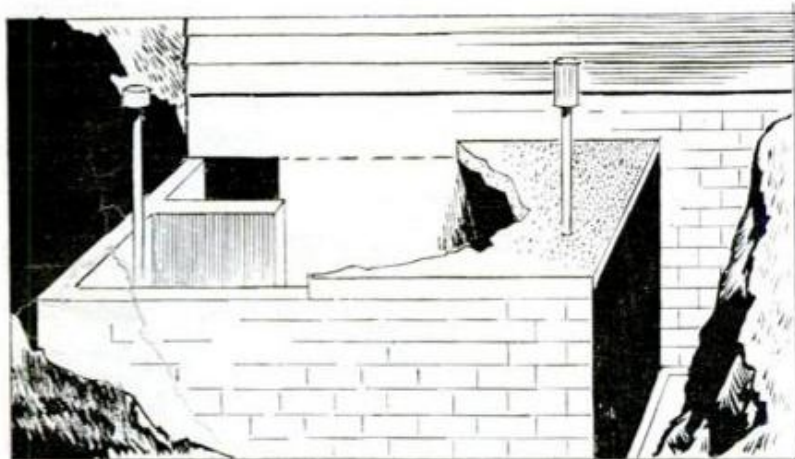
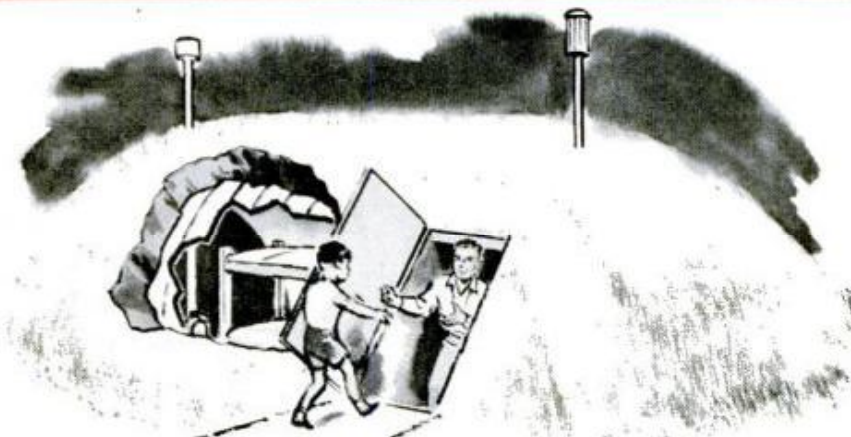
Slide the roof boards into place across
(Continued to page 258)

THIS ABOVEGROUND SHELTER is built outdoors of masonry, and is suitable for locations where it is impractical to build underground—wherever rock or ground water may be a problem. The shelter has two concrete block walls which sit at least 20 in. apart, and the space between has an earth or gravel fill. The roof is a 6-in. reinforced concrete slab covered with at least 20 in. of gravel. Instead of using concrete, heavy wooden beams could be used to support a dirt roof. This shelter would cost considerably more than one built inside a basement where earth and basement walls form two protective sides of the shelter



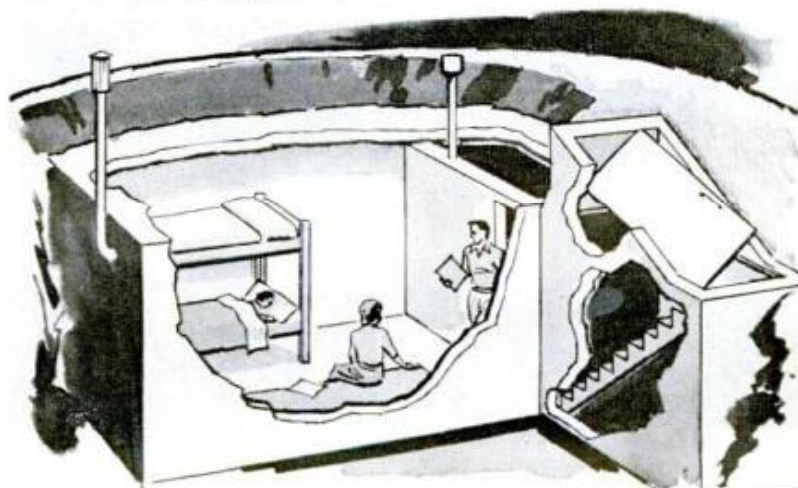


PRESHAPED METAL or precast concrete form effective fallout shelters when mounded over with earth. The shelter shown would provide almost absolute protection from fallout radiation



THIS SHELTER could be built as an additional basement room at the time the house is under construction. It would add about \$500 to the cost of the house

ANOTHER TYPE of underground shelter providing excellent fall-out protection is built of reinforced concrete. Either a stairway or a hatchway entrance is used. Such a shelter would best be constructed by a contractor



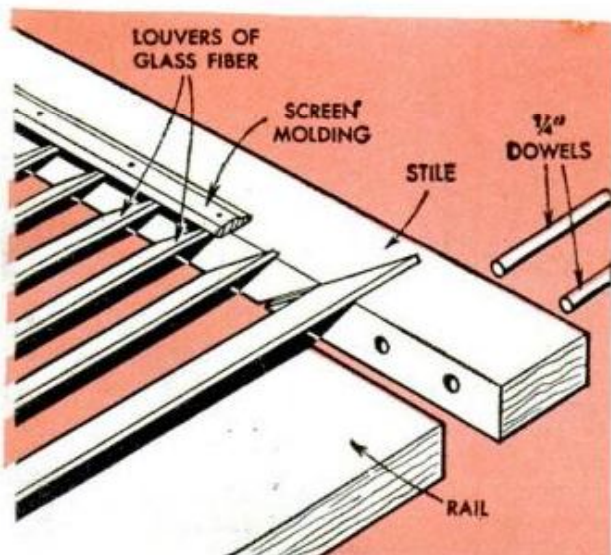


LOUVERS IN COLOR

LOOKING FOR a new wrinkle in home decoration that you can carry out yourself? Then give a thought to what you could do with louvered doors and louvered panels having colored slats of $\frac{1}{8}$ -in. glass fiber. There's that small, plain-paneled door that closes the closet in the smaller bedroom. Think what a spot of color could do for that room. Or, consider the stark, unbroken white of the kitchen cabinets, the need for a colorful folding screen or possibly a louvered room divider to update the living room.

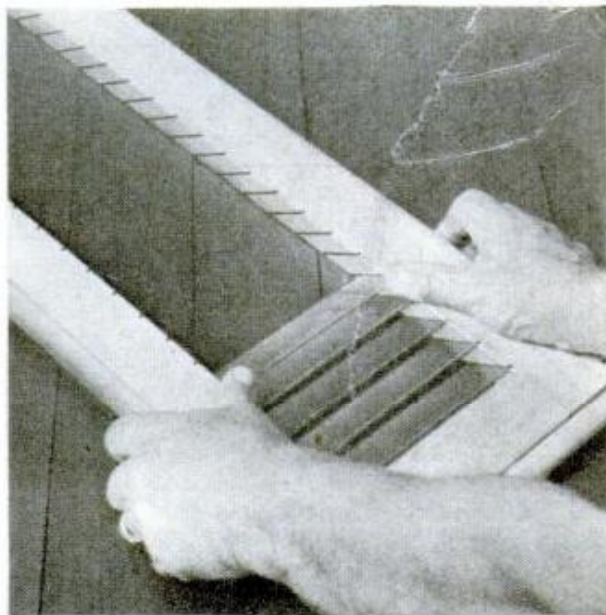
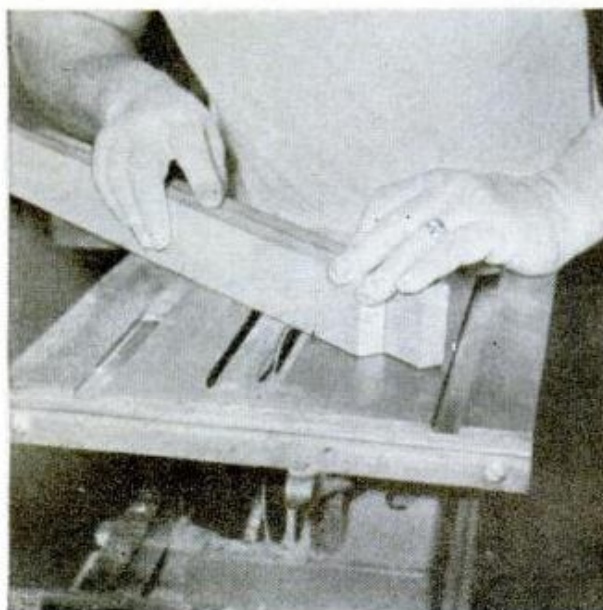
Use $\frac{3}{4}$ -in. clear, straight-grained white pine for the stiles and rails of the louvered-door frames. Rip the parts to width and square the ends of the rails. The parts should be cut slightly oversize. Then measure and cut the grooves for the louver slats. On small doors these grooves are spaced about 1 in. apart and normally are cut $\frac{1}{8} \times \frac{1}{8}$ in. at a 55-deg. angle.

After the parts have been cut to size join with glue and dowels. Make sure before the glue dries that the frame is square and that it is $\frac{1}{16}$ to $\frac{1}{8}$ in. oversize. If the measurements both ways are a trifle over, you can easily plane it to fit the opening for which it is intended. Then slide the slats into the grooves and finish with a screen molding as in the detail. Miter the molding at the four corners and fasten in place with $\frac{3}{4}$ -in. brads. Finish the frames to match adjoining woodwork.—James A. Lockhart



SAW CUTS for the glass-fiber slats should be made approximately 1 in. apart and at a 55-deg. angle

INSERTION OF THE SLATS is a simple matter of pressing them into snug-fitting saw cuts $\frac{1}{8}$ in. deep





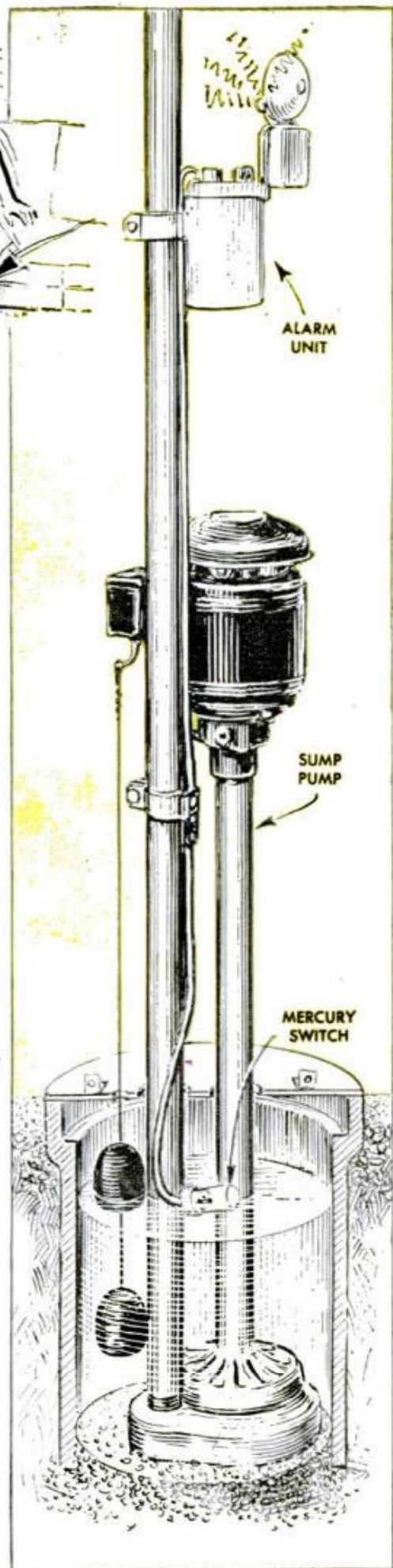
IT WARNS YOU When the Sump Pump Fails

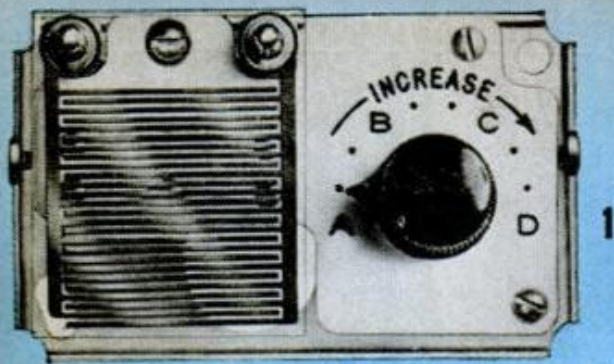
IT'S NIGHT. There's a heavy rainstorm and water is rising in the sump in your basement. The pump starts, runs for a time. Then there's an extremely bright flash of lightning, a long roll of thunder. Lights go out along the street. The pump stops. You're sound asleep while all this is going on.

A sump pump can become inoperative for any one of a number of reasons other than current failure due to natural causes, a tripped thermal unit, a sticking float, a "frozen" driveshaft—defects or causes you may be entirely unaware of until the damage is done.

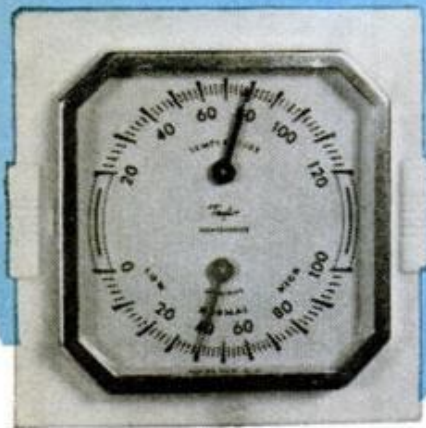
You can now buy a unit, called "Trusty-Warns," that wakes or warns you in time to get your auxiliary pump working if you have one, get the sump pump started again, or remove valuable property from the basement ahead of the flood. The alarm is battery operated, not dependent on house current, and the detail at right shows how it works on a sump pump. When that bell rings it's loud enough and urgent enough to bring you running from almost anywhere, upstairs or down, asleep or awake. Similar units are available for hooking up to serve as burglar and fire alarms, also to a home freezer.

THE ALARM KIT (below) is designed to fit any sump pump

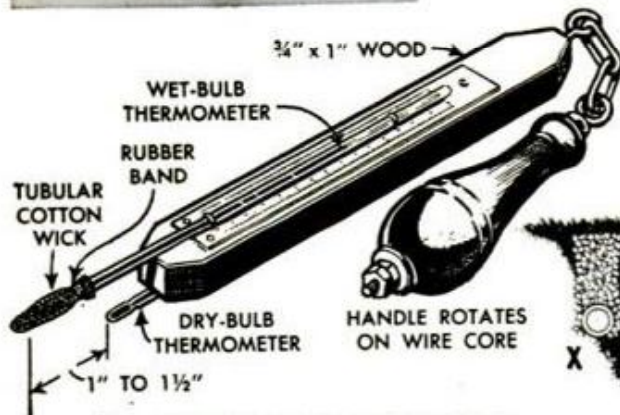




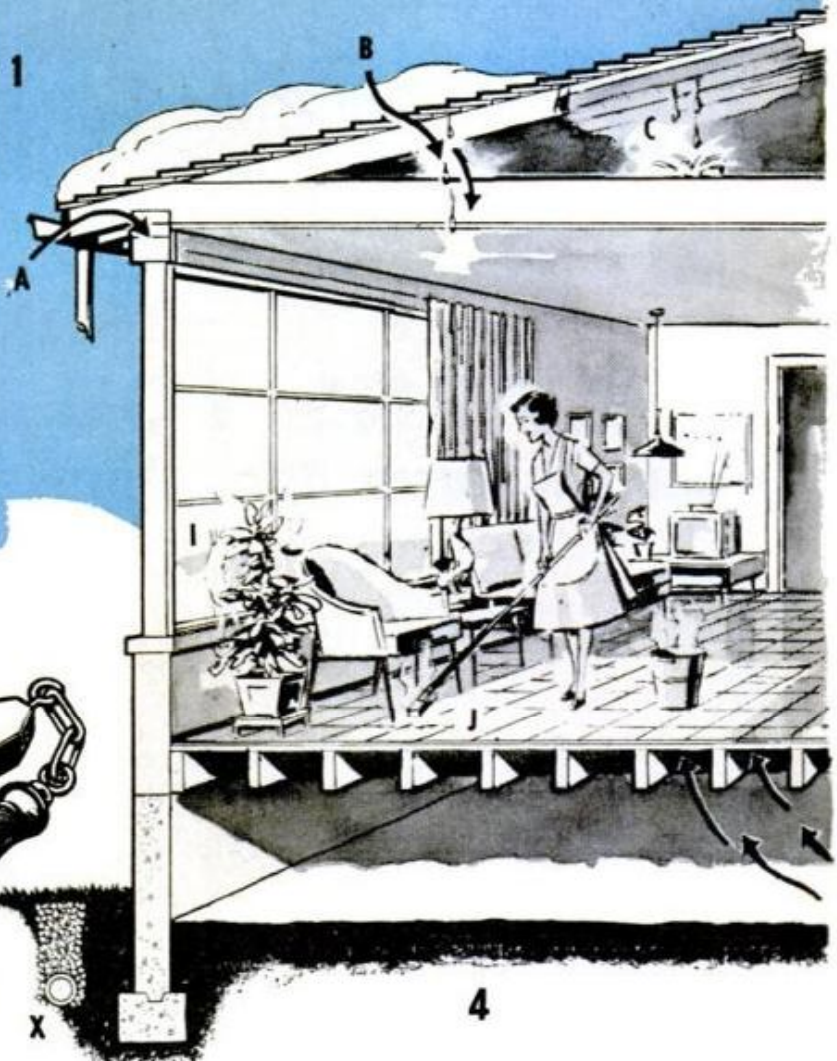
Minneapolis-Honeywell Regulator Co.



2



3 HOMEMADE SLING PSYCHROMETER



4

What to do about EXCESS HUMIDITY

By E. R. Haan

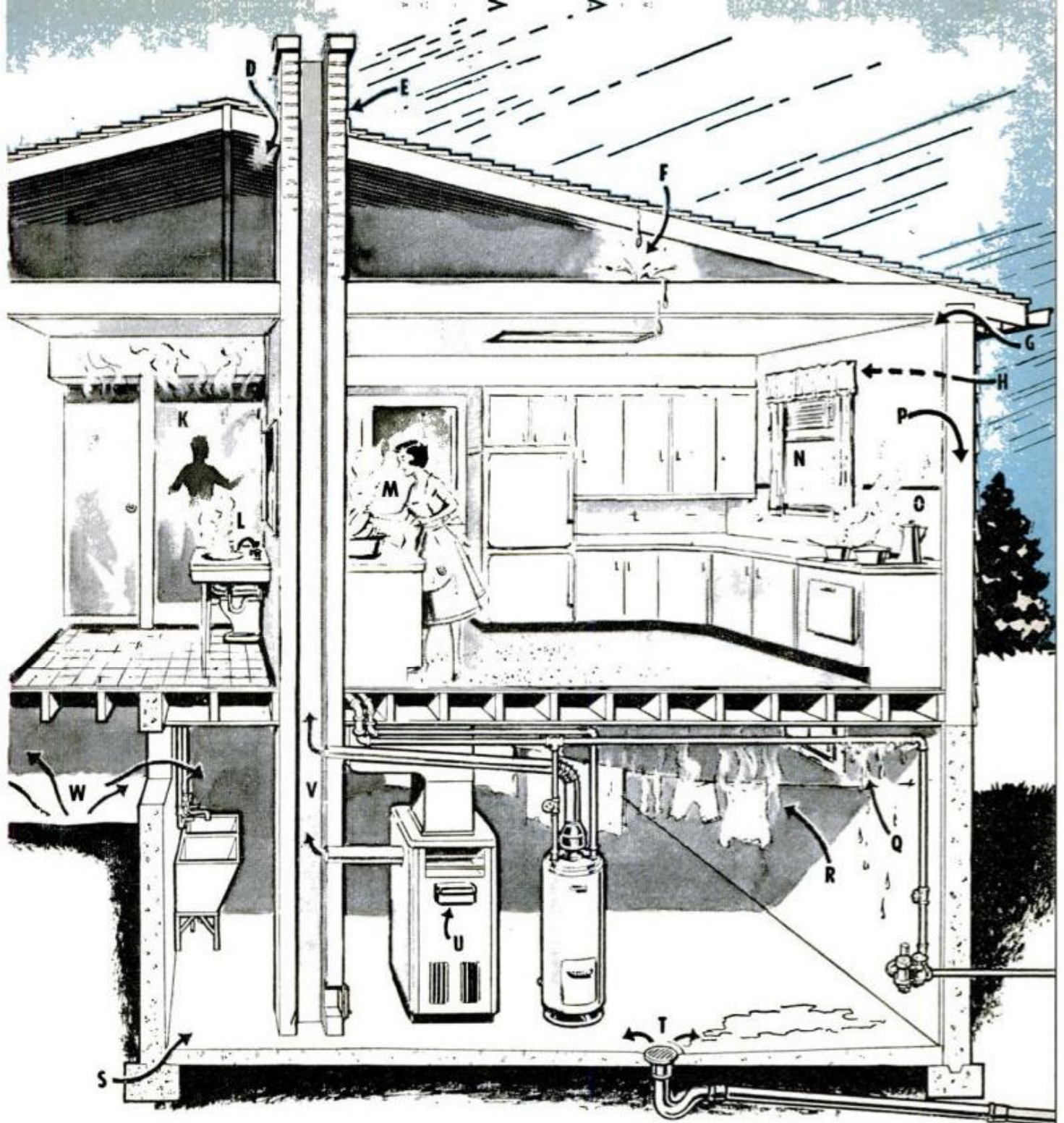
ALTHOUGH a moderate percentage of humidity in your home is essential, too much can cause all kinds of trouble. Often, in older houses, it is difficult to maintain enough humidity, but in the newer and more tightly constructed houses of today, the problem is just the opposite—how to get rid of excess humidity.

Nowadays more moisture is produced per cubic foot of living space than formerly since the average size of houses has shrunk, but cooking facilities causing moisture have remained the same or increased, there are now more baths and showers, and laundry equipment has in-

vaded kitchens. Damp crawl spaces and poorly insulated slab floors add to the woes of excess humidity.

Some Excess Humidity Troubles

Fig. 4 shows numerous sources of excess humidity and some of the results. Repeated condensation on windows lifts paint and varnish, rots wood, rusts steel, damages wallpaper, plaster and floors. When condensation takes place in outerwalls the insulation deteriorates and ice may form on the sheathing. The ice melts when temperature rises and the water runs down on the sheathing and studs to the sills,

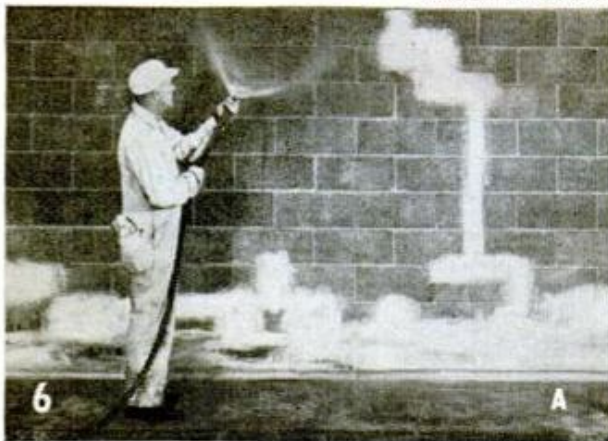


SOURCES AND RESULTS OF EXCESS HUMIDITY

- A. Leaky or clogged gutter can let water drain into walls.
- B. Melting snow on low-pitch roof; water may rise between shingles and find way inside.
- C. Ice on underside of roof sheathing, from condensed vapor, melts when temperature rises.
- D. Water leaks at flashing.
- E. Driven rain enters defective mortar in brickwork.
- F. Roof leaks.
- G. Driven rain forced through poor joints between siding and trim.
- H. Defective window flashing lets water enter wall.
- I. Evaporation from flower pots almost equals water put into them.
- J. Mopping 8 x 10-ft. floor adds about 2.4 lb. of water to air.
- K. Hot shower evaporates about $\frac{1}{2}$ lb. of water.
- L. Constant evaporation from splattered water drops of dripping faucets.
- M. From $\frac{1}{2}$ to $\frac{3}{4}$ lb. water evaporated when washing dinner dishes for family of four in sink.
- N. Condensation on inside of windows indicates high humidity.
- O. One day's cooking for family of four adds 5.8 lb. of water to air.
- P. Lack of vapor barrier lets vapor get into wall and condense on sheathing.
- Q. Sweating cold-water pipes, a common humidity problem in summer.
- R. Laundering in open tubs and drying inside, for family of four, releases 30.7 lb. of water into air.
- S. Leaks through walls and floor keep basement damp.
- T. Sewer backflow is occasional serious problem.
- U. Humidifier of warm-air furnace may require adjustment for less evaporation.
- V. Water vapor produced by gas-burning appliances (and oil burners) disintegrates mortar joints of chimney not having a continuous flue liner.
- W. Moist air in crawl space penetrates house.
- X. Diverting water with drain-tile line to prevent it from collecting in crawl space.



American Blower Co.



Standard Drywall Products

AFTER PLUGGED OPENINGS have been coated with sealer, entire wall is sprayed with water, above, followed by two applications of a heavy concentrate of sealer applied 3 hrs. apart, starting with a 3-ft. strip



causing the wood to rot. Excess moisture in walls also causes paint failure on the outside.

In unheated and unventilated attics, excess moisture contacting cold roof sheathing also may form a coating of ice. When several months' accumulation melts in spring, the water can run down to rooms below. A damp and poorly ventilated crawl space may cause the floor above it to rot and collapse. Slab floors not provided with adequate insulation may accumulate puddles of water during cold weather when moist, warm air in the house contacts the cold slab or the floor covering. Dampness also causes mildew damage to furniture, fabrics, cloths, rugs, books, wallpaper and other materials. Condensation in basements is mainly a summer problem; can be controlled usually with a dehumidifier.

Humidity Recommendations

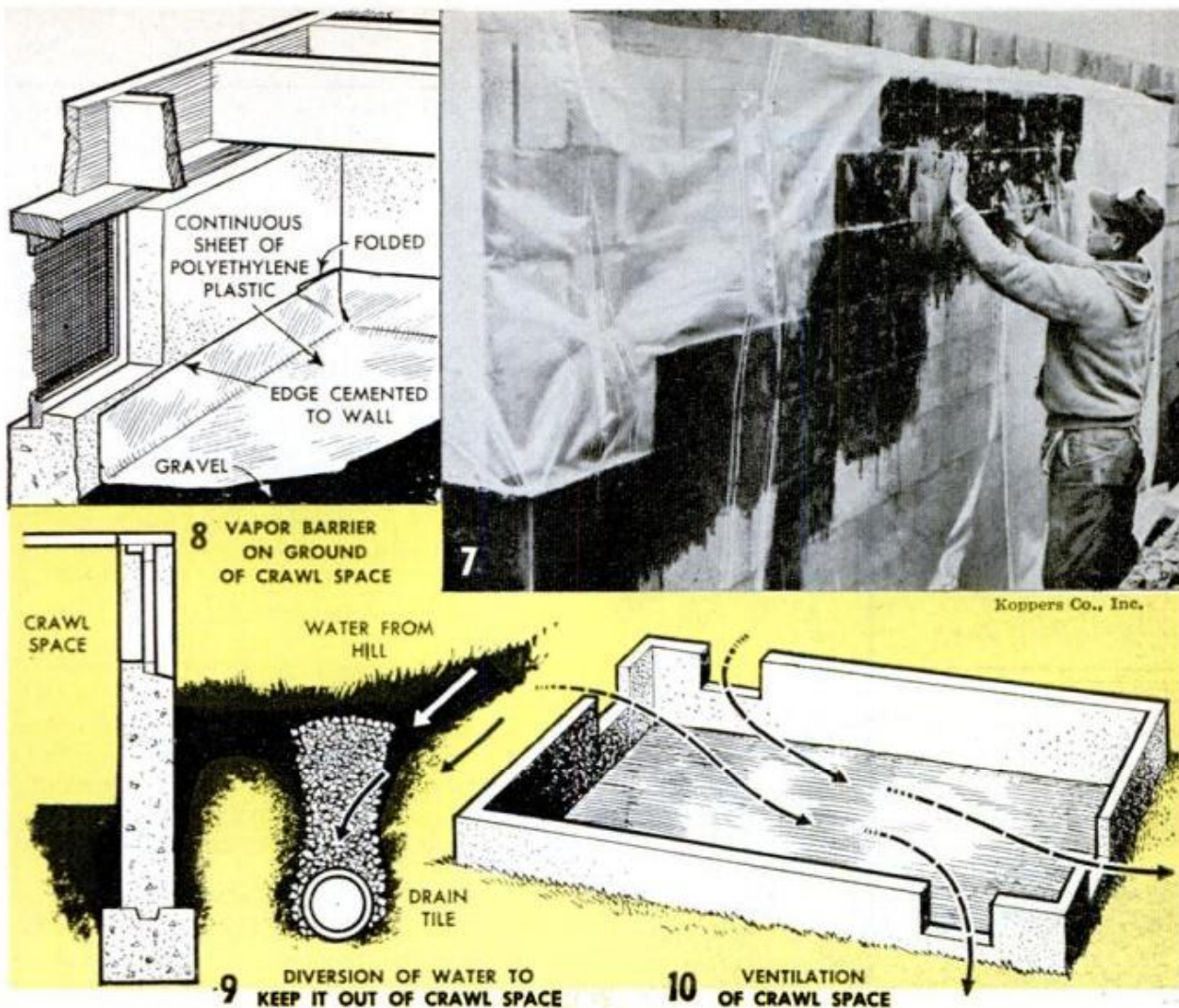
Troubles such as those mentioned above usually can be avoided by keeping the humidity in your home within the recommended limits given below, which were based on the findings of the Engineering Experiment Station of the University of Minnesota.

Outside air temp. (F.)	Inside relative humidity at 70° F.
—20 or below	15% or less
—20 to —10	20% " "
—10 to 0	25% " "
0 to 10	35% " "
10 and above	40% " "

To measure humidity you can use a sling psychrometer. A homemade one is shown in Fig. 3. It consists of a dry and a wet-bulb thermometer on a common base. It is swung in a circle and the readings are compared to figures in a table to find the relative humidity at various temperatures and air pressures. You also can use a hygrometer or humidity indicator of the dial type. One which is combined with a thermometer is shown in Fig. 1. In addition to humidity indicators there are humidistats which are highly sensitive to humidity changes and are used to automatically control electric motors and other devices. Fig. 2 shows a humidistat which has a sensitive electronic element. This unit is used with a relay.

Moisture Sources in Homes

Most of the moist air in a house is produced by cooking, dishwashing, laundering and showering. Other sources include tub bathing, floor washing, watering flowers and plants, furnace and radiator humidifiers, leaks in the water-supply sys-



Koppers Co., Inc.

tem, operation of gas and oil-burning appliances. People also give off considerable moisture by respiration and perspiration.

If you have a warm-air heating system, one of the first things to do is to adjust the furnace humidifier for less evaporation. It may even be necessary to stop evaporation completely. In a hot-water or steam-heating system, it may be necessary to stop using evaporating pans on radiators, or separate humidifiers. For the average family of four, the amount of moisture introduced into the air daily by cooking three meals and dishwashing is about 4.8 lbs. according to the Engineering Experiment Station at Purdue University. Therefore, an exhaust fan in a kitchen, installed in a canopy over a range, or in a wall as in Fig. 5, is practically a necessity.

Most clothes driers should be vented outdoors. In the absence of a drier, drying clothes add considerable moisture to the air. In such cases an exhaust fan should be provided for ventilation. Moisture caused by floor mopping should be eliminated in the same way.

Gas-fired appliances, including furnaces, ranges, space heaters and refrigerators,

produce water vapor. A gas furnace may produce as much as 7,000 lbs. of water in a single heating season. An oil furnace produces 8 lbs. of water vapor per gallon of oil burned. This moisture goes up the chimney and invades masonry joints and causes them to disintegrate. A stainless-steel flue liner will prevent this. When chimneys are built, the mortar used should not contain any lime as this makes it more water-absorbent. Crumbling of moist mortar is accelerated by frost.

Moisture That Comes From the Outside

All of the excess humidity in homes is not produced inside. Some is introduced from the outside as for example the evaporation of water leaking into basements through cracks in walls and floor. Modern methods of waterproofing concrete include the use of quick-setting compounds in various consistencies to plug cracks and seal pores as in Fig. 6. A dry basement also is assured by "wrapping" it in a continuous layer of polyethylene plastic as in Fig. 7, preferably done at the time of building. This material comes in rolls of 10 to 20 ft. in width, and therefore requires few joints.



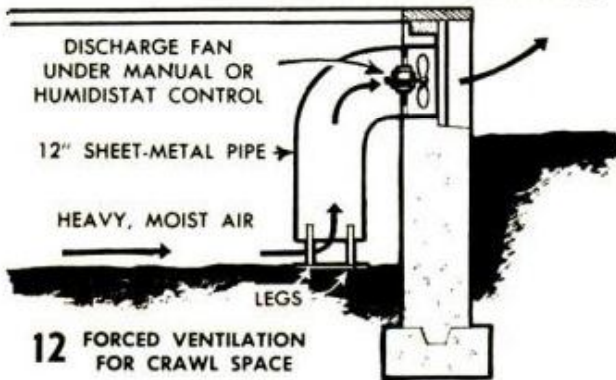
Fastener Corp.

In basementless homes having heated crawl spaces of which the vents are closed during cold weather, continuous evaporation of water from the earth often produces excess humidity throughout the entire house. The easiest way to prevent this is to seal off the moist earth with a polyethylene vapor barrier, Fig. 8. Edges of the plastic are brought up on and cemented to the walls. If ground water rises above the level of the crawl-space floor, or if water drains toward a crawl space from a higher location, the plastic film may require weighting down with sand to keep it in place and prevent its rupturing.

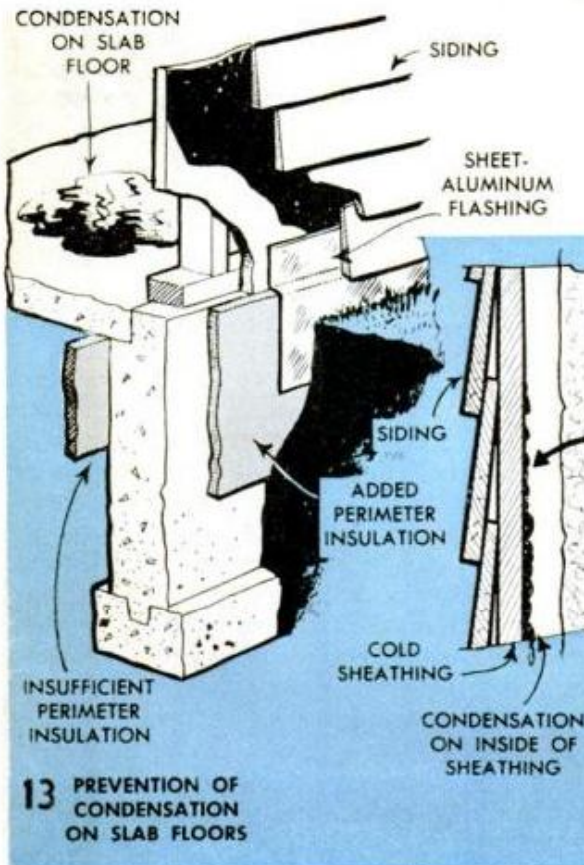
A second way to control damp crawl spaces is to divert water that flows toward them from a higher level as indicated in Fig. 9. A third way is to provide adequate ventilation. The vents should be located on opposite sides at corners as shown in Fig. 10 to take advantage of prevailing wind direction. The total area of vents covered with $\frac{1}{2}$ -in. wire mesh should be 2 sq. ft. per 100 lineal feet of crawl-space perimeter, plus one-third of one percent of the crawl-space ground area. Where existing vents are inadequate, an exhaust fan can be installed in a large-diameter sheet-metal pipe as shown in Fig. 12.

Condensation forming along the walls of a basementless house on a slab floor can be stopped by installing an adequate amount of perimeter insulation as in Fig. 13. Sewer backflow is best prevented by installing a good backwater valve in the house drain near the point where it joins the house sewer so the valve will be accessible for servicing. Water leaks through roofs, those at window and dormer flashings, water seeping into walls from clogged or overflowing roof gutters, or other outside

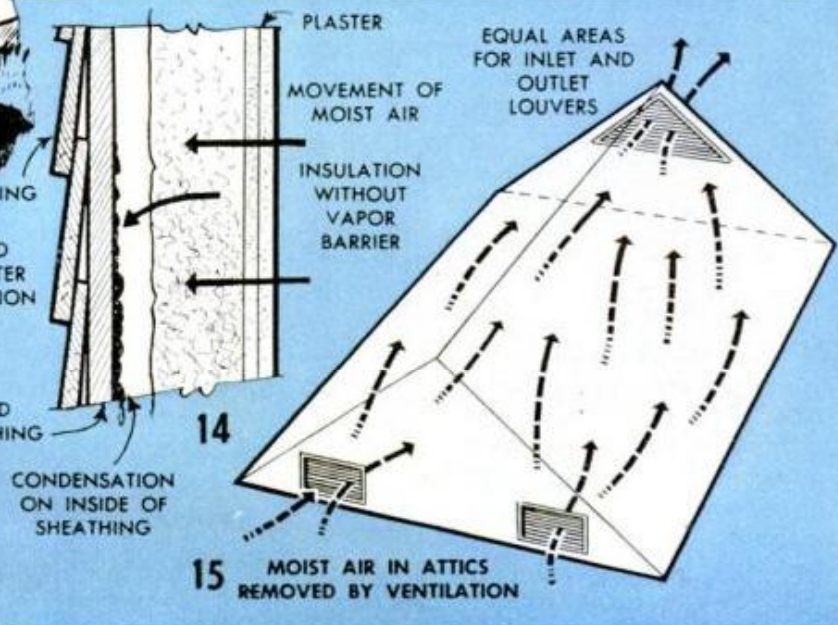
(Continued to page 254)



12 FORCED VENTILATION FOR CRAWL SPACE



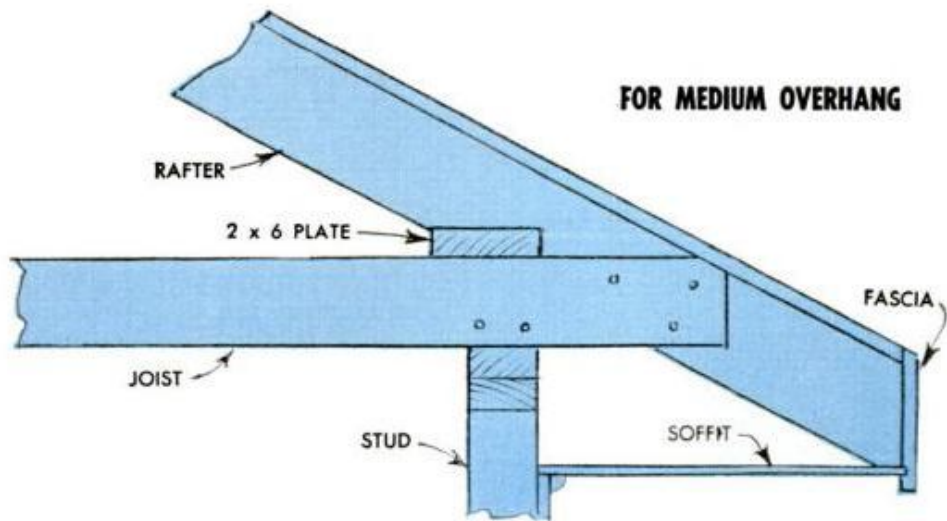
13 PREVENTION OF CONDENSATION ON SLAB FLOORS



14

15

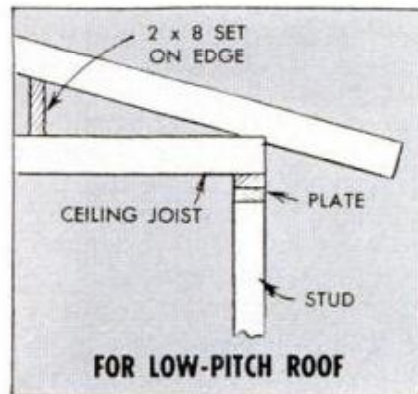
NEW FRAMING TECHNIQUES



FOR MEDIUM OVERHANG

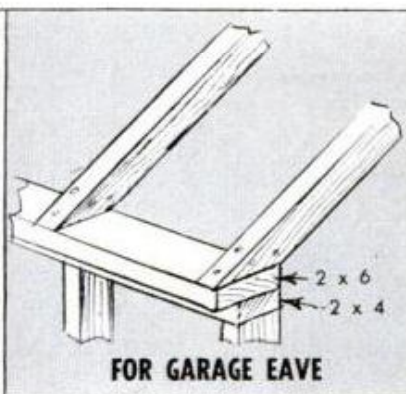


THIS FRAMING METHOD allows the use of a wider projection on the overhang without lowering the window line—as required when rafters rest directly on double plate



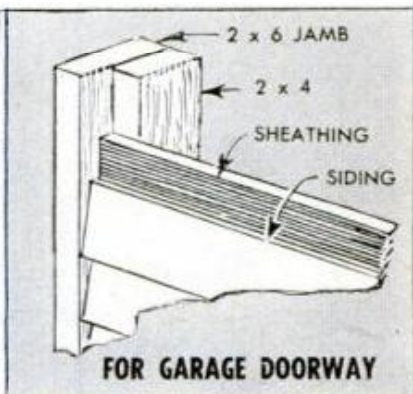
FOR LOW-PITCH ROOF

WHEN FRAMING a low-pitch roof, support is added by nailing 2x8s on edge between joists and rafters



FOR GARAGE EAVE

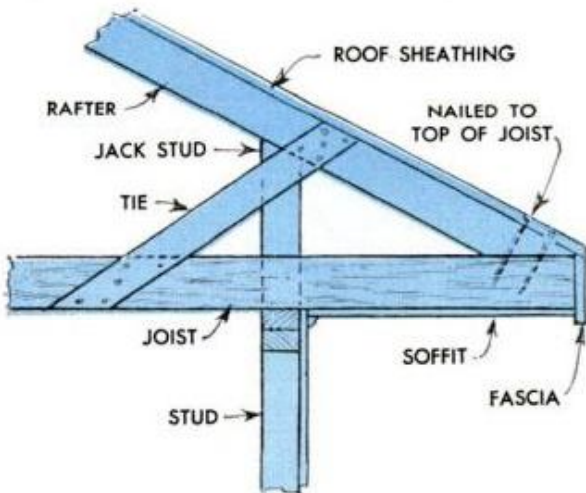
LABOR IS SAVED by forming a simple garage eave with 2x6 top plate. Rafter sets flush on inside



FOR GARAGE DOORWAY

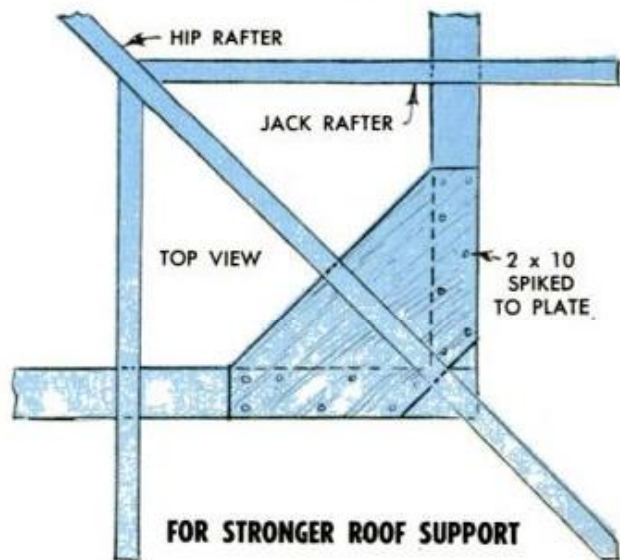
GARAGE DOORWAYS are framed easily and quickly by using 2x6s for jambs, 2x4s for nailing strips

TO FORM an extra-wide overhang without lowering the roof line, use this method. Ties and jack stud add strength, and rafters rest directly on the joists



FOR WIDE OVERHANG

SPIKING A 2x10 to top plate increases strength of framing and provides a better nailing surface for ceiling material. Notch hip rafter to fit gusset



FOR STRONGER ROOF SUPPORT

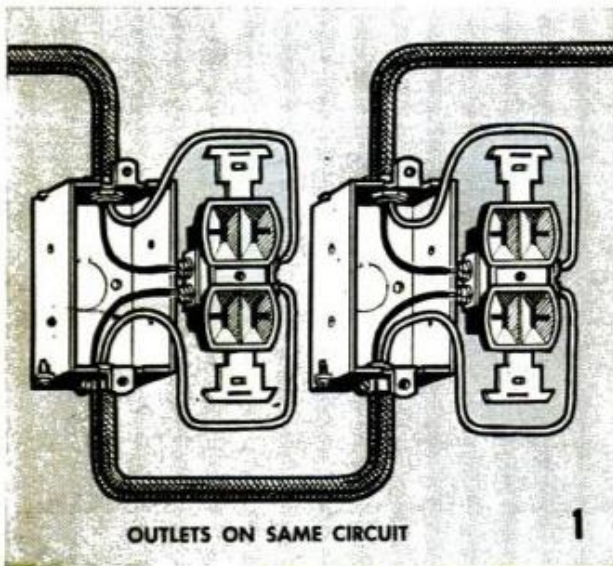
WIRING YOUR BASEMENT PLAYROOM



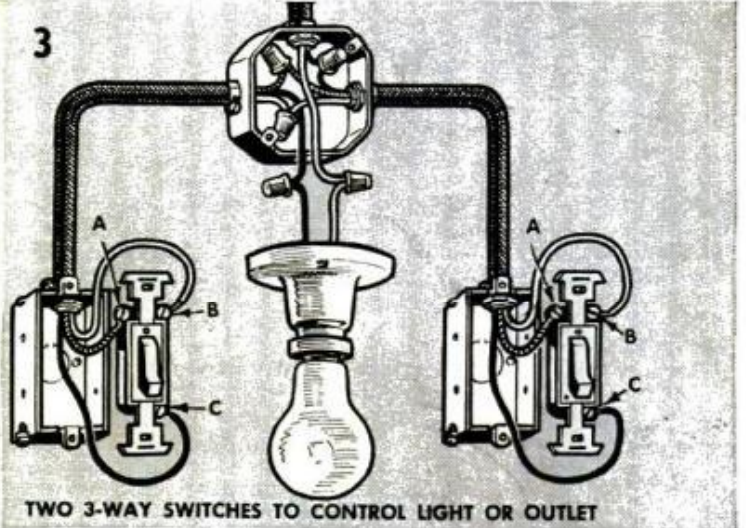
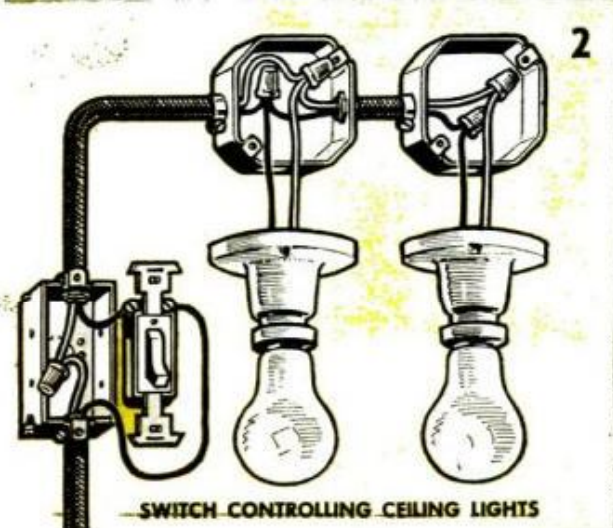
NEW CIRCUITS for light and power can be tapped-in at service entrance or into a branch circuit box

PLANNING AND BUILDING a recreation room in the basement can be a lot of fun from paneling the walls to tiling the floor and ceiling. Manufacturer's instructions for applying their products have made it easy for any do-it-yourselfer to transform a dingy basement into a glamorous playroom. But how about the wiring? This is an important step that must be done before paneling and tiling, and while individual requirements will differ, the basic wiring information given in this article can be adapted to any particular layout. The diagram in Fig. 7 is a typical two-circuit hookup which can be followed in adapting it to suit your own needs and desires. During the planning stage, you should first check your local electrical code requirements as to the type of installation allowed. For example, some codes require the use of only rigid conduit in the basement. Your local power company or city inspector's office can answer your questions.

A basement recreation room needs a high level of illumination to make it an enjoyable place for games, reading and working on family hobbies. Where ceilings are low, you should use flush lighting fixtures, Fig. 14, and plan to set them between



OUTLET AND SWITCH CONNECTIONS. The two recreation-room circuits connect as shown in Figs. 1, 2 and 3. These circuits run directly to the service entrance or, for top efficiency, to a branch circuit box that sets in or near the room where the power is used





Armstrong Cork Co. photo

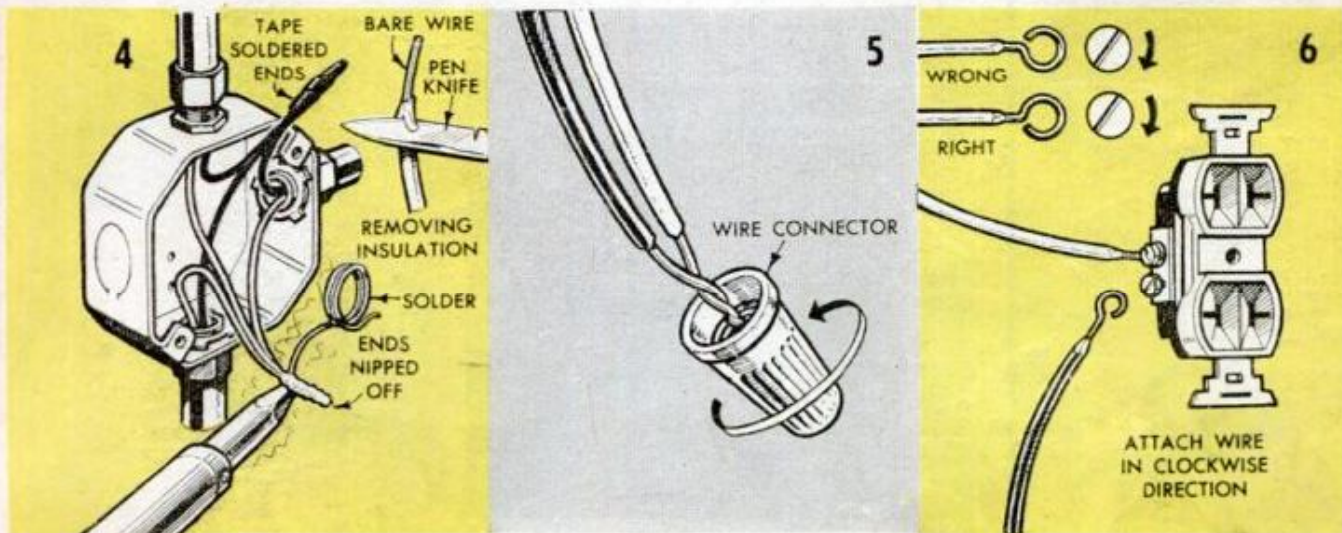
BRIGHTLY LIGHTED RECREATION ROOM soon becomes the center of family activities for hobbies and relaxation

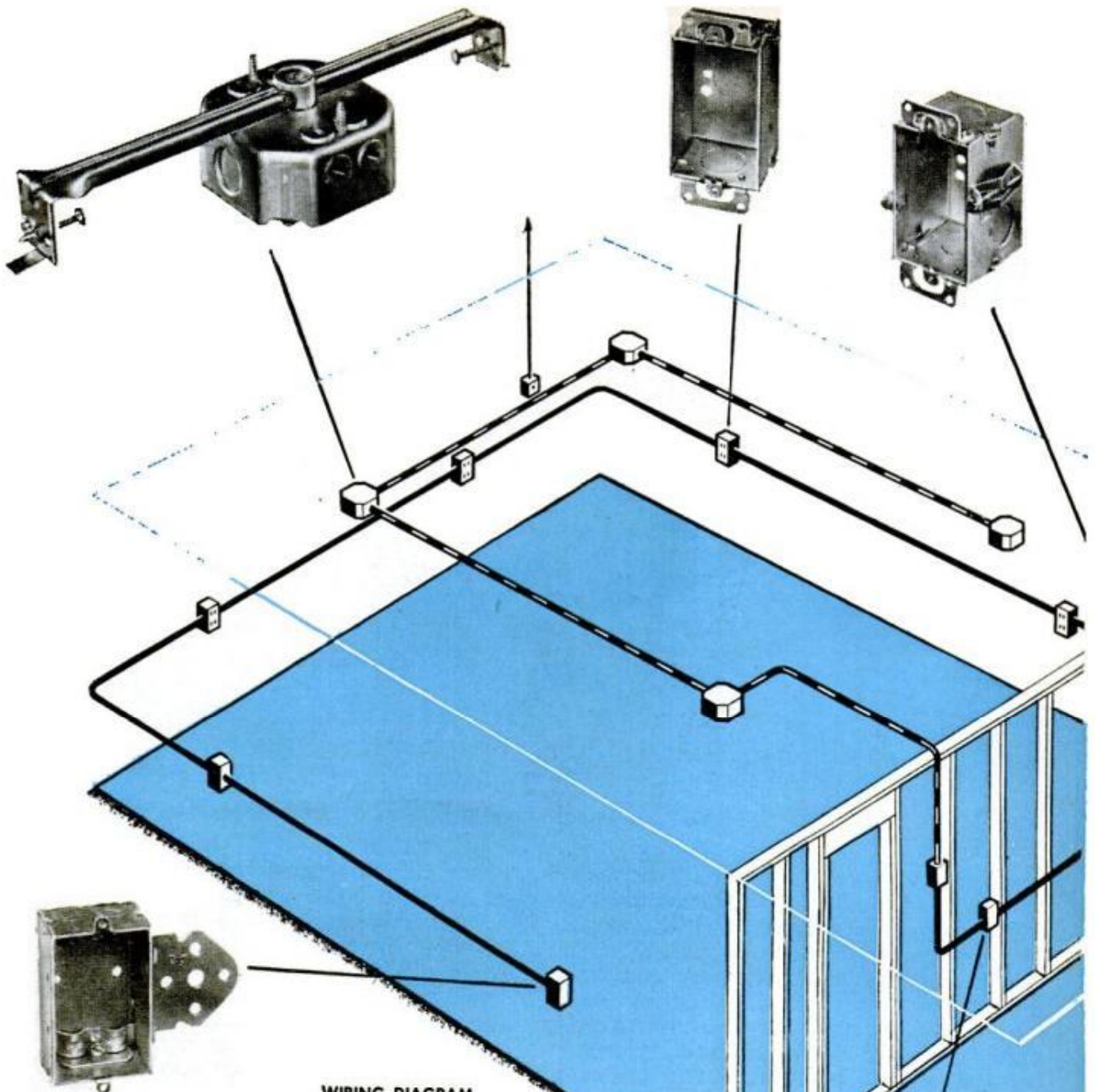
the joists. These will provide the necessary general illumination. Then use portable lights to supply concentrated illumination for reading and close-up work. Plan for a minimum of two 20-ampere circuits to supply the family recreation area.

The two circuits may be run directly from the main entrance panel or from a branch circuit box. With the increased use of electrical power the idea of using one or more branch panels makes good

sense. One line, consisting of a 2-wire No. 8 or a 3-wire No. 6 cable, supplies plenty of power from the service entrance to the branch panel. Then several circuits run from the branch panel. The National Electrical code recommends No. 12 wire be used for all general-purpose circuits. You will notice that all the ceiling light fixtures in the wiring layout are on one circuit. The other circuit supplies only the outlets, Fig. 7. A minimum of one outlet is required

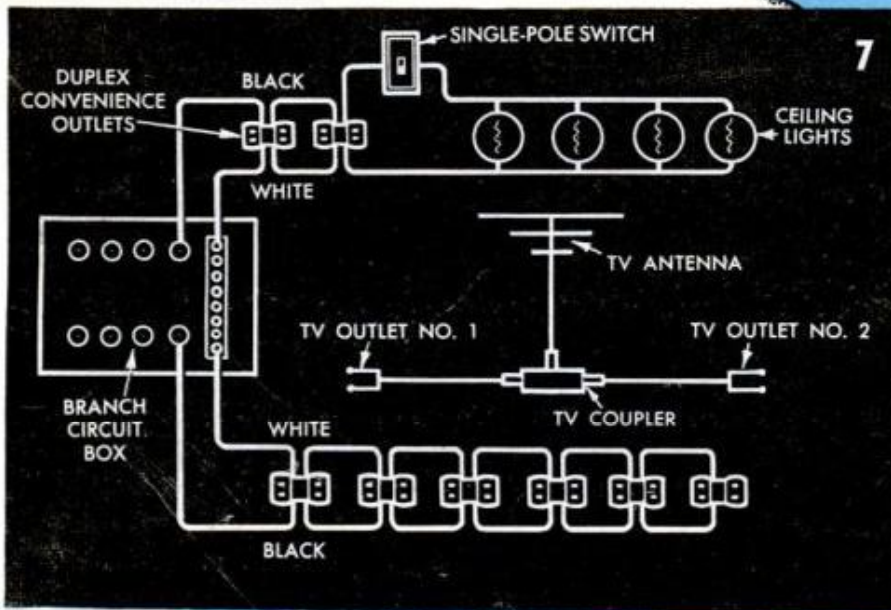
WIRE CONNECTIONS always should be securely joined either by soldering or by approved wire connectors





WIRING DIAGRAM

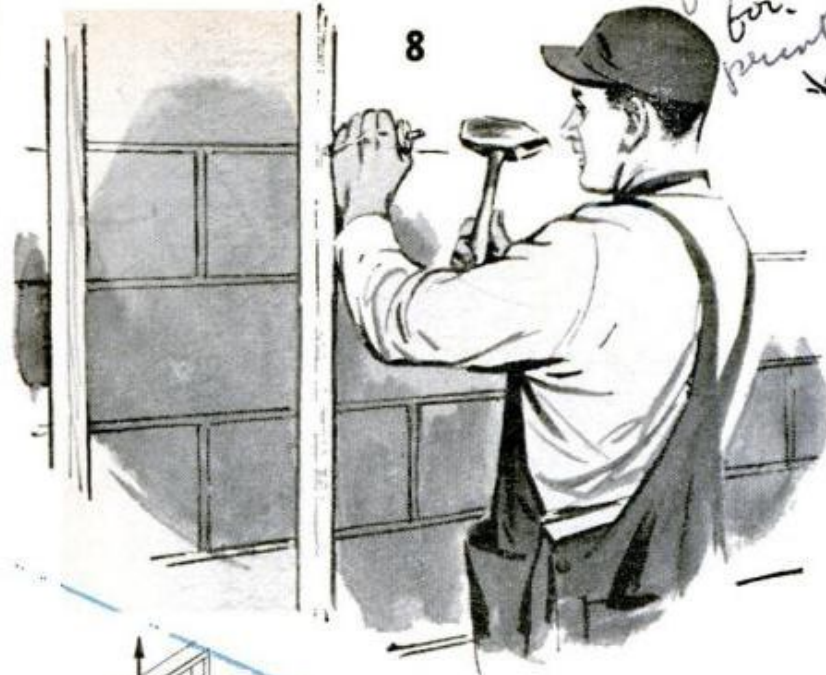
Courtesy All Steel Equipment, Inc.



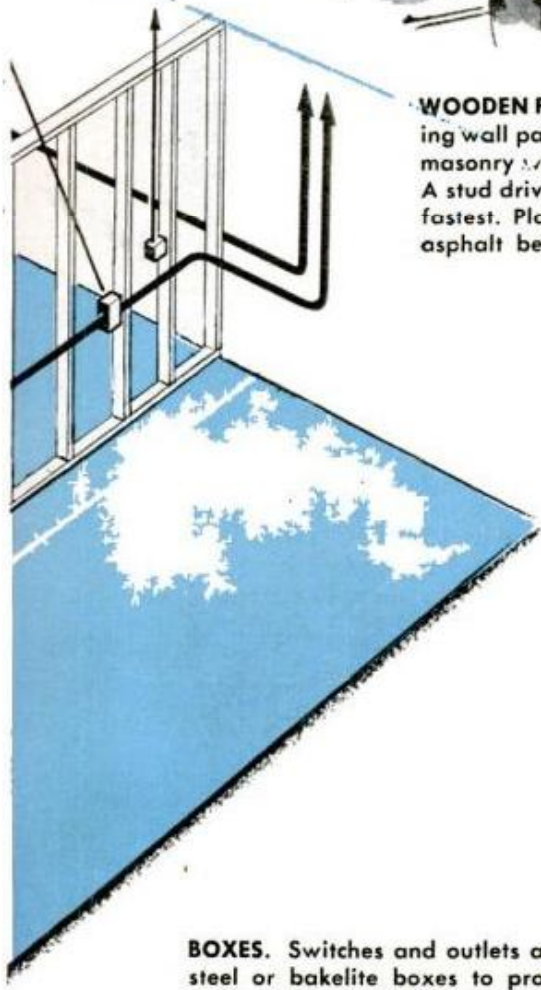
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check folder for permit



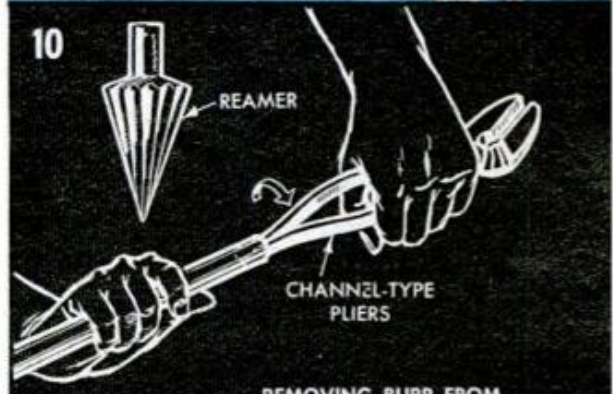
WOODEN FURRING strips for attaching wall paneling can be fastened to masonry walls in a number of ways. A stud driver (non-explosive type) is fastest. Plan to coat wall with hot asphalt before paneling is applied



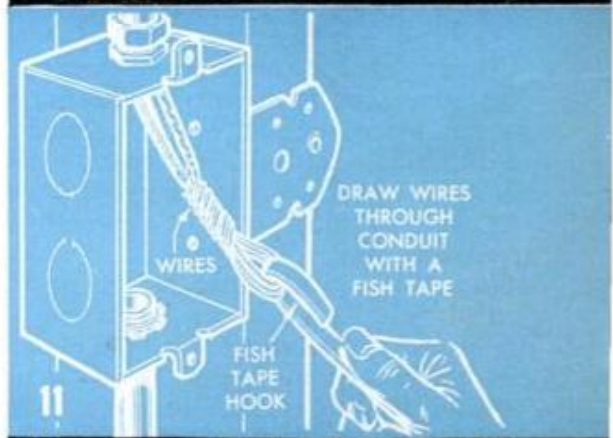
BOXES. Switches and outlets are mounted inside the steel or bakelite boxes to protect the wire connections and reduce fire hazards. Dozens of different sizes, shapes, brackets, covers and mountings are available for the boxes. Deep boxes are used where space permits, giving more room for wires and for making connections. The various types of mountings make it easy to attach the boxes to plasterboard, studs or ceiling joists. Five typical boxes are shown on the opposite page. These boxes have knockouts of various sizes that accept conduit, armored cable or non-metallic sheathed cable. Also, many of the boxes include clamps to hold the sheathed cables. When shopping for boxes, be sure to specify where and how they will be used, including the depth of the mounting space and type of wire being installed



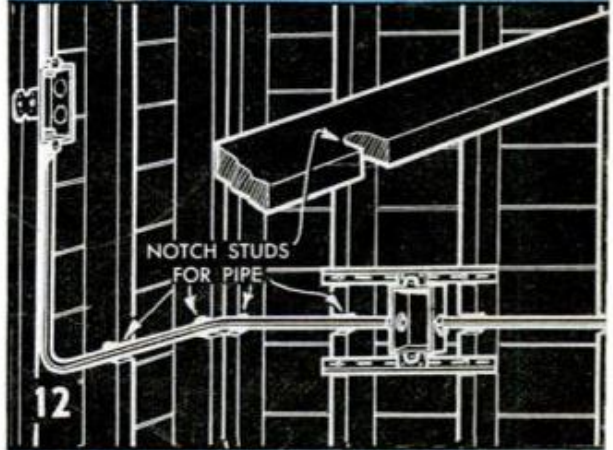
CUT CONDUIT WITH PIPE CUTTER OR HACKSAW



REMOVING BURR FROM CUT PIPE ENDS



DRAW WIRES THROUGH CONDUIT WITH A FISH TAPE

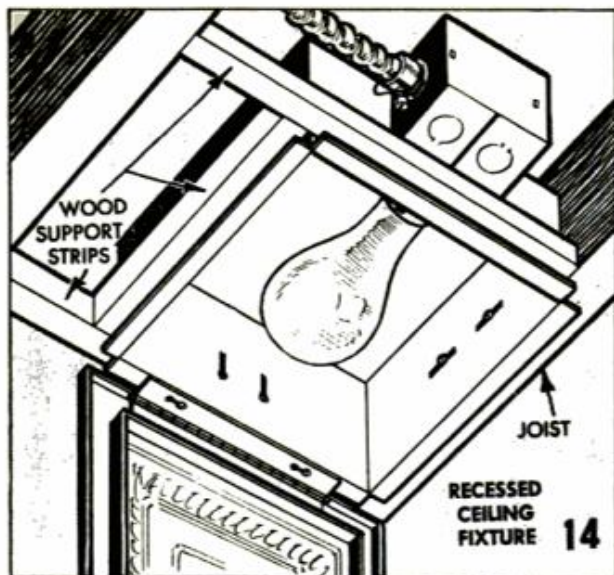


NOTCH STUDS FOR PIPE



STRAP CABLE TO JOIST

JOIST DRILLED FOR CABLE



FLUSH FIXTURES allow more headroom in low basement

every 12 ft. along the walls—attach no more than 6 to 8 outlets or lighting fixtures to each 20-ampere circuit.

Circuit Hookups

Wiring circuits are easy to connect when the color code is observed. The black conductor is the hot wire and connects only to other black wires or brass terminals. The white conductor is the ground wire and connects to other white wires or light-colored terminals. This rule of white wires connecting with white wires and black with black, Figs. 1 and 2, holds true except for a few switching circuits. Then it may be convenient to use the white wire as a hot wire. When this connection is used, you should identify by wrapping a band of tape around the white wire near the splice to show the wire is hot.

A 3-way switching circuit requires a 3-wire cable between the two switches. See

A, B, C in Fig. 3. The white wire always runs to the light fixture first, and the black wire runs through both switches before connecting to the fixture. The red wire completes the switching circuit, and this wire is hot. Generally approved methods of making connections in boxes are shown in Figs. 4, 5 and 6.

Types of Wiring

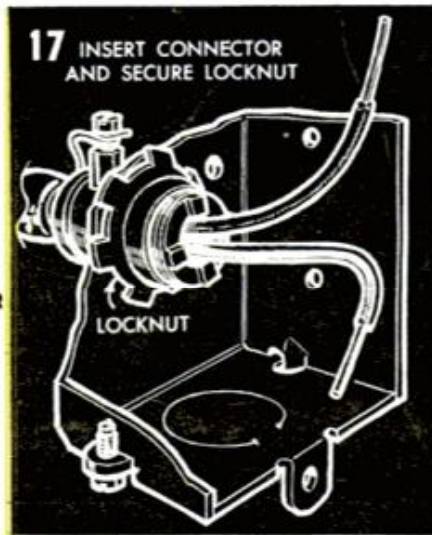
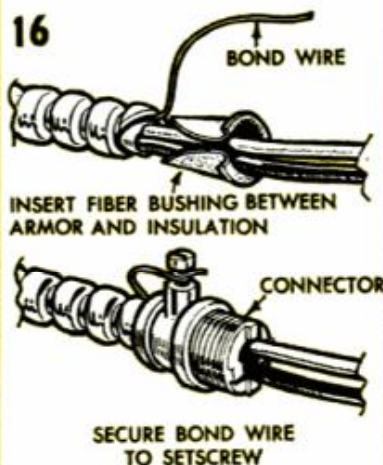
For home-wiring installations three types are used: conduit, non-metallic sheathed cable and armored (BX) cable. Many local electrical codes now require using metal conduit for all new installations below grade level. But flexible armored cable or non-metallic sheathed cable are frequently used in areas that do not require conduit. There's also a relatively new plastic cable that is flexible and has some of the advantages of metal conduit. This cable can be buried in the ground or in plaster.

Thin-wall and rigid metal conduit is the most expensive type of wiring, but it provides the best protection for the wires and grounds the entire system. Metal conduit is installed before the framing and furring is covered. After the walls are paneled, the insulated wires are pulled through the conduit. See Figs. 9 through 12 for generally accepted methods of wiring in conduit.

Conduit is available in 10-ft. lengths. Couplings join the sections together, and conduit connectors secure the pipe to the steel boxes (only metal boxes are used with conduit). Joists, studs, and furring strips are notched, Fig. 12, to receive the conduit. Steel straps support the pipe every 10 ft. for concealed work and every 6 ft. for open work. If a pipe cutter, Fig. 9, is not available, a fine-tooth hacksaw can be used. Ream the cut ends on the inside to remove the rough edges, Fig. 10.

(Continued to page 250)

ARMORED CABLE PROVIDES good mechanical protection, but it should only be used indoors in dry locations





Prefinish Wall Paneling This Easy Way

Paneling a wall or an entire room can be simplified considerably if you prefinish the panels before installing them. To speed up the prefinishing job, set up a small production line so that each unit can be handled efficiently. Lightly sand rough spots with 6/0 paper and dust off the surface with a dry brush. Place individual panels across two sawhorses or on a large table. Apply clear wood finish quickly and evenly with a mohair roller. By using a roller to apply such finishes on flat surfaces you are assured full, even coverage. Sight across the panel to be sure there are no dull spots. Most clear finishes are applied without thinning, but follow the instructions.

After a panel is coated, set it aside to dry. Before applying a second or final coat to the front of the panel, rub the surface lightly with 4/0 steel wool or 7/0 sandpaper. If semi-gloss finish is desired, go over the last coat lightly with 4/0 steel wool. The number of coats used will depend on the porosity of the wood and the finish desired. To prevent moisture getting under the finish, back-prime each panel.

Prefinishing has the advantage that it can be done in the workshop at your convenience and without messing up living areas. If panels are finished immediately after being delivered, the wood has less tendency to darken and warp.

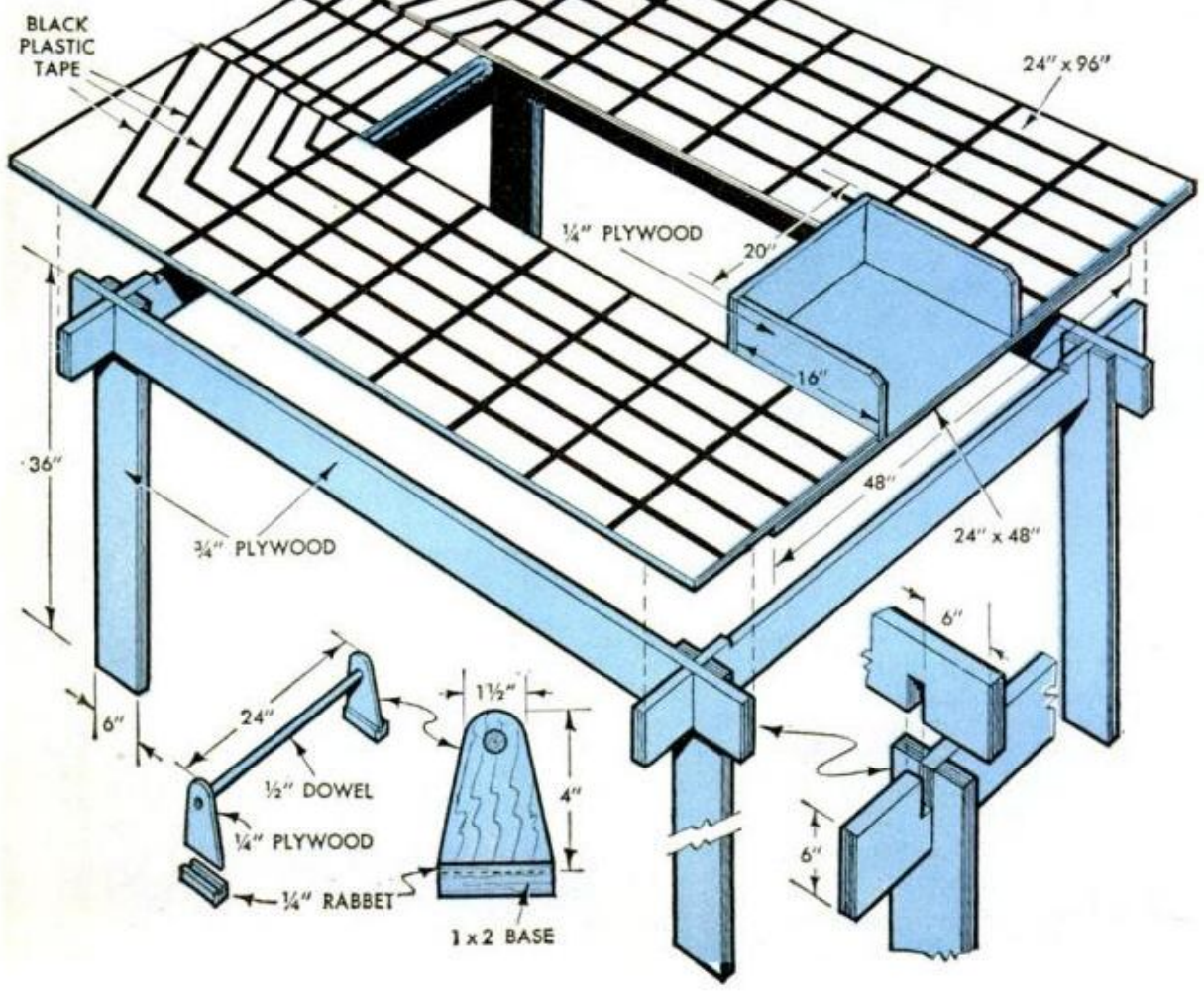
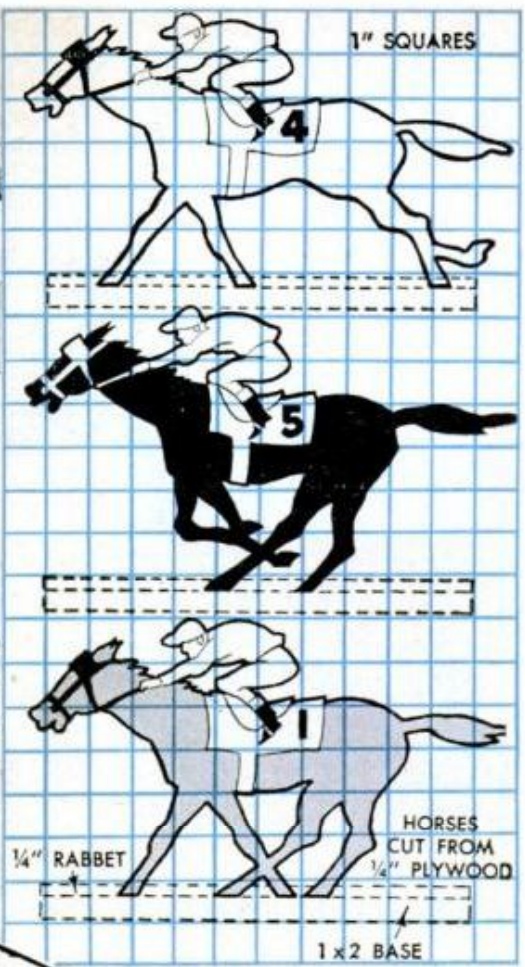
Plastic Spray Protects Book Covers

Clear plastic spray, available in spray cans, makes a good protective coating for book and magazine covers. Hold the spray can at a distance of 8 to 10 in. from the surface and use a back-and-forth motion. The plastic dries quickly to a smooth, glossy coat, which remains clear and flexible. The spray helps restore fading colors on book jackets. Books treated in this way can be cleaned with a damp cloth.—Ken Murray

Foam rubber for which there are so many uses is awkward to cut, but by compressing the slab with a board it can be sliced easily with a sharp knife.



SHOP NOTES AND CRAFTS





Douglas Fir Plywood Association

THEY'RE OFF AND RUNNING

Horseracing in your backyard? It's legal in this case since it is just an exciting group participation game that can be played indoors and out. You'll find it a sure-fire party mixer, a fund raiser for a charity bazaar or just plain fun for the entire family

A ROLL of the dice and they're off—down the straightaway, around the turn and into the stretch. With play money backing the horses, nobody goes broke and all the long shots pay off handsomely in pure fun. No track ever started off at better odds since all you need to set up your own "mutuel" are a 4 x 8-ft. panel of $\frac{3}{8}$ -in. fir plywood (exterior grade), two smaller pieces measuring 16 x 48 in., a $\frac{3}{4}$ -in.-thick panel for the supporting stand, some $\frac{1}{4}$ -in. plywood for the dice box and horses, a $\frac{1}{2}$ -in. dowel, paint and plastic tape—all for less than \$10.00.

Begin by cutting the $\frac{3}{8}$ -in. panel in half lengthwise to provide the long sides of the track. The smaller 16 x 48-in. pieces provide the ends, forming an 8-ft. U-shape track with an open space in the center for the "bookie" who manipulates the horses and holds the bets. A three-sided box at the starting gate provides a place to roll the dice. The nags and jockeys are cut from $\frac{1}{4}$ -in. plywood

and glued in grooved bases. Plastic tape divides the track into lanes after the plywood is painted. The rules are simple: One person rolls the dice. The horses are moved the number of spaces that show on the dice. The sample racing card specifies the number of dice used in each racing event, four being used in some, two in others. ★ ★ ★

RACE CARD	
FIRST RACE	<p>FOUR DICE—Two Hurdles—Double to jump and double to finish.</p> <p>1. Flash of Gold 2. Chiromino Golden 3. Golden Sensation 4. Gay's Golden Rose 5. Gay Blaze 6. Blue Dusk</p>
SUNSET HANDICAP	
SECOND RACE	<p>TWO DICE—Two Laps—One die shows number of horse; other shows number of spaces; single to finish.</p> <p>1. Diamond Pride 2. Cascade Izard 3. Sonora Lady 4. Barbara Genius 5. Brown Bennett 6. Caesar Lincoln</p>
BOURBON HIGH HANDICAP	
THIRD RACE	<p>TWO DICE—Straightaway—Single to finish.</p> <p>1. Troubles Josephine 2. Chief Geranimo 3. Maxey Nicodemus 4. Rex Franklin 5. Rhodes Star 6. Peep O'Dawn</p>
PAYNE HANDICAP	
FOURTH RACE	<p>FOUR DICE—One Hurdle—Double to jump and double to finish.</p> <p>1. Susan's Folley 2. King's Ransom 3. My Souvenir 4. Star Rocket 5. Vanity Fair 6. Midnight Moon</p>
MARTINI DERBY	
FIFTH RACE	<p>FOUR DICE—Mule Race—Single to start and double to finish. Last mule in is the winner.</p> <p>1. Congo 2. Hilo 3. Toni 4. Pico 5. Cody 6. Kini</p>
MULETEER'S STAKE	
SIXTH RACE	<p>FOUR DICE—No Hurdles—Double to start and double to finish.</p> <p>1. War Star 2. Lady H. 3. Pan Cheval 4. Lucky Lady 5. Pentago 6. Tiffany</p>
WESTWARD HO MEMORIAL	

PLAY IT SAFE WITH THE



FRANTIC EFFORTS to rescue a youngster locked in a bathroom are avoided by fitting door with panicproof lock which permits opening from outside in emergency

FROM the half million burglaries that occur each year only a small fraction of the intruders are able to get past truly modern locks. Today, maximum security is within the reach of everyone through the use of the cylindrical lock.

Lock makers have made it easy for anyone to replace an old-fashioned (unsafe) mortise lock with a modern pick-proof cylindrical lock. Replacement kits are now available which contain king size escutcheons to hide the scars and holes of the old

lock which means there are no puttied holes to mar the looks of the new installation. When buying outside door locks, be sure they are the key-in-the-knob type with a guard-bolt feature. This feature makes it impossible for the lock-jimmying intruder to slip his way in by pressing back the movable part of the latch since guard-bolt prevents the lock from being opened except with a key. This safeguard actually costs only about a dollar more and

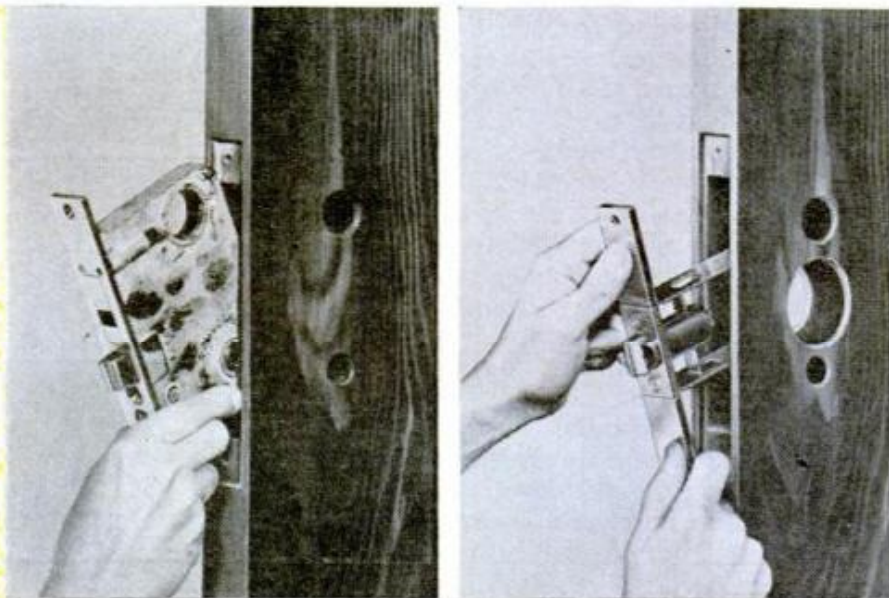
DON'T make it easy for the would be prowler—think of an unusual place to hide the key which is away from the front door. Under mats, in mailboxes, over doors are common hiding places where he is almost sure to look



1. TO REPLACE old fashioned mortise lock with modern cylinder lockset, remove screws holding the knobs, side plates, striker and the lock itself

2. LOCKSET OF REPLACEMENT KIT fits same mortise in edge of door but requires boring larger hole through face of door to accommodate larger lockset

*How to
replace
old mortise
Lock*



RIGHT LOCK

is well worth it. Choose a lock with a 5 or 7-in. backset. The backset principle allows you to place the lock any distance from the edge of the door, which not only creates a more balanced and attractive design, but allows more knuckle clearance when opening the door. Lock escutcheons (ornamental plates that back-up the knobs) are available in an exciting range of metals and finishes, ranging from polished and brushed brass to satin aluminum.

A well lighted entrance doubles the protection against prowlers. When you go out for the evening, make it a practice to leave the front-door light burning. Most prowlers will pass up a lighted home for fear of being seen. You also can help protect your home against entry by working for better street lighting in the neighborhood. Make sure each member of your family has a key. If you hide an extra key, try to be just a bit original in selecting a hiding place. Don't choose the usual places such as under the door mat, in the potted plant or mail box; instead, choose a place that's completely away from the front door.

The privacy locks you select for bathrooms or bedrooms should have a panic-proof feature with an emergency release. Younger or older members of the family sometimes lock themselves in, and panic or sickness may prevent them from remembering how to get out. Instead of standing helpless on the other side of the door, you have only to insert a nail file or some such thin instrument into the tiny slot on the outside and release the lock. ★ ★ ★

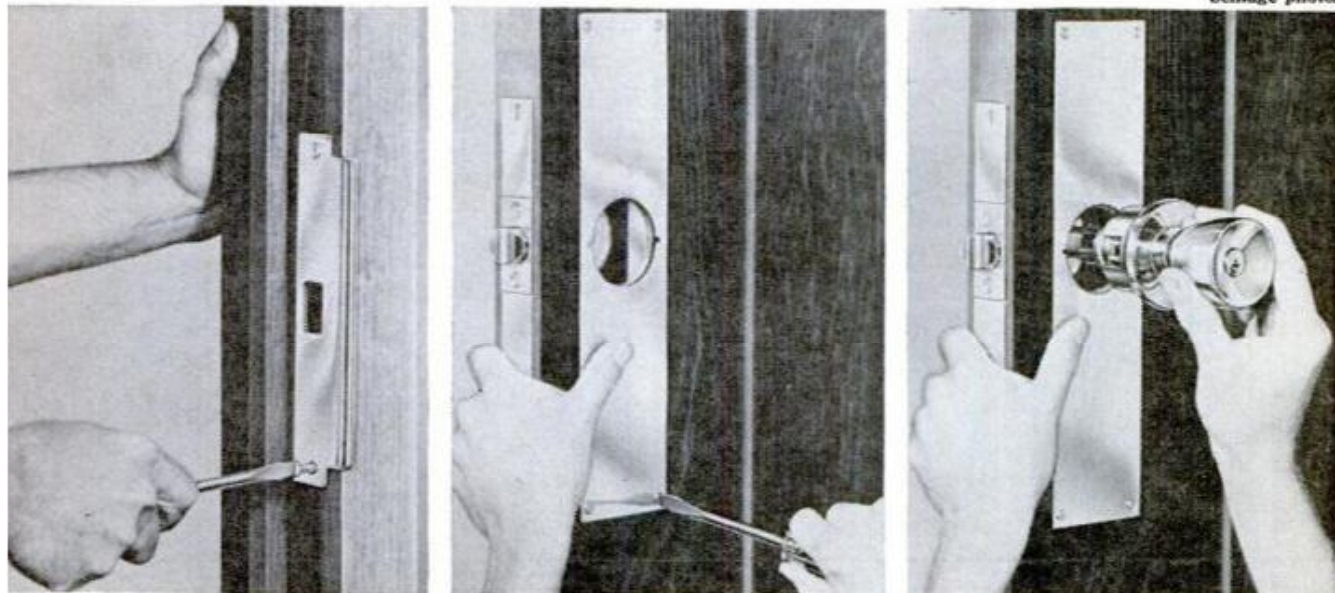
3. AFTER NEW REINFORCING UNIT with latch and faceplate attached is installed, screw holes of old side plates are concealed by new kingsize escutcheons

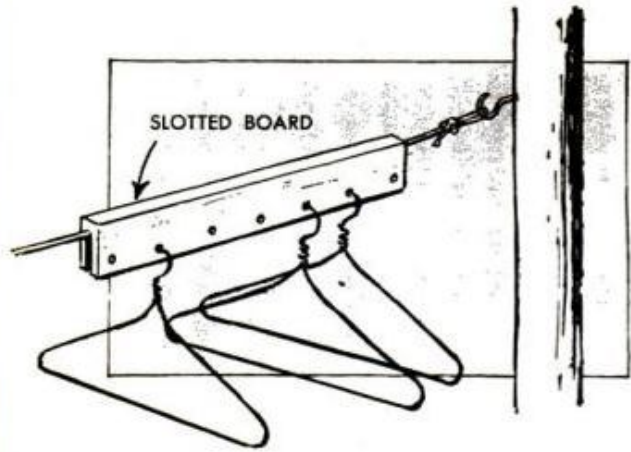
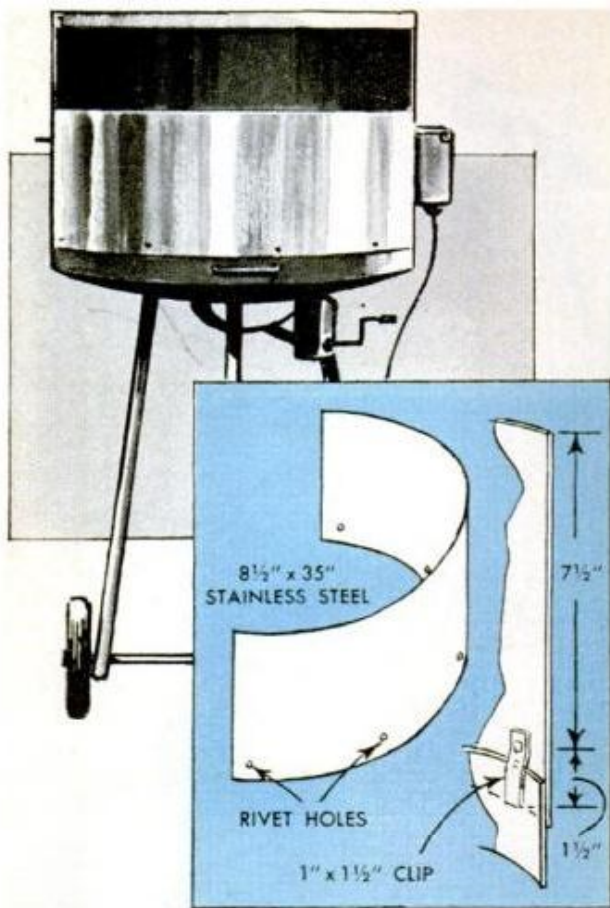


LEAVING AN ENTRANCE LIGHT burning while you are out for the evening is a smart thing to do—the average prowler shuns the limelight for fear of being seen. You can outsmart the housebreaker further by leaving bathroom light on since this is one room where light is seldom left burning even when family is at home

4. AS LAST STEPS, cylindrical lock is inserted through holes in escutcheons and then new strike plate is screwed to the door jamb to replace old one

Schlage photos





WEATHER PERMITTING, you may want to air garments outside on a line but keeping them on the line on a windy day is a problem. They'll stay put if you groove a board to fit over the line and drill it crosswise with a row of holes. When the hangers are hooked through the holes they just can't blow off

REMOVABLE HEAT SHIELD made to clip around the open front of a barbecue grill will speed up outdoor cooking and keep the wind from blowing ashes onto your steaks. Heat reflecting off a stainless-steel shield will save as much as an hour's time when roasting a large turkey or barbecuing a cut of beef

SOLVING HOME PROBLEMS

HANGING THE CORDS from your waffle iron, fry pan and other electrical appliances from a nail is poor practice—such cords are not made to take sharp bends. You'll prolong their life if you store them on a hanger of greater diameter than a nail. A thread spool sawed off at an angle makes a fine holder

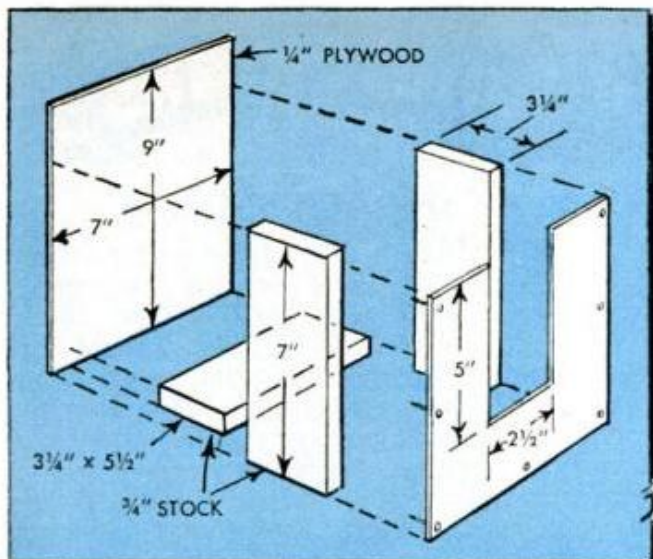


EVER REACH for a previously uncapped tube of glue, cement or wood putty and find that prolonged storage has caused it to harden? Next time play it safe and store the partially used tube inside a screw-top container. Double capping will keep air from reaching the contents and causing the materials to harden

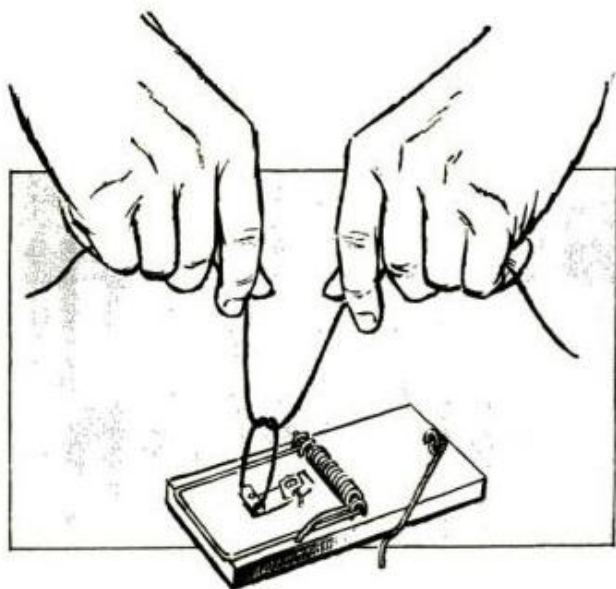


A COMPLETE JOB of painting should include the areas behind radiators and other permanently installed fixtures. Although these areas may be difficult or impossible to reach with a brush or roller, a synthetic sponge may be nailed to the end of a yardstick and dipped in the paint to get the necessary reach





WHERE'S A SAFE PLACE to put a hot pressing iron when you are through with it? Answer: In this wall holster. Made of plywood scraps and lined with sheet asbestos, the holster provides a safe place for the iron to cool, as well as a handy place to keep it. Holster can be mounted on wall or inside cupboard door

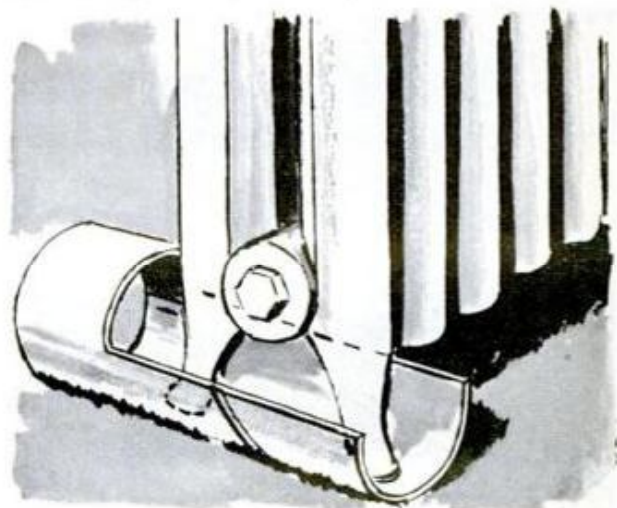


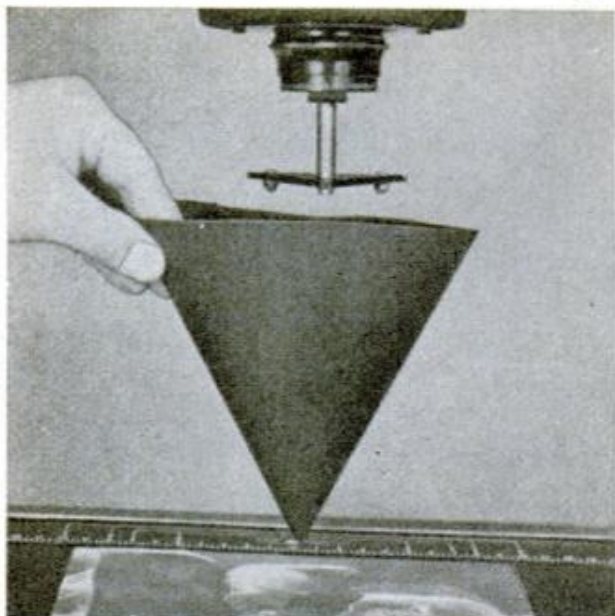
WHEN IT COMES TO ANIMAL INGENUITY the house mouse rates a spot somewhere near the top of the list. Often he's smart enough to leave a bait-empty, un-sprung trap as evidence of his I.Q. But don't let him get the best of you. Bait the trap with string soaked in bacon drippings, knotting string tightly to holder. To date no mouse is known to have undone a knot. If he does, adopt him—you may learn something

COME CARPET-LAYING TIME it may be necessary to move that heavy radiator in and out of the room. Don't take the chance of marring the floor or the new carpet by dragging it. Cut two sections from the cardboard tubing around which the carpet is wrapped, cut slots in them as shown and slip under the radiator legs. The tube sections, serving as nonmarring runners, will let you skid it like a sled



PERIODIC OILING of squeaking door hinges is avoided when a flat is filed on the hinge pins. The flat forms a lubricant reservoir the full length of the pin which, when filled with petroleum jelly, will continue to self-oil the hinge parts without any further attention



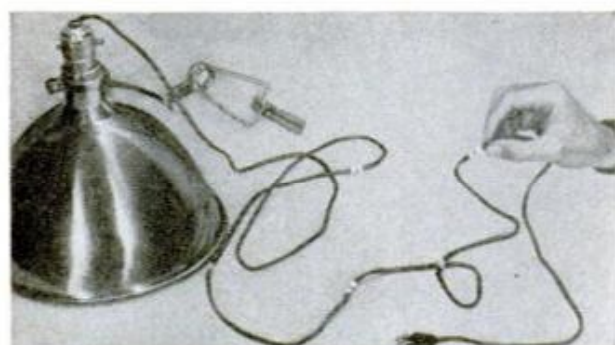


PHOTOKINKS

Paper Cone Aids Printing

A paper cone is perfect for spot printing and burning-in areas during enlarging. Simply shape a piece of 6 x 6-in. black paper into a cone. With this, control the enlarging light by moving the cone around to blend the areas together. By varying the size and shape of the cone opening you can time your spot printing to produce the best results. Such control is particularly useful when combined with multi-contrast paper and a series of contrast filters.

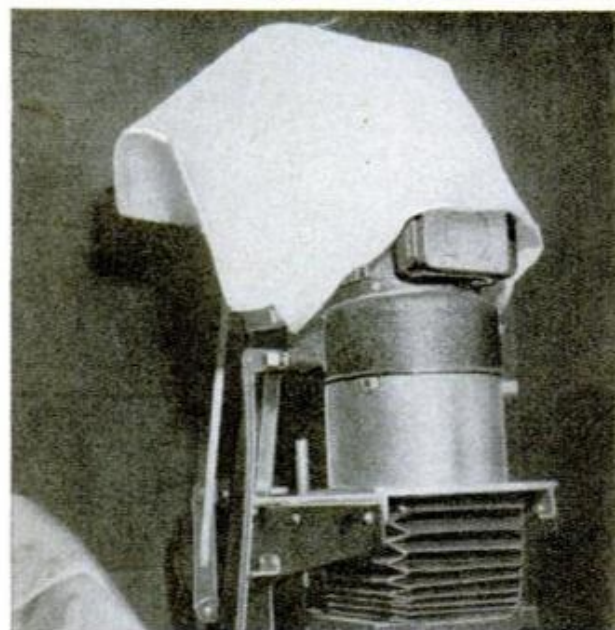
—Bil Toman



Cord Indicates Distance

To simplify positioning photoflood and flash reflectors at the proper distances from the subject, mark the cords at one-foot intervals. These points are wrapped with white strips of tape, and the footages marked on the tape. The cord is used as a tape measure by extending it to the subject and reading the distance indicated.

—Henry Hanscom



Towel Protects Enlarger Cover

A bath towel, folded and laid over the lamp housing of the enlarger, helps to protect the plastic dust cover. The towel serves as a cushion between the sharp edges and corners of the frame and the plastic. The plastic cover should be made long enough so that it rests on the bench top, fully protecting the enlarger from dust.

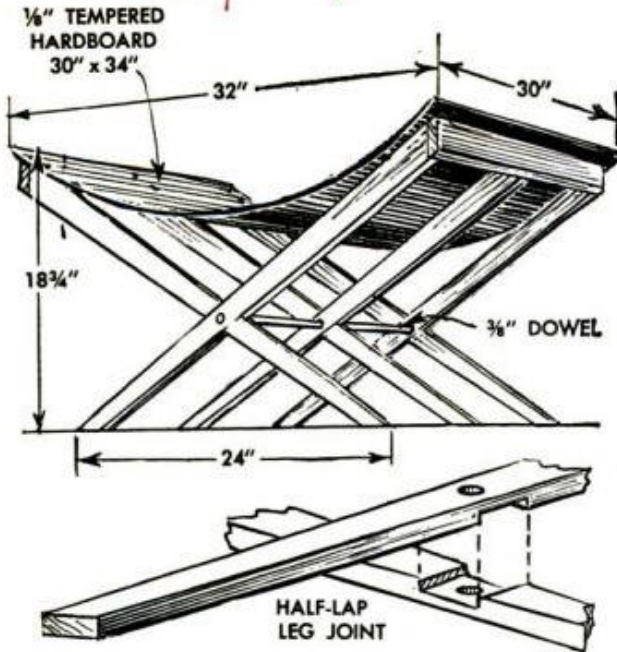
—A. M. Wettach



Ever have several rolls of film to develop and lacked the large tanks to do the job quickly? By cutting off the tops of half-gallon milk cartons you can have all the serviceable multiple-roll developing tanks you need. The plastic handle of a print paddle can be used as an agitator by passing it through the centers of the developing reels.

Pointing Board for Leads

Small emery boards of type used to manicure fingernails are handy for pointing retouching pencils. The boards are easy to hold and they take little space among pencils and other retouching materials. To point the lead hold the pencil at a slight angle on the emery board and rotate the holder between the fingers, moving the lead back and forth over the board.



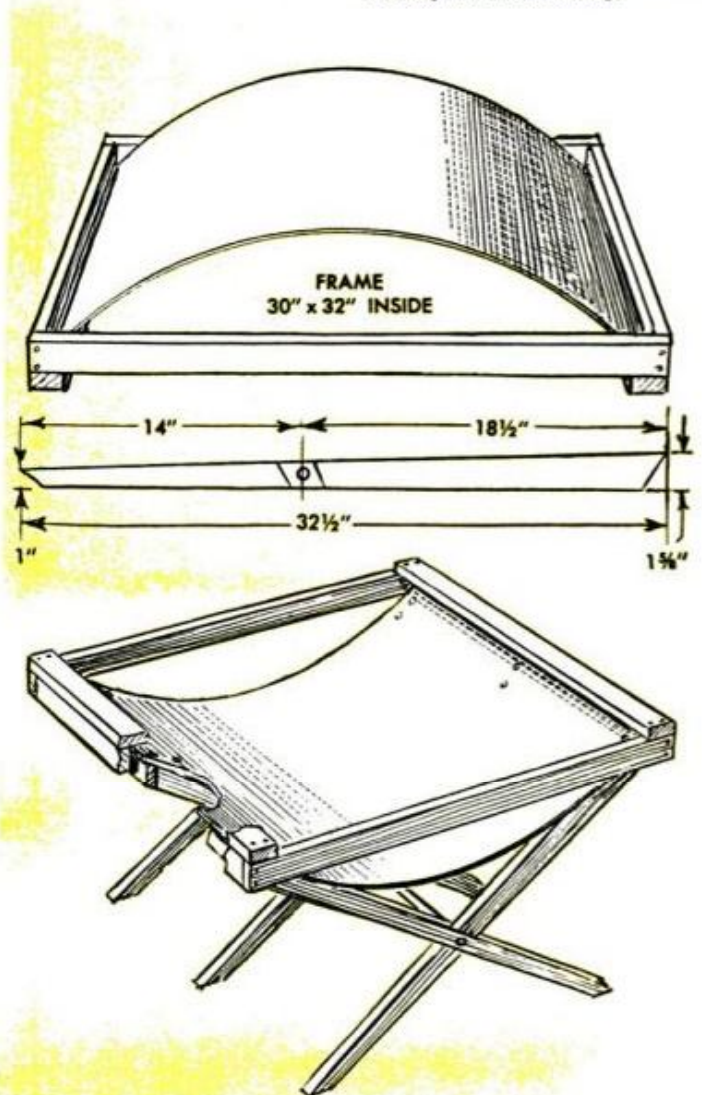
LUGGAGE RACK FOR THE GUEST ROOM

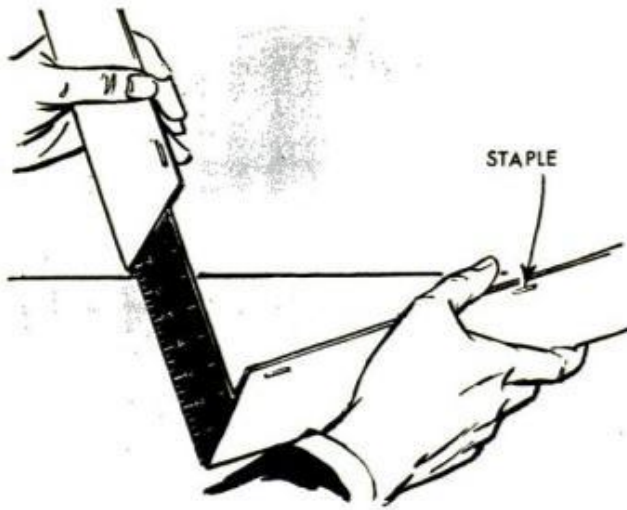
YOUR WEEK-END GUESTS will appreciate the convenience of having a luggage rack at their disposal, and this curved-top one does a perfect job of cradling an open suitcase. When it is not being used to support luggage it will pinch-hit nicely as a smart king-size magazine rack. Its high-style appearance is created by the scooped top, which is simply a piece of 1/8-in. tempered hardboard fastened to three pairs of legs with screws set in cup-type washers. A black-lacquer top contrasts sharply with white legs.

The half-lapped joints add strength to the rack. These, plus the 3/8-in. dowel stretcher and the hardboard top, provide enough support to insure against sway. The only unusual thing about the construction is the method of bending the piece of hardboard prior to attaching it to the legs. This is done by first building a rectangular framework of 1x2s 30 in. wide by 32 in. long and nailing 1x2 cleats across the ends to form ledges as shown in the illustration. The tempered hardboard is sprung into this temporary form, which holds the piece bowed. Now the frame, along with the curved piece of hardboard, is placed over the leg assembly and centered so it overhangs evenly all around. Two holes are drilled through the hardboard and into each leg. Then, before driving the screws, glue is applied to the surfaces of the legs which contact the hardboard top. Once the top is screwed in place the framework can be lifted off. The rack top is large enough to accommodate a man's two-suitcase. ★ ★ ★



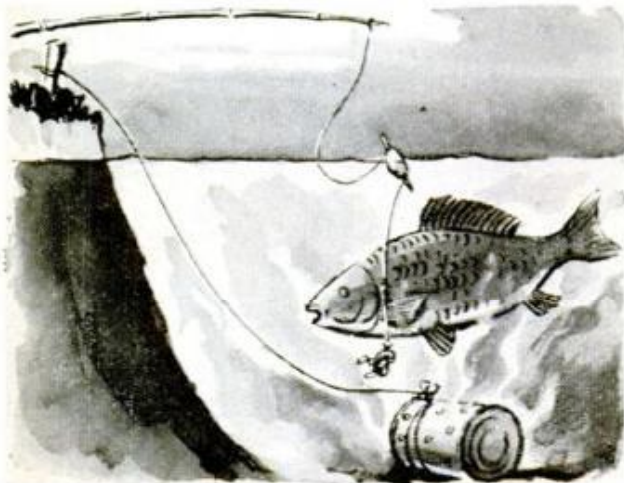
Courtesy The Masonite Corp.





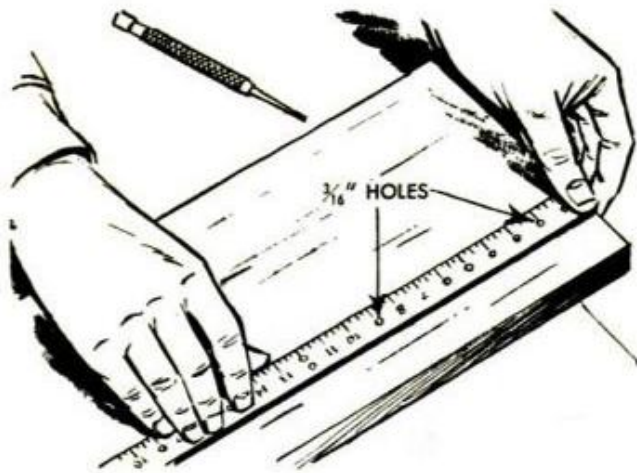
Sheath Protects Steel Square

An unprotected steel square carried in a tote box with other tools usually gets scored and nicked, making it difficult to read the graduations. But it takes only a few minutes to make a two-piece sheath from cardboard that will keep the square in new condition for years, no matter how much it's banged about. Cut strips of cardboard, fold and staple along the edges to make pockets that will fit snugly over both the body and tongue of the square. Miter the ends to a neat fit. When storing the square in the sheath keep the blade oiled to prevent rusting.—H. Hanscom



Can of Corn Attracts Fish

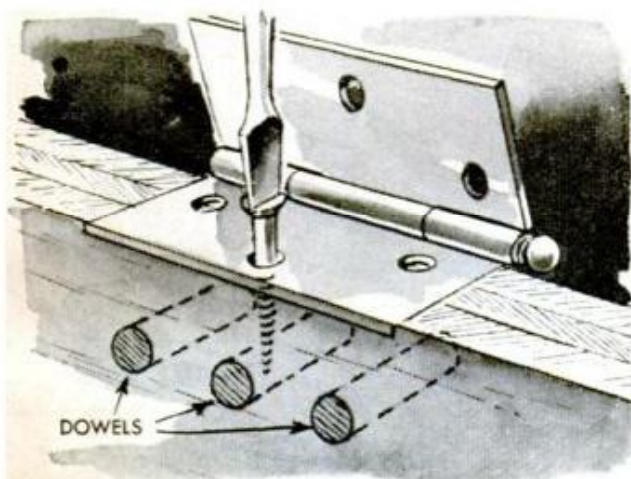
Fish, such as carp and suckers, put up sufficient fight to provide a thrill for the average fisherman. A Wisconsin sportsman claims that such fish can be lured by puncturing a can of sweetcorn with holes about the size of a 20d nail, tying the can to a stout line and lowering it into the water. Since fish are unable to reach the corn, they will take the baited hook. The can of corn should last for several hours of fishing. Raise the can occasionally and shake to loosen kernels and release more fluid when the can is returned to the water.



Braille Yardstick

This is how I altered a yardstick for use by a blind friend who wanted to try woodworking: Starting with the ordinary yardstick I drilled $\frac{3}{16}$ -in. holes on the inch marks the full length of the yardstick. Then I drilled pairs of holes at 3-in. intervals after the 6-in. mark. Of course, these pairs of holes can be located in any other combination along the length. The holes permit measurements to be made by feel alone. They also allow you to take measurements in hard-to-see places.

—James E. Stout



Attaching Hinge to Plywood Edge

To provide enough holding power for hinge screws in plywood edges or in edges weakened by repeated reuse, drill $\frac{1}{4}$ -in. holes crosswise through the panel in the path of the screws. Then apply glue and drive $\frac{3}{8}$ -in. dowels into the holes. The dowels will provide the extra holding strength needed to keep the screws from pulling out.—Joseph Federico

Old sheet music adds interest to recreation-room decor when it is pasted to panel or door and coated with white shellac.

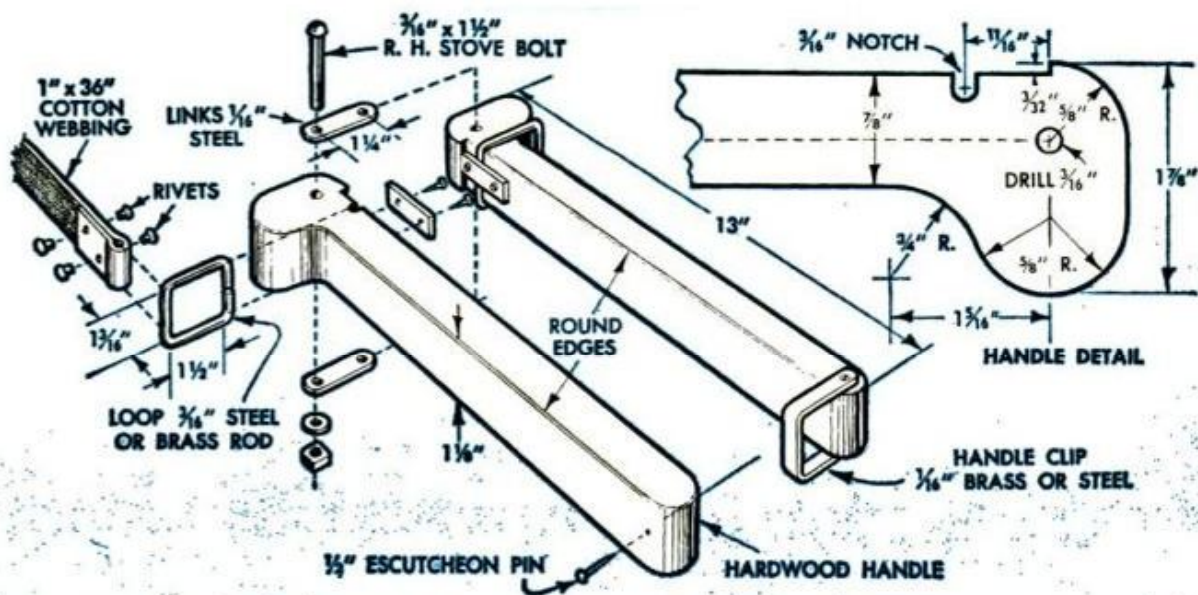
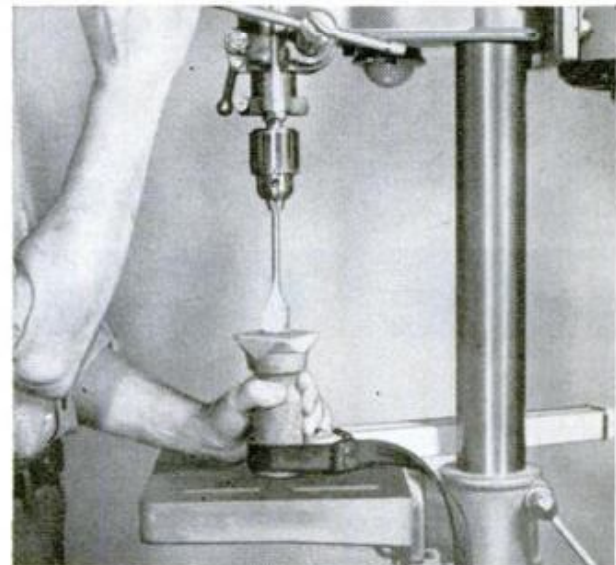
STRAP WRENCH

URNS, HOLDS, CLAMPS ANYTHING

YOU WON'T soon run out of uses for this strap clamp in the home or the workshop. It will hold a glass jar while you turn off the stubborn vacuum cap, grip the chrome-plated sink drain without ever a scratch or dent, clamp work for gluing or drilling as in the photo and hold small parts in place for assembling with screws, nails or other fasteners. Specifications below call for a strap, or band, 36 in. long, but you can assemble it with a longer strap and use it as a column clamp or chair clamp. The latter type of clamp is widely used in repair and refinishing shops for clamping chair frames after cleaning and regluing.

It will be noted from the details below that the handles can be locked together after tightening with a U-shaped metal clip, or lock, which is pivoted near the end of one handle. This permits the wrench to serve either as a holder or clamp simply by adjusting the band to the correct length, drawing tight and locking the handles to hold parts together under tension.

Construction is simple and you likely have most of the necessary parts at hand. Select two pieces of straight-grained hardwood for the handles, cut to the rough shape shown and then finish with a half-round rasp and sandpaper. Make and fit the steel links and loops. When making the links from flat steel, file both to identical size and shape, then clamp together and drill for the bolts. This procedure assures uniformity of the parts. Bend an eye from light sheet metal and rivet to one end of the strap, or band. Note that the eye pivots on one of the loops.—Howard R. Clark





Trouble Shooting THE TOUGH ONES

By Ben L. Davis

RECENTLY a well-run '55 Chevy eight was brought in the shop with clicking valve lifters. According to the owner, they had been clicking badly for quite some time. As the first attempts to quiet them, such as running the engine hot with a good tune-up oil, an oil change and new filter, did little good, I recommended a new set of lifters.

This job completed, the loud valve noise showed up once more. The thought of the lifters being starved for oil crossed my mind but this was not too discouraging since it was normal for the oil to work its way through the motor before it could reach the lifters.

But after warming, the engine still didn't perform. It misfired. Somehow I was doubtful about the firing order. I looked up the mechanic's guide for that model. Checking the diagram against the car, I found the plug wires had been shifted two cap towers from their original seats. Although this was a minor point so long as the firing order followed in sequence, my decision was to set the car by the book.

To do this, the distributor had to be taken out and the drive gear set to permit returning the wires to the towers as they were originally.

Again the motor was started and this time it ran quietly and very smoothly as a good Chevy motor should. Trouble on the right bank had cleared up and I could give the credit only to altering the distributor position.

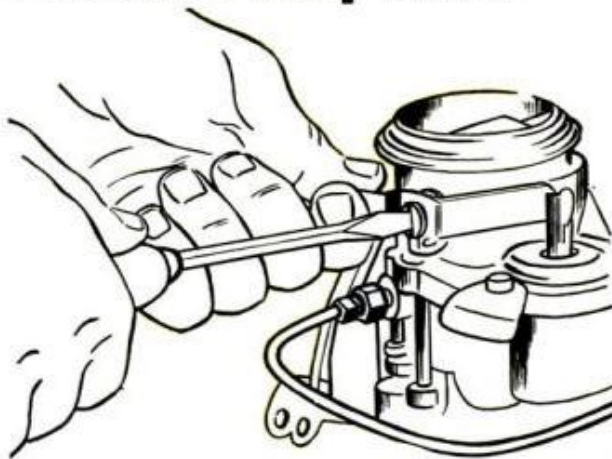
Sometime later I had the opportunity to service another Chevy '55 and took pains to recheck the cause of the earlier trouble. Sure enough, unless the distributor was replaced as it was originally, oil feed to the right bank would be cut off and the lifters on this oil line, running dry, could become clickers.

This being the concluding article in our series on "Trouble Shooting the Tough Ones," the editors are most anxious to hear from readers who have enjoyed reading about the personal experiences of a garage mechanic. If sufficient reader interest is shown, the series will be continued.

Unusual Locations Where Trouble May Occur

Loose Pump-Arm Screw

Some Plymouths in the several-years-old bracket stall or lose full control of the accelerator pedal due to a lost or loosened pump-arm screw. A loosened screw is easy to miss in a routine check and the mechanic working on a stalled car should keep this possibility always in mind. Ordinarily, a loose screw should be replaced but often the original can be made to do simply by flattening the threads on the shouldered end slightly so they will take securely in the aluminum air horn.



Hard Starting

Percolation, or bubbling, of fuel often causes hard starting in warm weather, more especially after the engine has been fully warmed up. On some cars which develop this trouble it is possible to minimize or cure it entirely by replacing the accelerator pump plunger with a newer ball-check vented type of plunger and including a later type metering rod. Although a stalled car often can be started simply by holding the accelerator pedal about half-way down while the starter is in operation, the basic cause of hard starting should be corrected.



Sticking Ignition Switch

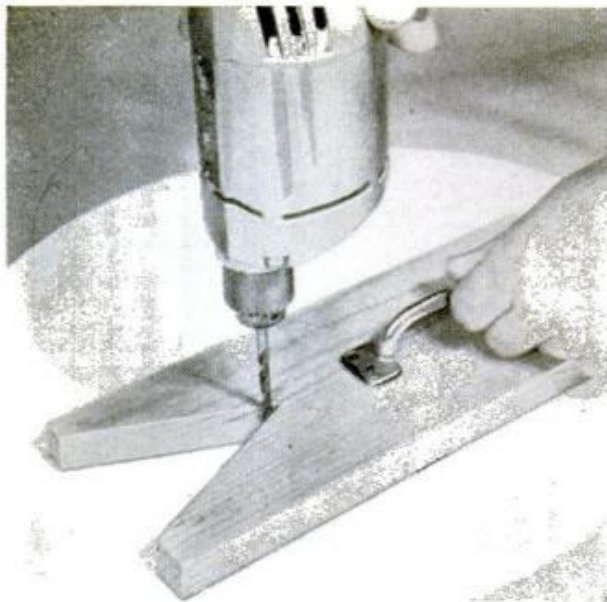
When fuel and temperature gauges fail to indicate just after starting the engine of the '60 Mercury the cause can be a sticking ignition switch. Usually this is due to a rough surface on the seat inside the switch housing, or bezel. This seat is indicated by the cross-hatched area in the sketch at the right. Remove the switch and smooth the seat with a fine abrasive cloth until any scratches or other burrs are eliminated. Clean thoroughly and before replacing the switch lay a very thin film of grease over the entire surface of the seat.



Removing Spring Retainer

Mechanics who have struggled with car-door handles can fully appreciate this simple tool. It's made from a standard hacksaw blade and it enables one to remove the spring retainer, or clip, that holds the handle on the spindle. File a notch in the blade as in the detail; the shape of the notch will suit the purpose for most car door handles. Then simply press the door panel inward sufficiently to permit the notched end of the blade to slip down behind the handle and reach the end of the retainer. Lift up and off it comes.





Pilot Assures Accurate Drilling

Where absolute drilling accuracy is required, it isn't always possible to rely on the hand and eye alone. Accurate spotting of the drill, especially on vertical surfaces, is assured with this simple drill pilot. It can be made from a piece of scrap lumber with a sash lift screwed on for convenient handling. Place the bottom of the V notch directly over the spot where the hole is to be drilled and rest the drill bit in it. A piece of felt glued to the underside will protect finishes and make the pilot less likely to slip from the desired position.

Metal Venetian blinds and curtain rods will be easier to operate, collect less dust and can be kept from rusting if they are given a good coat of wax.



Crush-Proof Shield for Plug Cap

If you're using an electric drill or other portable power tool and must unplug it frequently to move from place to place, chances are that sooner or later someone will step on the plug cap and crush it. This means tying up the power tool until the cap can be replaced. Safety measures to prevent this, however, are simple enough. Just tie a screw-base plug to the cord. When the cord is disconnected it will be an easy matter to slip the plug over the cap, providing it with a crush-proof shield.

Need a first-aid kit for that vacation trip? Dad's old lunch pail is ideal. Fill it with bandages, medicines and supplies and rest assured they'll travel unbroken.

COMING UP NEXT...

Mothballing Your Outboard. Keeping an outboard in condition over winter is more than just taking it out of the water. An outboarder's feature gives you the scoop on how to condition your motor for winter layup.

Hang-Up Wall Clocks. They serve a twofold purpose—tell the time of day un-failingly and decorate the wall in the modern manner. You have a choice of several eye-catching designs in this November feature, all of which you can make yourself.

Button Up Your Home. Already you're closing doors and windows against the first chill winds of autumn and now's the time to seal cracks with calking. This photo-caption story shows you how and where.

Cold-Weather Battery Booster. Your car battery will get numb with the cold some zero morning, unless, of course, you take the time to build the quick-charge booster described in this timely feature.

Portable Drill Lathe. With accessories, your 1/4-in. portable drill can do just about anything you put it to, but here's still another use for it—serving as the head-stock of a wood lathe. Construction details in the next issue.

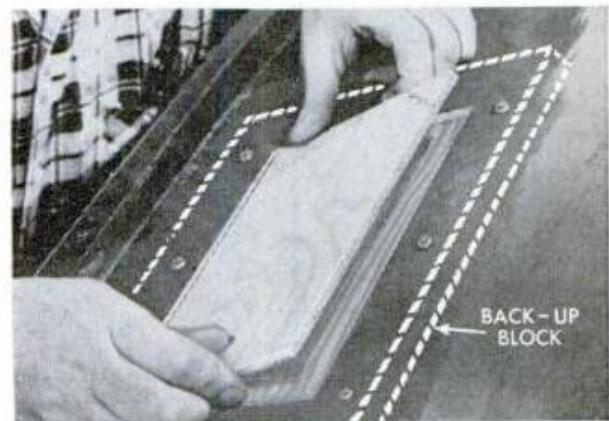
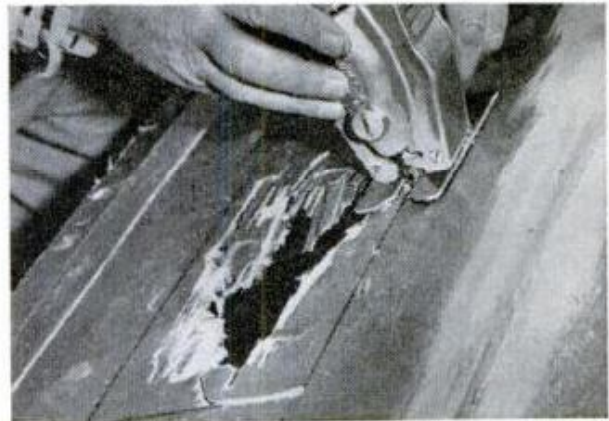
A PATCH FOR TILLIE

By Peter Whittal

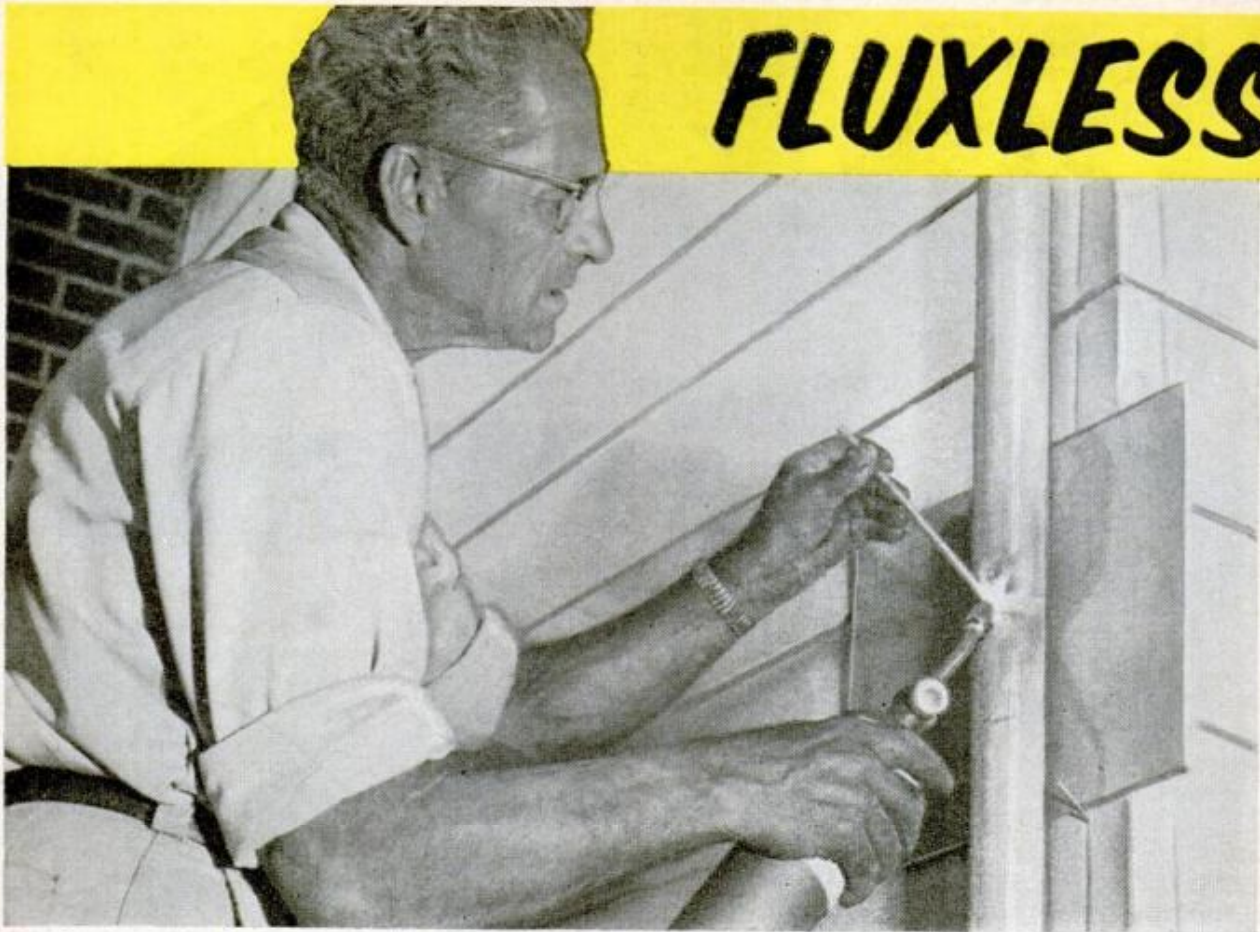


PHIL SAVAGE, my next door neighbor, was fit to be tied when one of the kids ran his favorite fishing punt, "Tillie," onto the rocks, poking a hole the size of your foot at the water line. In his own words, "the boat was a mess." Mrs. Savage, entitled to a touch of sarcasm occasionally as are all wives, suggested that Phil take the boat out in the middle of the lake and leave it there because, in her opinion, it was beyond repair. But, just to convince ourselves that husbands are smarter than wives, Phil and I decided to do a repair job rather than scuttle such a beloved craft. The procedure is passed on here to other salts whose craft may be dealt a similar foul blow at some time or other.

First, outline the patch dimensions on the boat, being sure to include all damage within it as shown in the drawing. Then, make the cutout to take a wooden patch as in the photo below the drawing. The patch (plywood in this case) will fit snugly if a piece of the same thickness as the planking is held against the opening and a tracing of the latter is made directly on the piece. Next, a backing block is screwed to the inside of the boat, overlapping the cutout by at least 2 in. as indicated. The patch, having been cut and fitted, is then coated on all contacting surfaces with waterproof glue and screwed in place flush with the planking as in the photo above. Now, you can sand the repair area and either apply two coats of paint, or glass it. The latter procedure will result in a much stronger, positively permanent repair. Follow the manufacturer's directions and apply at least three coats of resin, using one layer of glass-fiber cloth if the repair is in an area of minor stress, two layers otherwise. Use medium-weight cloth cut to a square outline that overlaps the patch on all sides by 3 in. or so. ★ ★ ★



FLUXLESS



FLUXLESS SOLDER easily mends breaks in aluminum sheet metal, such as downspout shown above and boat below. Board protects paint from heat of torch



Here is the answer to the amateur's soldering problems

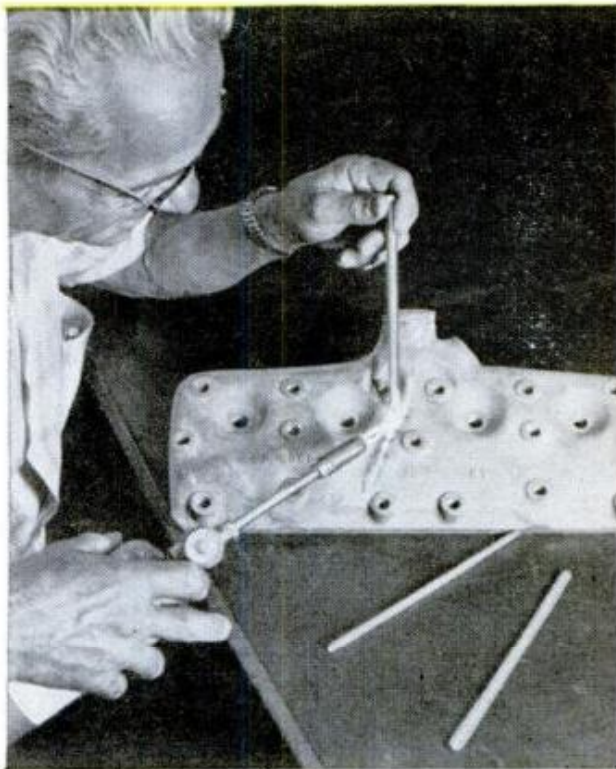
SUCCESS AT SOLDERING, or welding aluminum no longer is an accomplishment to be enjoyed exclusively by the experts. A fluxless solder marketed recently for do-it-yourselfers under the name of Chemalloy, makes it possible for anyone to repair cracks in aluminum, or join other metals to it or to each other. The protective oxide film that normally makes soldering or welding aluminum difficult is easily penetrated by the molten solder, forming a tenacious bond with the parent metal when solidified.

Being a special zinc-lead-tin alloy, the solder requires no flux or follow-up metal treatment. Several types of repairs are shown in the photos on this and the facing page. The procedure for making a repair or joining pieces of metal together is the same regardless of the type of joint or metal. The heat source may be a propane torch, gas burner, blow torch, or any other device that will heat the repair area to a minimum temperature of 500 deg. F. An acetylene torch is too hot for most soldering jobs. For best results, work with the lowest temperature above the melting point of the solder (500 deg. F.) and maintain this temperature for several seconds after the joint is soldered.

SOLDERING AT LAST



MOST METALS may be soldered by this new fluxless solder, including galvanized sheet metal mail box



SOLDER BECOMES FUSED with aluminum casting by continued application of heat after solder flows

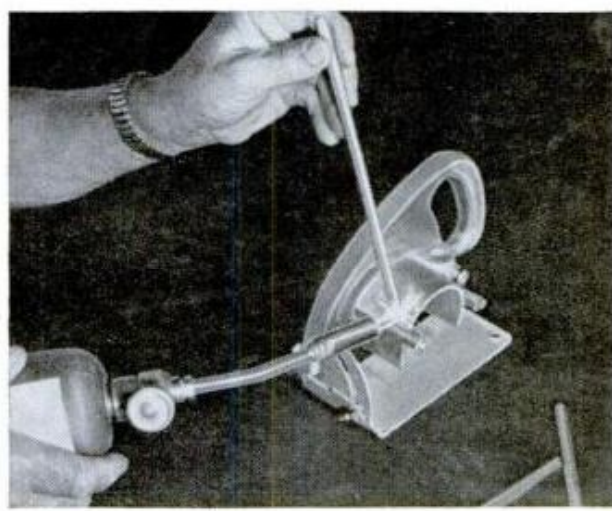
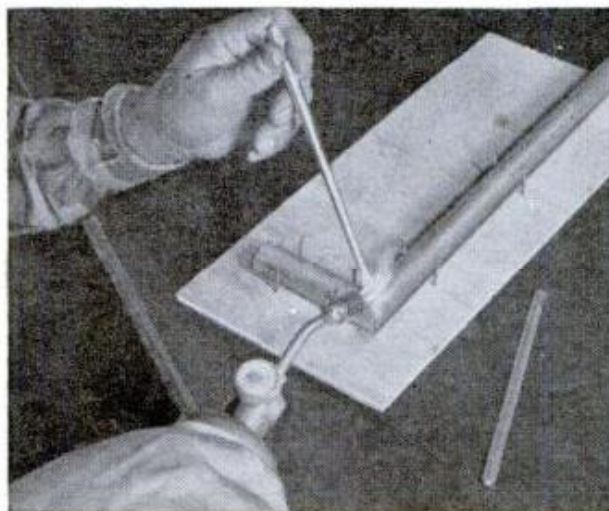
This tends to cause the fusion of the two metals similar to that which takes place when welding with arc or acetylene, producing a stronger joint than would result from mere surface contact of ordinary soft soldering. Visible uplift at the fringe of the solder puddle indicates there is adequate heat penetration for fusion.

Individual parts to be soldered together

should be clamped in the required position, or placed in a holding jig such as the one shown in the photo below, left, so that the parts do not move while the molten solder hardens. When joining metal pieces of different sizes, let the heat favor the largest mass to equalize fusion. File down excess solder buildup to get a neat joint. In a corner use a round file to form a fillet. ★★★

MITER JOINT is held together on plywood while soldering by pegging tubing in place with nails

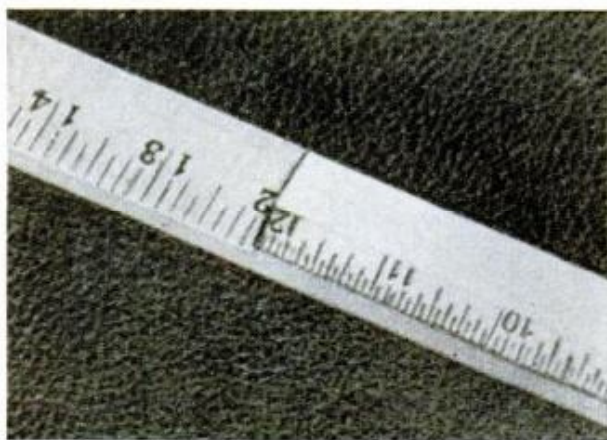
CRACK IN ALUMINUM CASTING of portable electric circular saw is solder-fused for lasting repair





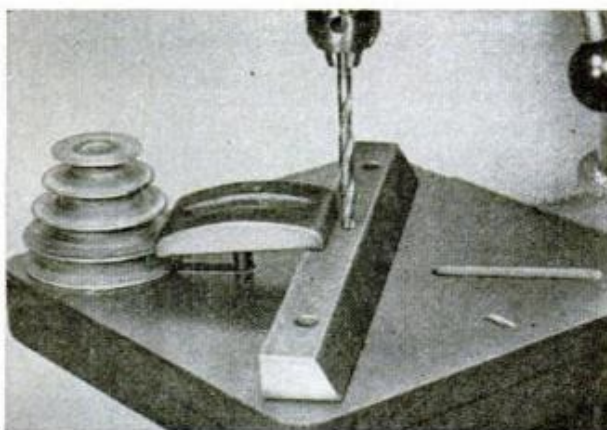
Small Parts Held in Place For Weld Fabricating

Welders fabricating units from a number of small parts often have trouble holding these parts in position for joining. This hold-down can be made right in the shop and often it will do the trick when no conventional clamp will serve. It's made by welding three legs to a length of round steel 1½ to 2 in. in diameter. Note that the pair of legs are made by bending a length of ¾-in. steel rod to a U-shape. The third leg, or foot, is cut from ¼-in. flat steel and welded in place. Ends of the pair of legs are ground to a sharp point so that the unit will stand firmly wherever it is placed.



Scale Cemented to Yardstick

By cementing a 6-in. steel scale or a 12-in. wooden ruler to a yardstick you can add to its usefulness for taking close measurements. The scale or ruler should be of the type graduated in 16ths of an inch. A thin hardwood ruler of the type supplied for school use is just right. Scrape the varnish off the back of the ruler to provide a good bonding surface for the cement. Spread cement, locate the ruler with the graduations on both ruler and yardstick in register and clamp until the cement is dry.



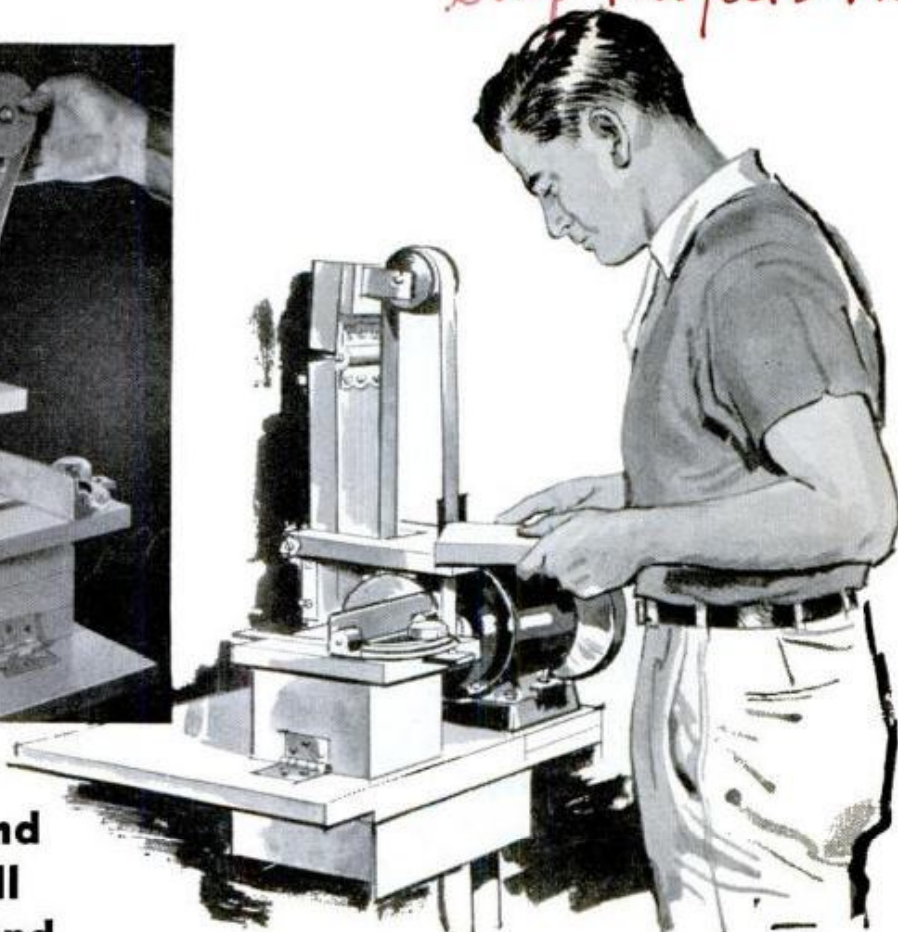
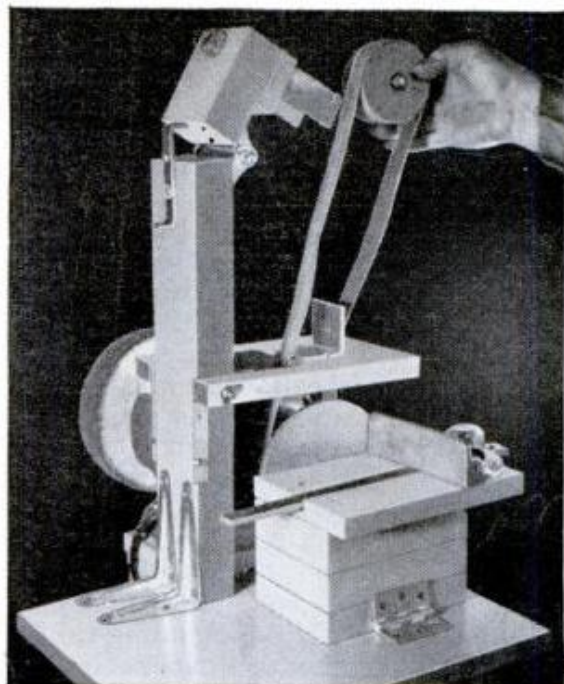
Four-Step Pulley Supports Clamp

When a stepped steel block is lacking for strap clamp height adjustment, a four-step V-pulley makes a good substitute when the required clamping pressure is not too great. Usually there is room to make the setup even on a small drill-press table and ordinarily it is not necessary to bolt the pulley to the table. In making the setup adjust the clamp so that it inclines only slightly upward as pictured. Otherwise the supported end might slip off the sloping side of the V-groove in the pulley.



Tape Reinforces Sandpaper Edges

Fine sandpaper has a tendency to tear when clamped to the shoe of an orbital sander. Even a slight tear may slacken the tension on the paper just enough to prevent it from moving with the shoe which, of course, renders it almost entirely ineffective. Tearing can be prevented by sticking strips of masking tape across the ends of the sandpaper sheet after cutting to size. Use only a wide masking tape and cut the ends flush with the edges of the sandpaper.



**You can band-sand
or disk-sand small
parts, also buff and
polish with this handy**

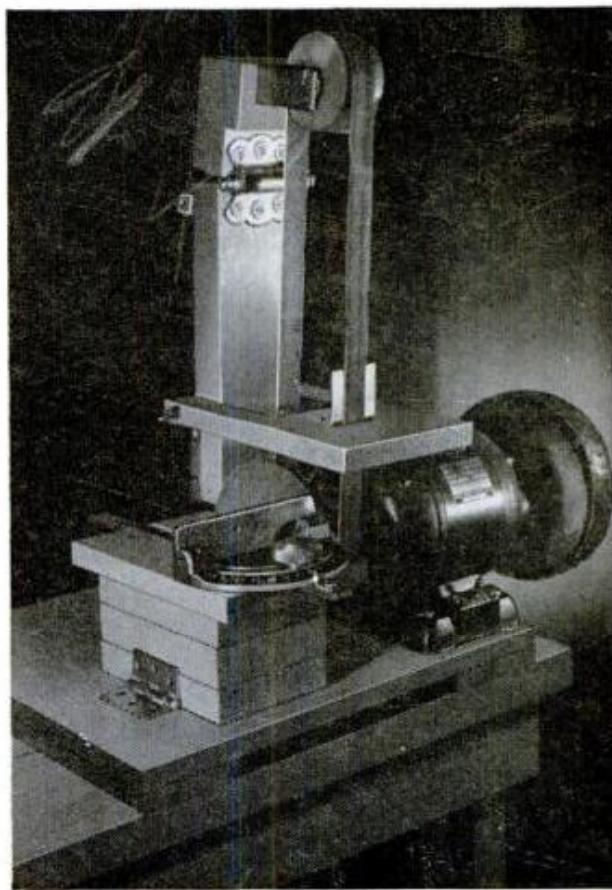
COMBINATION SHOP TOOL

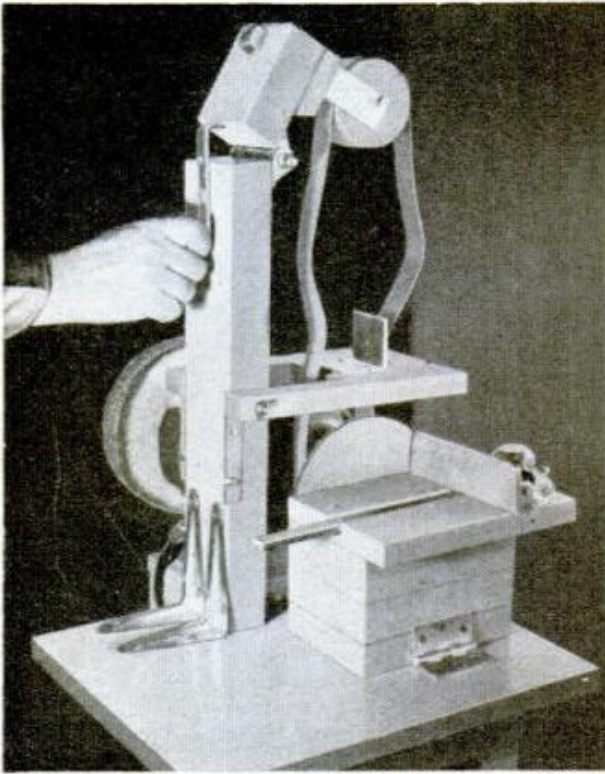
By William G. Waggoner

ALL THREE MACHINES, band sander, disk sander and buffer are combined in one bench-type unit and are driven by a double-shaft motor. The band wheels, or pulleys, are designed for abrasive bands 1 in. wide and as will be noted from the photos of the machine above and at the right, the band is backed at the table level so that you can do precise sanding, finish grinding and polishing on wood and metals. The sanding disk, lower band wheel and buffing wheel are carried on adapters mounted on the motor shafts. Note that the disk-sander table is hinged so that it can be tilted to permit changing abrasives or removing the disk.

The 2 x 4 upright which carries the idler is in two parts which are joined with a spring hinge of the type used on screen doors. When the abrasive band is in position on the pulleys, the hinge provides the necessary tension as in the photo at the right. The hinge also permits the top member of the upright to be tilted forward so that abrasive bands can be removed and replaced. Note the photo above.

The length of the abrasive band (meas-



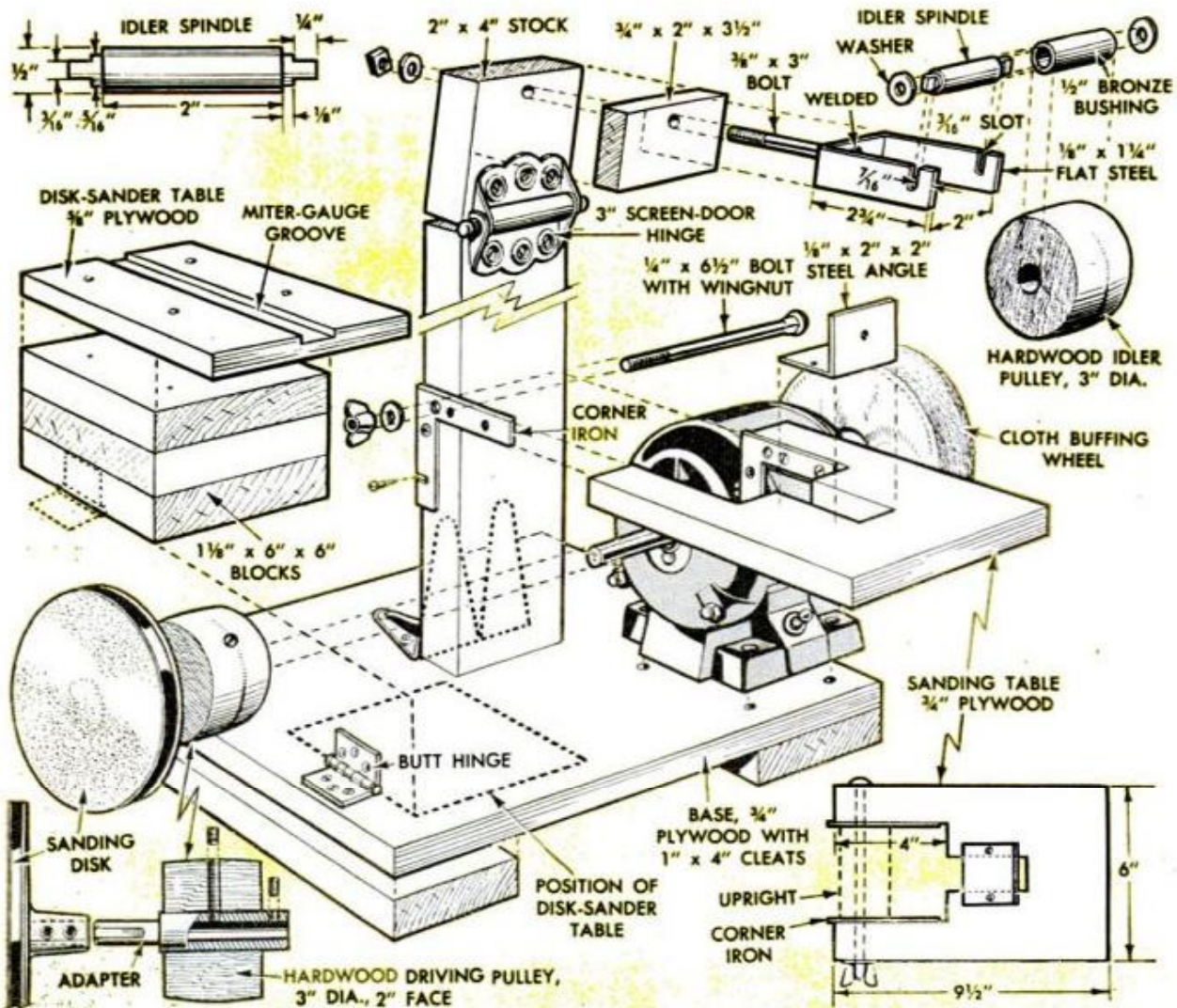


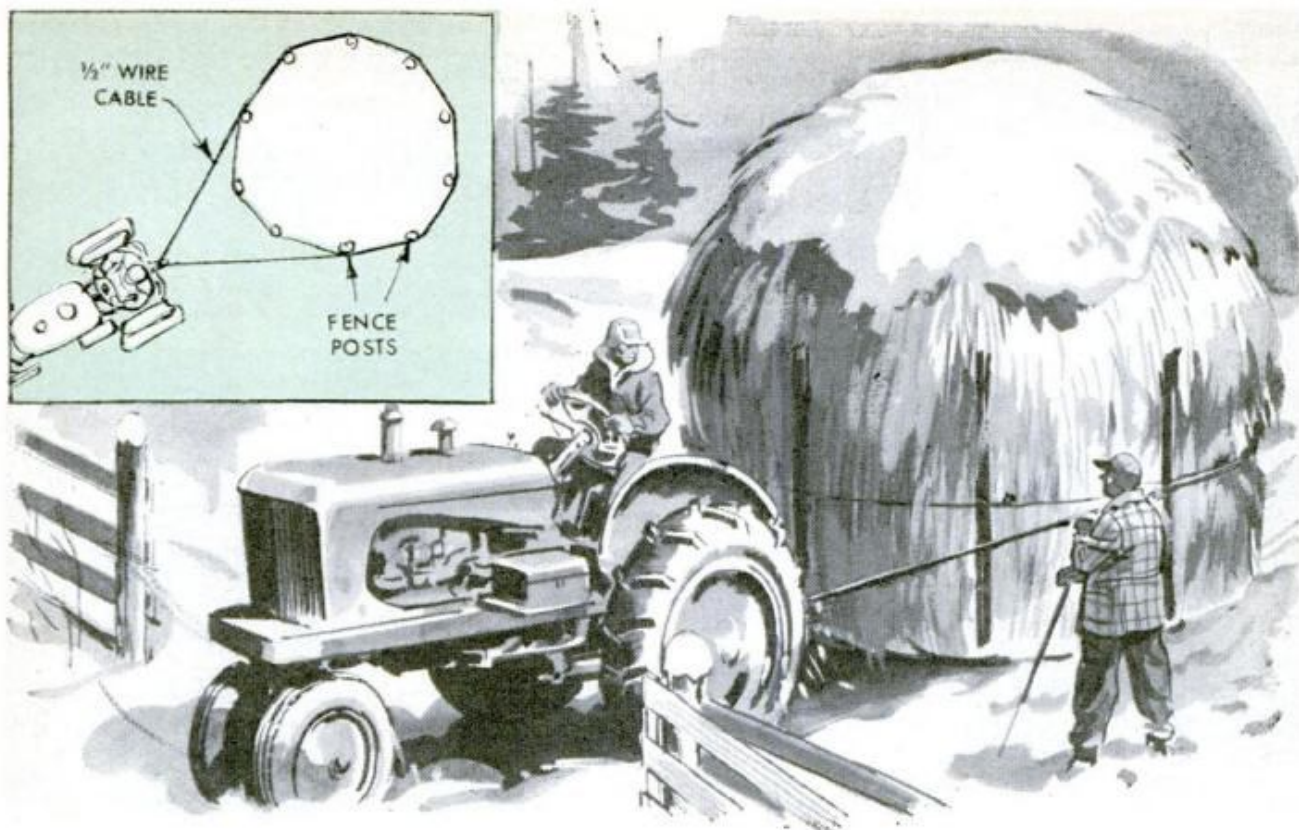
A PIVOTED STOP holds the idler in tilted position so that it can be lifted from the yoke for changing the band as in the upper photo on preceding page

ured around the pulleys) and the height of the motor shaft determine the length of the upright. The band used on the machine pictured is 1 x 42 in. and this is a convenient length. Before you cut the upright in place so that you can determine the height of the motor shaft above the base of the machine. This measurement, plus the length of the belt measured around the pulleys determines the over-all height of the upright. The S-shaped stop shown being positioned in the photo at the left is made from $\frac{1}{16}$ x $\frac{1}{2}$ -in. flat steel and is attached to the lower member of the upright with a screw. Its purpose is to hold the upper section of the upright in a tilted position while the belt is removed or replaced. It can be omitted if desired.

It's a good idea to make and fit the yoke for the idler and attach the sanding table to the upright before attaching the latter permanently to the machine base. In this way you can align the band so that it runs perpendicular to the table surface.

Suitable pulleys can be turned from close-grained hardwood. Note that the idler is fitted with a bronze bushing. ★★





HAYSTACK SKIDDED TO FEED LOT

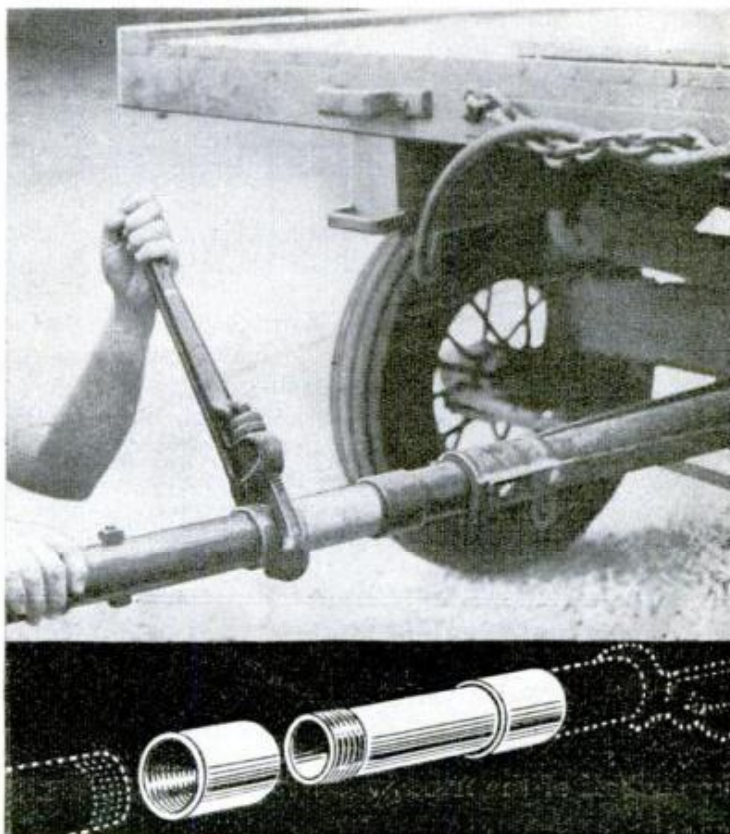
To save at least one handling I store my hay in small round stacks. I stand a number of small fence posts around each stack, space them uniformly and join with a length of smooth wire. I pull this wire tight so that each post is drawn inward against the stack. This is done immediately after stacking so that the posts tend to prevent

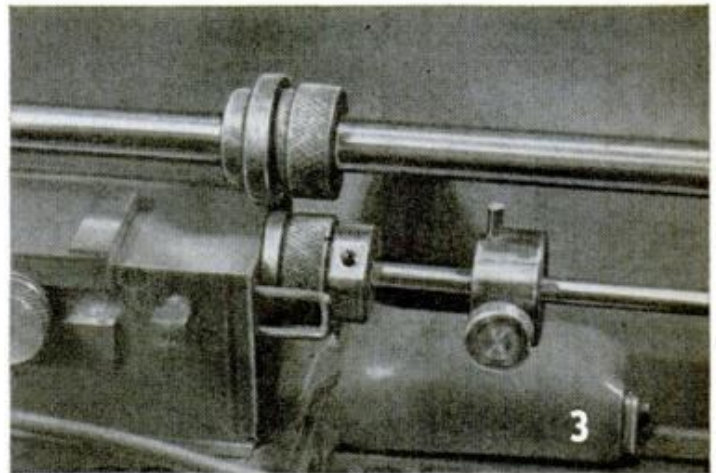
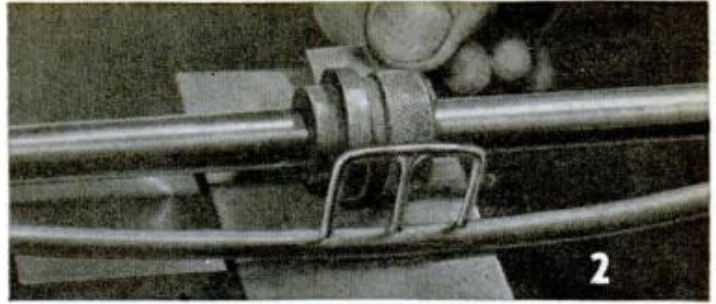
the stacks from tipping or being pushed over by stray stock. Then in the winter after a snowfall I back my tractor up to a stack, swing a 1/2-in. steel cable around it and support the cable at the center of the posts with short wire ties. Then I attach the cable to the tractor drawbar and away I go to the feed lot.—Peter E. M. Hofer

Extendable Drawbar For Farm Trailer

Farmers who work trailers alongside or directly behind such tractordrawn machines as corn pickers and balers are well aware of the advantages of a trailer drawbar that can be lengthened or shortened quickly and easily. One way is to make a drawbar from heavy pipe in two sections having couplings on the ends so that nipples of various lengths can be inserted as in the photo and detail. With this arrangement it takes only minutes to adjust the drawbar to the correct length.

Small burlap bags filled with stones make serviceable drags for animal traps in sets made along rocky streams where it may be difficult to stake traps in the regular way. "Sew" the open ends of the bags with wire, then attach the wire to the trap chains.





LATHE DOUBLES AS METAL SHEAR

By Walter E. Burton

THIS ROLL-TYPE metal shear is designed as a lathe accessory. It will cut light sheet metal without distorting or curling the material. It also cuts cardboard, thin sheet plastic, even heavy paper and some laminates. It's been dimensioned to fit a 9-in. metal-turning lathe and as will be noted from the detailed parts in Fig. 5, it consists of two cutting rolls, one driven roll and one idler, a specially machined base for mounting on the lathe cross slide, finger guards and an adjustable guide and a stop.

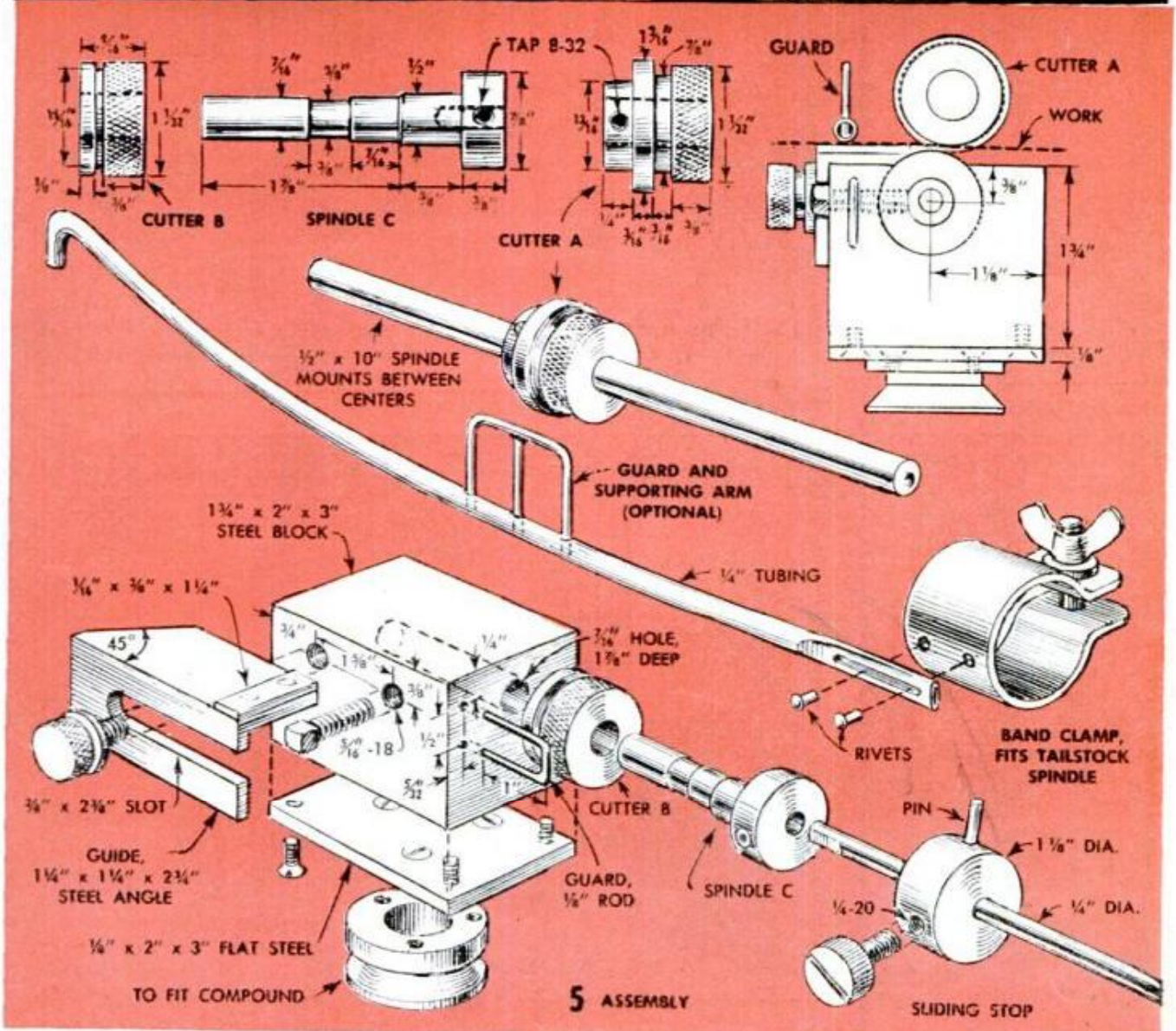
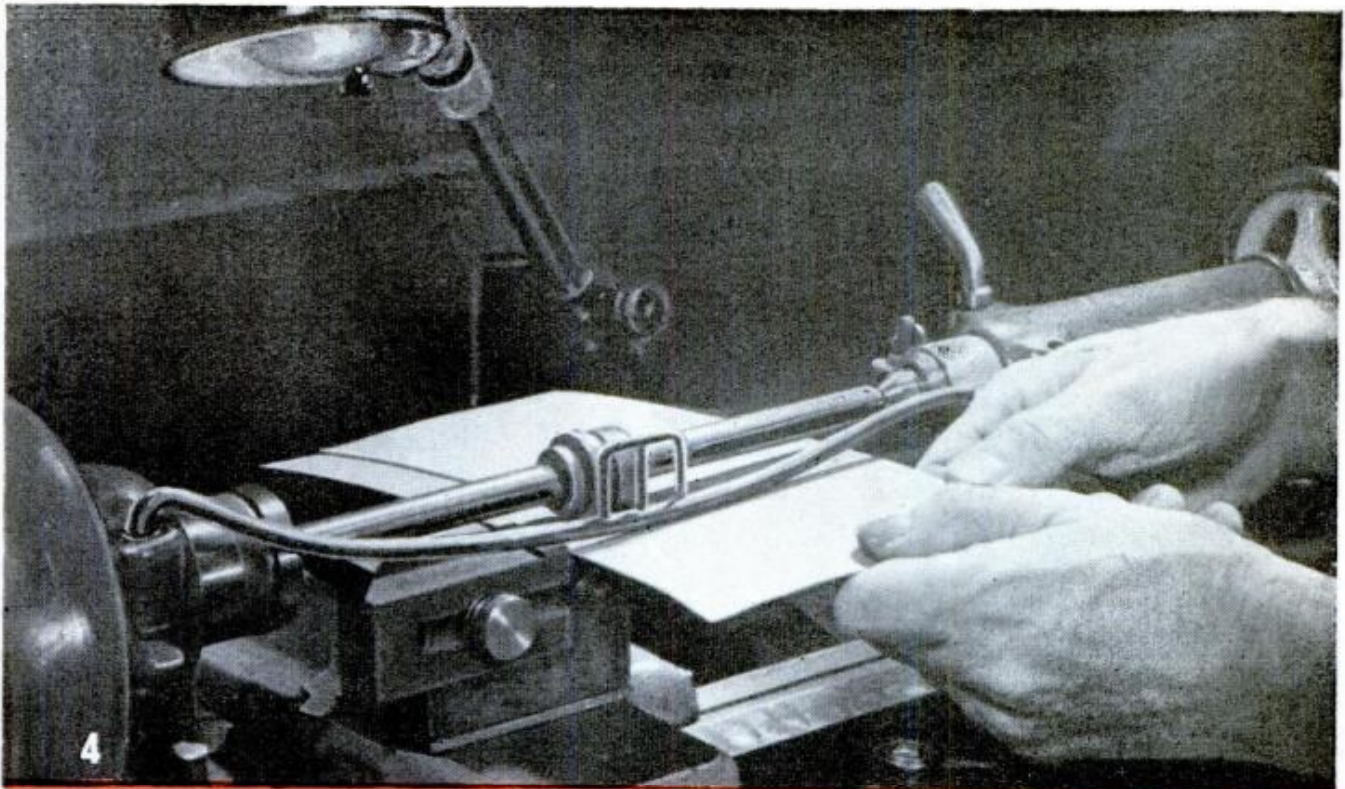
The shear is self feeding, the knurled sections of the rolls (cutters) serving as feed rolls. Cutter A is the driven roll and is mounted on a spindle 10 in. long, Figs. 1 and 5. This length has been found to be about the maximum for a 1/2-in. spindle. If made longer, it may tend to deflect somewhat under heavy cutting pressure. In use, the spindle is mounted between centers in the lathe as in Fig. 4 and driven either by a collet chuck as pictured or by means of a lathe dog. The finger guard that rides on top of the work, Figs. 2, 3, 4, and 5 is optional and can be arranged in any one of several ways, depending on the lathe used. In the original the right end of the guard arm is held in place by means of a band clamp on the tailstock spindle, Figs. 4 and 5. The left end is filed down to fit tightly into the socket-head screw which holds the upper half of the headstock bearing. Note

also that there is a second finger guard which, when the unit is in operation, is below the work and just ahead of the lower cutter, Figs. 3 and 5. It is here that there is the greatest danger of fingers being caught by the knurled sections of the cutters and for this reason this guard is essential to safety.

The bearing surface for the cutter B on the spindle C, Fig. 5, must be turned to diameter with a minimum tolerance and the center hole through the cutter should be drilled and the hole reamed to size. Note that the spindle C, Fig. 5, is turned to four diameters, the section turned to 1/2 in. in diameter forming the bearing for the cutter B. Note that the length of the bearing surface provides for 1/16-in. endplay. In operation the edges of the cutters overlap, the amount of overlap being controlled by moving the lathe cross slide.

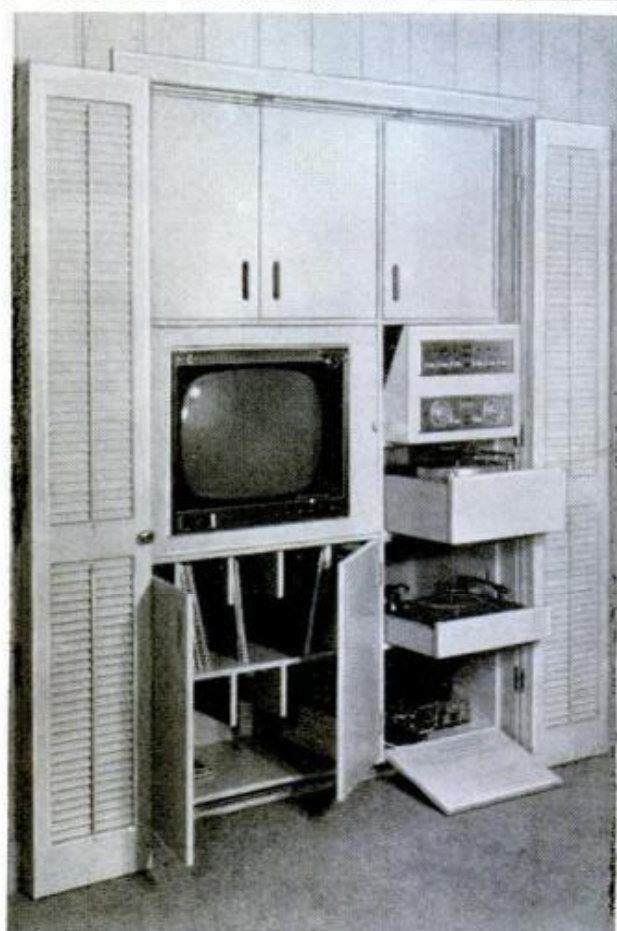
The guide, Fig. 5, is made from a short length of steel angle, the fillet being filed square so that the angle will seat on a corner of the base block. One web of the angle is slotted so that the guide can be adjusted to permit cutting strips of a given width and length.

Cutters can be turned from tool steel and hardened or they can be turned from mild steel and casehardened. For soft materials cutters turned from tool steels will serve very well without hardening. ★ ★ ★

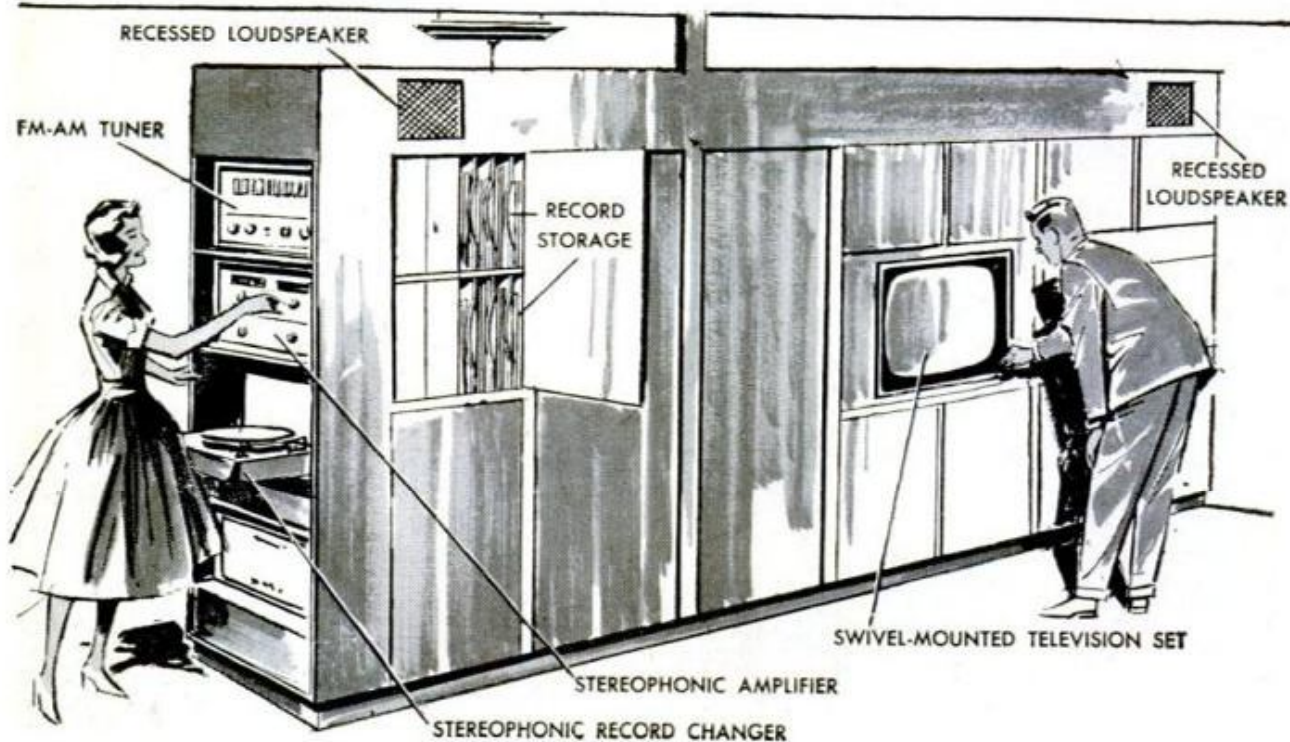


RADIO TV HI-FI

ELECTRONICS



Complete built-in system fits neatly in a corner of the room. A different treatment is seen above right, with the system hidden behind louver doors. Below, *PM's* House of Built-Ins unique entertainment wall



Electronics Are Built-In Too!

By Byron G. Wels



Turntable, enclosed in wall housing, pulls down to operating position. Record-storage cabinet matches phonograph panel, pulls down to expose records which are stored in the approved vertical position behind panel

THE PM HOUSE OF BUILT-INS features equipment which is the last stereophonic word in modern living. The entertainment wall provides a complete entertainment center for the entire family—television, stereophonic high-fidelity equipment, even record-storage space. What's more, in keeping with the theme, it is all built in.

The stereo amplifiers are dual 30-watt units. This is more than adequate to fill the needs of the home. For ease in servicing, the entire amplifier chassis may be tilted forward away from the wall. The unit is easily expandable so that new equipment can be added in the future. For example, should the homeowner care to add a tape deck, he can do it by simply removing one of the blank panels in the entertainment wall and cut it out to accommodate a tape deck of his choice. The loudspeakers

throughout the house are eight-inch coaxial units with each serving as a remote intercom unit. The tuners are FM-AM units so that stereocasts can be received. When FM multiplex transmissions are more common, the homeowner can easily add the multiplex adapter. The record player swings down on hinges to the horizontal playing position. Very little depth is required as the record player stores vertically when not in use. The cartridge in the record player is a dual-channel ceramic type with a diamond stylus for long use. If the units are intended for custom installation, the panels and controls of the amplifier and tuner are identical within the limitations of function. The record-storage cabinet, when closed, matches the record-player cabinet.

The television receiver is mounted on a Lazy Susan base which permits the set to



Integrated intercommunication system permits residents to interrogate callers and invite them to enter

be turned to face either side of the entertainment wall. A remote control unit permits ease of tuning and the speaker is placed at the front of the set to avoid interfering with activity in the family room when the set is being viewed in the living room. One television set thus can do double duty.

A unique benefit is derived from this system. The integrated intercom permits any of the remote stations to call any of the other stations. Each speaker can be used either as a remote loudspeaker for the high-fidelity system or can be changed to an intercom, simply by throwing a switch. The speaker in the nursery, for example, can be switched to an intercom, and mother, in the kitchen can hear baby if he cries. While she prepares the bottle, she can soothe the baby over the intercom.

When a caller presses the doorbell, an electronic chime sounds through all the loudspeakers. Pressing the intercom switch on any of the speakers, the homeowner can speak to the visitor. The weatherproof intercom installed at the front door permits the visitor to answer.

Other electronic devices can also be built in. Some fulfill functional needs, such as a fire-alarm system. One new system consists of many small detectors, each resembling a miniature light-bulb socket without a bulb.

Placed at strategic points in the home, these heat-sensitive detectors provide a small electronic pulse when fire breaks out.



Visitors identify themselves to owners through weatherproof loudspeaker-microphone at front door

This small signal is amplified and fed to a master panel. On the panel two things happen: A loud bell rings, indicating that fire has broken out; a light goes on indicating the area in which the fire has occurred. One glance at the panel tells the homeowner where the fire has started. Outside the house a horn sounds to summon help in case the residents are not at home.

Another possible built-in is a garage-door operator. The radio-controlled device of early days was a bulky box under the dashboard, taking much space from the driver or passenger of the car. The receiving unit was not very selective; kids with radio-controlled airplanes, hams on the 10-meter band and neighbors with garage-door operators, all could send the doors up and down. With the advent of transistors, the problem of operating garage doors is much simpler. One operating device is a small transmitter that can easily be carried in pocket or purse. Pretuned and crystal controlled, the unit has a small pushbutton that is depressed in range of the receiver. The small physical size of the transistor circuitry, plus the low current drain has eliminated the need for bulky power supplies and the transistor unit has much longer life than the older tube types.

Still another electronic built-in for the modern home is the electronic touch-plate for turning lights on and off. A capacity-operated relay is installed in the wall behind the metal plates that now enclose



Intercom unit above baby's crib amplifies all sounds. With volume highest, even breathing can be heard



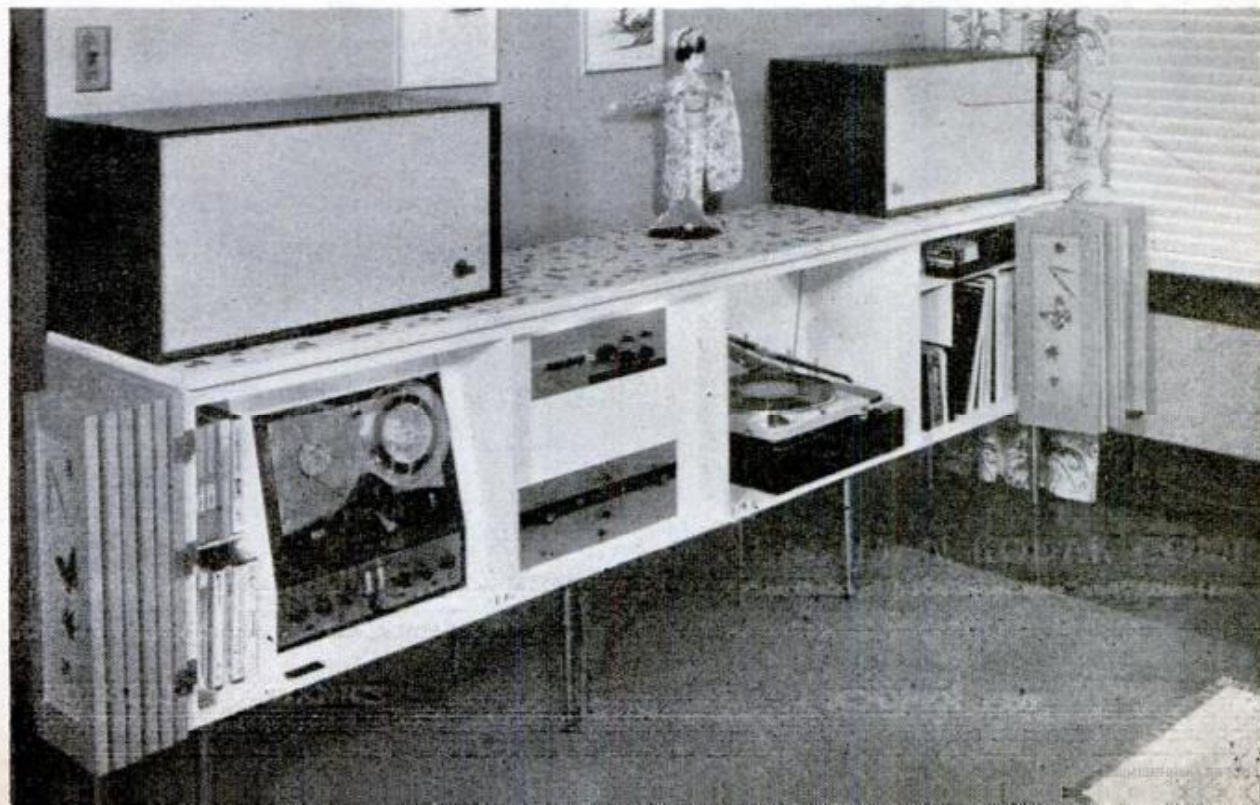
Elsewhere in the house, mother can soothe child or play music into nursery while heating baby's bottle

switches. When the plate is touched, the lights go on; another touch turns them off again. These units can easily be added to existing homes simply by replacing the switches in the house with the new capacity relays.

What built-ins may be included in the house of the future? The latter part of 1960 saw the development of reverberation. Reverberation was devised by the manufacturers of electronic organs to provide richer tonal qualities to their organs. A reverberation unit consists of two sensitive pickups and a length of spring. The signal from the stereo amplifier actuates the reverberation spring and this in turn feeds the loud-

speaker. The amount of reverberation can be varied so that the homeowner can actually dial the acoustics he desires right in his living room. In the ordinary stereo system, a symphonic concert comes through with the same acoustic effect as does the five-piece jazz combo. By adding reverberation, the symphonic concert sounds the way it does in a concert hall. Decrease reverberation and the jazz combo can sound as though it is playing in an intimate supper club. Last year stereo was considered to be the last word. This year it is stereo with reverberation. Next year development laboratories may even make reverberation obsolete.

Matched units in cabinet-mounted system are more than decorative. Balanced system means better sound





Radio-controlled garage-door operator in leather case can be carried easily. Pressing button raises door

Engineers are designing TV picture tubes with larger and larger scan angles. This makes for flatter tubes with shorter necks. The result is a thinner television set. One manufacturer has been experimenting with a picture tube based on an entirely new principle which promises to be less than

three inches thick. Couple this with modern transistor circuits, and picture-frame television may someday be a reality.

In selecting electronic built-ins for the home, remember that such built-ins can operate at maximum efficiency only if the power lines are not overloaded. ★ ★ ★

Panel and bell tell location of house fire; push-switch tests unit. Outdoor horn notifies neighbors



Handiest nailing tool since the hammer!

ARROW

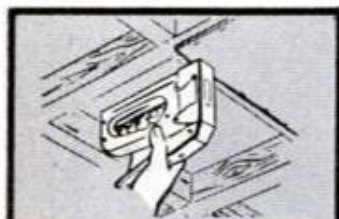
T-50 ALL-PURPOSE STAPLE GUN



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and ARROW'S CEILTILE STAPLE
Especially Designed for Ceiling Tile!

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Contains Arrow's versatile T-50 Automatic Staple Gun . . . 5000 Assorted Arrow Staples . . . 3 Interchangeable SLIP-ON Attachments for wire, screen and window shade fastening . . . and a Staple Lifter. Here's everything a home craftsman needs to do an all-around fastening job — all in one handy, portable kit! Makes perfect Christmas gift.



If purchased individually, items in this kit would cost **\$19.50**

SPECIAL KIT PRICE: \$17.50

You can BUY the Arrow T-50 Staple Gun at your local Hardware, Lumber, Building Supply or Stationery dealer.

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Camera

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Picture it now—
See it again and again

Automatic Camera is Amazingly Accurate

This automatic electric-eye camera is not only easier to operate than a separate light meter and camera—it's also more *accurate*.

The reason? In each Brownie Starmatic Camera, the built-in meter and shutter are custom-matched to each other by a final factory adjustment. Thus, any of the common variations of meters and shutters are balanced out, and exposure errors are eliminated!

Shoot in bright sunlight or in shade, the lens opening adjusts automatically for correct exposures. When light is too dim, a signal tells you to use flash.

You get snapshots or slides, 12 beautiful pictures to a roll on economical 127 film. Can't take an accidental double exposure. Brownie Starmatic Camera costs less than \$30, or as little as \$3 down.

"Electric Fingers" Thread the Film For Automatic Movie Projectors

Now you can get your movie shows under way with no fuss, no fumbling. Just choose a Kodak automatic movie projector.

All you do is insert the end of the film in a slot. "Electric fingers" then take over, to start your show automatically. They thread the film through the gate . . . form the loops . . . and guide the film down to the take-up reel, which picks it up automatically! It's quick, reliable, all automatic, and astonishing to see.

There's a Kodak 8mm automatic movie projector in every price range. See them at your dealer's.

Brownie 8 Movie
Projector, A15,
less than \$55.



Kodak Cine Showtime
Projector, A20, less than \$125;
Model A30, less than \$150.

Brownie 500 Movie
Projector, A5, less than \$95.

from Kodak

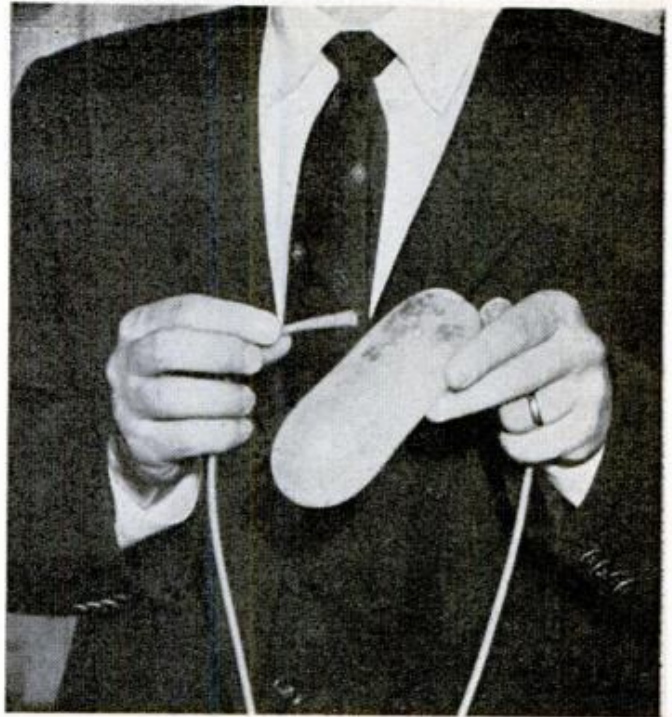
Sensitized Photo Balloons Used in Diagnosis of Stomach Cancer

Rubber balloons coated on the inside with special Kodak photographic emulsion are being used with great accuracy to detect stomach cancer.

A patient is fed a tiny amount of radioactive phosphorus 32. Then he swallows an emulsion-coated balloon which is inflated until it is in contact with the stomach walls.

Cancerous tissues absorb more "P32" than normal tissues, and show up as darkened areas on the balloon when it is removed from the stomach and processed.

Knowledge gained by Kodak in creating such specialized products for medical, scientific, and industrial use, also helps produce finer films and equipment for amateur photography.



Dark areas on balloon reveal presence of stomach cancer. Kodak scientists worked for several years to develop a fast, flexible emulsion for the balloon coating. The balloons are now available to physicians.

Versatile Slide Projector Lets You Use Any of 3 Changer Systems

This handsome new Kodak 500 Projector, Model B, puts the accent on versatility. It lets you choose any of *three* modern slide-change systems—fast-action Kodak Readymatic, Airequipt magazine, or Universal tray.

And it gives you great performance. The 500-watt lamp and big condensers show both 35mm and super slides brilliantly. The 4-inch *f*/3.5 lens gives big-screen images even in small rooms.

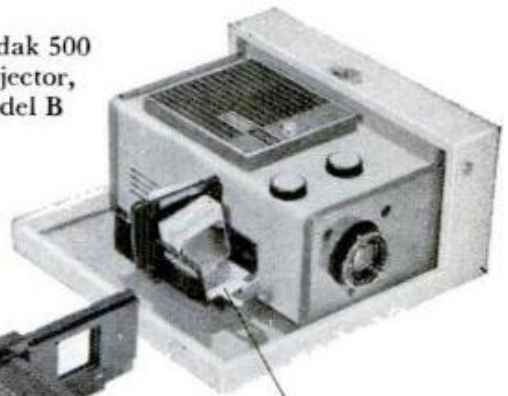
A quiet, turbine-type blower pulls cool air in over your slides and around the lamp. Elevation and focus knobs are on top for easy adjustment. Handsome two-tone styling. Sturdy case cover.

With Kodak Readymatic Changer and 4-inch lens, Kodak 500 Projector, Model B, is less than \$68, or as little as \$7 down. Ask your dealer to show you how smoothly it works with each of the changers.

Prices are subject to change without notice.

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Kodak 500 Projector, Model B



Kodak Readymatic Changer for cardboard mounts. Quickest from slide-box to screen.

Kodak Universal Changer is versatile—handles card, glass, plastic or metal mounts in trays.



Airequipt Magazine Changer stores each slide in a sturdy, durable metal frame.

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See Kodak's "Ed Sullivan Show" and "Adventures of the Nelson Family"

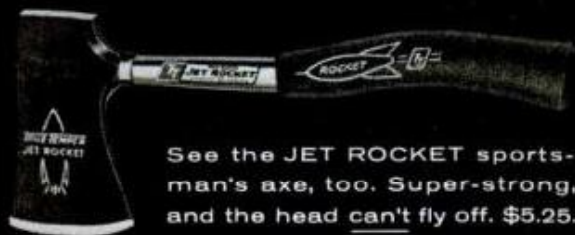
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You can feel the dynamic power and balance in this famous tool. You'll enjoy the aliveness of the JET ROCKET as it centers the power of your swing and smoothly absorbs impact shocks.

Head is permanently locked to tubular-steel handle. Comfortable cushion grip won't slip, even when wet. Shake hands with a JET ROCKET at your favorite hardware store today. True Temper, 1623 Euclid Avenue, Cleveland 15, Ohio.



See the JET ROCKET sportsman's axe, too. Super-strong, and the head can't fly off. \$5.25.

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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.

Propagating Clematis



Q—I have a flowering clematis vine about 5 years old. The blooms are purple and I would like to have several more of the same kind to plant in different locations about my yard and house. But I have tried without success to obtain small plants from nearby nurseries. No one I've asked seems to know how to obtain new plants from the original plant other than by

seed. Is there some way?—S.W., Tenn.

A—Propagation of the many varieties of clematis can be done with seed, and also by layering, division, cuttings under glass, and by grafting. In your case, inasmuch as you want plants of the same type and characteristics, it probably would be best to try propagating from the original plant by layering. This method, when successful, reproduces a replica of the original plant, without any of the variations such as may occur in plants produced from seed. It is possible to propagate by layering in your locality in the fall, but you are likely to have better success in spring. There are several methods of layering, but probably you would succeed best with what is known as simple layering. In this procedure, the long branches, or trailers, are bent downward into a short, shallow trench and located so that the tips are above ground level. Then that portion of the trailer which is in the shallow trench is covered with soil. Cover the loose soil with a board weighted with a stone. Keep the soil damp. It must never be permitted to dry out. After three weeks to a month, depending to some extent on local temperature and weather conditions, the trailer will root in the area covered by soil. As soon as the new root system is well developed the trailer is cut from the parent plant at ground level or a few inches above, and you have a new plant. This same system can be carried out on several trailers simultaneously and if done in the spring it usually succeeds. In the fall the results are less certain. Rooting of the layered portion of the trailer can be speeded up somewhat by lightly scraping away the bark, or covering, at several points along the length of that portion of the trailer that is to be buried in the shallow trench. This should be done with care, working only with a sharp knife. When transplanting the newly rooted sections cut from the parent plant, be careful to remove the entire root system.

(Continued to page 246)

New Du Pont LUCITE[®] House Paint adds years of beauty... saves real money



“Lucite” makes the difference... and only Du Pont makes “Lucite”

Outstanding durability, superior blister-resistance, easy application make Du Pont “Lucite” the greatest house paint discovery in 30 years.

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COMBATS BLISTER PROBLEM. Moisture blistering, once the homeowner's most serious problem, has been solved. Tests show that “Lucite” over Du Pont Blister-Resistant Primer, on new wood or old surfaces from which the paint has been removed, effectively resists blistering.

GOES ON EASILY, DRIES FAST. Never before has an exterior house paint been so easy to apply. New “Lucite” flows on without effort. Dries quickly. Ideal for wood and masonry surfaces.

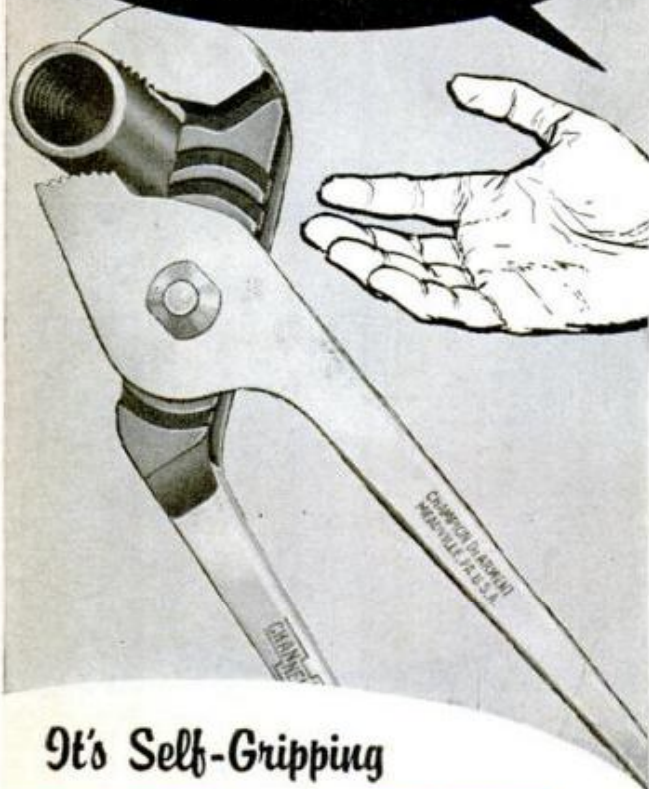
Send for new 12-page booklet, “How to Get Extra Years of Beauty from Your Next House Paint Job.” Write Du Pont Finishes Div., Dept. PM-10, Wilmington 98, Delaware. Or ask your Du Pont Dealer. He's in the Yellow Pages of your telephone directory.

*Buy the paint that's worth
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ON THE HANDLE

CHAMPION DeARMENT TOOL COMPANY
MEADVILLE, PENNSYLVANIA



Decorating Problem

Q—In my older home, in all the downstairs rooms, there are picture moldings located about 20 in. below the ceiling. I believe these are called drop ceilings. The rooms are rather small and the ceilings are 9 ft. high. I want to re-decorate the place but what to do with these areas above the moldings is my problem. If I remove the moldings it seems to me that the rooms will look bozy and uninviting

no matter what I do with decorative colors. Have you any suggestions?—O.W., Wis.

A—We assume you plan to decorate with paint rather than wallpaper. In effect, in most rooms, you can bring the ceiling down by painting it a dark color, but in many rooms, especially those with windows to the north only, this is not advisable. You might also consider installing a false ceiling, but of course, this is rather expensive, even in a single room of average size. In some rooms having high ceilings a paneled wainscot is quite effective. Horizontal contrasting paint stripes, horizontal paneling on one or more walls also are methods of lowering high ceilings. Of course, the picture molding is removed when any of these approaches to solution of the problem is carried out. Another much less expensive method which is quite effective in the average room having a high ceiling is to leave the picture molding where it is, paint the walls below the molding in a bright, cheery color, paint the ceiling an off-white and then cover the area between the ceiling and the picture molding with a wallpaper in a contrasting color. In all cases the wallpaper should have subdued figure and preferably a textured surface.



Wants Dark Woodwork

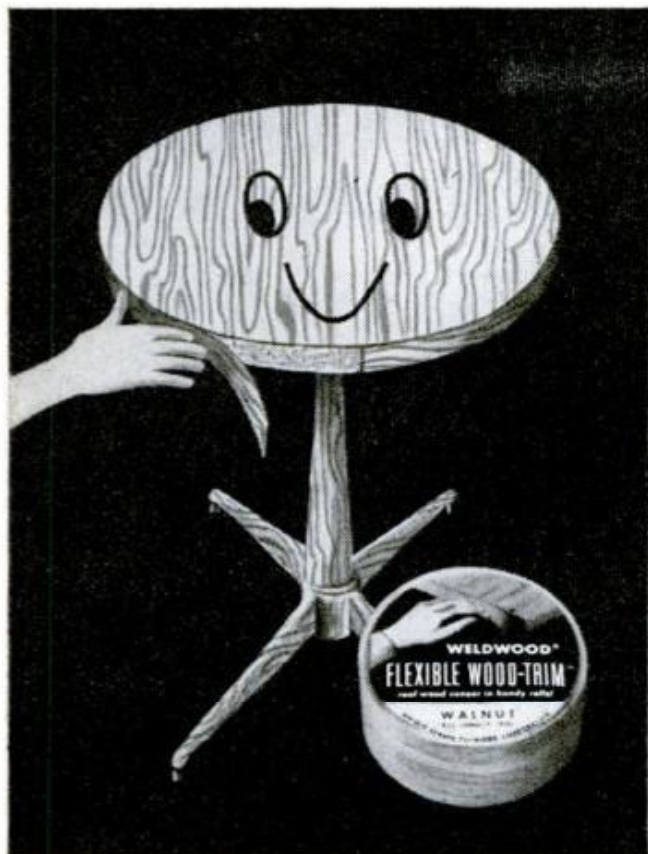
Q—I want to stain some of the woodwork in my older home a dark color as a part of the decorative scheme. It has been painted but I've found that I can remove the paint quite easily to the bare wood with a remover. None of the stains available seems to give the effect I want, that is, they are too light even when applied and allowed to dry full strength. I know that most re-

finishers want the woodwork a lighter color, but I want it dark. How can I get what I want?

—M.M., Vt.

A—You do not make your requirement very clear. We can assume from what you say that you are refinishing old wood that has been painted. This being so, the wood already has absorbed a portion of the oils that were in the original coat of paint or primer. If a primer was used as a first coat. These oils, having long since oxidized, will tend to prevent absorption of a penetrating stain. Although you did not say, it occurs to us that you may be planning to match a stain on old woodwork. If this guess is correct, then it should be remembered that the old woodwork has darkened to its present color by age. It was not originally as dark as it now appears. It also should be kept in mind that any dark stain you apply now will tend to darken as it ages. A pigmented walnut oilstain will normally give a dark, brownish color on softwood, but in your case one coat may not darken the wood sufficiently to meet your requirements, due to the oils the wood already has absorbed. Much depends on whether you want a color shading to brown or red and whether you wish the grain of the wood to show through the finish coats, or obscure it entirely. You can mix special stains by using artists oil colors. Van Dyke brown oil color reduced with turpentine will give a dark stain color on softwoods.

3 secrets of professional woodworking—by Weldwood



1. Hide rough edges with
WELDWOOD FLEXIBLE WOOD-TRIM



2. Bring out wood's beauty with
WELDWOOD SATINLAC



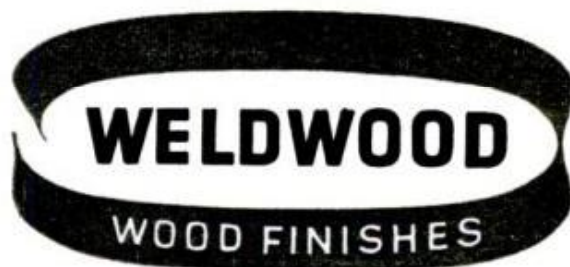
3. Protect the finish with
WELDWOOD PASTE WAX

WELDWOOD® FLEXIBLE WOOD-TRIM®, real wood, paper-backed, in handy 8' rolls. For edging plywood, lumber. Comes in 6 different woods. Apply with Weldwood Contact Cement or Presto-Set® Glue.

WELDWOOD SATINLAC®, self-sealing finish gives glowing, soft-sheen luster, brings out the wood's natural beauty without "plate glass" shine. For extra-light finishes, use first coat of Weldwood Satinlac Lightener.

WELDWOOD WAX is a rich, high-carnauba *paste*. It's quick, easy, self-cleaning—puts the finishing touch on lasting wood beauty. Resists water spotting, won't harm wood, protects as it beautifies.

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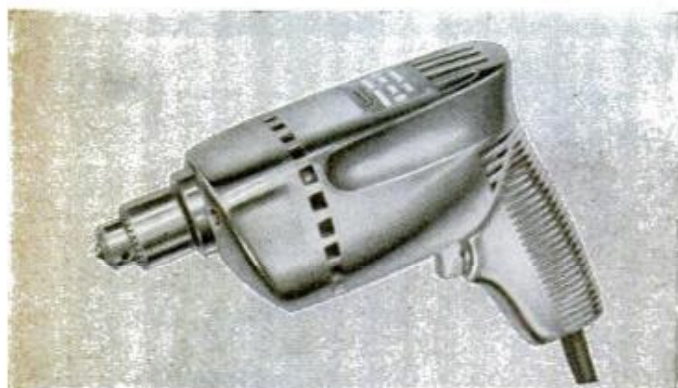
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STANLEY*Ideas***TO BETTER YOUR
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These STANLEY FALL SPECIALS help

Now is the time to plan the improvements you've always wanted to make in your home.

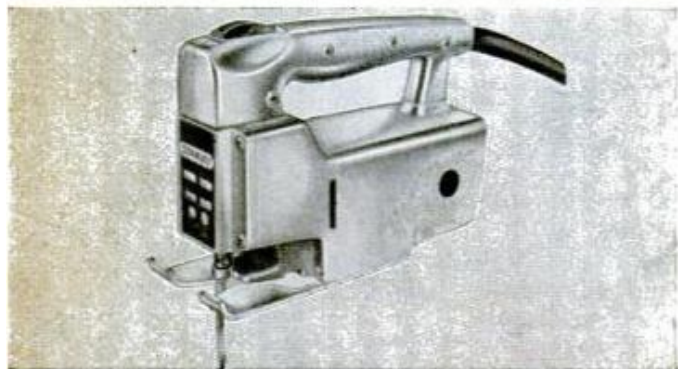
This Fall, install that playroom or the built-in bookcases your wife has always talked about.



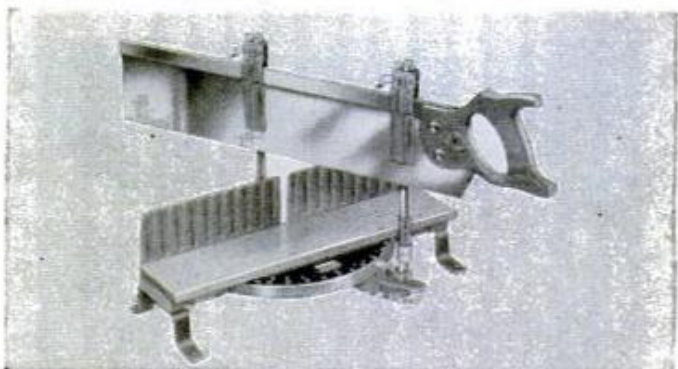
Powerhouse! \$5.00 off on this 1/4" drill. Reg. \$24.95—**Now only \$19.95!** Most powerful 1/4" drill for the price on the market. Use it for sanding and polishing, tool



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This 50¢ booklet free at your dealer's with the purchase of any one of these Stanley Fall Specials! Features 20 illustrated pages of home improvement "how to" with the accent on ideas for better living. If dealer's supply is temporarily exhausted, write The Stanley Works, 6210 Elm Street, New Britain, Connecticut.

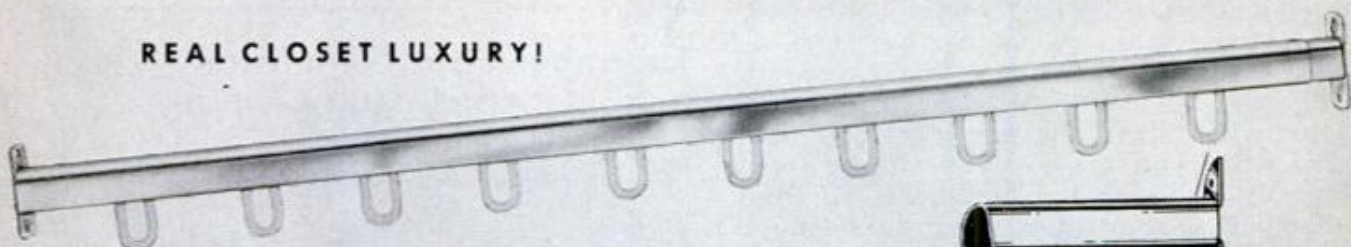


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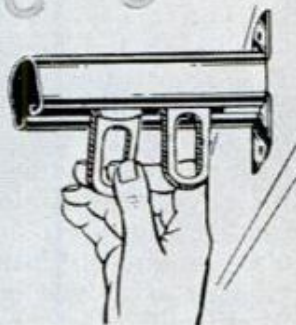
Refinish fine furniture... design attractive kitchen cabinets... add a carport. Just look

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REAL CLOSET LUXURY!



Eliminate hanger tangle with Stanley "snap-in" glides that slide easily and quietly—*automatically* space your clothes. Or if you must crowd your closets, go ahead. This bar is strong, stays rigid however you load it with extra clothes hangers. Long-lasting bright nickel finish.



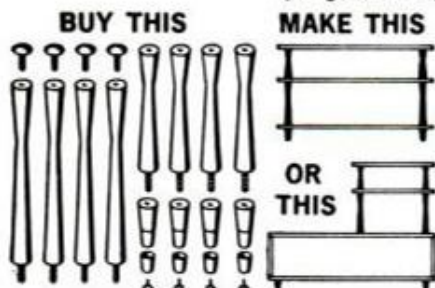
NEW! Stanley Adjustable Closet Bar with 10 smooth-riding nylon hanger glides... Reg. \$2.88

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SEE DOZENS OF OTHER hardware home improvement items at **Stanley Hardware Centers** in leading stores near you.

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... or make dozens of other tables, bookcases, desks, etc. Kit includes 4 each 10" and 14" spacers and legs; 4 brass ferrules, 4 no-mar glides, and instructions. In natural finish, ready to stain.

WOOD LEG SETS of 4

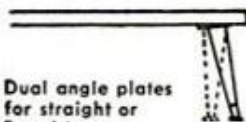
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Decorator style, gracefully tapering hardwood legs for bed frames, chairs, tables and easy, quick furniture modernizing or repair. In natural finish, ready for stain. All hardware included. 6"—\$2.49 (reg. \$2.98); 12"—\$3.49 (reg. \$3.98); 28"—\$5.98 (reg. \$6.98). Also 4", 8", 16", 20" and 28" sizes.



No-mar, self-leveling, self-locking feet.



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CANADIAN PLANTS: HAMILTON, ONTARIO AND ROXTON POND, P. C.

Wiring Your Playroom

(Continued from page 212)

Bending the conduit is usually done with a conduit bender, but a pipe tee connected to a length of pipe makes a good substitute tool. The bends should be gradual and not more than four 90-deg. bends should be used in a run between two boxes. The connector locks the pipe to the box through one of the 1/2-in. knockouts. After installing the conduit and boxes and finishing the walls, use a fish tape or length of steel wire to pull the insulated wires through the pipe, Fig. 11. Shaking some talc on the wires helps to lubricate them and makes it easier to pull the wires through conduit bends.

Armored cable commonly called BX is flexible and easy to handle, but it must be used indoors in dry locations and only with metal boxes, never bakelite or porcelain boxes. Cut the armor with a fine-tooth hacksaw, being careful to avoid the insulated wires. Hold the saw at an angle and saw across one turn of the sheathing. Twist sharply to break the metal, Fig. 15, and then pull off the armor. For splices remove about an 8-in. section of armor.

It is important that fiber bushings be used to protect the insulated wires from jagged metal edges of armor. Unwrap the paper backing and insert the fiber bushing between armor and insulation, Fig. 16. The connector slips over the end of the wire, and the bond wire fastens under the set-screw. A locknut holds the connector securely in the box, Fig. 17.

Staples or straps support the cable every 4 1/2 ft. and within 12 in. of every box. The cable can also be supported by running it through holes drilled in the joists.

Non-metallic sheathed cable should be used only in dry places. An exception is the plastic-covered cable, which may even be used underground. The advantage of sheathed cable is in its flexibility and ease of handling. It is inexpensive and generally used to install additional wiring in finished houses. The protective sheathing is easily removed by pulling the rip cord, Fig. 13. Both metal and non-metallic boxes may be used. Most boxes have built-in clamps to hold the sheathed cable.

Connecting and Splicing Wires

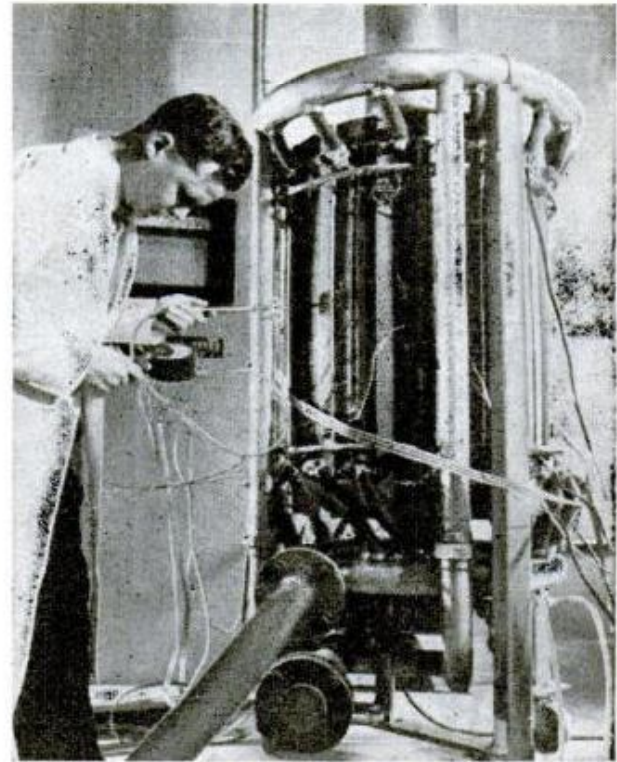
Wires must run continuous from box to box, and all splices and connections must be made inside the boxes. The splices and connections require special attention to make the system safe and strong and get full use of the electric power.

For a good terminal connection the wire is twisted around the screw in a clockwise direction to avoid loosening it as the screw

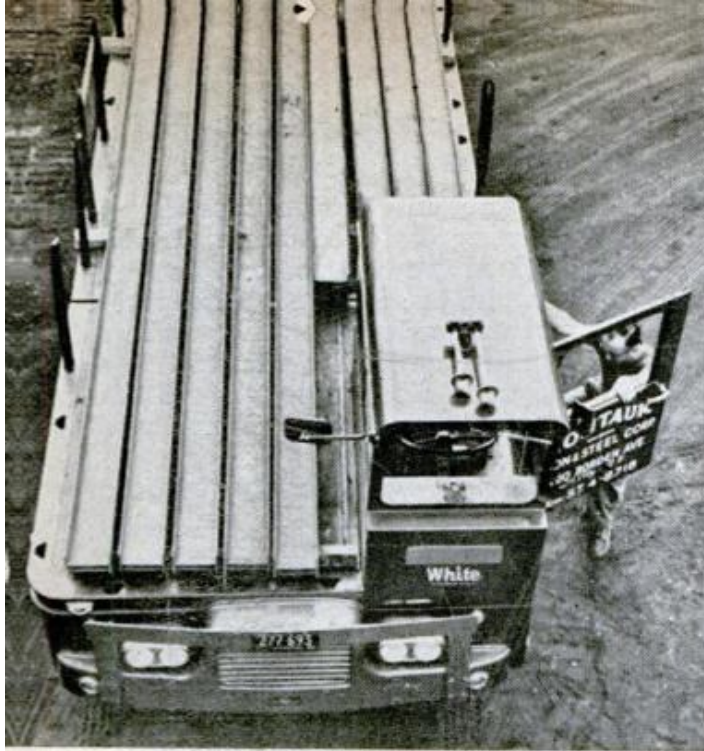
is tightened, Fig. 6. The easiest way to join two or three wires is by wire connectors, often called wire nuts. These connectors do not require soldering or taping. About 1/2 in. of the wire is scraped bare, and two or three wires are joined by screwing the connector over them, Fig. 5.

All other splices are made with solder and tape. To make the splice, scrape about 3 in. of insulation from the wire until bright and clean. Twist the ends together and coat them with a non-corrosive soldering flux. Then dip the wires in solder or apply solder with a torch or iron. The bare wires are wrapped with plastic electrician's tape, extending it over the insulation to make the wires waterproof and provide the proper insulation. ★ ★ ★

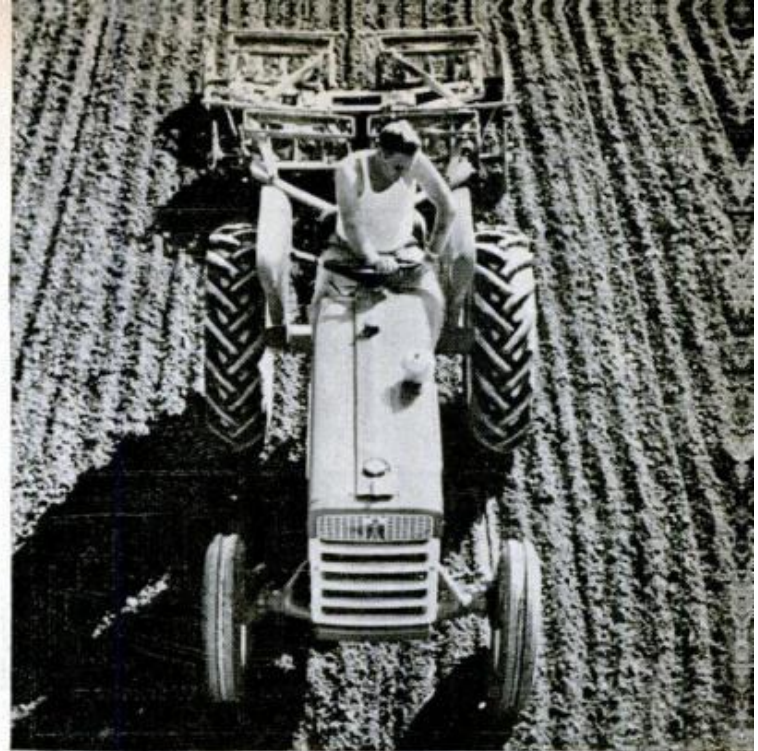
Thermoelectric Generator Delivers 5000 Watts of Power



Directly converting heat into electricity, a new thermoelectric generator developed by Westinghouse for the U.S. Navy has no moving parts but delivers 5000 watts of power—enough to light 8 to 10 average-size homes. It is built in 2500-watt sections, each resembling a hollow cylinder 30 inches across and 30 inches high. Kerosene is burned inside the cylinder while the outside surface is cooled by water. Electricity is generated when heat flows from the hot to cold faces. Pumps for the water and the fuel burners are operated by electric motors taking their power from the generator.



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Q.

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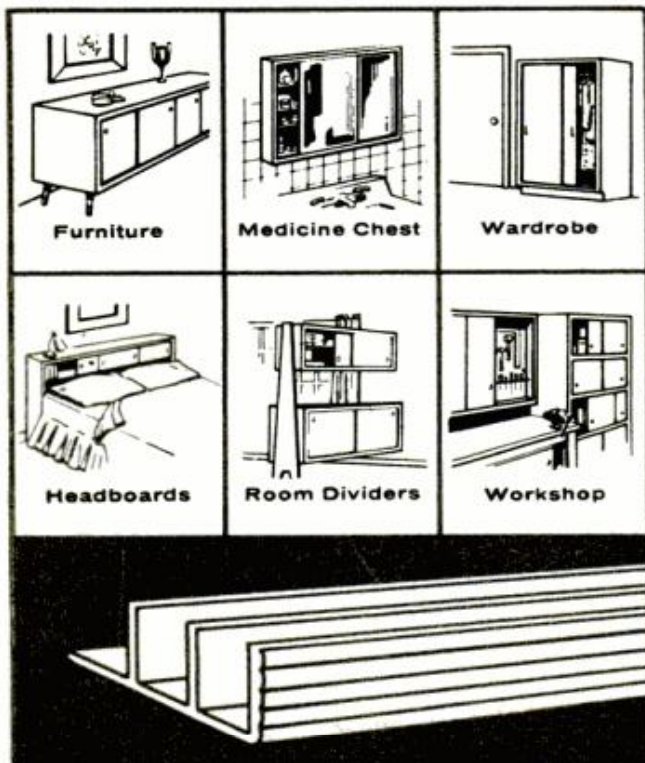
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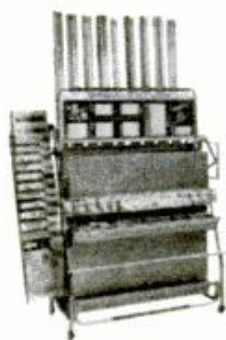
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"Poly" Coddles Plants

(Continued from page 147)

Such increases not only prevent frost damage in winter but greatly accelerate growth during the warm growing season.

In addition, the plastics tend to keep irrigation moisture on or near the surface longer, minimize unwanted mineral deposits in topsoil, discourage growth of weeds, and prevent damage from high winds.

Chief advantage over glass or plastic greenhouses is the cost, plus mulching benefits and weed prevention. Black plastic is especially helpful with weeds.

Necessity Breeds Invention

Gary began his experiments because of an irrigation problem. The water is scarce near his nursery and Santa Paula's water has a high mineral content.

For mulching, polyethylene strips are spread on the ground around each tree, covering the earth from the circumference of the tree trunk to a point about six inches beyond its foliage. For lean-tos, the plastic sheets are stapled to wood stakes which are driven into the ground at an angle on one side of the plants.

Gary reports a 20 percent increase in growth with mulch coverings alone, and a 40 percent increase when plastic windbreaks are used, too. He also found that the windbreaks are more important for increasing ground temperature than for windbreaking, and he is now experimenting with windbreaks on both sides of the plants to get maximum benefit from the plastics.

Grows Trees, Plants, Rootstocks

Gary specializes in the production of disease-resistant orange and lemon trees for commercial growers and retail outlets. To obtain budwood for such trees, he grows plants with seeds from diseased trees (such plants are usually nonsusceptible to their parent's ills) and then determines which seedlings are capable of producing acceptable fruit. In some cases, he must let them grow eight years.

Disease-resistant rootstocks are also grown, and these can usually be budded in two years or less, depending upon how fast they grow. And since he grows far more rootstocks than full-grown trees, the speeding-up process of the plastics is important.

Gary estimates he spends only 1½ cents per square foot in polyethylene, for which he has been able to utilize his land with 40 percent greater efficiency. ★ ★ ★



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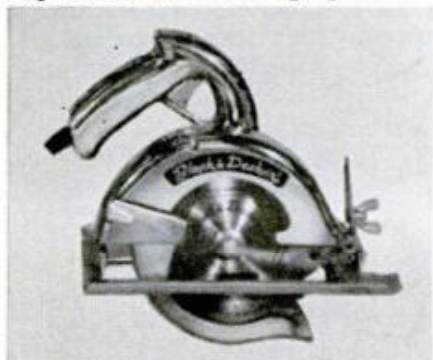
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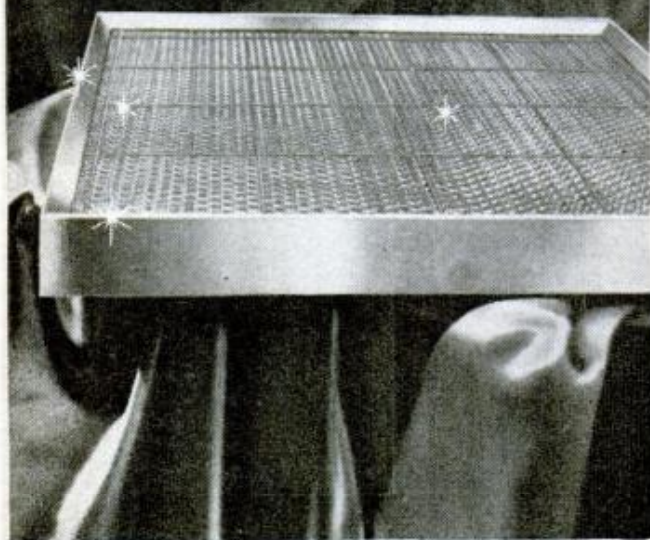
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Excess Humidity

(Continued from page 206)

sources, should be tracked down and remedied.

Condensation in Walls

During cold weather warm, humid air inside of a house always moves toward outer walls, floors and ceilings because of its attraction to cold, dry air with which it unites to release its moisture content. Water vapor slowly but steadily passes through most materials of which walls are made. To prevent this penetration and subsequent condensation on sheathing in outer walls as shown in Fig. 14, insulating batts and blankets used in house construction have vapor-barrier coverings. A wall filled with blown-in insulation requires a separate vapor barrier, which may be a sheet of polyethylene plastic or other equally effective membrane. Vapor barriers are always placed on the side of the wall facing the heated interior. Besides membranes, there are a number of highly effective sealers that are applied by brush or spray gun.

Vapor barriers also are needed at ceilings under unheated attic spaces. A room added to the outside of a house should have its ceiling covered with a vapor barrier, as in Fig. 11, before the plaster base or dry-wall materials are applied. Floors over unheated crawl spaces should also be provided with vapor barriers, usually directly above the insulation, if the latter does not already have a vapor barrier. It is highly important that vapor barriers be continuous, all laps and joints being sealed tightly with appropriate cement. Builders of new homes should insist that suitable barriers be installed on the room side of exterior walls, also ceilings.

Ventilation of Attics

Sometimes the partitions of a house serve as flues that conduct moist air from the basement to the attic. The cure for this is to seal the openings at the basement. Unheated attic spaces require adequate ventilation to carry off humid air and replace this with fresh outside air. Vents also help to keep the attic cool during hot summer months.

Ventilation in attics under gable roofs may be accomplished with louver-type vents as shown in Fig. 15, the intake and outlet vents being at opposite ends. The total area of the louvers should be $\frac{1}{500}$ of the area of the attic space. Other types of roofs require other types of vents. Even the small spaces between rafters of a flat roof require adequate ventilation. ★ ★ ★



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T'ai Chi for Your Muscles

(Continued from page 157)

by using the body in such a way as *not* to strain the muscles, *not* to overactivate the heart, *not* to exert oneself excessively."

A teacher and performer of modern dance and of Chinese theater dances, Miss Delza introduced the exercise to her pupils on her return, in 1952, from a four-year residence in China. Among others, pupils include stage and screen stars, and employes of the United Nations, in New York, where she teaches the exercise once a week. She tells her students that with one lesson a week, plus diligent practice, the movements—which have such names as "Single Whip," "Flying Oblique," "The Snake Creeps Down"—and their definite order can be learned in six months.

An example of one of the simpler movements is called "The White Crane Flaps Its Wings."

Says Miss Delza: "Start with feet parallel and the length of your own foot apart. Place the right hand against the forehead with palm out. Raise the left hand with bent wrist over the head. You should feel as if you are suspended by a thread from the top of your head. Bend forward at the waist, left arm moves down and out. Do not move the right arm. This is part of the still-

as-a-mountain one side and flowing-as-a-river on the other. As you come up, bring your arm to shoulder height. Stand erect and bring the left arm to the forehead like the right. Then curve both arms in a position called 'holding the ball.' Bend your knees, keep a straight back. Then exercise the right arm, repeating the sequence.

"This kind of exercise requires patience and poise," she says. "You must feel everything. These movements are never boring and they bring into play every part of the body from the smallest finger joint to the largest muscle." Because such movements must be made in a state of attention, doing the exercise itself, says Miss Delza, makes one alert and easy.

That the exercise is effective in preparing a person physically is borne out by the fact that in Shanghai, where matches have been held, no Western boxer has yet beaten a boxer who trained on T'ai Chi to get balance and power.

That the exercise has wide appeal was shown from results of a television appearance Miss Delza made in New York City at the beginning of the year: More than 1000 people from 40 states wrote in asking for more information on how to perform it. In answer to this, and similar requests from more recent TV demonstrations, she is preparing a book on the subject. ★ ★ ★



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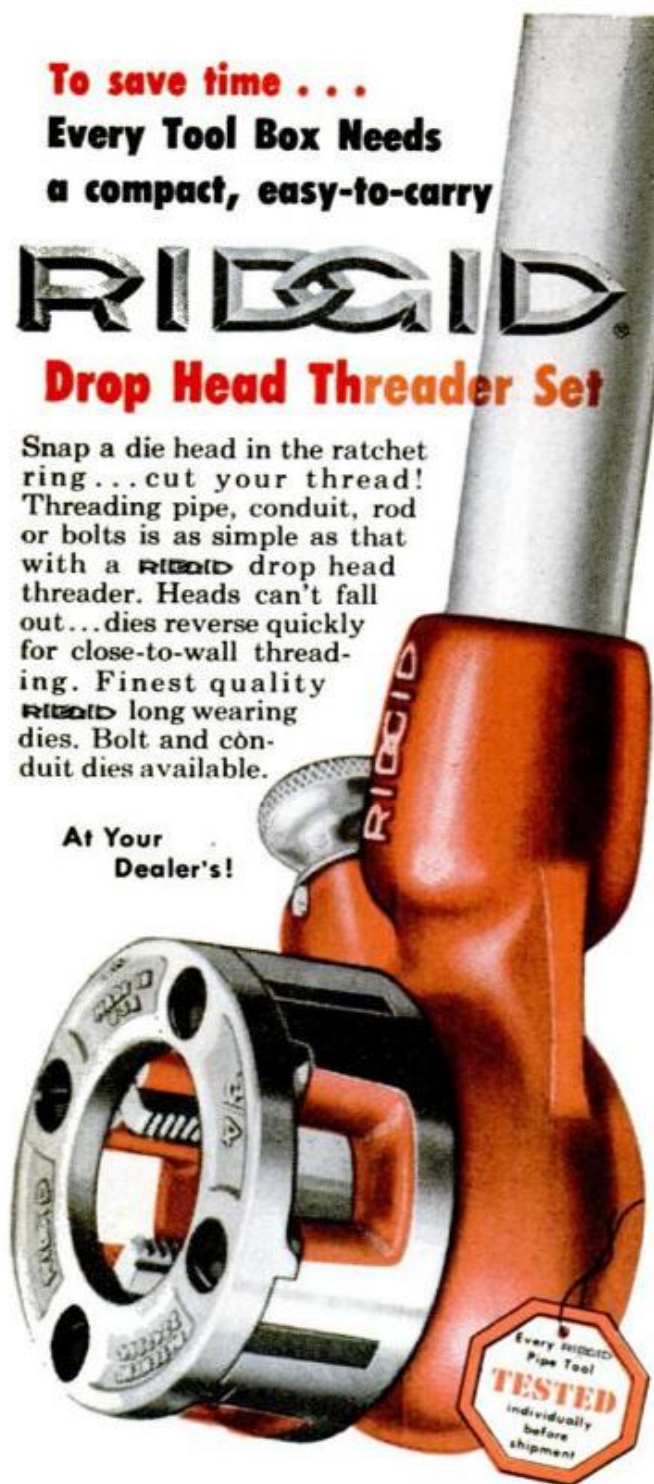
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$\frac{1}{8}$ " to 2"—12-R

For bolts— $\frac{1}{4}$ " to 1"—OO-RB



Enclosed Ratchet Type

For pipe— $\frac{1}{8}$ " to 1"—O-R

$\frac{1}{4}$ " to $1\frac{1}{4}$ "—11-R

RIGID

The Ridge Tool Company • Elyria, Ohio, U.S.A.

Before the Siren Sounds

(Continued from page 199)

the beams. First, nail two of the boards to the joist from inside the shelter. Over the sheathing place two layers of concrete blocks using no mortar between them. The work on the roof continues in this manner until the last roof board is covered with concrete blocks from outside the shelter. After all the roof blocks are in place, complete the wall by setting the final rows of blocks in mortar.

Basement walls above ground level require additional shielding. There is approximately an equal amount of shielding in 8 in. of concrete as in 16 in. of books, 20 in. of earth, or 30 in. of wood. Bags of earth or gravel could be stored in the shelter. Then, in case of an emergency, the bags would be ready to stack along foundation walls to provide enough extra protection.

A shelter entrance requires at least one right-angle turn to scatter the radioactive dust. The entranceway and vents usually provide plenty of ventilation for a basement shelter, but a blower is essential for some, especially those built completely underground. In these shelters, vent pipes and filters are used to cross-ventilate the whole area.

Radiation fallout cannot be detected by taste, sight, touch, hearing or smell, and so far no inexpensive test equipment is available. In a shelter a battery-powered radio is essential for receiving local defense instructions and information about when it is safe to come out. The shielding material in the walls cuts down radio reception so much that an outside antenna is needed.

Besides having flashlights with fresh batteries, a shelter should be provided with a 4-cell, hot-shot battery to light a 150-milliamper, flashlight-type bulb. With such a battery, low-level lighting is obtained that furnishes continuous light from a fresh battery for at least 10 days. Besides these emergency lights, regular electric outlets should be available in the shelter for periods when the current is on.

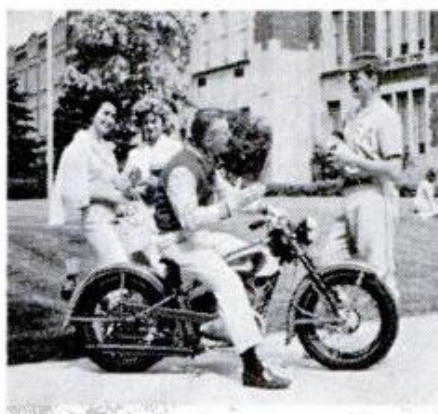
The housekeeping problems of shelter living would require careful family planning. Containers for waste should be on hand. And a 2-week supply of canned food should be kept in the shelter, as well as plenty of water.

For additional information on the construction of fallout shelters, ask your local civil defense organization. Or write the Federal Civil Defense Administration, Battle Creek, Mich. ★ ★ ★

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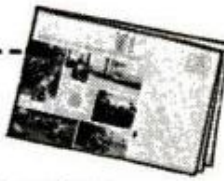


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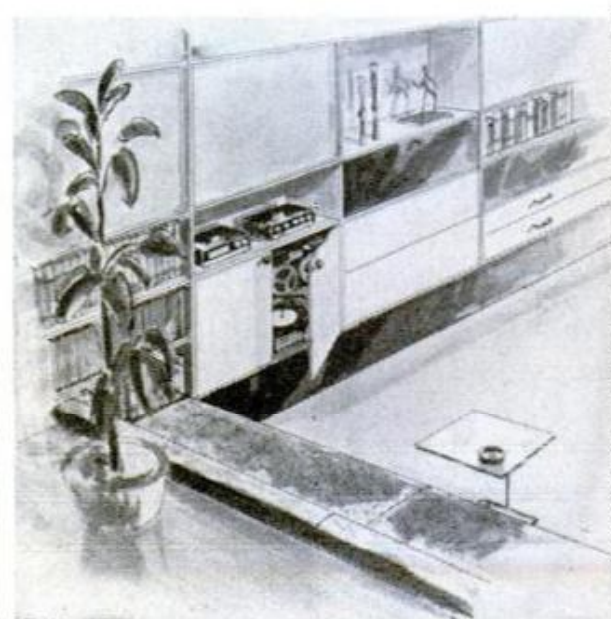
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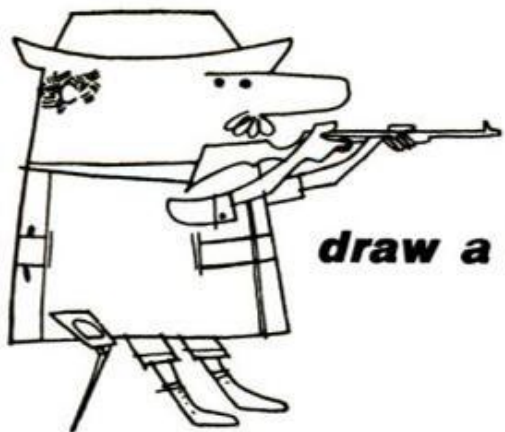


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Sun, Shade and Wind Where You Want Them

(Continued from page 189)

blazing glare of the late, lowering sun so it won't pour in beneath the foliage and bathe the west wall in heat. Depending on the way your house sits on the property, or if you have a terrace on the south side, it may be advantageous to spot a small shade tree in the southeast quadrant to catch the morning sun at about 10 o'clock when it begins to heat things up."

Use Tall Trees for Summer

There are good reasons for using tall high-crowned trees on the south side. The high angle of summer sun varies from about 73 degrees on June 21 to 50 degrees as the season wanes. So, south-side shade trees are most effective if their high canopies overhang the roof. As summer fades, days grow cooler, and the sun creeps further south in the sky, you'll want some warmth. If trees have high crowns, then the lower late-season sun will shoot in under the branches and flood the house. For the same reason high shrubs should not be used near the south side of the house.

What kind of trees are best for shade? Local nursery men and landscape experts can tell you which do well in your area. In most cases, however, shade trees should be deciduous varieties. They are trees that shed their leaves each fall, allowing winter sunshine to filter through bare branches and help warm the house. Steen has a few words of sound advice regarding varieties: "The Norway maple, while beautiful and hardy," he says, "should not be used where you want lawn. The canopy is too dense and its shallow root system robs the topsoil of nourishment. White oak, tall, stately and high-canopied, is subject to an oak blight and should be avoided where the disease is prevalent, just as you'd avoid American Elm in the northeast. Fruit trees tend to branch low, so they make excellent shade candidates for the western side of the property. But be ready to gird yourself for a rigid schedule of spraying throughout the budding and fruiting season, or you'll wind up with an unsightly mess of rotting, wormy fruit on the lawn. This can make the trees more of a handicap than an asset."

Chart Lists Shade Trees

The best shade trees, according to Steen, are those with a lacy bower, deep roots, no pods or shedding bark to dirty the lawn, and dense, sturdy wood to withstand wind, ice and snowstorms—especially in northern areas (see chart for a few shade tree suggestions).

SHADE TREES

Eastern Areas

American Beech
Locust (thornless and podless varieties)
Sugar Maple
Pin Oak
Tulip Tree

Southern Areas

Magnolia
American Beech
Locust (thornless and podless varieties)
Sugar Maple
Pin Oak
Tulip Tree

Midwestern Areas

Little Leaf Linden
American Beech
Locust (thornless and podless varieties)
Sugar Maple
Pin Oak

Western Areas

Tulip Tree
Magnolia

*Many other trees will thrive in specific local areas. Check your nurseryman. Avoid trees that are soft or brittle, such as Chinese elm or soft maples that come apart in storms; shallow-rooted poplars that steal food from lawns and raise walks; "dirty" trees like arbutus and sweetgum that litter the lawn with fruiting pods and bark. Trees like willows, box elder and poplars should be far from septic fields and tanks because their roots intrude the lines, break them and plug them. Trees subject to local diseases—like white birch and American elm in the northeast, and white oak in many areas—should be avoided at all cost in those areas.

Roof overhang of two to four feet on a one-storey house will serve as well as trees in shading a south wall during summer's height. But if your home isn't architecturally suited to such a device, and shade trees aren't practical, don't give up. A "plant awning" can be just as effective and, in the right place, surprisingly attractive. A plant awning is simply a vine, such as ivy, wisteria or climbing hydrangeas, trained up a trellis at one corner of the house. Wire mesh, tacked along the wall above the window frames, will give the creeper a natural pathway to follow. And it will grow along the track by itself, filling out more and more each year until it forms a bushy green eyebrow two to three feet thick along the length or breadth of the house. If you pick a vine that drops its leaves in winter, the living awning will provide shade in summer, and allow winter sun to penetrate and warm the wall area it covers. If flowering vines are used, your house will wear a unique garland in the season of bloom.

Many older homes have sun rooms and sun porches with huge window areas facing west or southwest. Usually they're fine and cool in the morning when no one uses them; maybe even too chilly and dark for breakfast on a nice morning. But on hot summer evenings, for which they were de-

(Continued to page 267)

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THE RUBEROID CO., 500 FIFTH AVE., N.Y. 36, N.Y.

signed, they are often the hottest place in the house because they are perfect traps for the blazing afternoon sun. Even blinds don't help because they block the breeze. The hot walls and flat roof of the typical sun porch make an oven of the place.

This is where a vine-covered arbor or pergola, simply constructed against the southwest or west wall with framing lumber and open-work lath, can work miracles. And if you build a flagstone, brick or concrete pad under the pergola, you will have enhanced your home with a high usable, semicovered terrace for outdoor eating. Arbors don't have to be green tunnels, either. Framing and lath can be worked into patterns and designs that cast enough shadow themselves to provide dappled shade. Side walls can be louvered. Variations in design can be effected to match your taste and the style of your home.

Sun room or no sun room, the "hot spot" for most homes is the wall facing most nearly southwest or west. This wall can absorb a phenomenal amount of heat during late afternoons in summer if no shade trees protect it. All night long, the stored-up heat is radiated to the rooms inside. The entire wall becomes, in fact, a radiant heat panel. If a pergola or structural sunshade would spoil the lines of the house, or isn't feasible for other reasons, there still are tricks you can try. Ivy-covered brick, stucco or stone will cut wall temperatures as much as 30 percent. Since vines tend to creep under shingles and clapboard, ivy won't do on such homes. For these, trellises of lath or metal placed a few inches from the bare outside walls will readily support fast-growing climbing plants such as roses. Leafy barriers like vines and climbers not only shade the walls, but also transpire to the air around them. Evaporation of this moisture uses up considerable heat, and you'll usually find that the air pocket between a trellis and a house wall is several degrees cooler than the general outdoors.

If you have a green thumb and like to work at grafting and pruning, a spectacular wall cover can be achieved with ornamental espaliered trees. Usually slow-growing varieties of fruit trees, these decorative plants are carefully cut back each year. Only the shoots that extend in the pattern desired are permitted to grow. The branches of an espaliered tree, grown flat against a house wall, can be pruned and trained to bracket windows or arch over doorways in graceful, blossoming designs. Such plantings can provide your home with a decorative, pictorial effect, eliminate the severe look of large expanses of bare wall and, most important, give needed protec-

tion against merciless summer sunshine.

"Arbors, plant awnings and other plantings that overhang windows and bays," Steen points out, "have the added advantage of protecting drapery fabrics, carpets and furniture upholstery from fading and deterioration due to strong sunlight. But there's something to remember about wall climbers. On a wood-shingle or clapboard house, you will be faced with the problem of a paint job. Espaliered trees, trellis climbers and vines are a pain in the neck against painted walls when painting time arrives. For natural-colored masonry, all right. But," he adds, "if flowering climbers or trees are used against the house, give some thought to how the color of the blossoms will look beside the wall colors. You can achieve some ghastly effects with magenta blossoms against red brick, for instance."

Not everyone wants to block out sun and loosen up foliage so breezes can drift through. "In North Dakota, where I grew up," says Steen, "people are more interested in shelter belts to break the winter prairie gales and summer winds than they are in shade. And in the chilly North and West, it may be desirable to soak up sunlight in traps during the heat of the day, so outdoor areas are comfortable for evening cookouts."

Many people think of windbreaks as long, straight rows of trees or high slatted fences. This is hardly necessary, or even good. In most areas, cold winds blow in from the north, northeast or northwest; soft, warm desirable summer breezes hail from the south, southwest and west. If a wind fence, or a high hedge of dense evergreens and shrubs—such as hemlock and arborvitae—is constructed so that it curves around the northern and easterly sides of your home, it will block the northern gales throughout the winter, deflecting them from house and environs. The same curved hedge, however, being open to south and west, will scoop up summer breezes and guide them in toward the house and across any patio enclosed by it. If the curving line of the hedge or fence comes in closer at one corner of the house, it will tend to squeeze the breeze through the bottleneck, increasing air motion across the area beyond the corner. A patio or terrace located there would be noticeably cooler than any other place around.

If your area differs from the norm, the same idea can be adapted to accommodate any condition of prevailing wind. And it will pay off abundantly. According to controlled tests, such a wind buffer, if it slows a winter blast from 12 to 3 miles an hour

(Continued to page 268)

(Continued from page 267)

when the temperature is 32 degrees, will cut fuel consumption for that day precisely in half. Properly built and located windbreaks have reduced annual fuel costs by nearly 23 percent at government agricultural experiment stations.

When it comes to terraces and "outdoor living rooms," Clayton Steen is at his best. "This is where you want real comfort," he says. "Sun and shade must be in the right places at the right times. For the kids, the sand box calls for sun during sand-box time; the playhouse should be shaded from hot afternoon sun. The terrace must be sheltered from cold wind, but should snare evening breezes so grownups can use it at night. It should be dappled with warm sunlight on a summer morning if the family likes to breakfast outdoors. Everything, besides being pleasant and decorative, must be geared to the use that the family will make of it. It's a family affair."

To achieve desired effects, Steen has dozens of ingenious tricks up his sleeves. On a cold, windy hill overlooking a broad sweep of valley or lake where winds build up, his circular terrace may be dropped below grade, with a curved windbreak hedge or sapling fence on the windward side. In this way, the sun's warmth collects in the pocket during summer afternoons,

and radiates gently during chilly evenings without being blown away by damp breezes off the water. "Such an arrangement allows the terrace to be used much earlier in spring, and late into fall," he says.

Suppose the view is on the windward side? A curving fence or hedge can be built around a glass window frame of the same height with considerable effect.

"Today," Steen points out, "you can get good looking louvered fences in wood or aluminum, and arrange the louvres so that they break unwanted winds, but catch desired breezes during hot periods and swirl them around the entire area."

The landscape expert has used fan-shaped sun "visors" covered with plastic panels to shade particular parts of a terrace from unwanted sun. "One spot can be warming up while another corner is cooling, by applying ideas like this in combination with plantings," he says.

Small pools can do a great deal to cool a protected corner on a terrace, and all good landscape architects use them effectively. It takes a tremendous amount of heat to evaporate water, and cool air around an attractive pool is almost always present if you can box it in with dense plantings so it doesn't dissipate too quickly. "Even the cool 'look' of a pool is a psy-

(Continued to page 270)



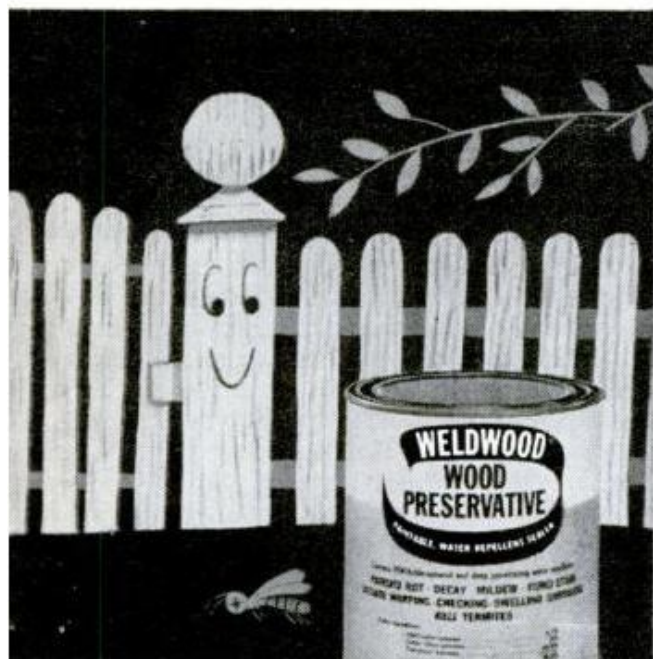
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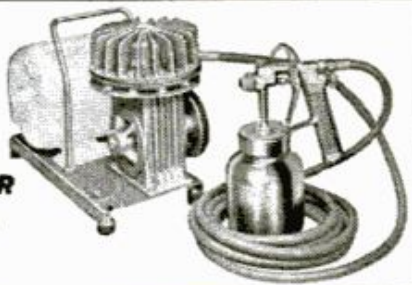


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chological help on a hot evening," Steen maintains. "And so are the colors and textures you use on a terrace. In shaded areas, white paving, sand, and light tones have a clean, warm appearance. In hot spots, darker tones—gray gravel, slate, flagstone—appear much cooler. And such things make for easy maintenance."

If the terrace is relatively unshaded, and close to the house, light-colored paving material should not be used, according to Steen. "Hot summer sun will reflect from it and glare through the windows, radiating off ceilings and walls," he points out. Even concrete walks close to the house are heat-bouncers, and thick plantings between them and the house will help lick the problem if you're stuck with such a walk. By making a walk of small flagstones, separated intermittently by patches of lawn, the heat reflection factor will be considerably reduced.

"Sometimes the smallest things make a big difference," Steen says. "Even poorly-chosen colors can wreck a perfectly good control idea. With a highly reflective, light-colored terrace, you avoid painting a house white, yellow or pink. Those are better with a dark-surfaced, shady terrace. For the bright one, the house should go to gentle grays, off-browns and tans.

"And," he continues, with a grimace, "I wish people would learn that shocking colors on a house may look fine in the advertisements, but most of them clash forever after with any flowers the owners plant around them. The fact is that most flower gardens look their best against a dark gray house.

"The whole thing is a matter of fitness and common sense." ★★★

Powdered Paint

Dry painting—spraying powdered paint onto a surface for instant drying—now is being developed to replace liquid spraying or painting in some applications. In explaining the process, Joseph Gaynor, a chemical process engineer for General Electric, said that a constant injection of air or gas can keep particles of paint mixing in automobile-factory paint bins, for example, thus eliminating the need for a solvent. Getting the dry paint to stick can be done by heating the metal just above the melting point of the paint particles so that they melt and flow into a smooth coating, said Gaynor. Applying glue or a tacky substance to the metal before the paint is sprayed also would make the paint stick until it is heated.

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NOW—AN INDOOR BUILT-IN BARBECUE AND A BUILT-IN STEREO SYSTEM

Pictured at the right is NuTone's fabulous new Built-In Barbecue . . . also NuTone's Hood-Fan which keeps the kitchen air fresh, clean and odor-free. Below is the NuTone Built-In Stereo Music System for Stereo records, tape, radio and intercom in every room. Easy to install in standard 4" walls.

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Cincinnati 27, Ohio

OCTOBER 1960

271

Mister Rescue and His Bloodhounds

(Continued from page 133)

ground portable unit to be used only on assigned emergency frequencies.

Russ is authorized to work the new VHF channel reserved for search and rescue work, and CAP's Channel 7, which is good for about 15 miles.

Mounted atop the station wagon is the business end of a high-output PA system. Its amplifier peaks out at 40 watts, or about 110 decibels, through a 4½-ft. air column in the horn. It is loud enough that a speaking voice can be heard and understood through it, from two miles away in flat country. This horn is also used for speaking directly to a lost person thought to be nearby, as an aid to getting through heavy road traffic, and a handy means of directing volunteers gathered for a search.

To provide current for this equipment an alternator is used instead of a generator. This device is widely used on police cars because it creates no radio interference, utilizing slip-rings instead of a commutator. It generates alternating current which is rectified to 12 volts d.c., and will provide 50 amperes as long as the motor runs, or about half that amount while it's idling.

For the first five years of his rescue work Russ had none of this fine equipment. He worked with a wobbly Model-A Ford panel truck and second-hand camping gear and paid his own expenses. This was double-tough because when he was called out he had to leave his job without pay. Now and then gasoline money was offered, but this didn't put groceries in the Cone larder.

Here was an odd situation—he was performing a service that was becoming more important every month. (One deputy is on record as saying that Russ and his dogs are worth 400 men on a search.) Lives were being saved, and Russ had only to witness the reunion of one lost child with tearful parents to realize that his job, as he puts it, is "the world's greatest." His scrapbook bulged with stories lauding his work and authorities praised him highly—but he was dead broke and got that way doing the job. His wife had been working to help out, but with a baby on the way she had to stop.

When the two of them had to dine on a lone can of beans one night, the Cones decided search work had to go. Thanis suggested finding a sponsor. But how do you do that? Russ didn't know, but he started for Oakland the next morning with his scrapbook in a last-ditch struggle to rescue his rescue project.

Rattling into town, he noticed the sign on the Calo Pet Food Company, stopped the truck on a hunch and went in. He was tak-

en to Charles Mel, president of the company, who asked to look through the scrapbook. Three weeks later Russ was provided with a fully equipped station wagon and was on the Calo payroll at a regular salary plus expenses.

There wasn't a happier man in California that day, but Russ was a little fearful that he was going to be used as an advertising medium. Mr. Mel calmed his fears by stating flatly, "Even if the Rescue Unit never sells one can of dog food, Russ, we feel that a service such as yours should be maintained as a free public service without you having to suffer for it." And that's the way it is.

RUSS CONE SAYS:

If you are lost, admit it to yourself, then observe these five rules:

1. Stay where you are.
2. Make some kind of shelter or windbreak.
3. Hang a garment where it can be seen.
4. Make noise by pounding a log.
5. Eat, sparingly, anything that does not taste bad or have a milky sap.

★ ★ ★

This Month's "Great Pioneer in Science"

(Page 22)



Michael Faraday (1791-1867)

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 professional
 finishes -
 wood,
 leather,
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 - in minutes!



... new **DINO-LITE** pressure-sensitive plastic veneer
 ... just press down and trim!

Here's what you've been looking for to take the work out, put the fun back in your finishing and re-finishing jobs. It's **DINO-LITE**, a new pressure-sensitive vinyl veneer that produces wood, leather or marble finishes even the best professional cabinet makers would be proud of!

All you do is peel off the paper backing, press **DINO-LITE** down and trim with scissors. The built-on adhesive sets in 48 hours, giving you a permanent finish that matches wood or other veneers costing five times more!

Produced in America's most beautiful grain and color patterns, **DINO-LITE** is fade-proof, washable, stain and abrasive resistant, and can be polished to a high gloss.

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full 24" x 48" sheet in walnut or cherry woodgrain, or white marble . . . ready to install . . . with full instructions included. Send check or money order along with coupon to above address. Satisfaction guaranteed or money back.

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Enclosed is my check money order for \$2.00. (No stamps, please.) Please send me (post paid) a 24" x 48" sample sheet of walnut, cherry, or white marble **DINO-LITE**.

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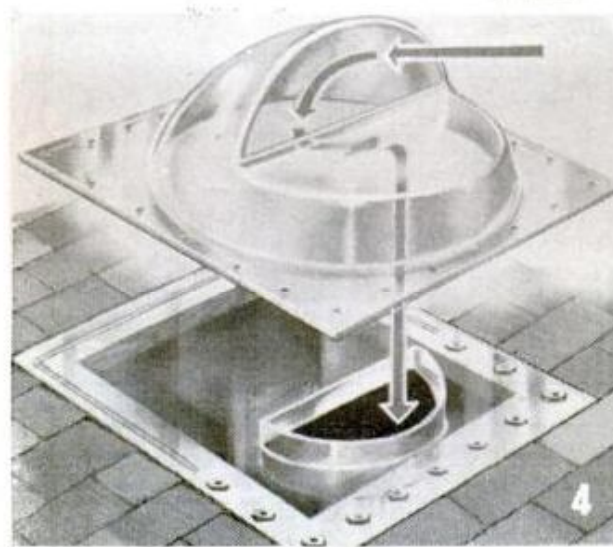


2. PUTTY IN A CARTRIDGE is applied with a calking gun. Cartridge comes with a shaped nozzle that applies putty in a ribbon of correct size and simultaneously smooths it into a triangular fillet. Smoothing with putty knife after application not necessary

Gibson-Homans Co., 2366 Woodhill Rd., Cleveland 6, Ohio

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Strauss Photo Technical Service, Inc., 930 F Street N.W., Washington, D. C.

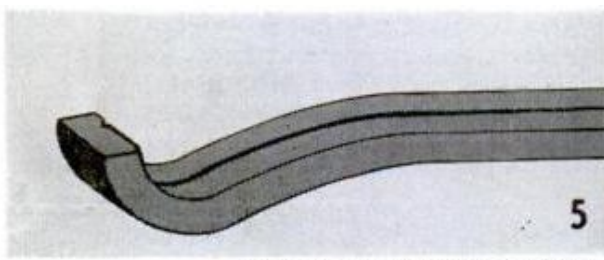


4. SKYLIGHT combines a ventilator that provides a constant flow of fresh air with no chance of rain, sleet or snow getting inside the structure. It's transparent, is easily attached to roof. Comes in various sizes for homes, industrial buildings and boats

Sudbury Laboratory, Sudbury, Mass.

5. FLEXIBLE, PERMANENT MAGNET comes in a strip only slightly larger than ordinary lamp cord. Can be fastened by stapling or gluing. Can also be sewn into shower curtains, drapes, pot holders, or stapled or glued into drawers for holding metallic items

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So easy to install—in the attic, crawl space or closet! Banish that rooftop antenna or rabbit ears. Get signal gain across all TV and FM frequencies. Comparable to an outdoor conical antenna.



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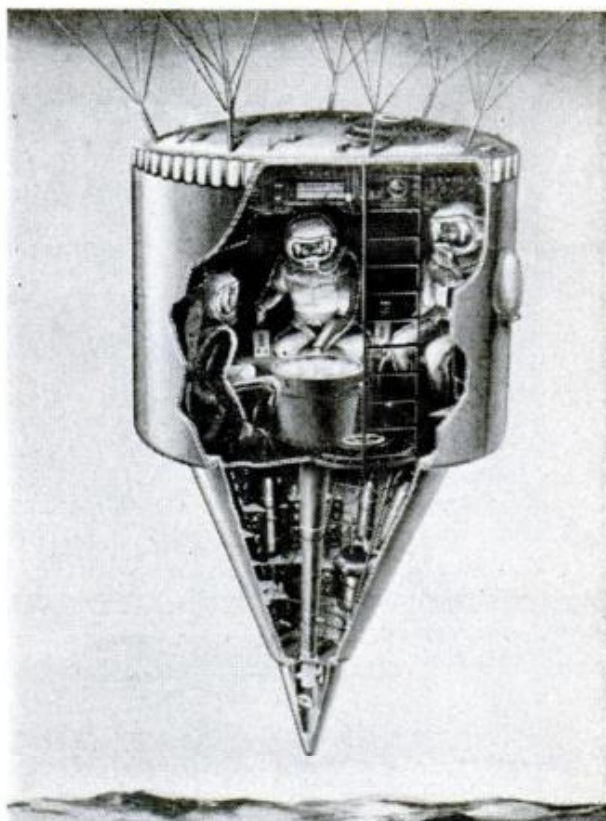
NOTE: Jerrold offers a full line of specialized reception aids including outlets, plugs, twin-lead TV wire, etc. Write for literature.

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ELECTRONICS CORPORATION
Distributor Sales Division
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Our Moon Program Starts Now

(Continued from page 142)



Successful moon shot will end with this scene: Crew floats back to Earth in capsule held up by parachutes

to right itself in its liquid bath after it comes to rest, automatically pointing its antenna away from the Moon.

In righting itself the inner sphere will puncture an exterior seal and the liquid will soon vaporize away. Thus the sphere will settle against its outer shell, making a firm contact through which quake vibrations can be transmitted to its seismometer.

The seismometer is a special design in which Caltech and Columbia are cooperating. It is both rugged and delicate. It is being dropped without protection from a helicopter at 1000 feet altitude, then examined for failures.

The capsule will be heavily insulated against lunar temperatures and will constantly develop some heat of its own because of its battery-powered circuits. This heat will be used to boil water (three pounds of water will be carried on board for that purpose) and the resulting vapor will escape, keeping the interior within safe temperature limits. The principle is something like that of an evaporative cooler. Minimum amounts of water will boil away during the bitter nights, more water will be consumed during the long hot days.

JPL engineers think that capsules of this type will have many uses in the future.

((Continued to page 278))

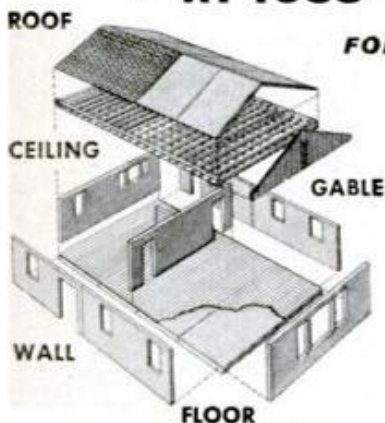
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To save money in conventional building—send us your blueprints for a free Cost-Reduction Analysis. They will be returned with an engineering report on the savings you can make with Homasote Materials.



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"It's about those electric buses we ordered from your company!"

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PROJECTS



Dremel moto-shop

Versatile, multi-purpose tool for every workshop — and one the whole family can use. Handles delicate scroll work, or "big tool" projects. Moto-Shop is basically a 15-inch jig saw with a power take-off. It has a powerful ball-bearing motor — cuts through 1 $\frac{3}{4}$ " wood, light metal, tile, plastics. Table tilts to 45° for angle and bevel cuts, raises and lowers to new, sharp blade area. 4-way blade holder permits cutting in any direction. Moto-Shop is self-contained — no belts or pulleys. Unique blade guard makes it safe for the whole family.

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Model 572 Deluxe Moto-Shop — 15-inch Jig Saw with disc sander, grinding wheel and guard, wire and cloth buffing wheels, 30" flexible shaft and a 12 piece accessory set..... **\$49.95**

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Quality Power Tools Since 1934

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They think such a capsule would be ideal for the first explorations of Venus, the mysterious planet whose surface has never been seen. A capsule that is made to float would remain on Venus' surface no matter whether the surface is liquid or solid.

A capsule's radio would be too weak to reach all the way back to earth from distant Venus and so the engineers propose that the space bus that delivers the capsule be used as a relay station. They would put the bus into a near-miss trajectory or else into an orbit around the planet. In either case it would pick up the weak signals from the capsule and retransmit them with its own powerful equipment.

Instead of carrying capsules, Ranger One and Ranger Two are to transport a whole array of instruments on a magnesium framework that looks something like an oil-well derrick. Each of these craft will be 12 feet tall, 5 feet in diameter and will weigh 610 pounds. The instruments include a rubidium vapor magnetometer for measuring the magnetic field of the craft's environment, devices for measuring the intensity of the Sun, others for measuring the hydrogen intensity in space around the Earth and an ion chamber for measuring cosmic-ray radiation.

There will be an instrument for measuring the impact of micrometeorites. One box will contain a "lubrication experiment." A big question about space travel is whether a lubricant will evaporate away, allowing bearings to stick and gears to seize. Some information about this will be obtained from the lubrication-friction experiment.

In Pasadena today the JPL engineers are discussing the color schemes for all the Ranger craft. Black and white are the two most popular colors. Black absorbs heat and can keep an instrument warm, white reflects heat and can keep a device cool.

The instrument cone of one probe that was shot toward the Moon was ornamented with long white stripes because it was to fly parallel with the Sun and could have over-heated. Yet if the shot had been postponed a few days, when the Moon was away from the Sun, the cone would have been redecorated with black stripes. Presenting a smaller surface to the Sun, it would have needed the black ornamentation to keep warm.

This principle of space decoration works so well that in the case of two space probes for which an interior temperature of 86 degrees was desired, one of the probes reported by radio that its temperature was little more than 100 degrees while the other reported an interior steady state temperature of 88 degrees.

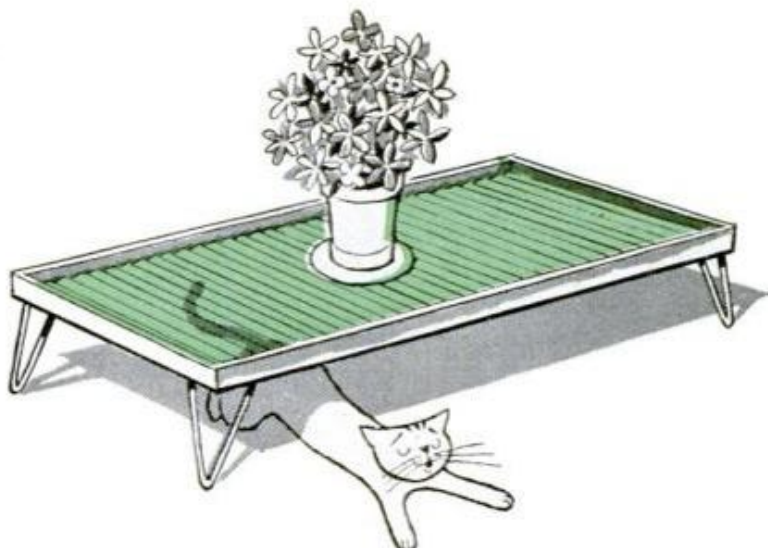
(Continued to page 280)

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Plan No.

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|--|---|
| 1. <input type="checkbox"/> Patio Roof | 7. <input type="checkbox"/> Fluorescent Ceiling |
| 2. <input type="checkbox"/> Room Divider | 8. <input type="checkbox"/> Indirect Lighting Fixture |
| 3. <input type="checkbox"/> Folding Decorative Screen | 9. <input type="checkbox"/> Adjustable Wind Screen |
| 4. <input type="checkbox"/> Weather-protected Entrance | 10. <input type="checkbox"/> Wind and Sun Screen |
| 5. <input type="checkbox"/> Woven Fence | 11. <input type="checkbox"/> Planter Box Screen |
| 6. <input type="checkbox"/> Window Awning | 12. <input type="checkbox"/> COFFEE TABLE |

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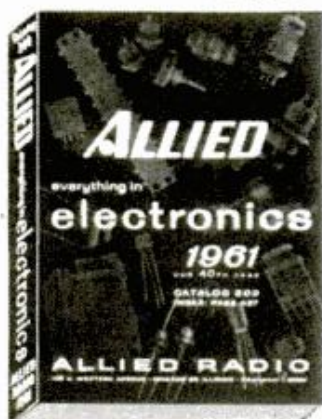
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Instead of absorbing heat, black also can be used to dissipate excess heat into space. The backs of the solar vanes on the Ranger craft will be black. The solar cells on the front surfaces would become excessively hot except for the black rear surfaces that will radiate much of the heat away.

By the time the Ranger program is finished a new and somewhat more powerful launching rocket, the Atlas Centaur, will be available. With its thrust it will be able to deliver a capsule to close-by planets or even soft-land a fairly heavy load of instruments on the Moon.

The big step, that of manned travel to the Moon and back, must wait until the 200-foot-tall Saturn rocket becomes operational. The first trial launchings are scheduled for 1964. Its motors, using conventional fuels, are under development now by Rocketdyne, while Aerojet is conducting parallel studies of liquid-hydrogen engines.

The way JPL engineers see it, several Saturn rockets would be used to soft-land one-ton packages of survival gear and housing, surface vehicles, breathing oxygen and other supplies on the Moon, then a seven-stage Saturn carrying a crew in a sealed cabin would be fired toward the Moon. Three stages would get them to the target and the fourth stage would be used for terminal maneuvering and for backing down to the surface. The last three stages, relatively small because of the Moon's weak gravity, would suffice for the return to Earth. With the possibility of liquid-hydrogen engines and other breakthroughs it may be that the Saturn program will become less complicated than it now appears.

Terminal guidance and maneuvering will be one of the big factors in a successful lunar mission. The manned cabin with its return stages must be guided to the exact point where the earlier equipment packages were landed. A near-miss of just 10 miles would be disastrous. No one could walk that distance, even on the Moon, while carrying enough oxygen to remain alive and in a suit insulated against lunar temperatures.

Preliminary work also has started on the biggest launching rocket of all, the Nova that will have 6 to 12 million pounds of thrust. This monster would have eight engines for its first stage, each developing as much power, or more, than Saturn's entire first stage. Nuclear power is being considered for its upper stages. With this vehicle it would be possible to populate the Moon or land exploring expeditions on Mars with power to spare for the return trip.

★ ★ ★

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Easy—Quick—Forever!



Action Compares
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Rear View

Nail two Roll-eez "N" on rail at drawer opening. If drawer has center guide, nail third Roll-eez "N" on top of back in the middle, and Roll-eez "M" on bottom of back, straddling guide.

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Food Preparation Center



Wall Ovens . . . Such a Joy to Use and Clean!

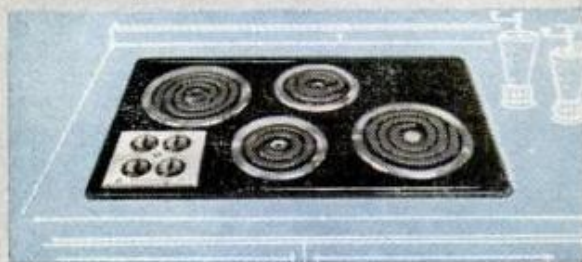
- Drop-Leaf Door to make cleaning easier than ever
- Automatic Cook-Master Control to turn oven on and off
- Fits wall opening 28½H x 21½W x 23¾D
- Can be installed with a screwdriver in as little as 7 minutes, 52 seconds (from roughed-in opening and wiring)

Seven other models available with such features as Double Ovens, French Doors, Pull 'N Clean Ovens, Meat Tender Controls.

Cooking Top Convenience, Finger-tip Controls

- Heat-Minder Unit for safe, no-burn cooking
- Speed-Heat Unit gets red hot in seconds
- Only 3½D x 19W x 31L opening needed
- Installs by adjusting only two clamps

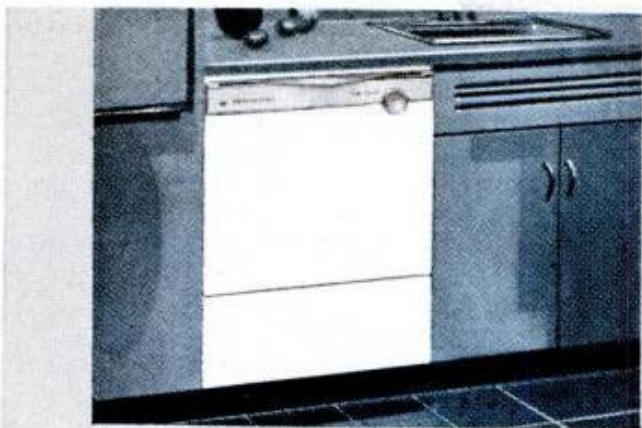
Other models available to fit 24" cabinets or with remote control panels. Fold-Back Surface Units, too.



New Frigidaire Flair Built-in glamour . . . in a free-standing range

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Kitchen Clean-Up Center



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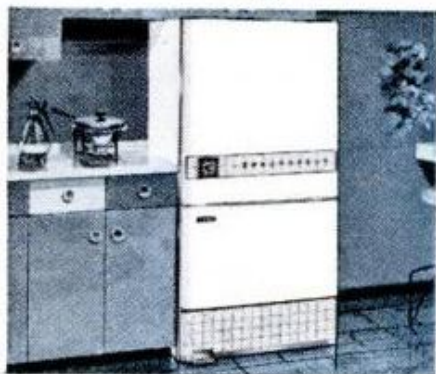
- Exclusive Swirling Water Washing Action gets all your dishes hygienically cleaner than hand-washing
- Big capacity Roll-To-You Racks are extra easy to load
- "Spots-Away" Rinsing "slides" water off the surfaces to combat spotting
- 34 $\frac{1}{4}$ "H-Min. x 24"W x 24 $\frac{1}{2}$ "D-Min. Opening

Free-standing cabinet models, and Dishmobile model (which can be built-in later) also available.

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- 30-35% faster than many comparable models
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- Dispenses detergent and bleach automatically underwater

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FRIGIDAIRE
PRODUCT OF GENERAL MOTORS

Advanced Appliances designed with you in mind

PM House of Built-Ins

(Continued from page 160)

For several months Milt and his team of assistants worked over the problem of designing a House of Built-Ins specifically for *Popular Mechanics* readers. Several design concepts were scrapped. Finally Milt came up with a concept that, from its inception, not only excited him but the editors of *PM*. Weeks of work went into the final plans and details.

On these pages you see the results of that work. In general terms, the home is a three-bedroom, 1964-square-foot house (plus a garage area of 538 square feet) with a family room as well as a living room.

But the house can't really be described in general terms. It's packed with ideas—ideas that can be plucked from this plan and incorporated into existing homes. The storage walls, the disappearing beds, the study areas—all can be built in any home by any craftsman. On page 170 are how-to-do-it instructions for one of the built-ins. Still others will be shown next month. Anyone planning to remodel or add to an existing home may well adapt these built-ins to individual needs.

As soon as Milt's plans were complete, down to the last electrical outlet, *PM* editors began a search for a builder. We wanted a pilot model of the home built, both as a study of the practicability of the plans, and to photograph for these pages. We wanted the very best builder. Recommendations came in from several sources, and the name Jim Nuckolls popped up frequently. A visit to Jim in Tulsa, Okla., showed why. Only 37 years old, he still is one of the most experienced builders in the Southwest (last year he built 145 homes). Over the years he has developed several new construction techniques that have been adopted by other builders. Most important, Jim is a perfectionist. He considers every home he builds as *his* home, and refuses to turn over the keys to a proud new homeowner until he is satisfied that every detail is complete.

After one look at the plans for the *PM* House of Built-Ins, Jim gave a low whistle and decided to build it. Typical of any good builder, he made one or two minor changes to suit his own construction techniques and his own geographical area, then went to work.

We wanted as many readers as possible to walk through the house, not just look at the plans. Other topnotch builders were shown the blueprints, and several of them enthusiastically agreed to build the house. Starting the week of Sept. 25, it's

open house for *PM* readers in each of these model homes. On page 169 is a list of the builders, and the address of each home. If you live in one of these areas, we're sure that a visit will make you as enthusiastic as everyone else connected with this project. And if you seriously consider building the home, a trip of a few hundred miles would be a worthwhile investment.

As you approach the home, you'll immediately see how Schwartz has achieved complete privacy, yet brought a great deal of the outdoors inside. Across the entire front of the H-shaped house is a masonry wall, interrupted only by a pair of gates with heavy ornamental iron. Walk through the gates and you are in a landscaped entry court, with a double door beckoning you inside the house itself.

The view that greets you as you walk through the door is spectacular. You literally are met by the landscaping from the rear of the house, which flows in toward the front door by way of an inner garden court. As you stand at the front door, all the walls facing you are glass.

To your left is a guest closet, to your right the living room and dining area. The living room is a showpiece—a throwback to Grandma's old-fashioned parlor, and the only room in the house with a somewhat formal atmosphere. In Schwartz's words, it's the one room in the house that's "always ready for company" because the family will instinctively gravitate toward the family room-kitchen wing, leaving the living room free for formal entertaining or those embarrassing moments when uninvited callers drop in and "the rest of the house is a mess."

The dining area is to the right of the front door, convenient to the kitchen, yet isolated from it. In this corner there's room for built-in china storage.

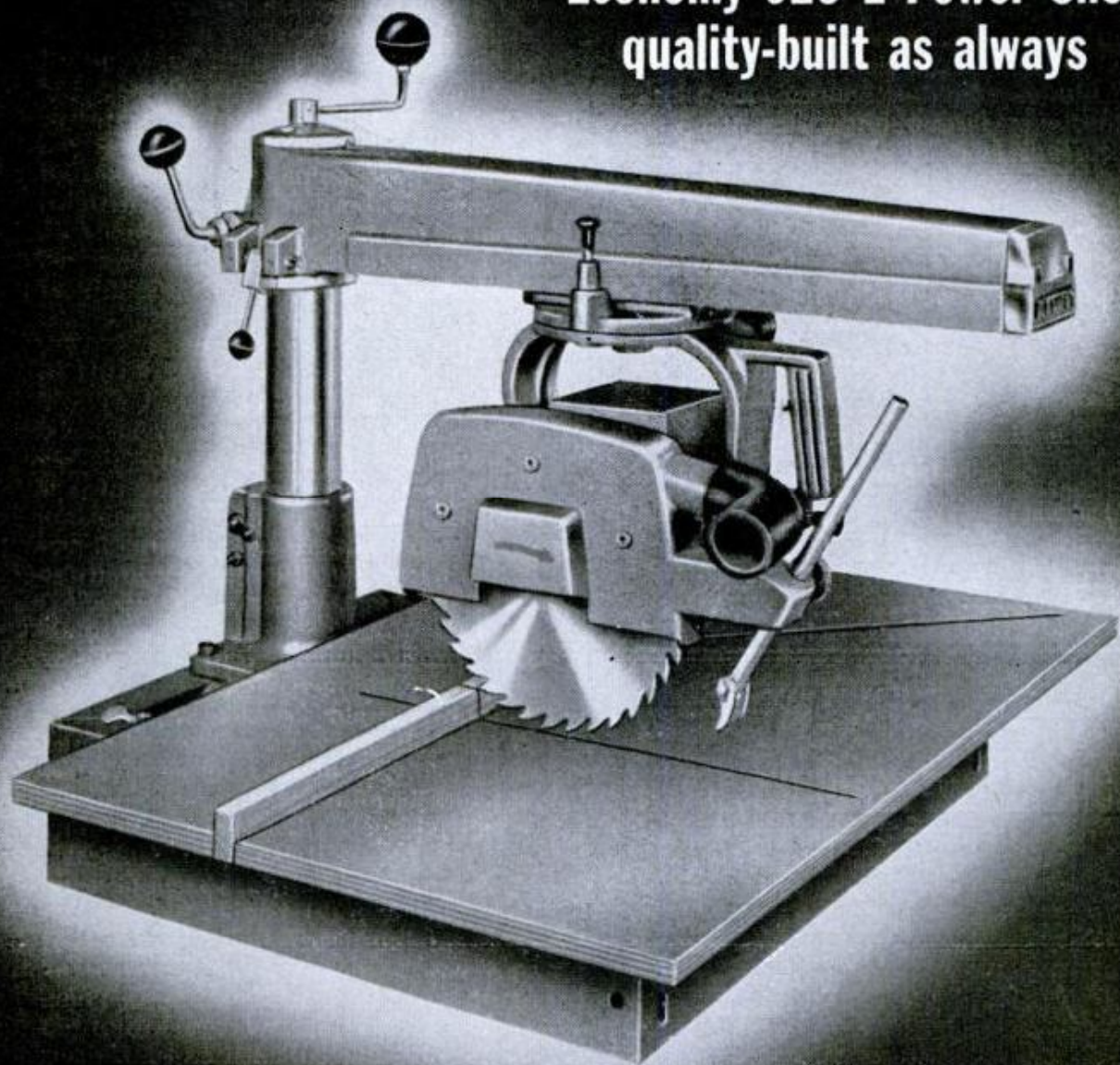
Between the living room and the family room is a built-in entertainment wall. One feature is a turn-around TV which can be viewed from either room. Both sides of the entire wall are accessible, and can be subdivided to meet the needs and interests of the individual family. We show it with built-in stereo speakers, and display and storage space for books, collections of glassware and those absolutely useless yet beautiful items that you can't display in most homes.

At the open end of the entertainment wall—in the doorway to the kitchen—is a built-in panel of components and controls for a stereo hi-fi-intercom system. One auxiliary station for the intercom system is in the bedroom wing. There's another at the front gate, so the housewife can de-

(Continued to page 286)

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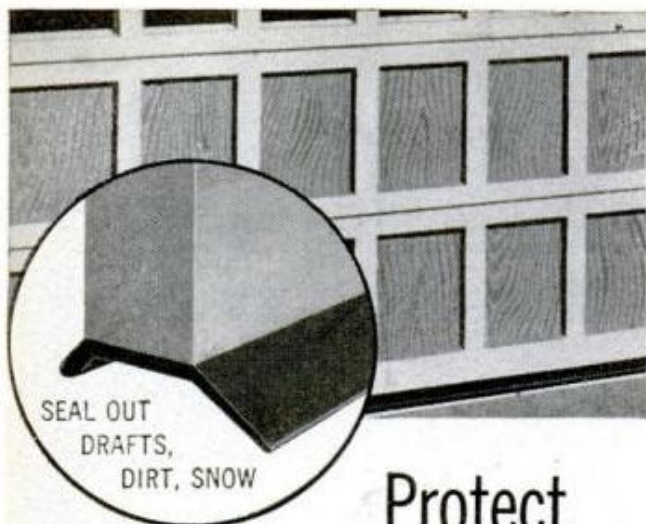
This 925-E DEWALT gives you features not found in other makes costing 25% more. It's cut-tested for accuracy, power-packed, versatile, safe. See it at your dealer's now. Send coupon for free catalog.

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termine the identity of any caller or give instructions to servicemen without opening the front door. For more details on this and other built-in electronic equipment, see page 236.

The real focal point of the home is the family room. Stretching along one wall is a massive and beautiful (but relatively inexpensive) fireplace made of concrete block. Schwartz has given a dramatic facade to the fireplace merely by recessing key blocks one inch. These keys are highlighted by twin skylights, with hidden fluorescent lights, that flood the fireplace wall with light both by day and night.

The family room lends itself to all kinds of recreation, from boisterous play to contemplative relaxation in front of the fire. Furthermore, such activity can flow right on out through the glass doors to the patio. The patio area, adjacent to both the family room and living room, is an ideal spot for a family swimming pool, as it can be seen from everywhere in the house except the two smaller bedrooms. Mom can even keep a wary eye on the pool from one end of the kitchen.

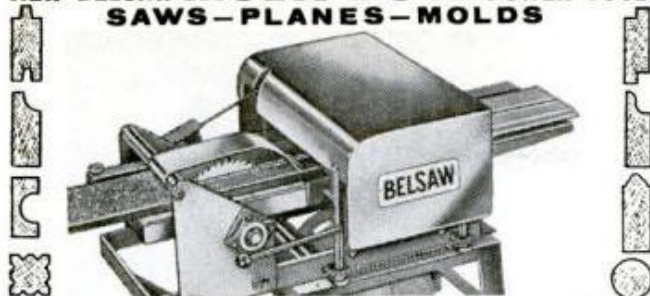
The kitchen itself not only is a show-place, but is highly efficient. Schwartz believes that a kitchen should be compact yet, properly equipped, capable of serving up to 20 people with ease. From any point in the U-shaped kitchen the housewife can reach any other point in four steps, yet there's plenty of countertop working area and a built-in range, oven and dishwasher. Furthermore, it's so finely detailed that there's even a shallow cabinet for canned-goods storage—eliminating stretch, squat or reach-over to find a particular can. It's a bright kitchen, too, with plenty of window area and shadowless strip lighting. Jim Nuckolls has even included a built-in charcoal broiler.

Just off the kitchen is the utility room with built-in washer, drier, furnace, water heater and optional air conditioner. In the basement version of the plan, this area includes the stairway, but the laundry equipment is kept upstairs where it belongs, still separated from the kitchen. In both versions there's a mud closet for storing bad-weather clothing and footwear. A home freezer can be installed either in the mud-closet area, or just outside the door in the raised-curb area of the garage.

This curb is built up around the sides of the two-car garage. Along one wall is a complete workshop. Built into this same wall is storage space for mowers, rakes, shovels and other lawn tools, with access from the outside.

(Continued to page 288)

NEW BELSAW MULTI-DUTY POWER TOOL
SAWS—PLANES—MOLDS



Now you can use this ONE power-feed shop to turn rough lumber into moldings, trim, flooring, furniture... ALL popular patterns. RIP... PLANE... MOLD... separately or all at once with a one HP motor. Use 3 to 5 HP for high speed output. Low Cost... You can own this power tool for only \$30.00 down payment.

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Tractor From Old Auto Parts

Parts of a half dozen old cars and a nine-horsepower, one-cylinder engine went together in six months of spare time to build a "compact" tractor for Ronald Herbert, of San Bernardino, Calif., who uses it for landscaping and weed-cutting and plans to make it part of a rental equipment business. The tractor, which cost about \$300, is equipped with a front and rear scraper and a ripper, and will soon have a five-foot rotary weed-cutter. It has enough power through its four V-belt drive to dig holes with the rear tires if it can't move an obstacle, but will make 35 miles an hour in high gear even though Herbert didn't work out a gear reduction ratio.

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As versatile as they are powerful, Wiss Snips are an all-purpose cutting tool no home work bench should be without. Above: No. V-13, seven-inch pocket size. Others from 8" to 17" in aviation, combination, and solid steel styles. At hardware and department stores.

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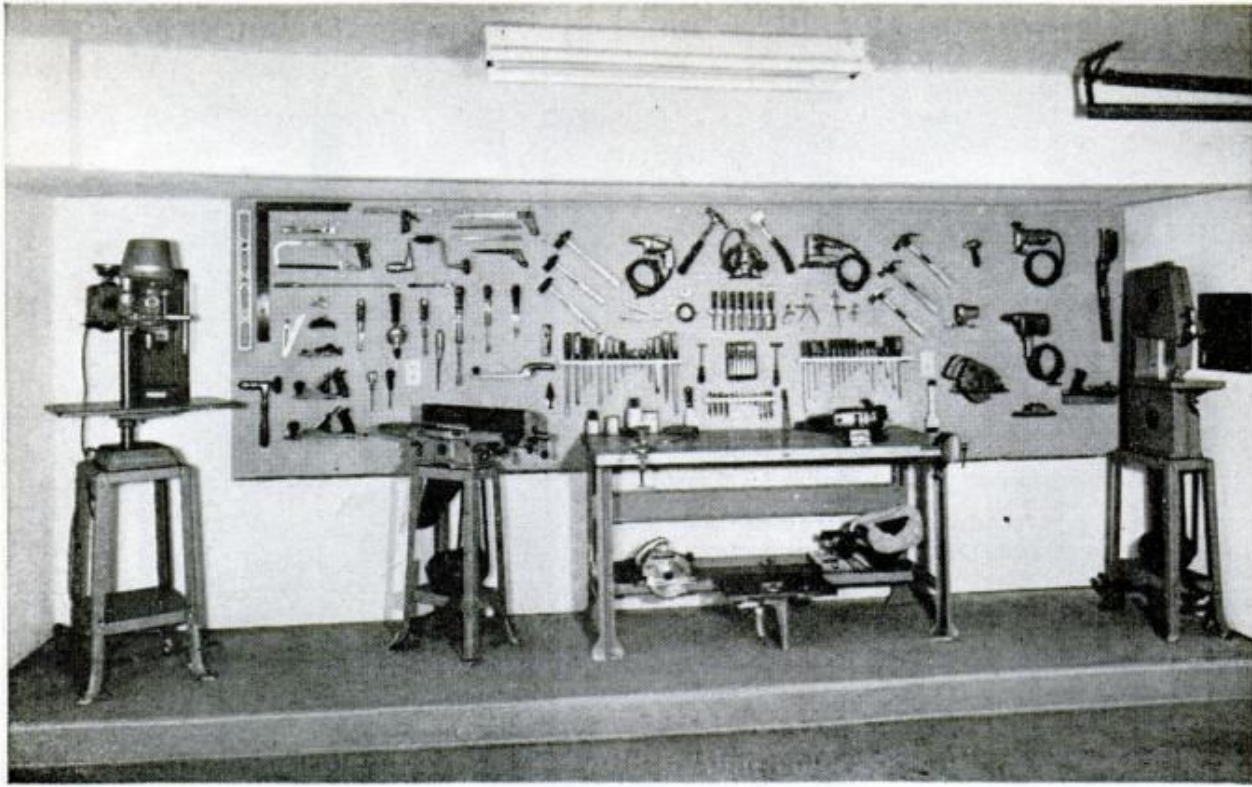


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World's Largest Manufacturer of Shears, Scissors, Pinking Shears, Skalloping Shears, Metal Cutting Snips and Garden Shears



Built-in workshop covers most of one wall of the garage. A raised curb sets the shop apart from the rest of the garage area. There's plenty of room along the wall for a big tool-display panel with matching sets of hand tools. Power tools have their own floor space on the platform. In the basement version of the plan, the built-in shop can be moved downstairs, and this shop area utilized for bicycles and smaller vehicles

Across the house, in the opposite wing, are three bedrooms and two baths. Because this area is a separate entity that can be closed off by one sliding door, the house lends itself to zone control for heating and air conditioning.

Two opposite walls of the master bedroom are covered with built-in wardrobes. There are drawers, shelves and hanging rods galore, with a designated spot for every item of clothing. These two walls have so much built-in storage space that there's room for adult hobby equipment such as guns, fishing tackle, cameras and sewing materials. Again, this built-in lends itself to individual treatment. The space is there, and the built-ins can be arranged to fill particular needs.

Outdoor Privacy

The rear wall of the master bedroom is glass, and opens out onto a patio screened by an optional privacy wall from the family patio. (This wall does not appear in the photographs, as it would have interfered with the photography.) Thus parents can enjoy their own private spot outdoors while teen-agers are entertaining in the family room and the main patio.

One look at the plan will show you how Schwartz has made clever use of hallway space that ordinarily is wasted. Along one

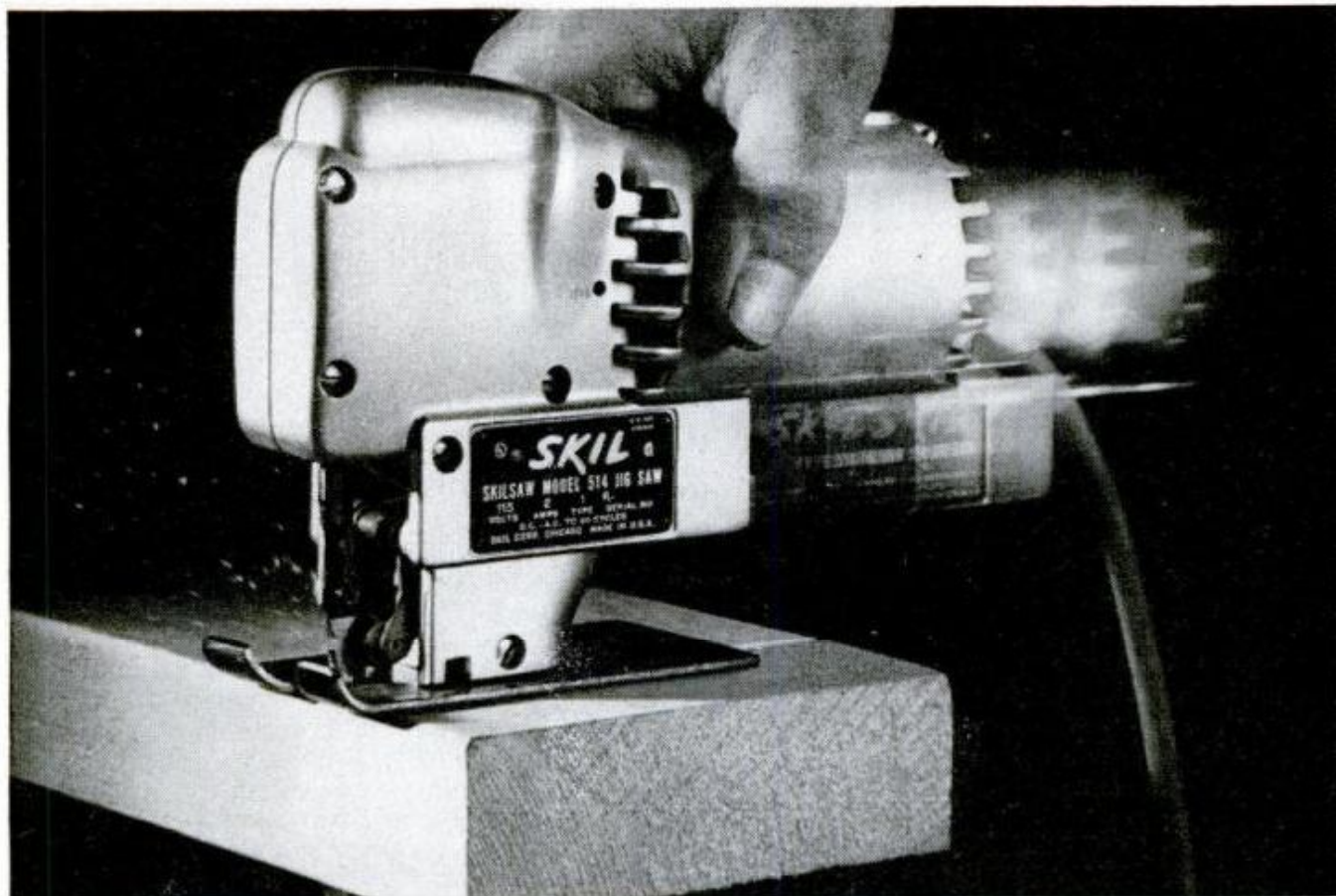
wall is storage space not only for linens, but for model airplanes, toys, dolls and other items of vast importance to children. Along this same wall are twin study areas with fold-down desks. The location—far removed from the other activities of the home—makes this an ideal spot for study.

Unusual Feature

Perhaps the most unusual feature of the *PM* House of Built-Ins is the wall between the two smaller bedrooms—a wall four feet deep. The two beds, one from each room, disappear into the lower section of this wall. Made up in the morning, the beds simply are given a shove and glide back into the wall, opening up the rooms completely for play and for easy maintenance. Either bed can be built as a single bed or a full-width double bed. In the latter case, the finish board is left off the forward edge. Then, when the bed is shoved into the wall, just enough projects into the room to serve as a comfortable built-in sofa. In the wall above the beds is built-in storage for clothing and personal property.

That's the *PM* House of Built-Ins. We think it's one of the finest homes of its size ever designed, a home full of ideas. Best of all, even if you aren't interested in building a new home, many of the ideas may be applicable to your existing one. ★ ★ ★

SKIL JIG SAW IS FASTER!



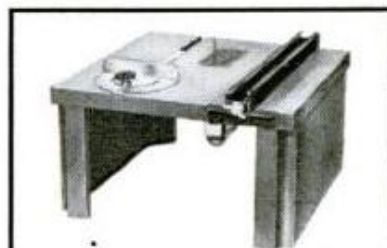
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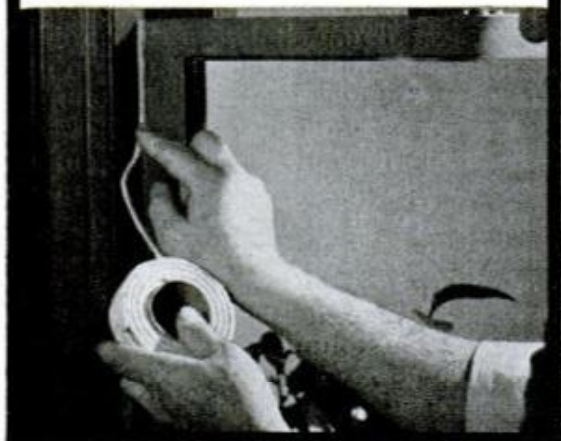
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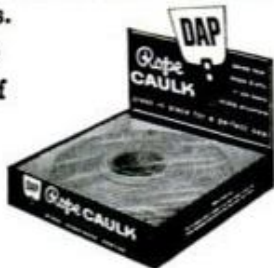


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The House Your Kids Will Live In

(Continued from page 181)

can use solid panels between window and door panels, or take long panels and cut in the window and door openings. You determine which method is more economical.

BARTLING: It is also feasible to "squeeze out" from one material a structural substance that will have different faces on each side—in terms of the density as compared to the core. Theoretically, this is possible now. In 20 years it's safe to assume that technology will catch up and there will be such a squeezed-out material, as you call it.

Is such a laminated piece desirable because of the wide variety of material you can laminate to the core?

BARTLING: Yes. You can still get the warmth and beauty that people like in wood and bricklike materials. It's entirely possible that new wonder materials will be put together in more or less conventional forms as we know them now—brick finish, wood finish, tile and so on. But they will be revolutionary in terms of the materials used. We have had a resurgence of colonial houses. Even though we have more modern forms, people still seem to respond emotionally to the old forms of architecture. I think it would be a fallacy to assume that in 20 years from now the forms won't be the same, even though technology has put us in a wonderland. People don't change as rapidly as science would permit.

JOHNSON: We can be certain that there will be substantial changes in the next 10, 20 and 30 years in technology. If an entirely different looking house could be produced for half the cost, with all the living conveniences and functions that are present today, whether or not it looked different, you'd have a big market for it. For example, sandwich panels and stress-skin construction of component parts can be used today to produce a house that looks "colonial." Our Knoxville house has a kitchen ceiling of a single layer that is at once acoustical, insulating and finished surface. It substitutes one piece for three layers.

BARTLING: The new materials will be multipurpose and multifunctional. Bathrooms will make more and more use of components. Electrical and plumbing systems may be built into the panels. Fixtures will be designed to plug together like radio parts. A two or three-piece bathroom would include medicine cabinets, mirrors and tile.

The really spectacular changes seem to be for the builder in the erection of houses on the site, rather than for the home owner.

(Continued to page 292)

ADJUSTABLE MITER BOX & CORNER CLAMP

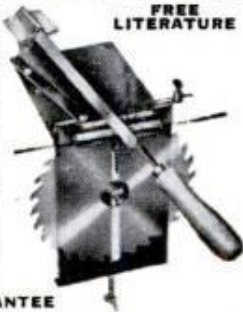


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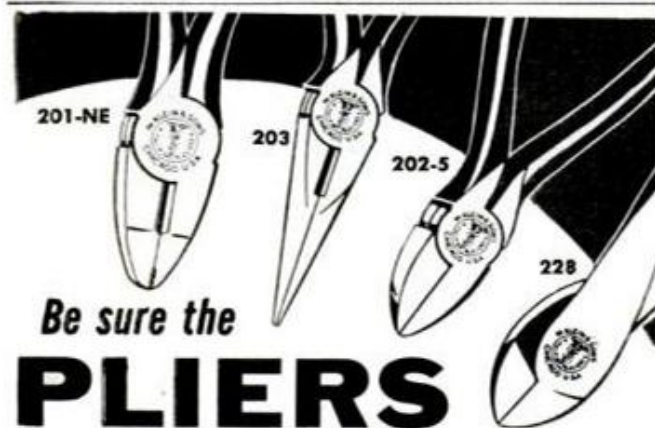
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KING: Not at all. So far, the shell of the house has been the subject. The greatest cost savings, however, will be in three other areas—the foundation, finishes and trim, and the mechanical systems of the house. For example, many manufacturers are developing more durable and permanent finishes providing maintenance-free surfaces.

Dust-free walls for example? Or walls you can wipe down?

JOHNSON: Better than that. Today it is possible to produce a finish in the factory for less than half the cost of the conventional exterior paint system. It will be as good at the end of 20 years as the ordinary paint will be at the end of five years.

BARTLING: The advantages *will* be in maintenance-free houses in the future. The housewife will be the chief benefiter: Materials that can be hosed down, floor finishes that are almost permanent. The greatest impact will occur in the mechanical end—plumbing, wiring, heating and kitchen assemblies, possibly using new energy sources.

What are some specific things the public will get for the money?

JOHNSON: A built-in electrostatic-precipitator air filter will bring the dust-free house to all. It will cost less than an automatic transmission in an automobile. On interior surfaces you'll see wall coverings from which you can wipe crayon marks with a damp rag and which require no painting for 20 years. There will be maintenance-free floors.

What material would you use for such flooring?

JOHNSON: There are clear coatings for wood that look like varnish, but may well last 10 years even in modern applications on the outside of the house. You'd get the beauty of wood without the problem of maintenance.

BARTLING: The old standby materials such as wood, brick, stone, are being refined. It would be a mistake to assume that all materials will be wonder materials. I can see hardwood flooring treated to change the very chemical nature of wood so that it will answer a wide variety of requirements.

Are there any specific wonder woods in the wind?

JOHNSON: Some chemical companies are impregnating wood so that is fireproof.

BARTLING: It should be possible to take a core of low grade wood, wrap it in aluminum foil or cover it with plastic film, and come up with a material that would have different characteristics than either of the

(Continued to page 294)

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original ones. One chemical company is doing research on wrapping wood in a plastic film and getting a completely inert material. They haven't solved the problem of how to fasten it because when you fasten it, you puncture it.

In all this let's not overlook the oldest material known to man—masonry. It is being used increasingly both from an architectural and decorative point, outside and inside. It is used on the facade of buildings to give texture. In Texas much masonry is used for decorative and screening effects at low cost. New shapes and textures are handsome.

What are some of the new things being done with brick?

KING: The brick people have found ways to reduce weight. They slice it into 1/4-inch faces and apply it to plywood or other material to form a lightweight structural panel that has the surface qualities of brick but none of the weight disadvantages. For the Michigan State research house brick was ground up, reconstituted and applied to an asbestos-cement board.

What interesting systems might be in the wind for the homeowner due to developments in electronics and energy sources?

BARTLING: New light sources in the future. More and more use of electrical energy for heating, getting electrical energy from the sun or through the transmission lines we have today. Already some utilities are reducing the cost of power to make such things feasible.

JOHNSON: The next step in the component parts for the shell of the house is to incorporate heating and artificial light. It's possible to do this today, but not economically feasible on a production-line basis.

BARTLING: It is economically feasible now to incorporate resistance electric wiring into the exterior wall panels and when the walls are up have some simple method to connect them. Or we can introduce hidden or surface films that are conductive by the introduction of carbon black and other materials.

JOHNSON: There are several things you can be sure about. The house of the future will continue to be a more comfortable house. It will be easier to heat, cool, keep clean, will be acoustically controlled—with either a slight, or no increase in cost. Possibly a reduction in cost.

BARTLING: One physical change you may see in lower-cost homes may be brought about by the cost of land. It is one of the main deterrents to low-cost homes. With our expanding population there will be an increasing tendency for lower-income

housing accommodations to move back to the central cities. This would indicate to me a tendency for housing to become more vertical.

You mean there's a chance our children will be cliff dwellers again?

BARTLING: There's nothing illogical about it. There's no reason why in vertical housing the desirable amenities could not be incorporated with a proper distribution of park and play areas, so we could get away from monolithic type of land use. More problems could be solved by licking the sewage-disposal problem than some of the more technical problems of building. A lot of things that increase the cost of land now would disappear. We could get marginal land, and greatly reduce the cost of home building.

JOHNSON: To lick this land-cost problem you have to get away from the two-dimensional transportation system for individuals. This ties each house to a set of highways and roads which are expensive. Secondly, free the individual house from its tie to the water line, sewer line, electric line and gas line. Development of a low-cost energy system is necessary. The only thing now that looks like a possibility to do this economically, is solar energy. With this it might be possible to take the water out of the air and return all the waste thereto by incineration.

Just how does this cheap energy solve the waste problem?

JOHNSON: A room air conditioner, for example, has some dehumidifying action. In ordinary size houses today, water from it runs out into a sewer. This water theoretically could fill the needs of a whole family if there were storage tanks. This is taking water out of the air. In reverse, with cheap energy you could incinerate waste and produce a readily disposable ash.

BARTLING: We can have this in less than 20 years if there is a revolutionary breakthrough in solar energy. It could come at any time.

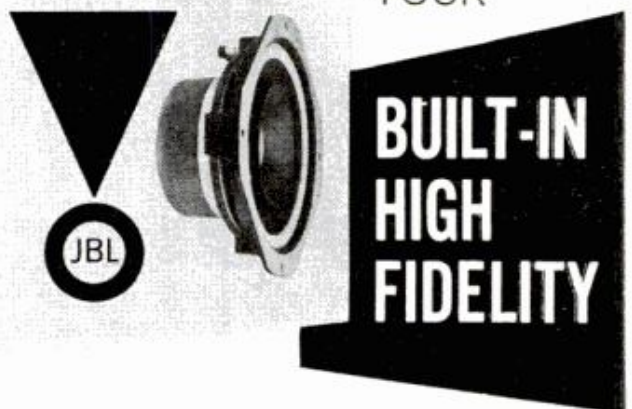
Aren't there research houses now at MIT and elsewhere using solar energy?

BARTLING: The heat-collecting mechanisms cost more than the house, so this is not economically feasible. You may, in 20 years or so, have a five-pound nuclear reactor for a house. The problem so far is that there is no feasible way to dispose of radioactive waste by-products. Present methods using leaded containers and burying them at sea, are impractical in terms of 10 million homes.

Has anybody done any actual design work on a domestic atomic power source?

(Continued to page 296)

HOW
TO CHOOSE
THE
LOUDSPEAKER
FOR
YOUR

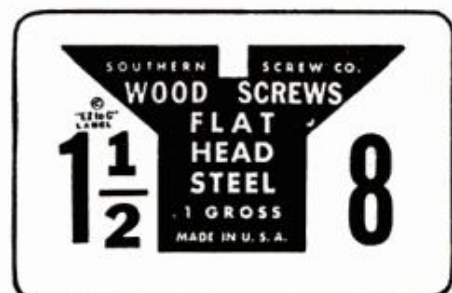


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JOHNSON: I don't think so. There have been designed and developed working models weighing 10 or 12 pounds produced for transportable military power. When such energy is feasible it could be used to do many household chores now done by hand. For example: Vacuum cleaning could be done with a simple electronic brain. A self-contained guided unit would vacuum across the floor, back and forth, all by itself. Using component construction, you might eventually even eliminate the wiring system in a house and broadcast the energy from a single source to a receiving mechanism.

In summing up, would you say there will be more of a trend toward the packaged or manufactured house?

KING: There is now a definite trend toward the industrialized approach to housing. This is separate from the packaged-house concept in this sense—manufacturers of basic building products will produce more completely fabricated components designed on a modular basis to integrate with components produced by other manufacturers. For example, window manufacturers will produce structural window panels which will fit the plywood manufacturers' structural wall panels.

JOHNSON: There will be an increase in the use of component parts that will fit together. This will not mean more standardization in the appearance of houses. One study showed 26 standard shell parts could be used to produce between three and four million different kinds of houses—not with unusual shapes or colors—but all with different surface appearances. Rectangles, L-shapes and so on.

BARTLING: One thing must be emphasized. Antiquated building codes will not permit any of these things to be done. The people in the community must be aroused to make this feasible.

JOHNSON: NAHB is trying to develop a science of building. We must have scientific facts about building houses—physics, chemistry, hydraulics—to really engineer a house for the people who will occupy it. Codes that permit the use of new knowledge and building science are vital to progress.

BARTLING: We must also develop new sources of mortgage money to build these houses. We must completely revolutionize the existing housing laws. These laws are 26 years old and are due for reappraisal. If you can't get acceptance by the people who lend the money, you really haven't gotten anywhere. We must have an integrated approach. You can't have one without the other. ★ ★ ★

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Before You Buy—

(Continued from page 194)

Many older homes are inadequate in this respect. The best storage area is that which is convenient to the point of use. A central storage for linens and a closet near the entrance for guests are all desirable.

The kitchen usually is the only completely furnished room in the house. Here, be sure to check for storage space. Adequate counter space needs to be located next to the major appliances and sink.

Does the garage or outdoor storage unit provide ample space for storing bulky garden equipment such as the lawn mower? Or must heavy equipment be lugged each time up from the basement through an outside entrance?

The age of the house has considerable bearing on its real value. When a house becomes five years old, it will cost approximately two percent of the purchase price for annual repairs and replacements. The older the house the more likely it will need major repairs. For instance, when considering two houses that are evenly priced, discount the value of the one that will soon need a new roof or other major replacements such as wiring.

If you notice any unusual architectural styles or unsightly additions, remove the house from your prospective list. An exterior using a minimum of different materials and without gingerbread ornamentation is usually best to consider.

In the construction of the house look for good materials and sound workmanship. Put all visible flaws under suspicion. In the basement you can observe much of the house structure. And the basement is the place to look for signs of flooding and excessive dampness. The attic, like the basement, is a place where structural faults are likely to show up.

Examine as much of the house framing as possible. Take note of doors and windows that stick. Study cracked plaster. These usually are indications that the house has settled abnormally and major problems may develop as a result.

Don't take someone's word that the house is fully insulated. This can mean almost anything. If in doubt about the quality of the construction, have an expert give you an opinion. A local appraiser is well worth his fee for checking the condition of the house and estimating its market value.

Unless you're experienced, you will be money ahead to have the wiring, heating plant and water heater checked by a professional. To replace any of these items will run to major expense.

Don't overlook the possibility of termite infestation in an older home in areas where termites are known. If there is any doubt, have an expert make a check of the structure.

Making the Deal

Every house depreciates in value at a regular yearly rate, but the rate varies from house to house and from neighborhood to neighborhood. A well-built house depreciates slower than a poorly-built one. A house in a declining neighborhood has a lower market value than the same house in an attractive, improving neighborhood. But in periods of inflation the cost of new houses raises the market value of old ones, and they usually sell for more than their original cost. Also, the forces of supply and demand are always at work, varying from community to community. If the house has been sold a number of times, check the downward or upward trend of local prices and see how they compare with the asking price of the property you are considering. Also, see what similar houses in the neighborhood have sold for recently. Finally, don't forget to check the taxes on the property and you might also remember to inquire about any special assessments. ★★

QUOTE:

"There is no direct evidence that the artificially created low-level, prolonged ambient radiation to which the bulk of the world's population is now subjected has caused any damage to man or his animals. It is my facetious estimate that there is more human hazard from the heat of the arguments than from the present ambient low-level radiation."

—DR. JOHN RUST,
Head of Nuclear Medicine,
University of Chicago

Do You Know This Old-Timer?

(Answer to quiz, page 12)



1909 Packard

Now you can use the "House of Built-Ins" ideas in your home!



NEW HINES WIDEWOOD®

makes built-ins easy

Most versatile new wood product since plywood ends all problems of edge-finishing! Combines the advantages of lumber and plywood to give you wood in one piece as wide as you want. Hines Widewood consists of selected pieces of fine Ponderosa Pine precision-joined and electronically bonded into large planks and panels. Ideal for shelves, cabinetry and many other uses. Unlike plywood, edges are solid wood and need no special finishing. Unlike lumber, wide widths resist warping, twisting, cupping. Easier than plywood to work. Convenient 18", 24" and 36" widths at your lumber dealer's now. Other widths up to 54" available.

Send 10¢ for complete plans of illustrated built-ins.

Stereo hi-fi built-in • book shelves • rotating TV built-in • hobby storage unit • foldaway desk • study wall • bedroom storage design

HINES

Edward Hines Lumber Co.

200 S. Michigan Ave., Chicago 4, Ill.

Enclosed is 10¢ in coin or stamps... please send complete plans and material list for the illustrated built-ins from the Popular Mechanics "House of Built-Ins"... plus full information about new Hines Widewood.

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Street _____

City _____

Zone _____ State _____

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HOW TO SPOT AND CURE A TIRED CAR ENGINE

No hard-working mechanical part will last forever and that goes for the key parts in your car engine, too. Your crankshaft makes millions and millions of revolutions. It's no wonder that engine bearings and rings eventually begin to show wear.



Fouled spark plug from an engine with badly worn bearings

HOW TO SPOT TROUBLE

Here are some of the symptoms to look for: black smoke from your exhaust, sluggish performance, gas mileage that keeps dropping off . . . and oil consumption that keeps creeping up.

PLENTY OF MILES LEFT

Your engine is still good for many thousand miles, *but it does need an overhaul.* A first-class mechanic can save you hundreds of dollars by putting new-car spirit back into your engine, *plus extra years of service.*

REPLACE ENGINE BEARINGS, TOO

Be sure you get a *complete* overhaul, including new main, connecting rod and camshaft bearings. Worn bearings can throw off as much as 25 times the normal amount of oil and *even new piston rings can't control that.* You'll avoid costly repair bills later by getting the job done right the first time.



Heavy carbon deposits from excessive oil throw keep valves from seating tightly

FEDERAL-MOGUL FOR ORIGINAL POWER

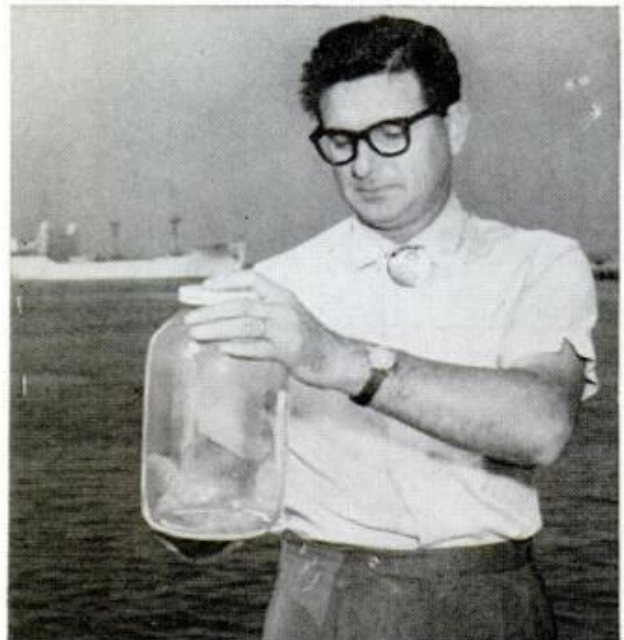
Bearings are the heart of your engine, but it takes a *precision* bearing for like-new performance and maintenance-free mileage. Federal-Mogul engine bearings are the world's standard for quality and precision. Ask any mechanic. There are F-M bearings for every leading imported car, too.



FEDERAL-MOGUL SERVICE

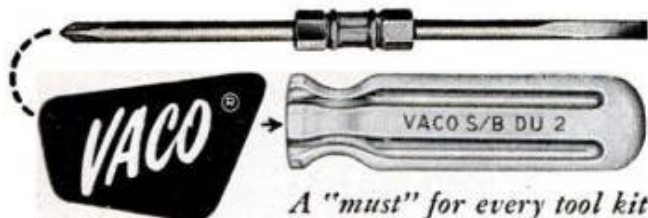


Division of Federal-Mogul-Bower Bearings, Inc. • Detroit 13, Michigan



Illuminated Pickle-Jar Guides Missile-Tracking Ship

When a severe storm threatened to blow their ship off course during a missile-tracking operation in the South Atlantic testing range, the crew improvised an illuminated buoy from two-by-fours, flashlight bulbs and a pickle jar. The ship, the Coastal Sentry, was one of six responsible for bridging the instrument gap between distant islands along the 5000-mile range, and it was essential to be in exactly the right position to pick up telemetry signals from an Atlas ICBM, then being launched. A heavy overcast prevented continuous celestial navigation, so the crew, led by Operations Manager Mike Salone, fashioned a buoy by nailing together three two-by-fours and attaching two empty oil drums as floats. At one end of the two-by-four pole they tied a 30-pound weight, and at the other end they wrapped some "glow tape" and fastened three six-volt, battery-powered flashlight bulbs. Over this they placed an empty gallon pickle jar to protect the batteries from the sea. The crew was sure that the buoy, immune to the winds, would drift with the known ocean current to the exact position the ship had been assigned, and that's exactly what happened. At T-minus 90 minutes the homemade buoy was dropped into the ocean, and for the next hour and a half the crew, through binoculars in inky darkness, followed the bouncing beam of light. This navigational ingenuity helped the ship participate in the 17th consecutive successful Atlas launch. This string of successes was broken a few weeks later, but not because of any lack of home-made missile tracking equipment. The missile misfired at takeoff.



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British Nylon Spinners, Ltd.,
68 Knightsbridge, London, S. W. 1, England

Folding Nylon Gas Carrier

Carrying gasoline, for emergencies or any purpose, is simple with a new plastic-impregnated nylon "can" developed by the same British manufacturer who builds huge flexible oil barges. The lightweight bag folds into a small package when empty, but holds four gallons which can be poured quickly and without air lock through an outlet hose.

OCTOBER 1960

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Secret is in the polymerizing oils in WATCO that give you the toughest and richest oil finish of any in existence. Use it clear to bring out gorgeous color and natural grain, or use with stains. Save wasted hours spent sealing and sanding...save money, because you need only WATCO!

Get envied, superior results...the remarkable natural wood finish that resists stains and mars.

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SEALS!
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American Walnut Manufacturers Association recommends WATCO . . . may be used on all woods . . . specifically walnut, oak, birch, cherry, teak, mahogany, knotty pine and cedar.



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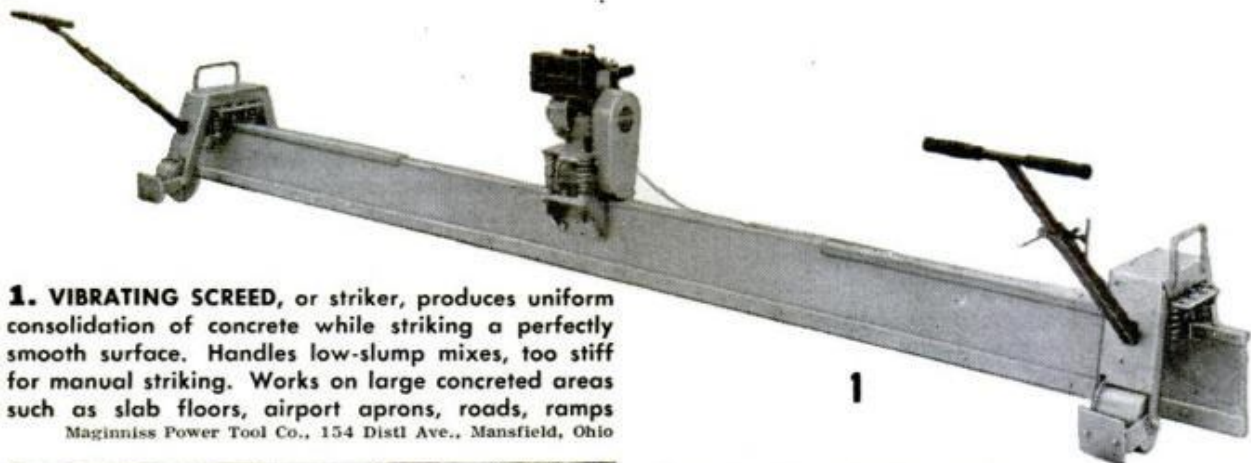
1756 - 22nd Street, Santa Monica, Calif.
Rush to me full qt. of WATCO Danish Oil Finish with Wood Finishing booklet at special price of \$2.00.

Name _____
Address _____
City _____ Zone _____ State _____

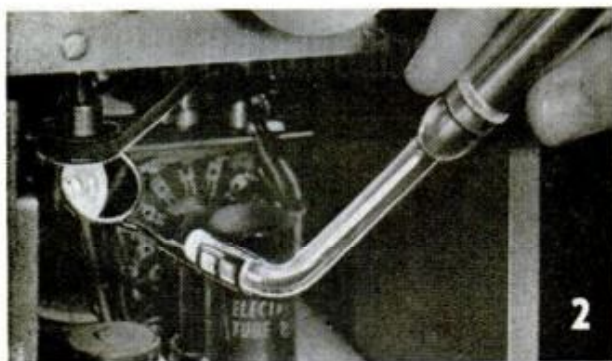
My local dealer's name is: _____
10 DAY MONEY BACK GUARANTEE—send check or money order for postpaid shipment—or shipped C.O.D. plus postage.

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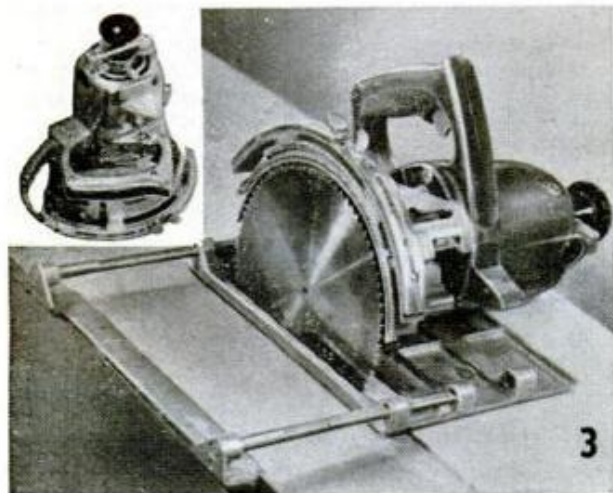
SHOPPING FOR TOOLS



1. VIBRATING SCREED, or striker, produces uniform consolidation of concrete while striking a perfectly smooth surface. Handles low-slump mixes, too stiff for manual striking. Works on large concreted areas such as slab floors, airport aprons, roads, ramps
Maginniss Power Tool Co., 154 Distl Ave., Mansfield, Ohio



2. INSPECTION LIGHT "looks" into recesses, tubes, anywhere it is necessary to see parts clearly that cannot be viewed from above or from either side. Plastic light conductors transmit 90 percent of bulb's light to distortion-free mirror. Two conductors are furnished with kit, one straight, one with 24-degree curve
New Industrial Supplies, 100 W. Monroe St., Rm. 1401, Chicago 3

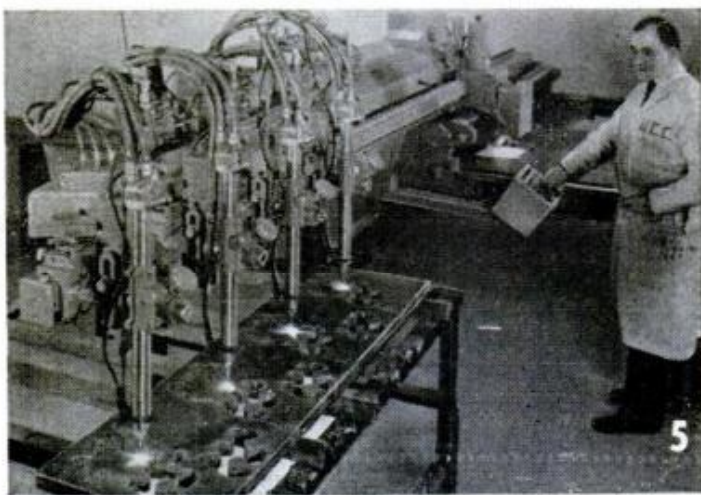


3. PORTABLE SAW works in conventional horizontal position, or in the vertical position for undercutting inside corners, door frames, window sills, also for cutting flashing grooves in masonry. Accessories are available for removing hard putty and for disk and belt sanding. Regularly supplied with 7-in. blade
Algo Specialties, Inc., 210 E. Chicago Ave., Algonquin, Ill.

4. NEW TYPE COLLET CHUCK has handwheel-operated, nose-type closure, offers complete collet chucking facilities at greatly reduced cost over conventional draw-in type of collet. Collet jaws are rubber-mounted, which greatly increases range and gripping power. Kit consists of handwheel chuck and 10 collets
The Jacobs Mfg. Co., West Hartford 10, Conn.

5. FLAME-CUTTING MACHINE features a new photo-cell tracer which is guided by a simple, exact-size pencil sketch of almost any intricate shape it is desired to produce. Sketches are made on ordinary paper; no costly metal or plastic templates or silhouettes are required. No part of machine contacts the drawing
Linde Co., Div. of Union Carbide Corp., 270 Park Ave., New York 17

(Continued to page 304)



IMPERIAL Brush Cleaner



**Cleans
Fast**

No mixing, no long soaking of brush. Leaves bristles like new—glossy, springy—never flabby. Effective on hardest caked paint and other finishes. At paint and hardware stores.

● Send 25c for illustrated Refinishing Manual or write for free folder "Care of Paint Brushes." Wilson-Imperial Co. 118 Chestnut St., Newark 5, N.J.



"The Master Touch"

Lots of folks are inclined to skip over the important step of "polish sanding"—fine sanding or rubbing between coats. Then they wonder why they don't get that true professional look to their job.

In the photo, dried bubbles and trapped particles are cleared away by hand rubbing with TUFBAK DURITE Paper Sheets, Extra Fine grit 320-A, using water or oil as a lubricant. Fold a standard 9" x 11" sheet twice to make a convenient pad.

In another instance, the first liquid coat on bare wood tends to curl up numerous surface fibers, resulting in stiff rough nubs. Use the same 320-A TUFBAK, dry or with lubricant, on a handy BEAR Sanding Block. Of course, repeat the polishing between additional coats.

Remember for your preliminary rough sanding, use BEAR ADALOX paper for a quick, easy job. ADALOX sands much faster than ordinary sandpaper—cuts down on the uninteresting part of the job. Dept. PM-10, BEHR-MANNING CO., Troy, N. Y., a division of Norton Company.



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No. 4
For all standard drills, drill presses and hand drills

Drills and Countersinks
2 depths for flush or recessed screws
— in 1 operation —
4 Bits for the 8 most popular
WOOD SIZES

Automatic stop
adjusts to 2 depths

TO ADJUST STOP

PARKER MANUFACTURING CO.
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Holes for Wood Screws
in ONE Operation.

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\$1.70 PER
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(Item 24)

World's THRIFTIEST Light Plants

700 Watt, push button start, 115 v. 60 cyc. AC. 2.2 HP, easy starting Briggs eng. 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. Reg. \$275... **\$143.50**
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ELECTRONIC BRAIN Now Available On All Our Plants—Write

MASTER MECHANIC MFG. CO., Dept. A-106, Burlington, Wis.
Southern Customers Order from Dept. A-106, Box 65, Sarasota, Florida

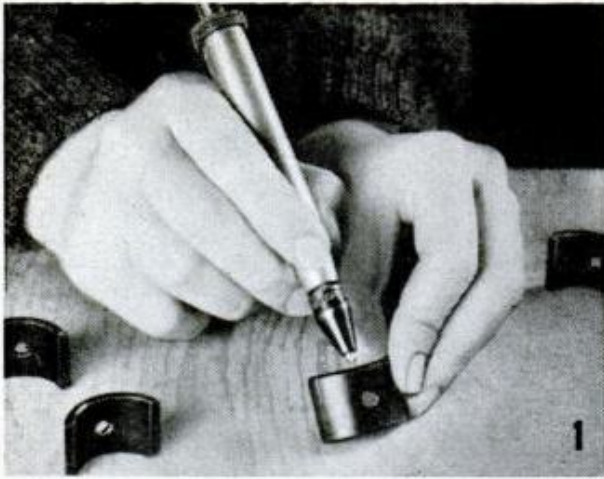
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that most
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OVER 60 YEARS' EXPERIENCE IN SOLDER AND FLUX MANUFACTURING

SHOPPING FOR TOOLS



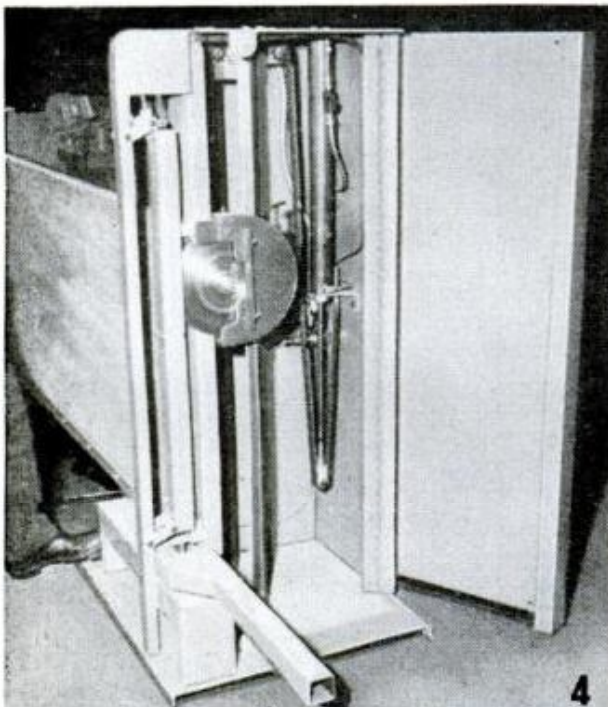
1. AIR-OPERATED PENCIL, or graver, writes on metals with a carbide-tipped stylus which makes 12,000 strokes per minute. Operates on 40 to 100 pounds per square inch air pressure. Writes on any of the common steels and nonferrous metals, plastics, ceramics and glass, by actually cutting or relieving the characters on the surface. Weighs only 5½ oz.
Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 32, Ohio



2. INSTRUMENT LUBRICANT packaged in hypodermic applicator assures a perfectly clean supply of lubricant to technicians assembling and testing fine mechanisms. Applicators insure pinpoint application of minute quantities of special instrument oils. Although inexpensive enough to be considered disposable, the applicators are easily refilled if desired.
Servishops Supply Department, Box 174CO, Englewood, Colo.



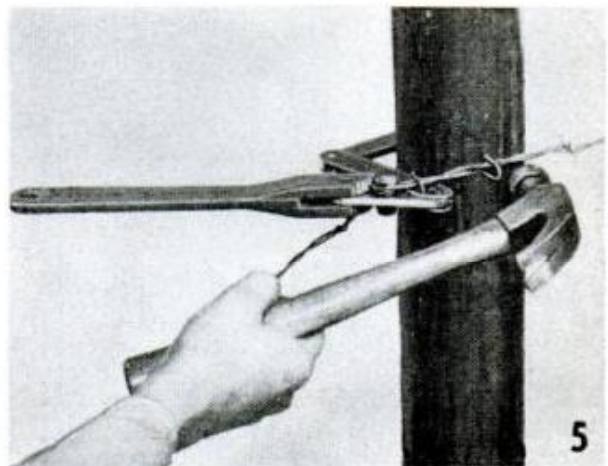
3. PORTABLE DRILL has nylon housing which eliminates danger of electrical shock. Grounding is not necessary; can be used with two-prong plugs. Nylon housing will take roughest usage to which drills are subjected in normal use without cracking or chipping. Comes regularly with geared chuck and can also be used to power accessory units made by manufacturer
Millers Falls Co., Greenfield, Mass.




4. TRIM SAW cuts doors to length in a fraction of the time required by other methods. Blade makes smooth, true cut without chipping. Machine is foot-pedal operated, saw being raised vertically by hydraulic mechanism to make cut in single stroke. When saw reaches top of stroke, completing cut, it is lowered automatically and door clamp released
Turn-A-Bore Equipment Co., 5916 E. Rosedale, Ft. Worth, Tex.

5. BARBED WIRE STRETCHER draws the wire taut and then holds it while it is being stapled. Folds compactly for carrying in a pocket, in saddlebags, glove compartment or tractor tool box. Handy tool for ranchers and farmers for making quick repairs to barbed-wire fences. In working position, tool grips both post and wire and can be used on either side of round or square post
Grosco, Inc., 626 E. Locust St., Des Moines 9, Iowa

(Continued to page 306)



2½ hours from now,
 this garage door will open
 and close at the touch
 of a button 

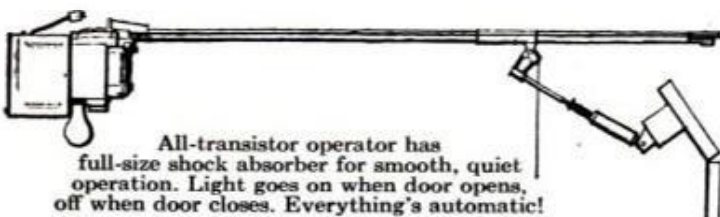


That's all the time it takes to make that overhead garage door of yours fully automatic. And never again will you have to get out of your car in the rain or cold or late at night to play tug of war with your garage door. Just tap the Delco-matic button on your dashboard, and the Delco-matic Garage Door Operator will do the rest. (Think how your *wife* will love that!)

Simplified all-transistor design of both the transmitter and receiver units makes Delco-matic virtually trouble-free and dependable in all kinds of weather. Because Delco-matic is interference-guarded by an exclusive frequency range, no other type of control unit can operate the door.

And the reasonably priced Delco-matic is the one garage door operator with all the finest safety features. A special load-sensitive, stop-door control protects children, pets and property, as well as door and operator against wear and strain. There are no slipping belts or slip clutches to wear out.

Delco-matic is sold and installed by the Crawford Door Company and authorized Delco-matic distributors, serviced by United Motors System electronics dealers. Write us for full details.



All-transistor operator has full-size shock absorber for smooth, quiet operation. Light goes on when door opens, off when door closes. Everything's automatic!

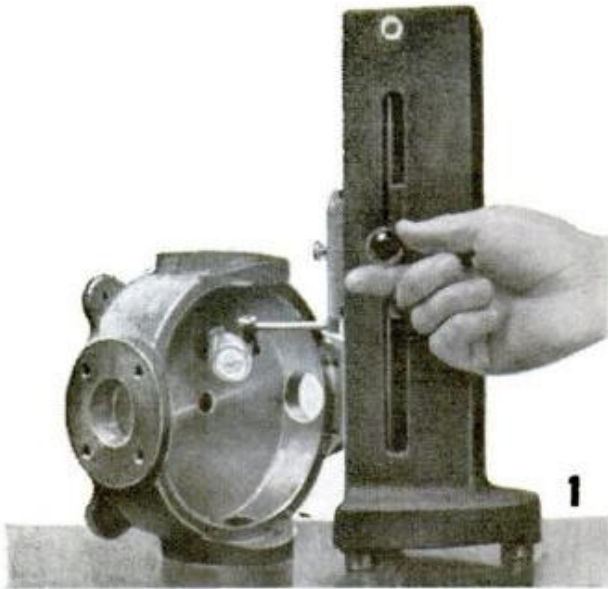
The Delco-matic Garage Door Operator is a featured appliance in the Popular Mechanics HOUSE OF BUILT-INS



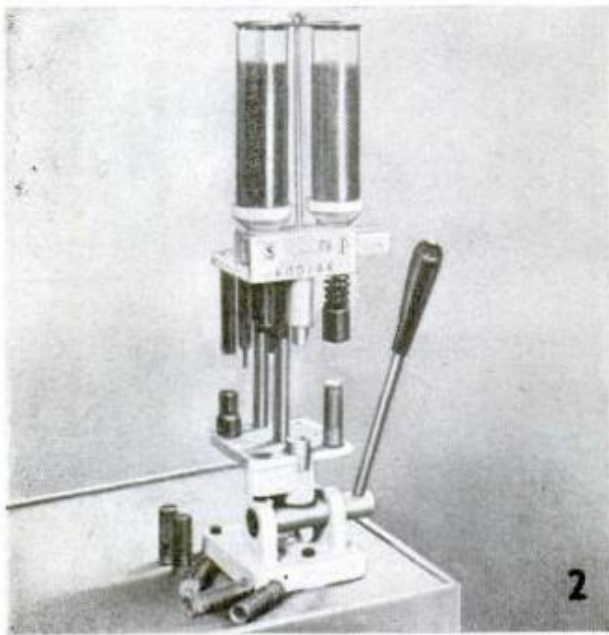
Delco-matic / DELCO PRODUCTS

Division of General Motors, Dayton 1, Ohio

SHOPPING FOR TOOLS



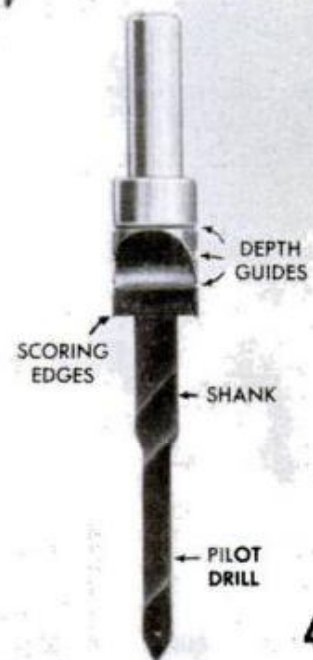
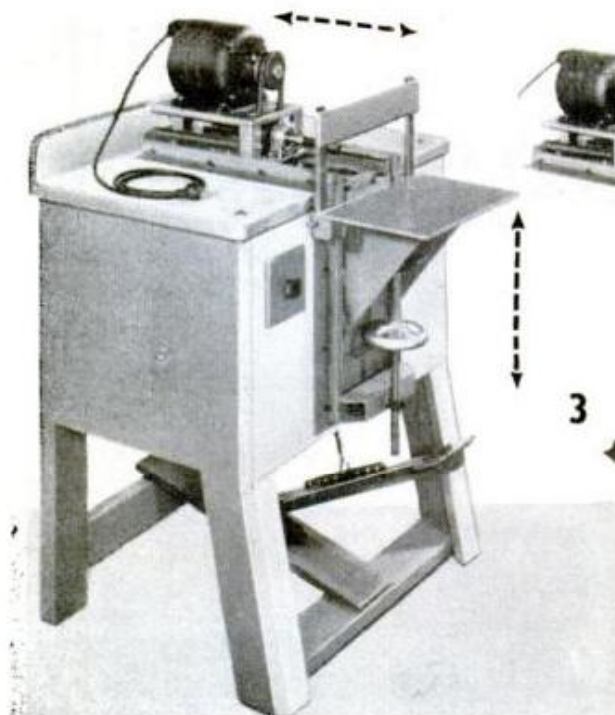
1. MACHINIST'S SQUARE checks precision work for squareness and straightness with an accuracy of .0001 in every 8 in. Designed especially for tool inspection, tool-room setups, parts inspection and quality control. Consists of a three-footed stand and vertical sliding head which carries ball-point indicator
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2. SHOTSHELL RELOADER accurately and dependably meters powder charge and shot when reloading paper shotgun shells. Wad-pressure indicator gives the uniform wad seating so necessary to consistently uniform shot patterns. Available in 12, 16 and 20-gauges; 12 and 20 gauge sizes handle 3-in. magnum loadings
Cook, Smith & Colwell, Inc., 310 Old Tavern Rd., Orange, Conn.

3. HORIZONTAL BORING MACHINE is designed to mount on a bench as you see it pictured in the left-hand view. Table raises and lowers by means of a handwheel and motor-driven boring head moves horizontally to carry bit to work. Boring head is actuated by foot pedal and is adjustable to give 6-in. stroke
Clarence Siegel, 4751 W. River Dr., Box 41, Comstock Park, Mich.

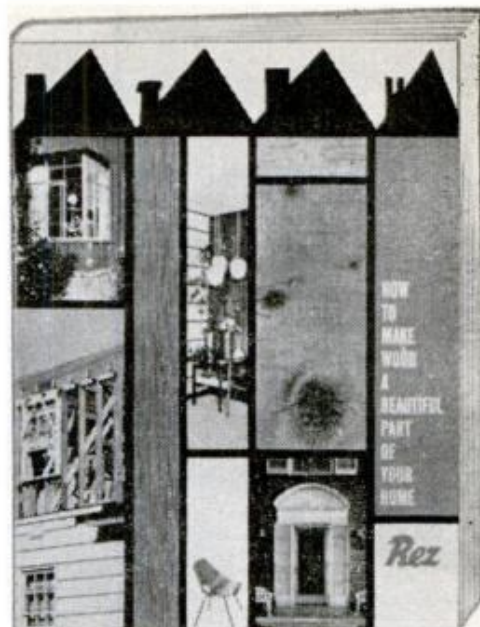
4. COUNTERSINK for wood screws drills the pilot and body holes and countersinks for driving the screw flush or below the surface in one operation. Cutting lips, or scoring edges, eliminate splintering of the wood around the hole. Works at an angle as well as at 90 degrees with the surface. Available in 20 sizes
Norfolk Products Corp., Norfolk, Conn.



New Valuable Guide for Men

"HOW TO MAKE WOOD A BEAUTIFUL PART OF YOUR HOME"

Wood grains, patterns, textures you can choose! Striking effects you can create! Practical new designs, plans and ideas! Hundreds of the things you want to know about natural wood finishing, decorating and building . . . yours for just 50c in one 56-page booklet . . . by the makers of REZ® — world's most colorfully complete line of natural wood finishes!



Now a wonderfully helpful booklet is ready for you—a complete how-to-do-it guide for decorating with wood and REZ natural grain sealer-finishes. Now you can choose from hundreds of wood grains and patterns, textures, colors and finishes

and achieve exactly the results you want every time.

See the woods you want for your home . . . Woods—light, sun-warm and refreshing. Woods—of rich dark tones. Woods—with dramatic whorls and patterns. Woods—with subdued grain tracings of quiet charm. Compare the most popular practical woods and plywoods. You actually see how their nature-grown beauty is enriched with a colorful variety of REZ grain-revealing finishes.

New booklet shows how natural wood becomes part of your color scheme with Color-Toned REZ. Outside, you can capture the charm and "feel" of forest, desert, mountain, seacoast or country landscape on your siding, carport, fence, trim or patio . . . inside, you can follow the same color scheme on paneling, cabinets, doors, valances, woodwork — coordinate wood color with carpeting, draperies and upholstery.

Saves you money . . . helps you select your favorite wood in the least expensive grade for your use — buy lumber, paneling, unfinished furniture and finish it easily in a few hours — enjoy all the luxury of good wood at low cost.

Easily adaptable ideas — illustrated ways to make home improvements you've always wanted — get more living space with built-ins, add on a family patio-porch, convert your basement into an activity room or rathskellar. 35 new designs. Guide plans. Easy to build.

New ideas in wall paneling . . . money-saving suggestions. How you can install and finish paneling yourself—save 25% to 60% of total cost you pay for wood.

Built-in, multipurpose cabinets you can custom-build to save space, make better use of existing storage area and open up more floor space for active use.

Different fence designs for beauty, privacy, sun screen, wind protection.

A treasure-chest of valuable additions to your home. Ways to make old rooms into new rooms with storage walls, book shelves, room dividers, closet stretchers.

Professional wood finishing made easy! Amazingly simple, sure ways to create a satiny, hand-rubbed look without rubbing or waxing . . . any color effect on any wood and enrich the natural beauty of the grain . . . a "bleached" or blond look without chemically bleaching. Tricks by master craftsmen you can use to bring out the distinctive best of redwood, pine, gum, fir, cedar, oak, birch and others. REZ solves every wood-finishing problem for you: no cracking or peeling, controls grain raise, ends mottled and uneven colors, protects against spotting from alcohol and water, defies stains and abuse. Brush it on as easily as water . . . REZ penetrates, seals, finishes — lasts for years — will not peel or blister — guards woods from sun and weather outside — gives lasting beauty inside.

USE HANDY COUPON

REZ Wood-Tones, Inc.

P.O. Box 123, Dept. PM, Springdale, Pa.

Send me the color-filled, 56-page guide, "How to make wood a beautiful part of your home." I enclose 50c.

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Address _____

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End Skidding and Wheel Spinning!



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DETACHABLE GRIT SPREADER



Revolutionary new grit release device provides "push button" traction!
ONLY \$29.95 INSTALL-IT-YOURSELF!

Napco, leading manufacturer of highway sanders for trucks, trailers, and buses, introduces an entirely new concept in passenger car grit release devices! *Skidmaster* is controlled by a patented new vacuum release valve connected by hose to the windshield wiper line or vacuum spark advance . . . there are no electrical connections . . . no drilling or cutting into car.

Skidmaster more than pays for itself . . . saves damage to transmission from "rocking", eliminates tire wear and wasted gas from "spinning".

Skidmaster helps you climb hills, park alongside of curbs, pass cars; start, slow down, or stop on curves and at intersections.

After simple installation, the outside units are easily removed, stored in trunk and attached in seconds, when needed. You'll never again use costly skid chains, ineffective snow tires and sand bags.

Fits any make or model car or station wagon. Simple installation kit with STEP-BY-STEP INSTALLATION INSTRUCTIONS. If you are not completely satisfied your money will be refunded. Shipped parcel post prepaid. \$29.95, SET OF TWO



Flexible bracket fits into window opening, does not interfere with window operation.



Flexible plastic discharge tube slides into pre-adjusted receptacle.

SKIDMASTER SALES CO.

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Gentlemen: I herewith enclose _____ for _____ Skidmaster Detachable Grit Spreader(s), complete, with instructions.

Name _____

Address _____

City _____ Zone _____ State _____

Enclosed: Check Money Order Sorry, no C.O.D.'s.

The Buick Special

(Continued from page 99)

Two-piece drive shafts have been used before, the major difference in the Buick setup (large Buicks use the same system) is that the center universal joint is a double constant-velocity joint that is made up of two single joints mounted back to back and piloted by a ball socket.

This double joint operates smoothly at a much greater angle than the single joint which permits the dip in the drive line, in turn minimizing the tunnel.

The rear axle is a conventional hypoid design of light weight. It is located by four stamped steel links rubber bushed at both ends. The lower links take driving and braking torque as well as provide the support points for the coil springs. Upper links are attached to brackets on the differential and position the axle laterally as well as prevent "axle wrap-up" on acceleration.

Brakes are conventional duo-servo hydraulic with 9½-inch cast-iron drums. Lining area is 130 square inches and seems to be adequate to do any stopping job unassisted as power brakes are not available.

Power steering is an option that many owners will want but not one that every owner will need. The Special can be handled nicely without it, but the GM power steering is smooth-acting and gives a bonus of "quicker" action, i.e. reduced turning requirement.

Although the Special's unit construction body-frame is low, only 53 inches from ground to roof, seating positions are good; there's average-to-good headroom front and rear and the seat cushions are well up off the floor.

Doors are well proportioned and have generous seat-to-roof dimensions so that entry is easy. The rear door is quite wide and the front door opening is not encumbered with a jutting, "dog-leg" windshield frame.

In width too, Special's passenger compartment measures a comfortable 58 inches although the car is just 71 inches wide.

Visibility is good through a moderately wrapped windshield and wide rear window.

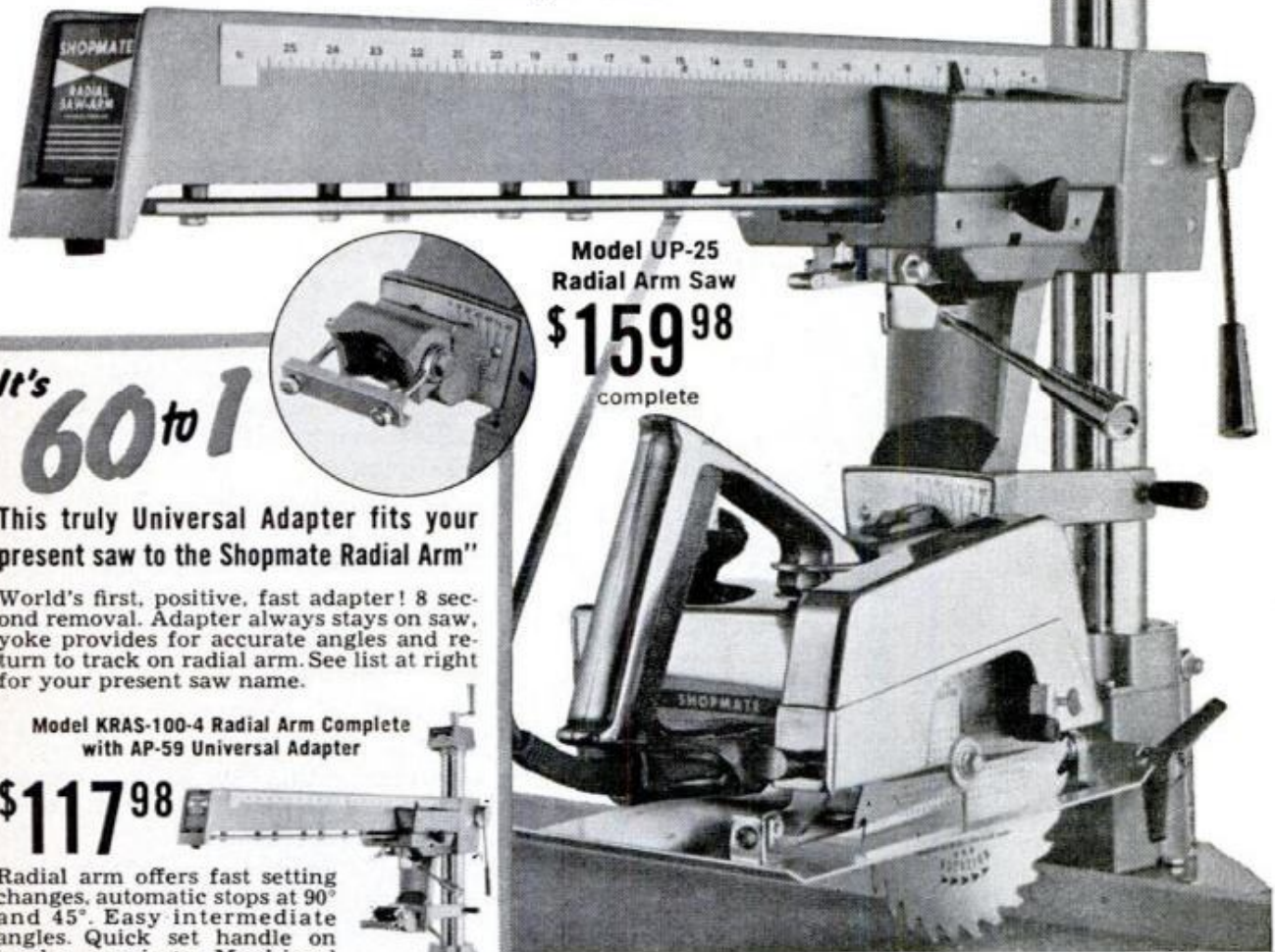
To sum it up, the new Buick Special is an attractive, perhaps handsome car of modest, comfortable size, thoroughly engineered, efficiently designed, weighing only about 2700 pounds, offering satisfactory fuel economy (an estimate of capability) and brisk, powerful performance.

If it is priced, as we suspect, at about \$2500 at the factory the Special will represent a genuinely new and worthwhile addition to the U.S. automotive lineup. ★ ★ ★

New Ultra Precision Radial Arm & 7" Portable Saw from **SHOPMATE**

*Amazing combination
from America's most advanced
Power Tool Engineers*

Now enjoy all the cuts and features of expensive radial saws—plus the advantages of a portable saw to take to any job! Wide panel ripping, compound, cross-cut and tapered rip sawing—plus rabbet, contour, fluting, radius and chamfer cuts!



Model UP-25
Radial Arm Saw
\$159⁹⁸
complete

*"It's
60 to 1"*

This truly Universal Adapter fits your present saw to the Shopmate Radial Arm"

World's first, positive, fast adapter! 8 second removal. Adapter always stays on saw, yoke provides for accurate angles and return to track on radial arm. See list at right for your present saw name.

Model KRAS-100-4 Radial Arm Complete with AP-59 Universal Adapter

\$117⁹⁸

Radial arm offers fast setting changes, automatic stops at 90° and 45°. Easy intermediate angles. Quick set handle on husky carriage. Machined track has adjustable ball bearings, lifetime lubrication.

SHOPMATE 7" Safety Clutch Saw
Perfect as portable or with radial arm. Safety clutch ends kick-back, prevents burn-out, adds years to life. 115 volt AC motor, 5000 rpm no load.

Model SC-700M
Sold separately **\$49⁹⁸**

SHOPMATE Radial Arm Adapts to all these saws—and more!

- | | | | |
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| AMERICAN —Models 6-00, 7-00 | McGRAW-EDISON —Models 1055, 1055A, 256A | SEARS —Mod. 02784, 02790, 02796, 02789, 02787, 25880, 27870 | STANLEY —Models H-65, H-68, H-70 |
| BLACK & DECKER —Models 430, 63, 730, 830 | MILLER FALLS —Models 626, 727, 646, 747 | SHOPMATE —Models SC-700, SC-700M, SC-700-3, SC-7100, SC-7100M, 6208 | STARFLYTE —Model SC-730M |
| CUMMINS —Models 717-01, 737-01, 757-01, 7800-01 | MILWAUKEE —Models S-16, S-17, S-18 | SKIL —Models 533, 536, 552, 553, 554, 698 | SUNBEAM —Models 72, 72-3, HD-199 |
| DORMEYER —Models CS-2, CS-8, CS-5 | PET —Models 630M, 635M | SPEEDWAY —Models 460, 475, 485 | TRUSTWORTHY —Models TW700, TW7100 |
| ELECTRO —Mod. 701 | PORTER-CABLE —Models 66, 160 | | WARDS —Model 8900 |

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Favorite Dealer

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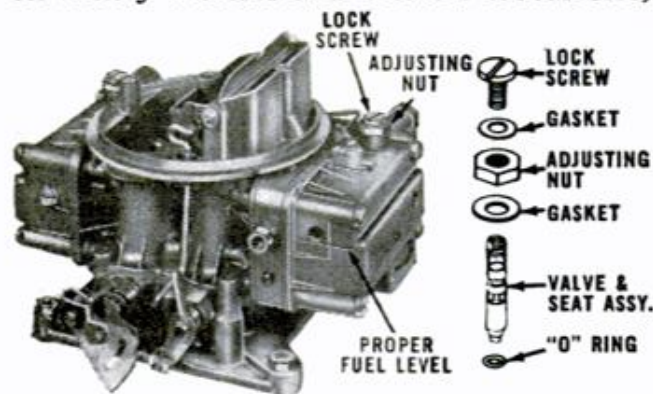
Portable Electric Tools, Inc.

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In Canada: Portable Electric Tools Ltd.,
452 Birchmount Road, Scarborough 13, Ontario

ONE SIMPLE ADJUSTMENT TO YOUR HOLLEY CARBURETOR

If you are getting poor idle or unsatisfactory fuel economy, one cause may be improper fuel level in the bowl. Because of the accessibility of the adjustable needle and seat arrangement on Holley 2-barrel and 4-barrel carburetors,



it's a simple matter to check the fuel level. Here are the easy steps: (1) Make sure the car is on level ground, then start the engine. (2) Remove the sight plug to check the fuel level in the bowl. (It should just reach the lower lip of the sight plug.) (3) If the level is too high or too low, loosen the lock screw with a screwdriver. Turn the adjustment nut clockwise to lower the fuel level—counter-clockwise to raise it. A 1/6 turn is the equivalent of 1/16-inch wet fuel level in the bowl. (4) Operate the engine until the fuel level is stabilized, then recheck level at the sight plug. Be sure to replace the sight plug. This adjustable needle and seat arrangement is one of many important developments of Holley's continuous research and engineering. There are, of course, other causes of unsatisfactory idle and economy. If this simple adjustment does not correct the trouble, your Holley dealer will be glad to make a thorough check of the carburetor.

★ ★ ★

When you make your own carburetor or ignition repairs and parts are required, be sure to use *genuine* Holley parts. Your Authorized Holley Distributor or Dealer, listed in the Yellow Pages, has a complete stock of Holley carburetor minor over-haul kits, tune-up kits, ignition parts, and brand-new replacement carburetors priced competitively with rebuilds. All are engineered and built to exacting *original equipment standards*. It will pay you to buy or specify Holley Parts.



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and
IGNITION EQUIPMENT

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ORIGINAL EQUIPMENT MANUFACTURERS FOR OVER 55 YEARS

The Olds F-85

(Continued from page 102)

upon the planetary gearing is shifted to "Second" gear with a ratio of 1.58 to 1. At the proper engine and car speeds a final shift is made to "High," which is of course the direct 1-to-1 ratio.

Thus the new transmission has what amounts to the four "gears" of the original Hydra-Matic, yet one mechanical shift has been eliminated.

This new transmission weighs 95 pounds less than the automatic transmission used on 1960 Olds 88 models.

With a curb weight of around 2700 pounds for the four-door sedan it's not surprising that the F-85 has pretty lively performance. Horsepower-to-weight ratio works out to about 17.5 pounds of car weight per horsepower. Acceleration time from 0 to 60 miles per hour (indicated) is slightly less than 12 seconds.

Like the Buick Special, the F-85 has optional power steering which makes for a noticeably easier and slightly quicker steering car. Oldsmobile engineers feel that that power brakes are unnecessary to aid in stopping a 2700-pound car.

For those desiring the pleasure of Oldsmobile ownership at the lowest possible cost the F-85 with manual three-speed transmission and manual steering is expected to sell at a price that will be hard to resist.

No prices for the F-85 (or other GM cars) have been released as *PM* goes to press.

The F-85 is available in "Standard" and extra cost "Deluxe" trim. The differences between the two are principally the more luxurious interior on the Deluxe.

As much as we could determine from preliminary investigation, (thorough testing will come later,) Olds F-85 and Buick Special are closely matched. Riding qualities are very similar. In handling, the Special seemed to have a shade less roll or lean in cornering, due possibly to slight differences in shock-absorber setting.

In performance the difference in the two cars' automatic transmissions shows in that the F-85's acceleration seems more pronounced and a shade quicker while the Special seems definitely smoother in takeoff.

Like the Special, the F-85 is solidly built, smooth riding, brisk performing and easy handling. Above all it goes about its business quietly and has a great deal of the luxury "feel" of its big brothers the Dynamic 88, Super 88 and 98. The F-85 will make the choice of a 1961 car in the \$2500 price range a really tough proposition. ★★★

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PM-1060

The Pontiac Tempest

(Continued from page 109)

spring independent suspension units already tooled up for the Corvair. The Corvair's differential and swing axles went along with the deal too.

The automatic transmission uses some Corvair Powerglide parts but is basically a new design with coaxial powerflow running from the drive shaft on through the transmission and differential back to the torque converter which is mounted on the very rear of the transaxle like a doughnut.

In principle the Tempest's automatic is a "split torque" setup similar to Buick Special's where after the shift to "Drive" range, and at a certain speed, approximately one-third of the drive becomes mechanical or "direct" while the remaining two-thirds of the engine's power is routed through the hydraulic torque converter.

One of the most spectacular items in this imaginative design is the drive shaft, a long, one-piece torsion bar bolted to the flywheel at the front end and to the transmission input shaft at the other.

This shaft is stressed so that it bends or bows downward some five degrees from the engine and upward to the transmission.

To appreciate the operation of this shaft hold a thin dowel or twig at each end and bend it slightly while rotating it slowly. You will see that if the angle is not too great it will rotate quite easily.

The Tempest's bowed shaft is maintained at the precisely correct angle by two bearings that "divide" its length into thirds. These bearings in turn are held within the U-shaped, stamped shaft tunnel or tube which is bolted to the bell housing at the forward end and to the transmission case at the rear. This tube serves as the "spine" that holds engine, driveshaft and transaxle all in one rigid unit.

This engine-power train unit is mounted on two rubber mounts at the sides of the engine and does not contact the car's frame until it reaches two additional mounts where the transaxle connects to the rear suspension cross member!

This unique construction does much to isolate and thus eliminate vibration of power plant and drive line components from the car. Manual transmission models have the clutch in the conventional location at the flywheel.

The brilliance of the precedent-shattering engineering job done on the Tempest can only be appreciated by driving the car and noting the unbelievable silence and smoothness of the engine and drive.

PM will carry a complete analysis of the Tempest's ride, handling and road behavior in a subsequent issue. ★ ★ ★



Ivan Wood, 2500 Leyden St., Denver, Colo.

Asphalt-Coated Ditch Liner Installed With Blowtorch

Farmers using a new material to line irrigation ditches need little equipment other than a blowtorch. Developed after 15 years of research at Utah State University, the material, soon to be introduced comes in 40-in-wide rolls. In the manufacturing process, the core of the liner, burlap, is treated to prevent rot and mildew. It is then dried and saturated with asphalt containing a high penetration additive to insure the coating of all fibers, and again coated with asphalt.

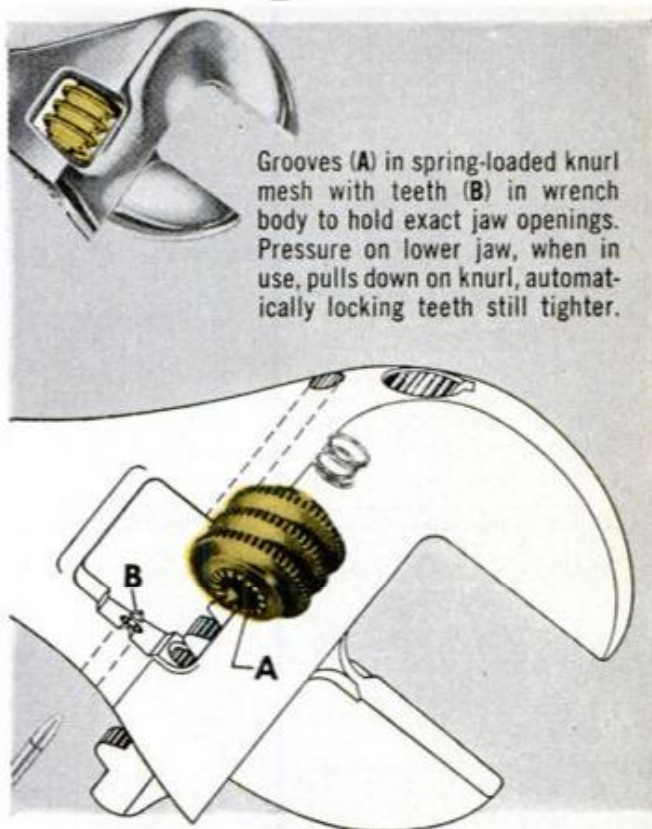
The ditch to be lined is cleared of all loose material and a sterilant is applied to the grade area to prevent vegetation from growing through the liner. In field tests at agricultural stations, it was found that the lining process can be speeded up by the joining of four or six strips on level ground before placing them in the ditch. All joints are overlapped about 2½ inches in the direction of flow.

Joining is accomplished by heating the asphalt surface with a blowtorch on both surfaces to be joined. When the surfaces are pressed together, a strong joint results. Patching a hole in the liner is accomplished by cutting a patch from the liner larger than the hole, heating the edges and pressing it into place.

The liner, which was developed on a project sponsored by the U.S. Department of Agriculture, seems to work best when applied to ditches of about 15 cubic feet per second capacity. While it is not meant to replace concrete liner, there are some site conditions where rigid lining cannot be used, or where extreme heaving from frost occurs. Since the new liner is a worthy moisture barrier, it should find application at these troublesome spots.

OCTOBER 1960

New Proto locking feature



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Available in ALL sizes

704L	706L	708L	710L	712L	715L	716L	720L
4"	6"	8"	10"	12"	15"	16"	20"

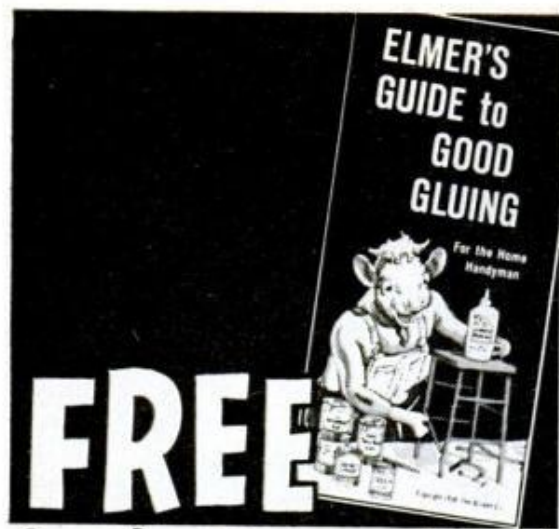
Meets Federal Specifications: GGG-W-631A, Type 1



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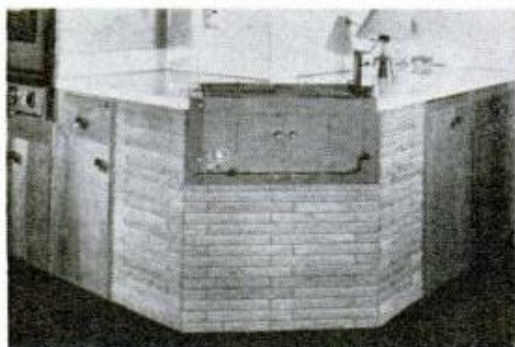


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The Dam That Spans the Canyon

(Continued from page 121)

mention the enormous problem of developing the aggregates, finding a source of millions of tons of sand, gravel and stone, and screening them and delivering them to the concrete mixers.

The aggregates for Glen Canyon are obtained from a source only six miles away. Some of this material, however, is unsatisfactory because it is so light in weight that it could produce "pop-outs" on the surface of the dam when frozen and thawed. To get rid of these materials a flotation process similar to that used in extracting valuable metals from their ores is used. The process is called heavy-media flotation and consists of dumping the materials into a tank containing water in which large amounts of fine ground ferrosilicon and magnetite are suspended. Light materials float to the top of this heavy solution and are washed away, while the heavy materials that sink to the bottom are caught on a conveyor belt that carries them to the stockpiles.

All the materials for the concrete are delivered to storage areas at the damsite by truck, then move by pipes or conveyor belts to bins and silos at the concrete mixing plant. This plant, located on a ledge that was blasted out of the canyon wall, consists of six 4-cubic-yard mixers that can produce 9000 cubic yards of concrete per day.

After a series of transfers the concrete is delivered to buckets suspended from an overhead cableway, and the cableway then transports the buckets out to the area of the dam that is being poured. Each bucket carries 12 cubic yards of concrete at a time and each cable that spans the canyon is four inches in diameter.

To facilitate construction, the dam is being created as a series of columns or blocks that are keyed together, with construction joints between the blocks. Upon completion, the contraction joints will be grouted under high pressure, converting the whole structure into a single monolithic mass.

Concrete generates heat while it is curing, and an enormous mass such as a dam normally would require years to cool. In doing so, it shrinks and possibly develops cracks. Today engineers have ways of preventing this and they have actually learned how to put the thermometer to work to create a stronger dam.

On the Glen Canyon job the Bureau of Reclamation specifies that all concrete placed in the dam must have a temperature of between 40 and 50 degrees when placed, even though summer temperatures at the site may rise as high as 110 degrees.

(Continued to page 316)



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The Basic Necessity
For the
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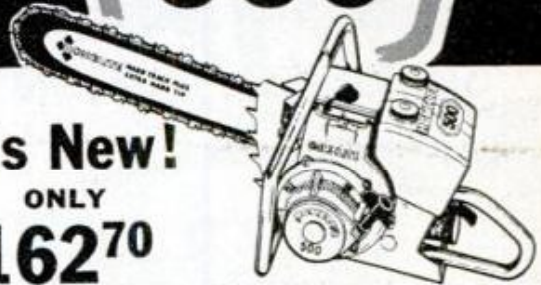
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To cool their materials the contractors are using a big refrigeration plant that provides cold air that is forced through the batching silos in which gravel and rock are stored. In addition the plant provides cold water that is sprayed over the aggregates to cool them while they are traveling through insulated tunnels to the mixers and, finally, the refrigeration plant provides cracked ice that is dumped into the mixers themselves.

One thousand miles of one-inch aluminum tubing is being installed in the dam to bleed off the heat generated while the concrete is setting. Cold water that is circulated through the tubing will bring the temperature of the mass of concrete down to 40 degrees, after which grouting will be forced into the pipes under pressure to seal them. Then the dam will be allowed to come up to its permanent average temperature of around 60 degrees. The concrete will expand slightly as it warms up and this expansion will tighten the ends of the dam into the canyon rock, securely locking the dam in place so that it serves as a true arch.

Completion of the dam is scheduled for March of 1964.

Glen Canyon Dam is the key feature of what is known as the Colorado River Storage Project, a plan for holding surplus river water in the Colorado's upper basin until it is needed downstream in dry years. At the same time, some of the water that is held upstream will be available for local industry and agriculture. The upper basin consists principally of parts of Utah, Wyoming and Colorado, and is a region that is virtually undeveloped because of the lack of water and power in the past.

In addition to the Glen Canyon unit on the Colorado itself, three other large storage dams are planned for tributaries of the Colorado: Flaming Gorge Dam on the Green River in northern Utah, Curecanti Dam on the Gunnison in western Colorado and the Navajo Dam on the San Juan in northern New Mexico. These dams will provide water of 11 new irrigation districts that will comprise 130,000 acres of new farmland in addition to providing more water to 230,000 acres of existing farms.

Not the least of the benefits provided by Glen Canyon Dam will be the vast new recreational area that will be opened up by its 186-mile reservoir.

The National Park Service plans at least 10 major resorts centers on the shores of the reservoir, all of which will be available by roads and boats and some of which can be reached by light planes. Boating marinas, campgrounds, motels, and swimming and fishing facilities will be available at each of the centers. ★ ★ ★



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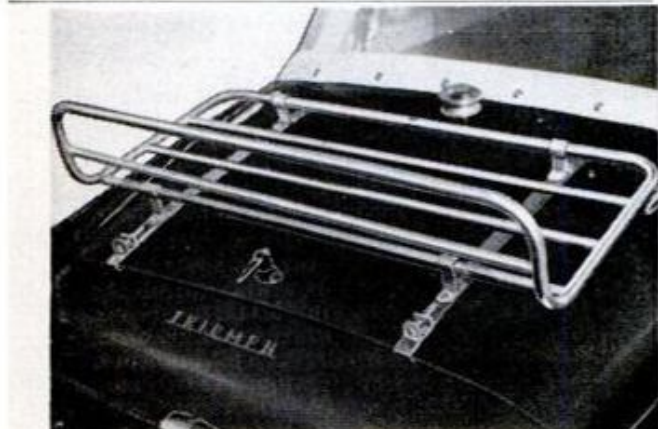
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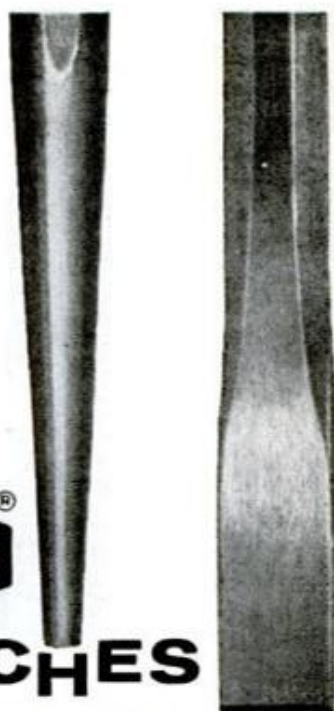


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Sports Car Luggage Rack

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OCTOBER 1960



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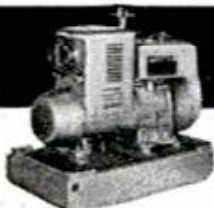
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(Continued to page 324)



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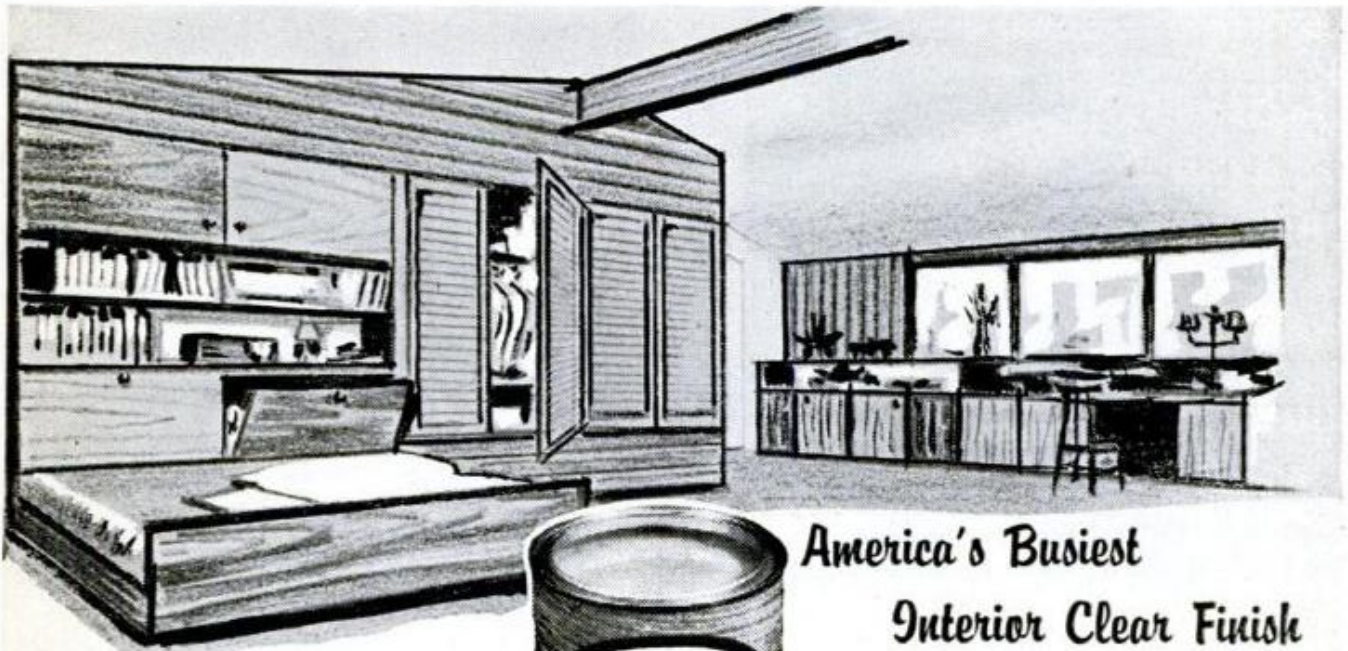
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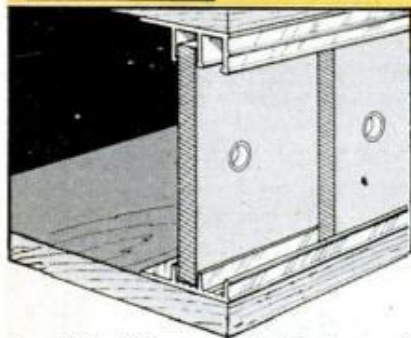
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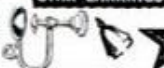
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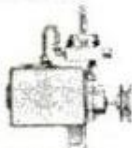


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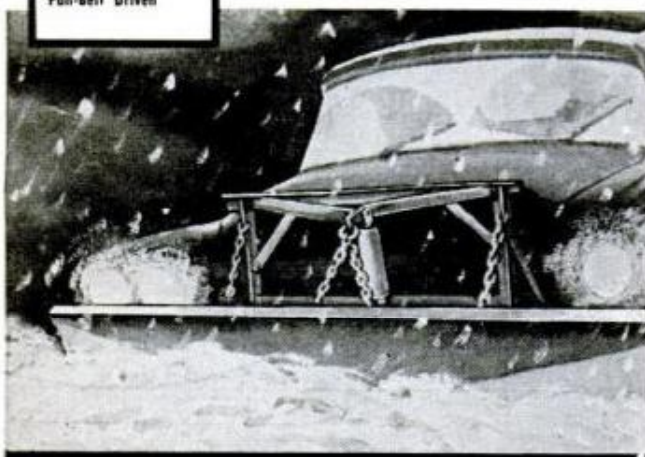
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Bestway Building Center
- Delta**
Bestway Building Center
- Layton**
Bestway Building Center
- Midvale**
Bestway Building Center
- Milford**
Bestway Building Center
- Murray**
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- Nephi**
Bestway Building Center
- Ogden**
Bestway Building Center
- Price**
Bestway Building Center
- Provo**
Bestway Building Center
- Richfield**
Bestway Building Center
- Salt Lake City (Sugarhouse)**
Bestway Building Center
- Tooele**
Bestway Building Center
- Tremonton**
Bestway Building Center
- VERMONT**
- Brattleboro**
L. Grossman Sons, Inc.
Putney Road, Route 5
L. Grossman Sons, Inc.
Corner Elm & Frost Sts.
- VIRGINIA**
- Hopewell**
Builders Supply Co. of Hopewell
- WASHINGTON**
- Auburn**
Bestway Building Center
- Bellevue**
Bestway Building Center
- Cheney**
Bestway Building Center
- Colfax**
Bestway Building Center
- Coulee City**
Bestway Building Center
- Ellensburg**
Bestway Building Center
- Encumclaw**
Bestway Building Center
- Everett**
H. O. Seiffert Co.
- Gig Harbor**
Bestway Building Center
- Harrah**
Bestway Building Center
- Kennewick**
Bestway Building Center
- Moses Lake**
Bestway Building Center
- Mount Vernon**
Lakeside Western Lumber Co.
- Naches**
Bestway Building Center
- Opportunity**
Bestway Building Center
- Pasco**
Bestway Building Center
- Prosser**
Bestway Building Center
- Pullman**
Bestway Building Center
- Quincy**
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- Rosalia**
Bestway Building Center
- Renton**
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- Ritzville**
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- Spokane**
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- Yakima**
Bestway Building Center
- WEST VIRGINIA**
- Bluefield**
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Citizens Coal & Supply Co.
600 Bluefield Ave.
- Charleston**
Wright-Bachman Lumber
- South Charleston**
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- WISCONSIN**
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- Arcadia**
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- Augusta**
Lampert Yards
- Barron**
Lampert Yards
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Fullerton Lumber Co.
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Beloit Lumber & Fuel Co.
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- Chetek**
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- Janesville**
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Gateway Lumber Co.
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- Madison**
Brookwood Home Center
- Milwaukee**
Bliffert Lumber & Coal Co.
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Bliffert Lumber & Coal Co.
10733 W. Blue Mound Road
Bliffert Lumber & Coal Co.
2128 West Morgan Ave.
Bliffert Lumber & Coal Co.
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More Built-Ins Information Centers:

- Bliffert Lumber & Coal Co.**
5030 North 35th Street
Bliffert Lumber & Coal Co.
8747 North 107th Street
Capitol Lumber & Hdw. Co.
400 West Capitol Drive.
Capitol Lumber & Hdw. Co.
3412 East Layton Avenue
Harris Lumber & Millwork
4350 North 35th Street
Holt Lumber Co.
11700 W. Silver Spring Dr.
M. H. Paulsen Lumber Co.
2837 West Stark
- West Allis**
Wilbur Lumber Co.
Waupaca
Fullerton Lumber Co.
Wausau
Fullerton Lumber Co.
Winter
Lampert Yards
- WYOMING**
Casper
Bestway Building Center
Casper Lumber, Inc.
Cheyenne, W. 20
Bestway Building Center
Cheyenne, Lway
Bestway Building Center
Evanston
Bestway Building Center
Green River
Bestway Building Center
Lander
Bestway Building Center
Laramie
Otto Builders Supply, Inc.
Swenson Lumber Co.
Lusk
Frontier Lumber Co.
Powell
Powell Lumber Co.
Rawlins
Bestway Building Center
Rock Springs
Bestway Building Center
- Monroe**
Fullerton Lumber Co.
Neillsville
Fullerton Lumber Co.
Osceola
Lampert Yards
Racine
Durand Avenue Lumber Co.
Radisson
Lampert Yards
Rice Lake
Lampert Yards
Ridgeland
Lampert Yards
Ripon
Fullerton Lumber Co.
Shell Lake
Lampert Yards
Spooner
Lampert Yards
Viroqua
Nuzum Lumber Co., Inc.

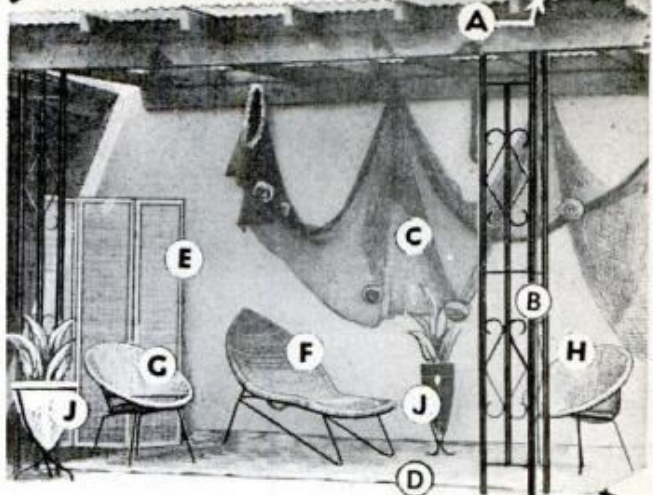


Kowa Display Co., Inc., 3-12 Kayaba-cho, Nihombashi, Chuo-ku, Tokyo, Japan.

Bear With Baby Buggy Ballyhoos for Brewery

Causing double takes among Tokyo shoppers is an incongruous group made up of a mechanical bear, baby buggy (with jovial passenger) and several cans of Nippon Brewery Company's best. The life-size robot bear walks, speaks and even sings as he pushes the carriage. The display is operated electrically by remote control. Necessary electronic apparatus—transmitter, receiver, speaker, etc.—is hidden in the bear and carriage.

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Take advantage of these special FALL Bargains. SAVE up to 50%. ALL items are shipped by the lowest Truck Rates to Save You Money!

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For Patio, Car Port, Fence, Screens or Awnings. Top quality 8 oz. structural fiberglass. . . corrugated type, 26" or 34" wide, 4 to 12 ft. lengths. In most colors. Specify color, width, and length. Minimum order 4 SHEETS. FREE Sample on request. Value 90¢ sq. ft. **39¢** ~~59¢~~ **ET.**

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Use INDOORS or OUTDOORS! Heavy 1-1/8"; black tubular iron supports with a handsome iron filigree between them. 8ft. high (can be cut to 7ft.), 12" wide. In either flat or corner type. Mounting flanges included.

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Easy to assemble in 4 HOURS. Kit includes 2 wrought iron corner trellises, 6 wrought iron ceiling beams—8 ft. long, 1 beam 10 ft. long and 5 sheets of 8' x 26" Ornyte Fiberglass.

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80 inches of lounging comfort, 26" wide, and 80 inches long. Regularly \$28.88 - NOW **\$14.88**

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Has a distinctive open weave. Sturdily set on black wrought iron frame. Size: 26" high with 17" x 18" seat. Worth \$6.95 each. **2 FOR \$6.88 388 EA.**

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For a carefree tropical air. Mounted on black wrought iron frame. Size: 26" high with a 17" x 18" seat. \$6.95 value. **2 FOR \$6.88 388 EA.**

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A bone white planter, 15" wide by 21" high. Wrought iron stand. **2.98 ea.**
Black fiberglass planter & stand. 9" dia. x 22" in height. . . .

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Nuclear Explosions Could Mine Sulfur

If sulfur deposits are discovered in the Gulf of Mexico, as is expected, the chances are they will be mined by nuclear explosions. This possibility has been studied by John M. Dales and Robert C. Dehart of the Southwest Research Institute, San Antonio, Tex. Using conventional rotary drilling techniques, the atomic device would be lowered to the sulfur deposit and detonated. The blast would raise the sulfur to the molten state for recovery at cost somewhat lower than by present methods, they said. One possible way to recover the molten sulfur would be to drill wells on the periphery of the sulfur well and force hot water into them to raise the sulfur. It might also be possible to force water from directional wells into the molten sulfur and the resulting stream would raise it to the surface.

Versatile Copier For Transparencies



Heiland Division, Minneapolis-Honeywell Regulator Co.,
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Built around an electronic flash unit in its base, a new color-slide reproduction system will perform more than 20 different color-reproduction processes, giving color photographers a versatility formerly limited to black-and-white only. The copier permits duplicating, cropping or enlarging; correcting for exposure, color balance or distortion; vignette and montage work; adding of textures and screens; creating or duplicating film strips; and creating sandwich effects. It will also produce negatives from slides.

Cardiograph of Power!



Pre-ignition Meter Shows Superior Performance of ACs

This AC engineer is tuned in on the heart-beat of an engine. He's using a special AC pre-ignition meter to check spark plug performance. Here, the meter shows all eight AC Spark Plugs are firing perfectly. This electronic instrument senses the combustion chamber temperature in each cylinder. If dangerous, engine-damaging pre-ignition occurs, the temperature rises sharply. The

sensitive meter connected to the cylinder, records the change. The needle moves over to the danger zone. This is just one of hundreds of proving ground and on-the-road tests that AC engineers perform to make certain that the spark plug recommended for your car gives you the best possible performance. When you replace spark plugs . . . at 10,000 miles . . . ask for ACs and be sure.

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OCTOBER 1960

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- Magazine Illus.
- Sign Painting and Design'g
- Sketching and Painting

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- Automobile
- Auto Body Rebuilding and Refinishing
- Auto Engine Tuneup
- Auto Electrical Technician
- Diesel Engines

AVIATION

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- Aviation Engine Mech.
- Reading Aircraft Blueprints

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- Advertising
- Bookkeeping and Cost Accounting
- Business Administration
- Business Management
- Clerk Typist
- Creative Salesmanship
- Managing a Small Business
- Professional Secretary
- Public Accounting
- Purchasing Agent
- Real Estate Salesmanship
- Salesmanship
- Salesmanship and Management
- Traffic Management

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- Chemical Engineering
- Chem. Lab. Technician
- General Chemistry

- Oil Field Technology
- Pulp and Paper Making

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- Construction Engineering
- Highway Engineering
- Professional Engineer (Civil)
- Reading Struc. Blueprints
- Sanitary Engineer
- Sewage Plant Operator
- Structural Engineering
- Surveying and Mapping
- Water Works Operator

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- Architectural Drafting
- Drafting & Machine Design
- Electrical Drafting
- Electrical Engineer Drafting
- Industrial Piping Drafting
- Mechanical Drafting
- Sheet Metal Drafting

ELECTRICAL

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to be accomplished in our lives and in
work. What man has done, man can do
er."

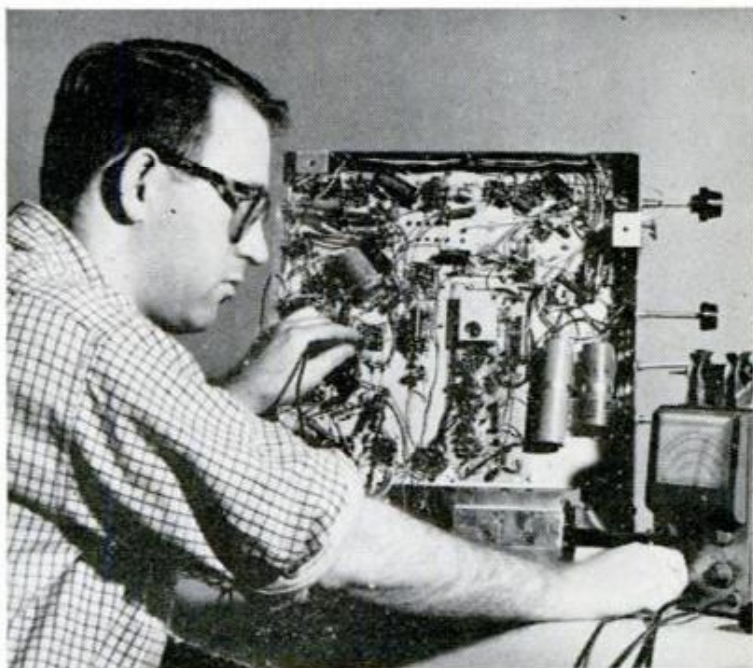
A handwritten signature in cursive script that reads "David Sarnoff".

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**2 TRIGGER
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give low 90-watt
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Features the new Weller Dual Heat Gun—most advanced soldering tool on the market. Not only does the heat and spotlight come on instantly when trigger is pulled, but 2 trigger positions give 2 soldering temperatures. You can switch instantly to high or low heat as your job requires.

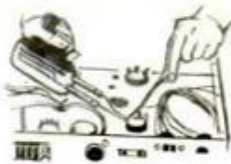
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