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OCT. 1962
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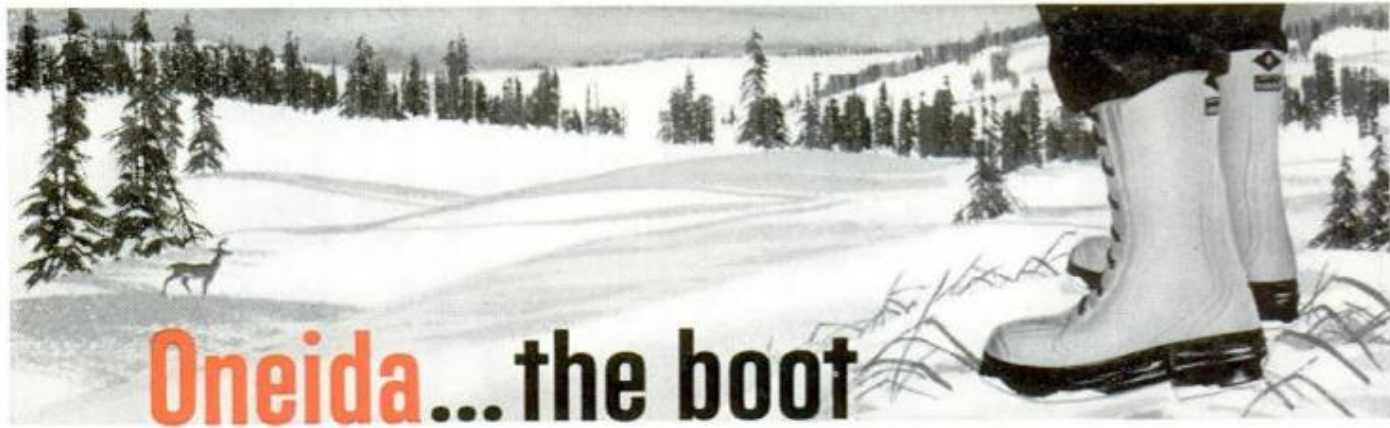
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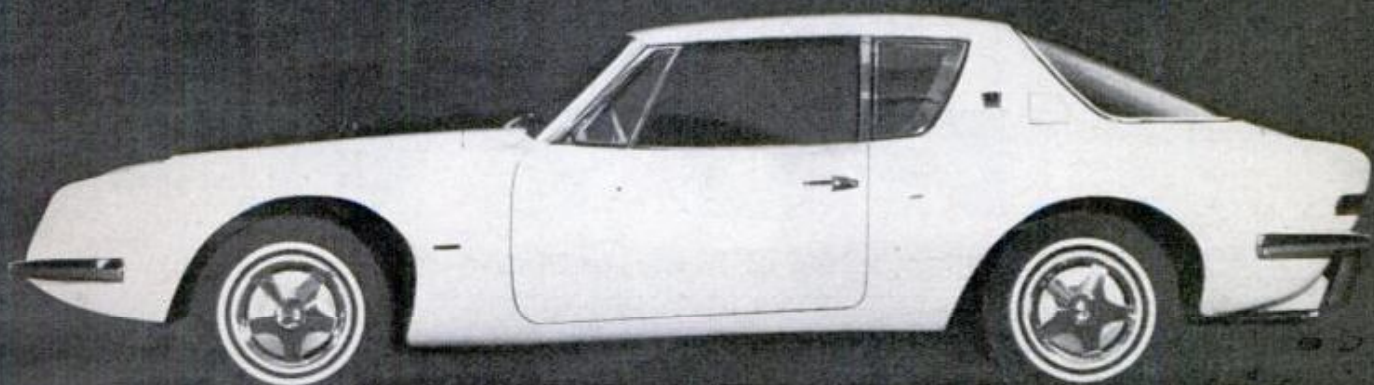
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CHAMPION

Two simple exercises that can add years to your life



PUSH

This evening, while at home, get into your car and push the brake pedal. Have someone in your family make sure both your stop lights are working. If one is out, replace it tomorrow. You'll make it easier for the other driver—safer for yourself.



PULL

Then pull the light switch. Make sure all your headlamps (don't forget the upper beam) and your rear lights are working. And while you're at it, check your turn signals. These Push-Pull exercises will do you good—especially if you find a burnout. It's very possible you will—because one out of every six cars needs a new bulb.

When you find a burnout, replace it with a dependable General Electric lamp, the brand most people prefer.

Miniature Lamp Dept., Nela Park, Cleveland 12, O.



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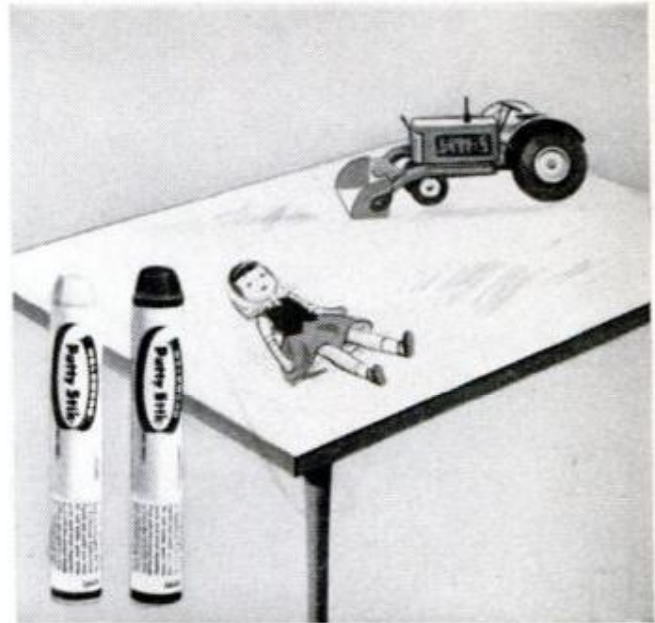
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POPULAR MECHANICS®

OCTOBER 1962
VOL. 118 NO. 4

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Decoys page 122**

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**Tractor
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page 140**



**Zoetrope
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page 150**

Next Month . . .

TORTURED TOYS are what you get when **25 kids move in on a roomful of the toy industry's hottest ideas** for Christmas, 1962. That's what became of 145 entries in PM's toy contest. When the kids and the judges were through, we knew which toys held most appeal, which were built to last, and a few other things. Find the results in November PM, plus 10 Christmas projects, plans for a basement shooting range, features about antique airplane buffs, "thinking factories" and "How Can We Store Human Knowledge?"

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**Bending Wood
page 192**

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**Razor Blade Radio
page 203**

This One



1N40-BHY-DT75

THESE 1963 MERCURY OUTBOARDS ARE NEW

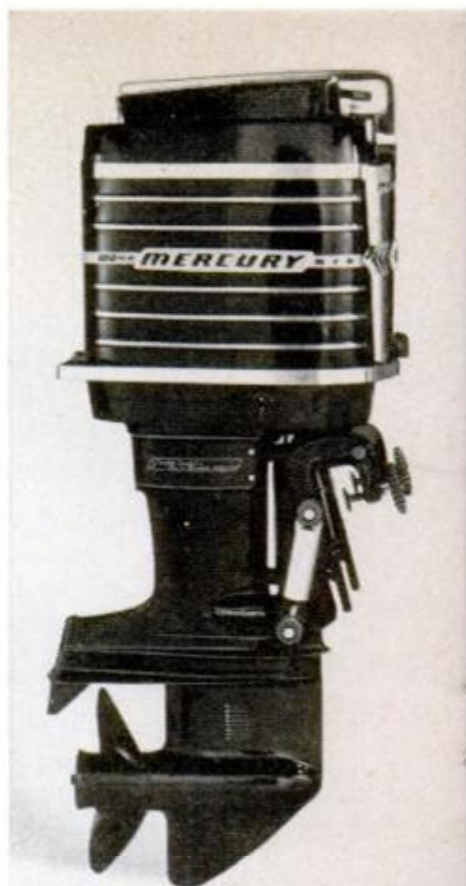
... to everyone except our engineers (who have spent years crafting these precision engines), our test drivers (who have proved them out over a million miles at Lake X, Florida), and our factory-trained dealers (who are anxious to show you how the '63 Mercs can give you more RUN for your money). See your Mercury dealer soon. He's listed in the Yellow Pages.

The finer facts for outboard buffs: New weedless water pickup/anticorrosion trim tab for salt-water protection/fixed-jet carburetion/Jet-Prop exhaust/low-level water pump for easier service/Power-Dome combustion chambers/balanced manifold system/heavy-duty alternators/long and short shaft for 15" or 20" transoms available on all models/die-cast, one-piece lower unit housings/single-lever control of throttle, forward, neutral, and reverse/complete selection of props for any power need.

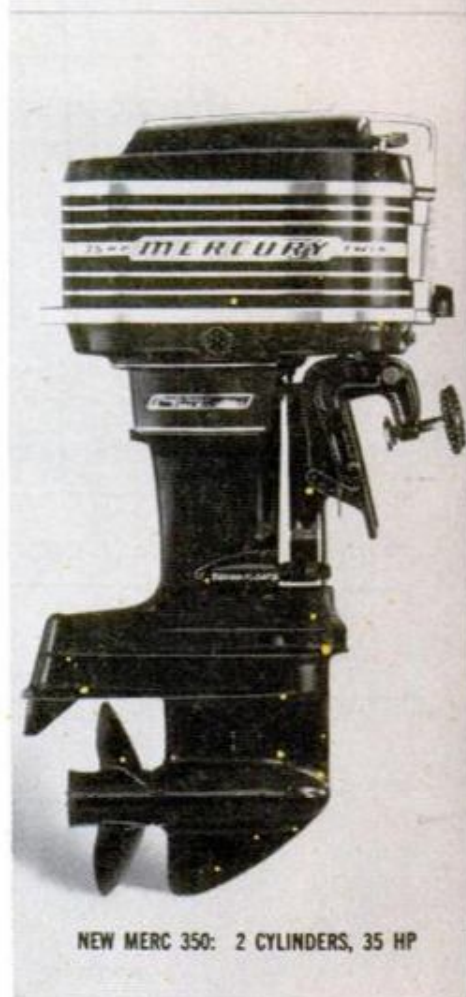


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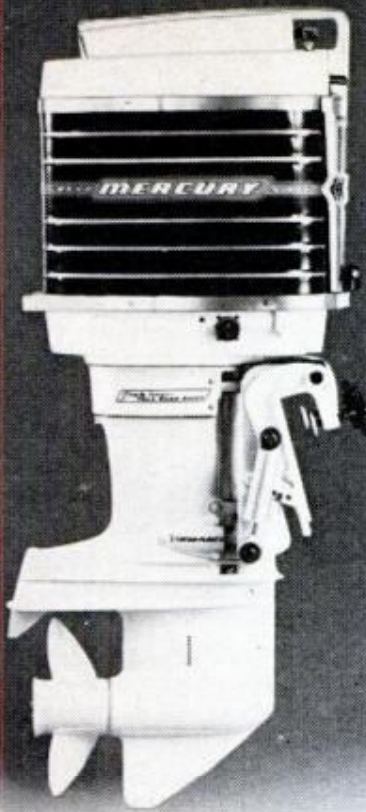
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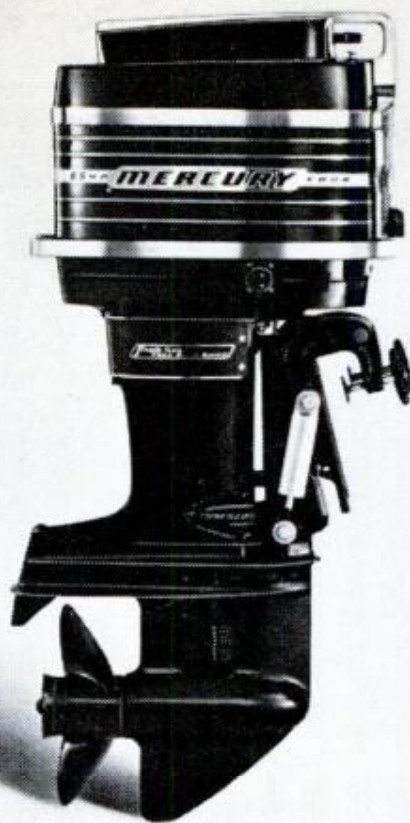
NEW MERC 1000: 6 CYLINDERS, 100 HP



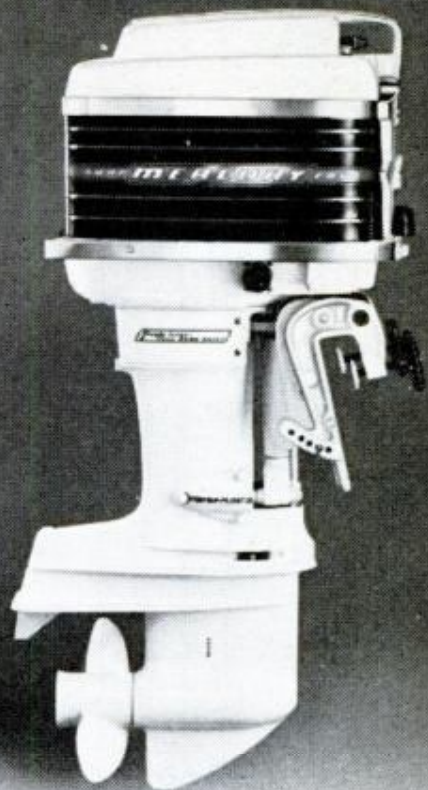
NEW MERC 350: 2 CYLINDERS, 35 HP



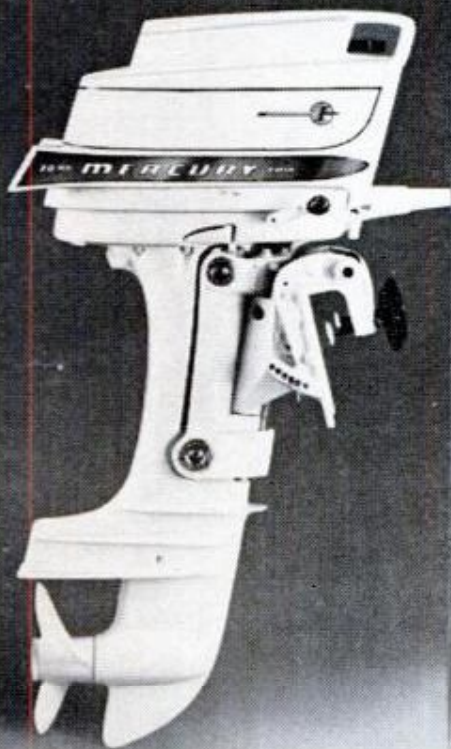
NEW MERC 850: 6 CYLINDERS, 85 HP



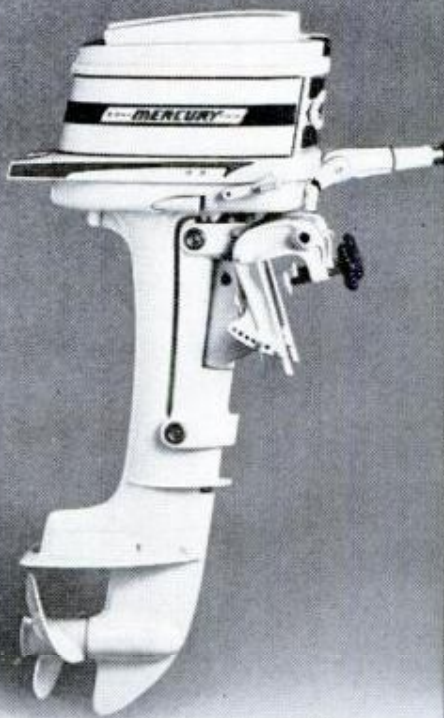
NEW MERC 650: 4 CYLINDERS, 65 HP



NEW MERC 500: 4 CYLINDERS, 50 HP



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Yeast Yields Secrets

LONG known by homemakers as a vital ingredient in bread, yeast has risen to an important role in scientific research.

Although yeast is one of the lowliest forms of plant life, the cells are similar to human cells, having a nucleus, genes, cytoplasm and outer membrane. In addition, Dr. Carl C. Lindegren of Southern Illinois University, has discovered that yeast cells are male and female. Either the male or female cell can produce offspring by budding, or they can be mated to produce hybrids.

With some 20,000 species of yeast, the possibilities of making different strains are incalculable. One billion cells are "born" every hour, and many generations can be studied in a single day.

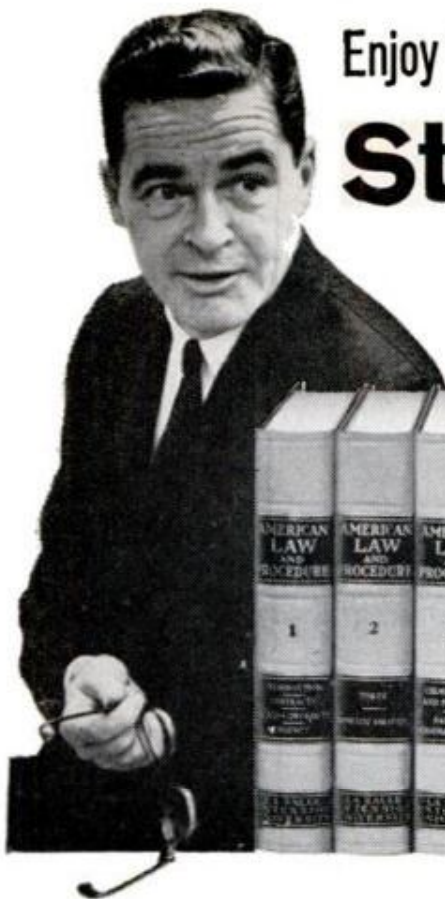
Using an electron microscope, the yeast cells can be magnified 30,000 times. Other sensitive instruments can manipulate them like golf balls so that what goes on inside the cells can be studied to learn how they react to radiation and other factors which affect human well being.

How do these revelations about the private life of yeast cells concern humans? First of all, budding yeast cells inherit certain traits from their parents through genes in precise ratios, just as humans inherit color of hair or eyes. Certain diseases, such as diabetes and afflictions like color blindness in humans will recur in a family. This is one reason why yeast is important in the study of human heredity.

Yeast is also being used to determine the long-range hereditary effects that radiation will have on human cells. In his laboratory at SIU, Dr. Lindegren can irradiate a cluster of cells and tell how many generations it will take for the effect of alpha rays, beta rays, gamma rays, x-rays, or ultraviolet rays to prove fatal. It's also been discovered that a tiny mechanism called the centriole inside the cell is the vulnerable target which radiation hits in order to destroy the cell. Such findings are valuable in measuring the hereditary effects on a human population of radioactive fallout from atomic bomb tests and cosmic rays.

The cause of cancer may even be revealed by further study of yeast cells. Basic investigations have shown that yeast cells can be made to act in the same way as cancer cells for research purposes, and that extremes of temperature may have a big influence on the spread of cancer.

Dr. Lindegren receives \$40,000 a year from cancer societies and the U. S. Public Health Service to pursue the cause of cancer, and yeast will be the medium used.

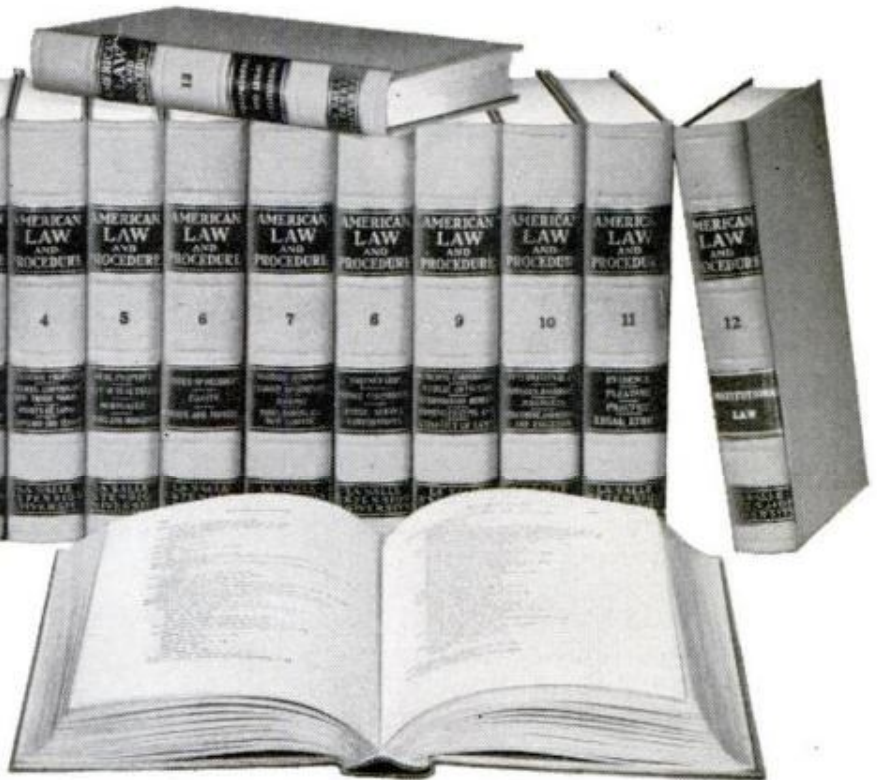


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Over the editor's desk

Holes for Bike Parkers

Glad to see you imported an old European bike parker (p. 137, July PM). Having experienced the ever water-filled parkers while a youngster, I am surprised to see no PM solution to this. Why not add one or two drain holes in the bottom?

Owensboro, Ky. LEENDERT KERSTEN

Fine idea. Now where did we put those carbide-tipped drills?

Call the Plumber?

Our May article, *Be Ready to Save a Life*, prompted Reader Joseph Contrino to ask whether a plumber's plunger would also help in performing the emergency life-saving method described. An expert in the technique, Dr. W. B. Kouwenhoven of Johns Hopkins Hospital, says no. Such a device would press on the ribs and cause considerable damage. Dr. Kouwenhoven also goes on to amend an incorrect impression he says might be gained from one of our photos. Pressure, he says, should be applied to the breast bone (not the xiphoid) by placing the heel of the hand on the lower third of the breast bone just above the xiphoid. No pressure should be applied to the ribs with the fingers. The fingers of the lower hand should be parallel to the ribs.

Life Saver

[The following letter was received by the READER'S DIGEST. It refers to an article which originally appeared in our January issue, and was reprinted with POPULAR MECHANIC'S permission in the May issue of the Digest].

The first situation you described in your May article, *How Quick-Witted Are You?*, involved a car stalled on a railroad track. I didn't realize it at the time but this stuck with me, as I was to find out on May 18, 1962.

That afternoon I was driving our '55 Pontiac on the Dixie Highway in Bridgeport, Michigan when I noticed flashers on the railroad crossing. I stepped on the brake and the car stalled halfway across the track. The first thought that came to mind was your answer involving the stalled car. I at once got out of the car and got my two small children out of the back seat. And none too soon because I hadn't gotten too

far away from the car when the train hit it.

I honestly believe your article saved my life and my children from serious injury if not from death.

Burt, Mich.

KATHERINE BENNETT

Free Clock

After two years of part time work as a hobby, I completed this clock from your December 1959 issue plans. It keeps remarkable time and is not too noisy.



The case is of walnut fence board, the works frame of oak, the kickboard from a horse barn, and the gears of walnut, birch, hickory, and maple and oak. The cash outlay was nothing and I made all parts with a pocket knife, files and a coping saw.

Griffith, Indiana

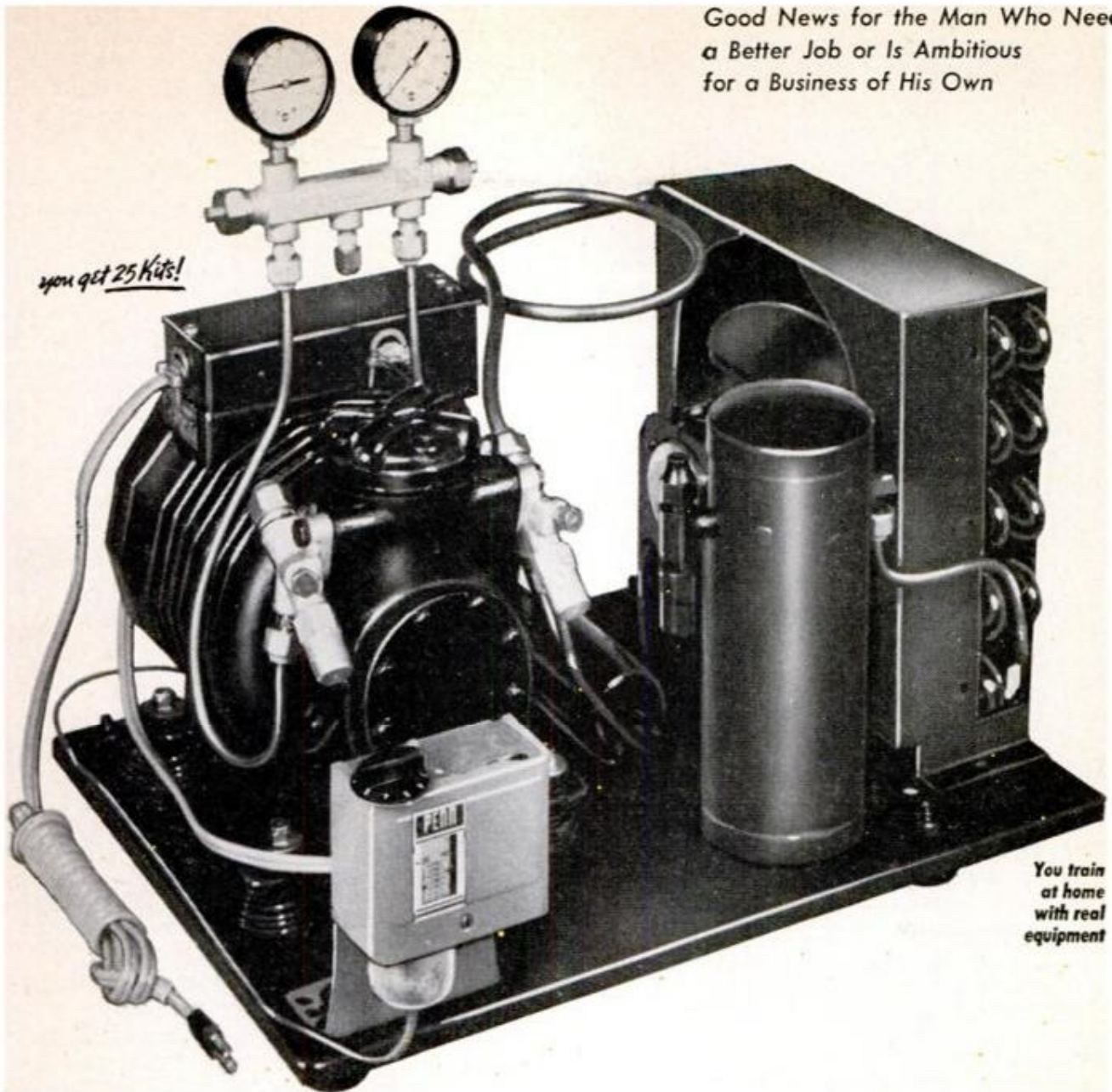
JOHN P. SHULTZ

Wants a Wing Dingy

The *Wing Dingy* (June PM) is the answer to my prayer if I could learn to fly it at my advanced age (1903) and if it is priced within my means. Summers we are here in East Penobscott Bay and winters

(Continued on page 12)

Good News for the Man Who Needs
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for a Business of His Own



you get 25 Kits!

You train
at home
with real
equipment

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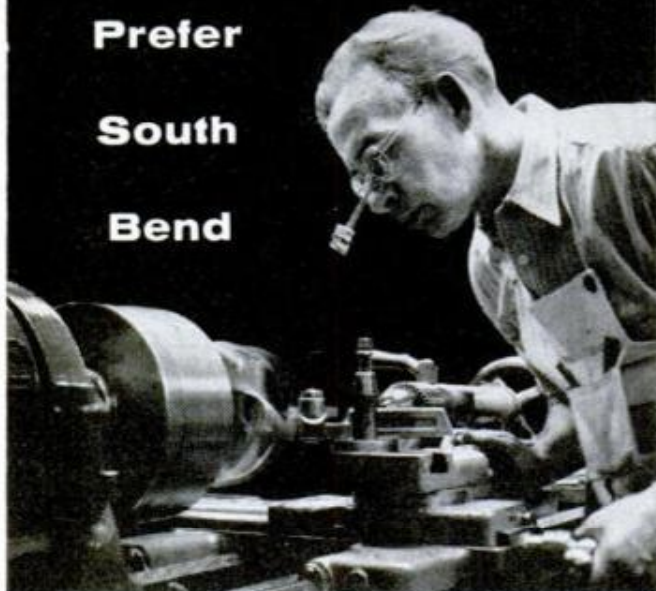


Photo from Learcal Division, Lear, Inc., Los Angeles

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LATHE

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we are in one of the Out Islands of the Bahamas where a nasty chop prevails, making it unpleasant even in our 16 foot Boston Whaler. Keep me posted on the Wing Dingy's progress.

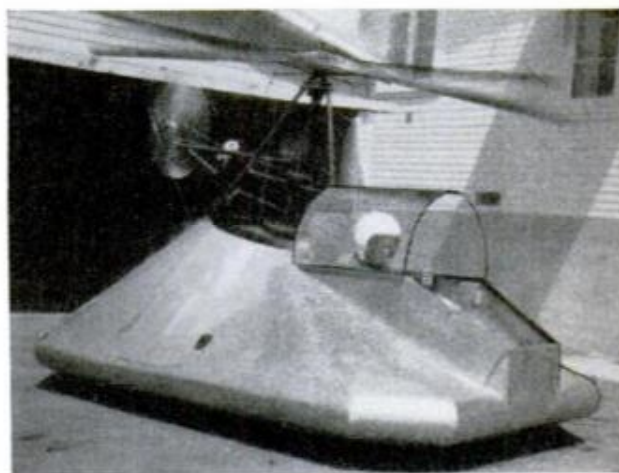
Deer Isle, Maine

E. G. WALTON

That we will. The possibilities of this unusual boat-aircraft are too fascinating to ignore.

Multiprop GEM

Couple of years ago, I saw a toy ground effect machine in a magazine. I experimented on about 25 models and ended up with a 6 x 6 x 9-inch one which worked well. Then I built this man-size one, 6 x 6 x 9 feet, and have flown it.



The machine begins to rise when the 72 hp. 2-cycle, 4-cylinder engine turns over 2,000 r.p.m. There's a four-bladed 29-inch prop on the engine to blow air under the body, a 4 foot overhead prop which tilts by stick for propulsion and a 22-inch variable pitch prop at the back, foot-controlled, for turning.

Lakeside, Calif.

A. G. KLEIN


Quite a craft, reader Klein. Let us know when you have her developed to the point where she'll go cross country, over the fences and above the cows. That would be a real breakthrough in GEM machine design.

Don't Do It

Somewhere in the confusion of moving our offices recently, we pulled a boo-boo. The method of cleaning drain pipes described on page 133 of our June issue works, but because of the danger of possible back siphonage of sewage it should not be used and is not permitted by most plumbing codes. Apologies to all.

The Editors

POPULAR MECHANICS



**A GOODYEAR
XTRA-GRIP
TRUCK TIRE
WAS HERE!**

Was here is right. Goodyear Xtra-Grip pulls through the mud and snow that leave ordinary truck tires slipping and spinning. That's because the Hi-Miler Xtra-Grip truck tire delivers up to **35% MORE TRACTION** than conventional tires. Truly, this is a safety-first tire. On rain-slick streets or back roads—in ice, snow, slush, mud—there are rugged, deep-biting lugs—more grip-

ping edges—to get you going, and stop you safely.

Xtra-Grip tires give you extra *mileage*, too. Up to **40% MORE MILEAGE** than the regulars, because they put more rubber on the road—rubber made of special extra-tough compounds. So for more traction—more mileage—get Xtra-Grip. Today. See your Goodyear Dealer or Goodyear Service Store. Goodyear, Akron 16, Ohio.

ANOTHER REASON WHY: MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

GOODYEAR

Hi-Miler—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

OCTOBER 1962

13

Science overseas

By William Kreh

Here's a jet-age mousetrap. Hordes of field mice around an airfield near Brunswick, Germany had plagued neighboring farmers for years. But soon after four French-built Alouette jet helicopters were stationed at the small field, the mice died by the score. Scientists gave the puzzled but pleased residents the answer: The jet's engine noise is of an unusually high frequency that is fatal to the rodents.



Pegase, Rhapsodie and Azur will soon be joining Peggy in France. It may sound exotic, but it's strictly scientific. Peggy is the name given to a small-scale reactor already in operation at the nuclear studies center being built by the French Atomic Energy Commission at Cadarache, near Aix-en-Provence. Pegase next year will start testing fuels for the industrial reactors of Electricite de France. Rhapsodie, a rapid neutron breeder will be ready for use in 1964. Azur, prototype of a reactor for submarines, goes into action late this year. Also being built and equipped at Cadarache are laboratories for research in irradiated fuel, purification of plutonium, studies in enriched uranium and beryllium, and experiments on hot glucine. The center is due to be completed by 1965.



A super-sensitive camera with an automatic focusing device has been developed in Britain for taking close-ups of the human eye. Held like a pistol, the camera throws out two D-shaped beams of light. To focus, the camera is moved toward the subject until the two D's form a circle. A trigger operates the shutter and fires an electronic flash. The camera is said to have many medical, scientific and industrial applications where rapid records are needed.



What was probably the first skyscraper city of the Americas is being unearthed in the Mexican province of Chihuahua. Archaeologists have uncovered about 40 acres of a city they estimate dates back to about 1200 A.D. Included in the ruins is a five-story apartment building.

You're shivering all the time and don't know it. And that, according to a Viennese scientist, may be the cause of regulated body temperatures in warm-blooded animals. The rhythmic, uninterrupted microvibrations impulsing through muscles at 7 to 13 times a second go on from birth to death, the scientist said. He found them in all warm-blooded organisms. Because of this, he believes they are the mechanism which maintains precise body temperature in warm-blooded animals.



Three Japanese firms are developing a communications satellite which they hope to put into orbit in time for world-wide telecasts of the 1964 Olympic Games in Tokyo.



Accurate measurement of blood pressure in the brain is possible with a new highly sensitive instrument developed by a Turkish scientist at the Istanbul Medical Academy. It is expected to be valuable in work involving brain tumors, vein blockages and hemorrhages.



A British scientist who is fond of bees has come up with a device for harmlessly extracting their sting venom. Used for research in the treatment of rheumatism, the venom was formerly obtained by wholesale crushing of the bees. The new device gives bees a mild electric shock which makes them eject their venom into thin silicone sheets from which they can withdraw the barbed stinger without harm. A normal sting tears the stinger and kills the bee. The venom crystalizes on the sheet in tiny globules. One gram of venom requires nearly 10,000 bee stings.



A tiny island in a Southeast African lake is receiving the attention of world scientists. It has been found to have a natural background radiation 30 times above normal. Natives of the 120-acre flatland—exposed to high dosages of radiation for generations—are being studied for noticeable effects. The high radiation is caused by unequal weathering of rocks, which has exposed radioactive minerals, subjecting the area to intense radiation.



An anchor light that is visible for half a mile and which switches itself on at dusk and off again at dawn has been developed by a firm in Great Britain.

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Tune in on the inventors

by J. L. Pugni

Instruments inside satellites can be suspended away from the vibration and heat of the satellite shell with a method developed by Fred Esch of Silver Spring, Md. The structure on which the instruments are mounted is held in place with a nylon lacing under tension. Patent number is 3,043,644.

☆☆☆

For tenting out Indian style, how would you go for a build-it-yourself portable tepee? It's easily assembled and disassembled—and you can even build a fire inside. For his contribution to outdoor living, James S. Des Rosier of Butte, Mont., won patent No. 3,042,052.

☆☆☆

Look no hand sprinkling with a spray iron developed by Harold S. Foster and Alfred G. Swenson of Ontario, Calif. A button controls the kind of ironing—steam, spray or dry—and a dial controls temperature.

The iron is patented under Nos. 3,041,756 and 3,041,757.

☆☆☆

More plaster can be added to an already dry plaster of paris cast, and the new plaster will adhere well when mixed according to a "recipe" developed by Leo Brickman of Metuchen, N. J., and Martin Edenbaum of New Brunswick, N. J. Their patent, No. 3,043,298, covers the addition of hydroxy propyl methyl cellulose in the plaster of paris.

☆☆☆

A process for protecting the chlorophyll (green coloring matter) while green vegetables are being cooked won patent No. 3,044,882 for James P. Sweeney and Margaret E. Martin of Silver Spring, Md. They add a citrate-phosphate buffer to keep the cooking water neutral.

☆☆☆

Using a mirror and a music box, you can trick a bird into singing, according to Michael Marder, New York, who received patent No. 3,041,911, for his idea. The music box is activated when the bird perches on a support.

Copies of the original patents may be ordered for 25 cents each from the Commissioner of Patents, Dept. of Commerce, Washington 25, D. C.



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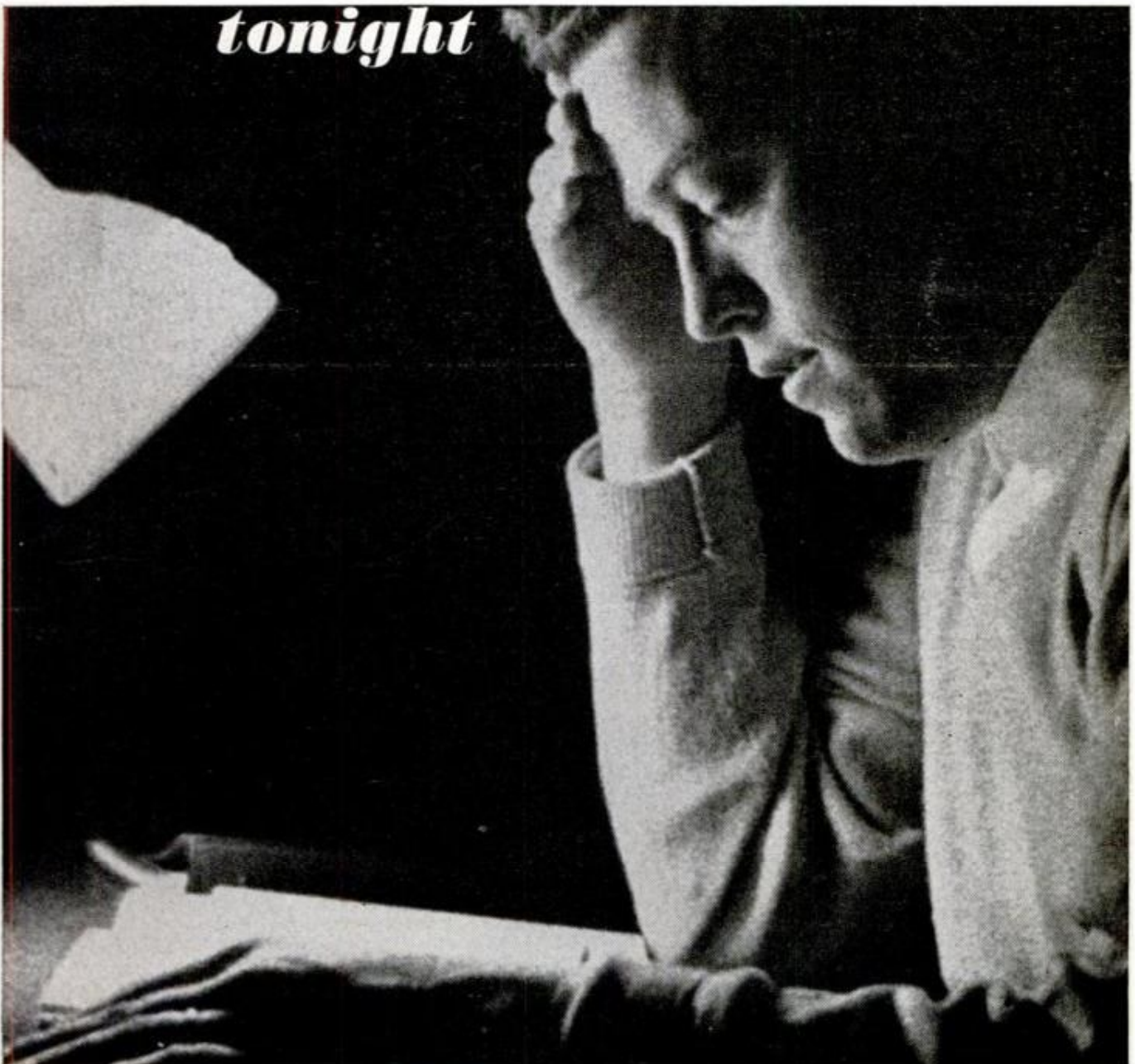
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By J. M. Smith President, National Radio Institute



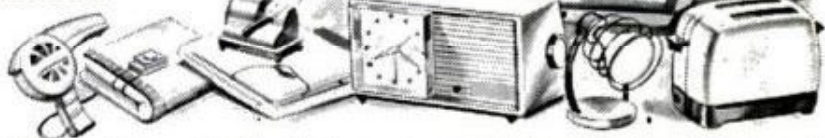
And I mean profits for you — no matter who you are, where you live, or what you are doing now. Do you realize that there are over 400 million electrical appliances in the homes of America today? So it's no wonder that men who know how to service them properly are making \$3 to \$5 an hour — in spare time or full time! I'd like to send you a Free Book telling how you can quickly and easily get into this profitable field.

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Science bulletins

The world didn't start with a bang! Nor will it end with a whimper. It just started rolling, and it will keep on rolling along, says astronomer Gerald Hawkins of Boston University.

Dr. Hawkins theorizes that the universe is static. It had no beginning, has no foreseeable end and—as opposed to other theories—it is *not* expanding. What it is doing is using up the old, decaying parts of stars and galaxies to form new stars and galaxies.

There is another "bang!" theory which says a primitive atom exploded and the universe is only its expanding bits of matter which, someday will be dead, isolated bits.

There is also a "steady state" theory which starts with an explosion but says matter is continually being created, rather than, as Dr. Hawkins says, being used and reused.

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Dr. Allan H. Frey has concluded experiments which show the electric charge in air has an effect on people who are in stress situations. People such as a pilot or astronaut, for example. Positive air ions, such as those produced by fluorescent lights, increase people's activity and ability; negative air ions, such as those used to heal wounds and infections, decrease capabilities and productivity.

If you've ever welded something, you can appreciate what a tiny, new micro-welder developed by Aerojet Co., can do. It is for use in outer space.

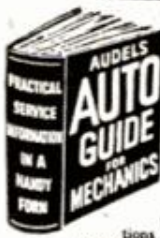
It will make a reliable weld in the time it takes to dot an "i" writing a letter. But—the dot of the "i" will be 30 times bigger than the size of the weld.

Scourge of the old, old West? Two paleobotanists from the University of Oregon have found the first fossil crocodile discovered west of the Rockies. They chipped it from rock 45 to 60 million years old.

The rock croc was about eight feet long.

James Biery

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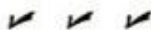
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Items from all outdoors

Goodies for fall sports department: One star of the recent fishing-tackle show is Du Pont's brand new monofilament fishing line that contains a daylight fluorescent additive, making the line easily visible any time it's light enough to see around you. Basing the new line on their Stren monofilament, they produced a line no different in physical qualities, but which emits a soft blue glow. When seen underwater and from below, as a fish sees it, however, the blue fluorescence loses itself against the light sky. Tests so far show no reaction on the part of the fish—they don't mind the color.

They're planning to call it New Stren Round Fluorescent Monofilament. It'll be in the stores this fall in sizes from 2 to 30 pounds.



Getting your shotgun or rifle ready for hunting season? It doesn't really help your aim to have it looking good, but it'll pass the time until the season opens, and will make the gun last lots longer. There's a new gunstock refinishing kit on the market that makes it easy. It's a set of four small bottles—wet sanding fluid, primer-dewaxer, wipe-on finishing fluid, and liquid wax. The set makes refinishing pretty simple, and produces a fast, good-looking finish. It's called the Master Gun Stock Refinishing Kit, and is sold by the Thompson Company, 509 South Gilbert, Iowa City, Iowa.



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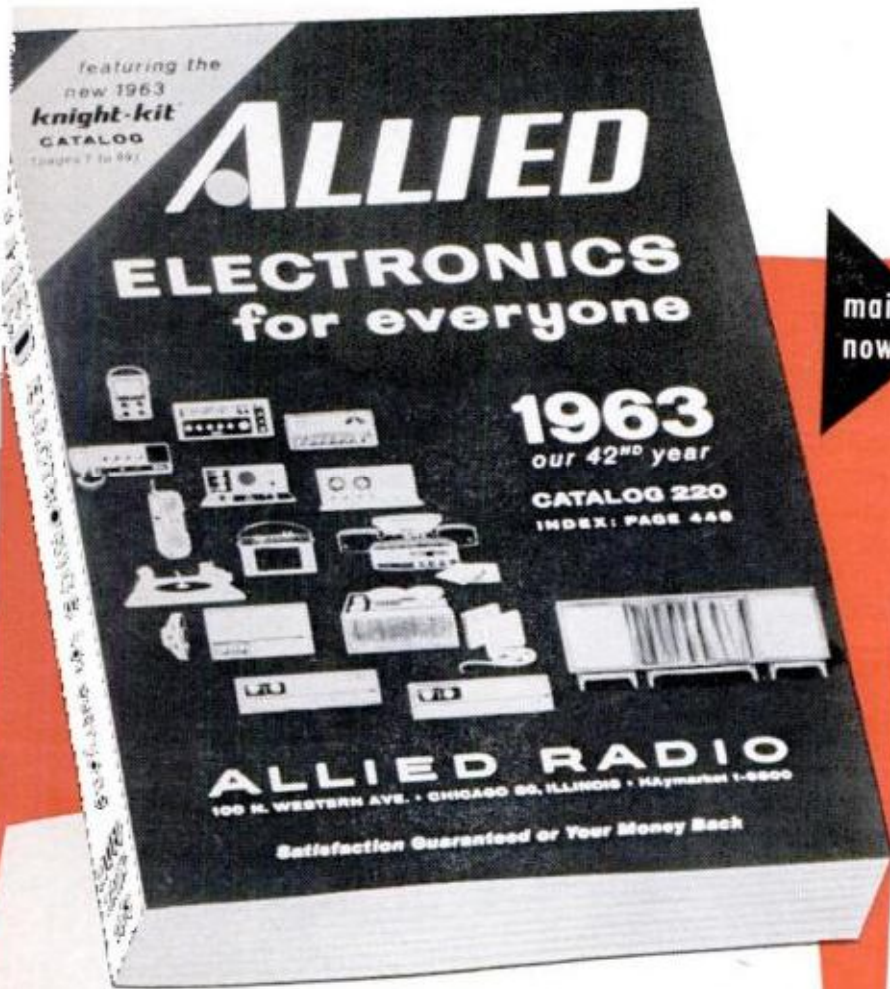
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This last would tear the arm off a pilot who wasn't used to it, but the *Angels* explain that forcing themselves to keep full back pressure on the stick to keep the nose up gives them a better feel of the plane for the high-precision touch they need. Over the years they've developed an extra bulge on their forearms to compensate.

For the rest, they say the heavy boots and pressure suits would only interfere with the delicate control they must keep over the planes, and the cramped position—using their legs, arms and even chin as one unit to nudge the stick ever so slightly this way and that—also helps overcome blackout on the high-G maneuvers.

The *Blue Angels* put on their amazing shows nearly 100 times a year throughout the country.



Military aircraft may finally get uniform designations.

Now, the Navy's F4H is the Air Force's F-110, yet they're identical aircraft. So are the Air Force's C-130 and the Navy's GV-1. These traditional designations just grew. The Air Force likes to name all its plane in the order they are made. The Navy likes to group them according to manufacturer.

It came to a head when Congressmen complained that they got confused when two witnesses talked about the same plane using two different designations.

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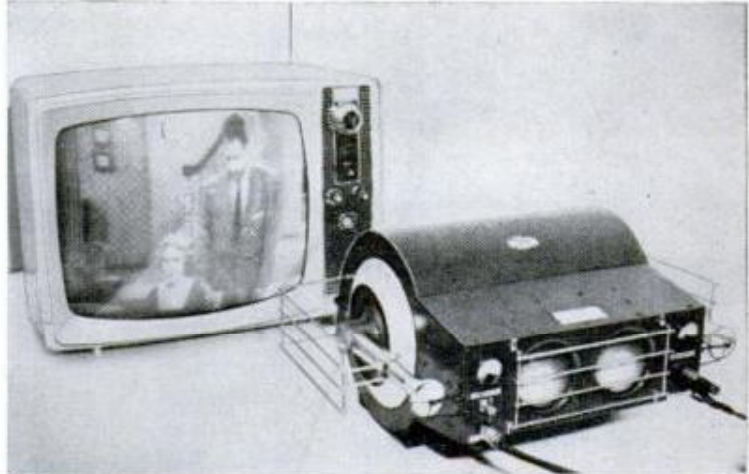


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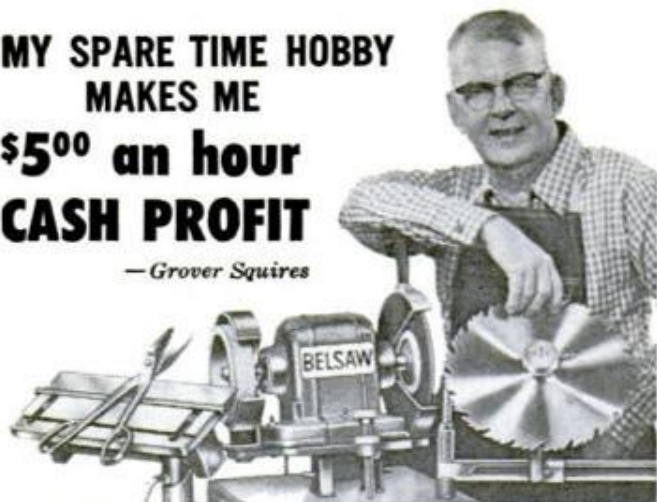
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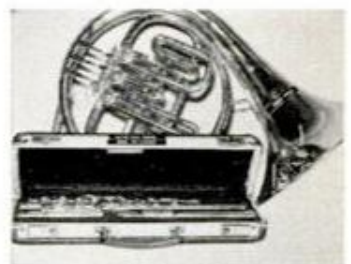
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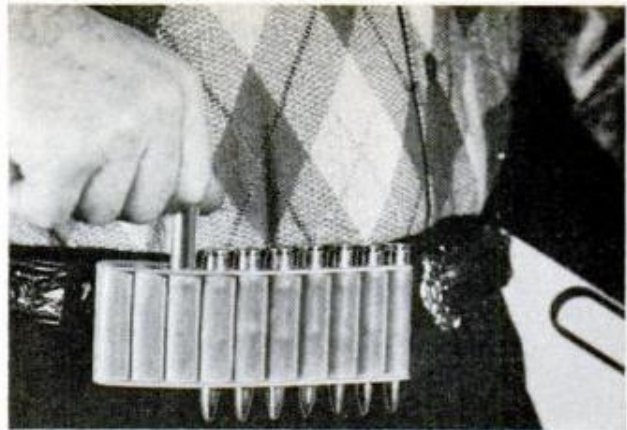
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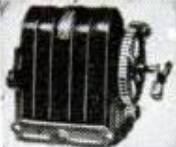


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Would you like a 32 page booklet (without cost) that will show you how to get continuous raises without long waits?

It has brought a new way of life to both men and women. It describes the Duraclean way to independence and higher income.

It tells you how our dealers, while continuing present job, earn up to \$9 and more hourly profit as their customer list grows... then switch to full time, lining up jobs for their servicemen. They gradually add more equipment, more men, and more profit.

It tells how they have eliminated job insecurity, income limits, dictates of a boss, lay-offs, and the monotony of office and plant routine; how now, instead, they enjoy security, freedom of action, ownership prestige, a fuller life and automatic income increases.

Territories for new dealerships get fewer every day as open areas rapidly fill up in this cooperative organization. This is a high profit, lifetime business with unlimited opportunity that has grown to a worldwide service. The coupon will bring you the full details by mail with no obligation.

No Experience, No Shop Needed

Owning your own business is easier and much simpler than you were likely thought... when you have the training and the constant aid of a firm that is deeply interested in YOUR success.

You need no previous experience. The business is easy to learn... easy to start... so easy to service that women do it. Dealers operate from home, office or shop. If you can invest a few hundred dollars, we will finance the biggest part of your business.

Each dealer has a personal relationship with our staff. We hold dealer area meetings, training schools, and dealer conventions. We all work together... exchange ideas and swap experiences.

\$9 hourly plus \$6 on Servicemen

The national price guide gives you a gross hourly profit of \$6 on EACH serviceman working for you... \$9 on your own service. One job a day brings a good income. Then, your business grows from recom-

mendations and repeat orders.

You not only steadily increase income... your dealership value grows. G. F. Munroe, after 12 months, sold his Texas dealership for 10 times his cost. Jerry Humbird operated 4 months and sold for \$1,325 above his cost. Jack Braniff started 3 dealerships and sold each at a profit. Leo Lubel, after 30 months, sold for \$8,308 above cost. We help dealers sell, if they wish to.

An experienced Duraclean dealer will train and assist you... reveal his proven ways to build customers. In a few days, your business is established with a growing income.

Customers Come Readily

The phenomenal growth of Duraclean service was due to the safer, quick-dry absorption process of cleaning, reviving, and protecting carpets and upholstery right on the premises. Housewives, hotels, theaters, clubs, motels, institutions appreciate having furnishings cleaned with a new consideration for life and beauty.

Customers tell friends how Duraclean eliminates soaking, harsh soaps and rough machine scrubbing... how mild, quick-action, foam lightly applied, cleans better, revives colors, enlivens fibers, makes fabrics brighter. Customers are your best salesmen.

You may write to one of our dealers, if you like.

You Have 6 Services

DURACLEAN brightens, cleans & revives upholstery.

carpets and rugs with a new SAFETY and convenience.

SPOTCRAFT safely removes spots and stains.

DURASHIELD retards soil and stains... keeps

fabrics fresh and bright months longer.

DURAPROOF kills and repels moths and carpet

beetles. You give a 6 year Warranty.

DURAGUARD flameproofs; avoids fire starts.

TUFTCRAFT repairs moth damage, cigarette

burns... often saves the furniture or carpet.



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An Exploding Market

Government figures show service businesses growing faster than industries and stores... \$750 million yearly potential just in rug and furniture cleaning. You have 5 other services.

You will have pre-tested yellow-page and newspaper ads, commercials, store display cards, sales aids and mailings. You are backed by national ads, Parents' Magazine Seal, McCall's "Use Test" approval, American Research & Testing Laboratories, furniture and carpet manufacturers' endorsements.

Upholsterers, decorators, furniture, carpet, and department stores refer jobs to you from their customers. Car dealers take orders; have used cars Duracleaned.

We prefer you have no cleaning experience... not have to "unlearn" old scrub methods. We and an experienced dealer show you all you need to know to build your business.

Small Investment

A few hundred dollars establishes your business... you can pay rest from sales. We supply electric equipment and enough materials to return your TOTAL investment.

A Duraclean dealer must be reliable, honest, energetic, and willing to work. If you can meet these qualifications and can make the small initial investment, we'll be glad to hear from you and mail you complete facts.

But, whatever you do, mail the coupon today... now before you forget it, before someone else gets the dealership for your area. There is no obligation to find out.

It has been said, "Opportunity knocks but once at every man's door." This may be that one opportunity in your life.

Find Out!

With no obligation, we'll mail you a 36 page booklet explaining these 6 vitally needed services... how and why your business grows... how we help finance you.

Then decide if this sound business fulfills your dream of progress and independence. Your location could be taken tomorrow... so mail the coupon today—NOW!

What Dealers Say

L. Falls: "I cleaned 1900 sq. ft. of carpet in one day and made \$135."

L. Broersma: "Have now completed 5 years with Duraclean. We have never had one complaint."

George Byers: "For State University my total billing was \$2,416. Total expenses \$814."

Ed Kramsky: "In 2 years, I now have two assistants, a nice home and real security for my family."

Leon H. Babbitt: "I average about \$400 monthly part time. I'm starting full time."

John Jaffe: "There's a huge demand for good carpet and upholstery cleaning. If you tell enough people about Duraclean you have to make good."

W. C. Smith: "Earned \$650 one week. Our volume keeps getting bigger all the time."

Gerald Weirrauch: "Three persons called me... saw Duraclean advertised in magazines."

Earl Davis: "Our sales increased \$17,660.00 this year."

A service man for Dealer C. Weed: "The furniture was filthy black. When through, I was amazed at how clean it looked."

V. Nebendahl: "I've closed every sale where I used the new slide projector to date."

N. Josseland: "Have made as high as \$200 in one day. Largest earnings for a single week... \$750."

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It may put you in business

DURACLEAN CO., 2-160 Duraclean Bldg., Deerfield, Ill.

With no obligation, mail letter with 36 page booklet fully explaining how I can increase my income and my family security with a Duraclean dealership.

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Pentagon sidelights

By William R. Kreh

A squeeze gauge has been devised and put to use at Fort Jackson, S. C., to help show new soldiers the importance of squeezing rather than pulling a trigger. The unit, which hooks onto a rifle, consists basically of a glass tube filled with pink water. As the rifle trigger is squeezed, the fluid is forced into the vertical tube, clearly marked to show the degree of pressure applied. Should the soldier jerk the trigger, the fluid spurts out the tube's open top. The gauge is being used by trainees in dry-firing practice before going out on the target range.

An electronic bloodhound, so sensitive it can detect alcohol in a man's saliva from a bottle of beer he drank the day before, has been developed by Air Force scientists. Called a gas chromatograph, it may be used to sniff out possible signs of life on Mars.

A new type of green paint has been developed by Army engineers to use in camouflaging its missiles. Although dark in color, the paint nevertheless reflects a high percentage of the sun's heat and keeps the delicate instruments inside the missile cool. Formerly, the missiles had to be painted white to reflect the sun's rays and protect their innards from solar radiation.

Flight box lunches offer the Navy more than food. Down at Jacksonville, Fla., they're using the discarded cardboard boxes as instrument hoods, used to simulate flying by instruments only by blocking from a pilot's view all outside conditions without hiding the aircraft instruments. With a couple of snips of the scissors and a few creases, one of the boxes can be shaped to fit under the visor of a flight helmet. Besides being simple, it's safe too, since it can be removed in an instant should an emergency arise.

Snapping shrimp, barnacles, and other sea creatures are appearing on television every day down in Florida and their No. 1 fans are Navy scientists.

The Office of Naval Research recently

installed a television camera and hydrophones on the ocean floor in the Florida Straits, connected by cable to a laboratory in the Bahamas where scientists study the marine life and the noises they make. Reason? Many of them make noises which, when heard on sonar, sound like a submarine engine. By watching and listening to them, the Navy hopes to be able to train its sonar operators to tell the difference between their noises from those of a real engine.

Along the same lines, the Navy has recently taken security off a tape recording of a "conversation" between three killer whales recorded in Puget Sound. The tape is being used to train sonar operators, since the noises sound amazingly like those made by the sonar echo off a submarine hull. As a sidelight, the Navy said only one whale "talked" at a time, the others waiting politely until he finished before "answering."

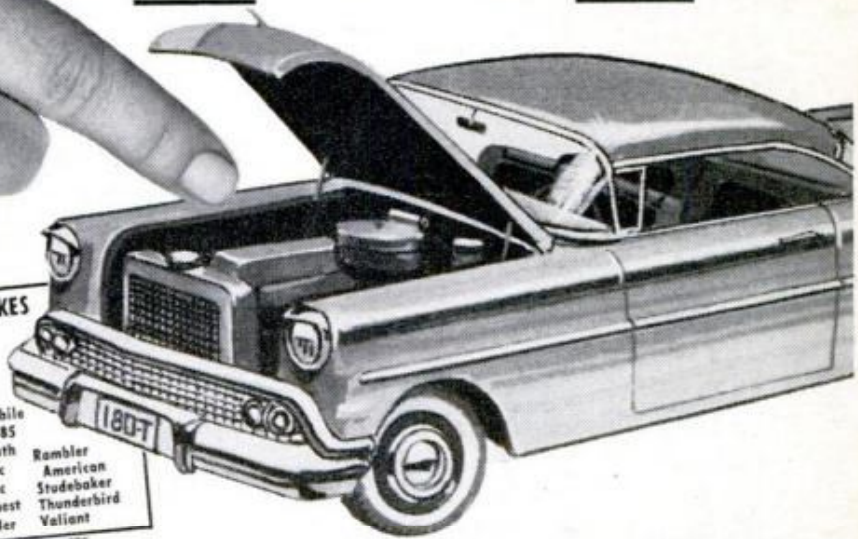
A super flash-bulb unit is being tested by the Army for use in night photography from the air. The electronic unit can illuminate an area of 750 square feet from an altitude of 1000 feet. The 165-pound unit is mounted in a 16-inch reflector which is carried under the wing of one of the Army's light aircraft. The new unit has several advantages over the style now used for night aerial photography—it's safe to handle (present bulbs are explosive), it can be used thousands of times without replacement, and since the duration of its flash is so short (1/10,000 of a second) it virtually eliminates any image motion on the film.

A compact "space kitchen" for feeding three men on a two-week space flight has been developed by the Air Force. The tiny, lightweight galaxy galley consists of an electric oven, water system, water heater and small refrigerator. The Air Force says the compact feeding console "is configured to resemble the eating facilities with which the astronaut is acquainted in his everyday living, thus maintaining a high interest level in eating."

A tick-pulling gadget that measures how much force it takes to pull one of the insects from a rabbit's ear has been built by the Navy. It was part of a search for an ointment or drug that will cause ticks to remove themselves from a man's body. They haven't found such a substance yet, but they're still looking. Meanwhile, they say kerosene and camphorated phenol are the most effective substances of all they've studied. Holding a lighted cigarette close to the tick's rump will also work wonders, we've found.

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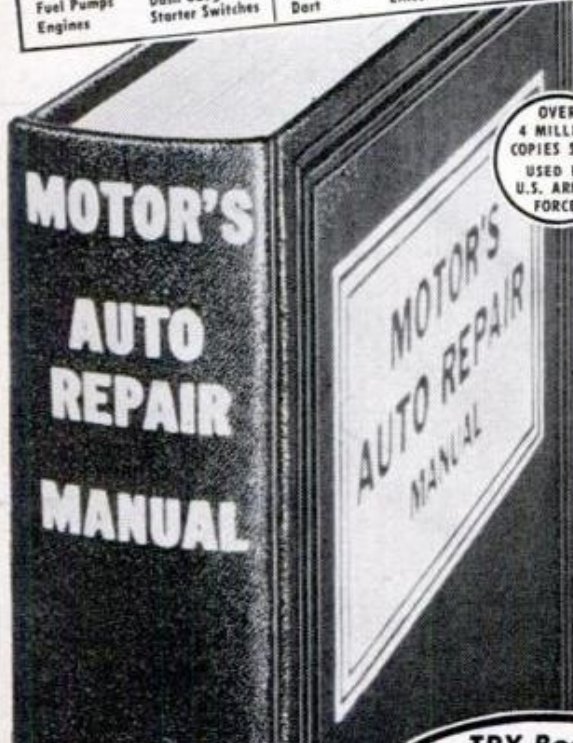
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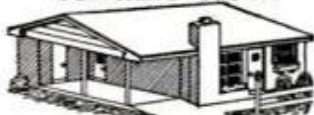


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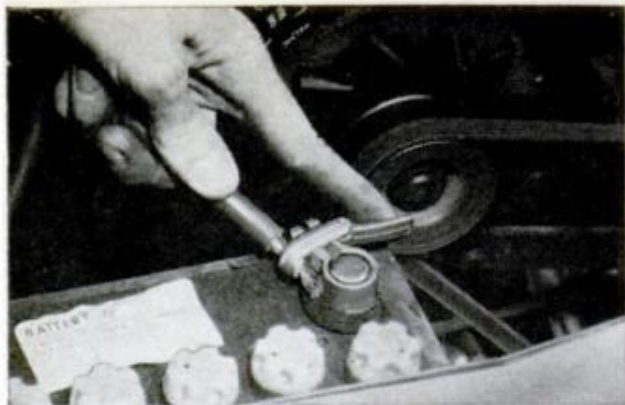
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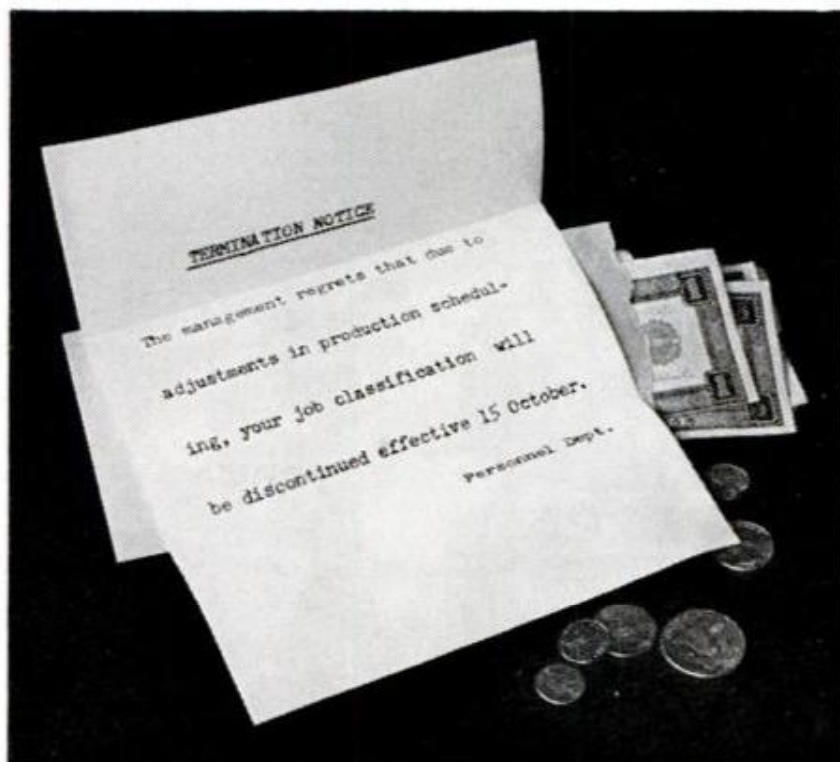
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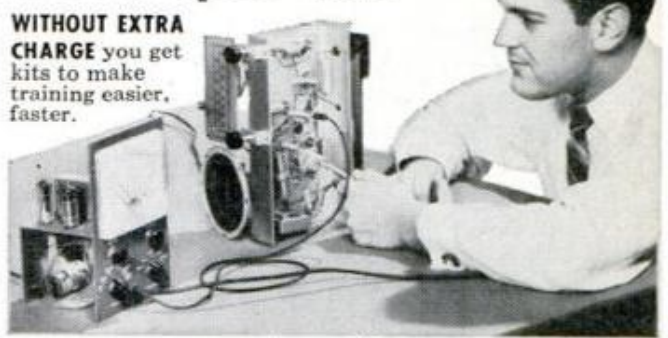
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Irving Park Road, Chicago 13, Ill., under catalog No. 12045.

The Scientific Life is the title given to Theodore Berland's new book, published by Coward-McCann, Inc., 210 Madison Ave., New York 16, N. Y. First-hand interviews have resulted in candid studies of nine leading American scientists—Willard Libby, James Van Allen, Philip Hauser—among them. What views do these "New Men" who are determining the future have on politics, religion, the world today? Berland, former science writer for the Michael Reese Hospital in Chicago and freelance writer for Popular Mechanics has found these men to have fascinating answers. Price of the 308-page book: \$5.75.

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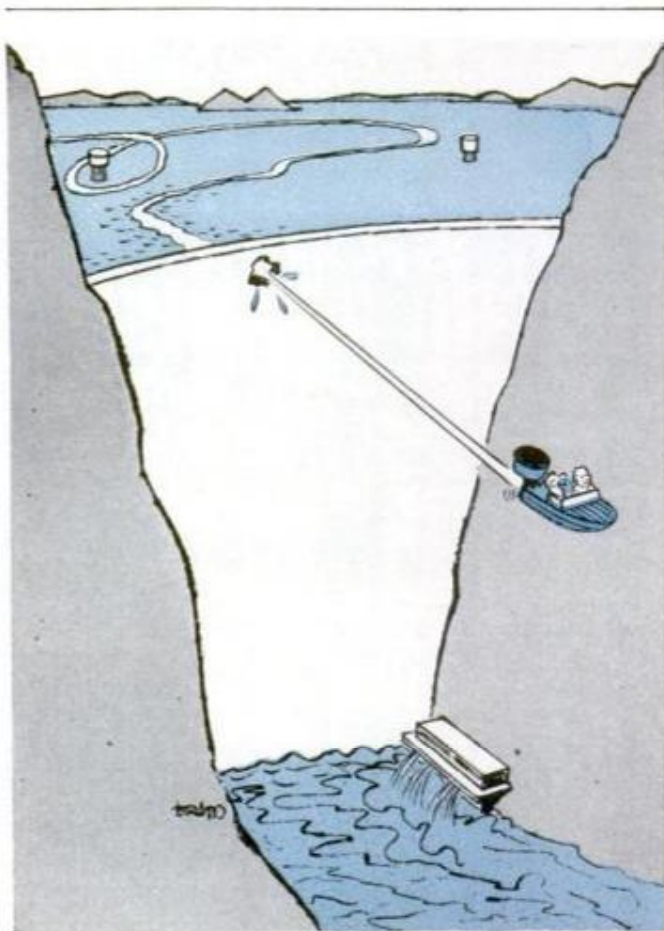
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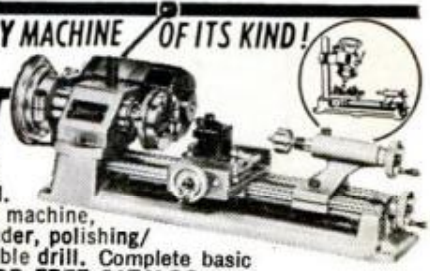


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In addition to the many opportunities brought about by growth in insurance, workers in this field have a unique advantage in that the need for insurance is just as great in periods of economic decline as it is during normal times. Individuals and businesses tend to retain insurance even when business is not at its best. This means that insurance workers have more assurance of regular employment as compared to workers in some other fields.

Clerical workers and agents make up the largest percentage of all workers employed in insurance. Other workers have jobs which are unique in insurance. Actuaries, for example, are mathematicians, usually with a college degree, who determine what rates insurance companies should charge for particular types of in-

surance in order to maintain the financial soundness of the company. Underwriters decide whether to accept or reject insurance risks and select the appropriate premium rates. Claim adjusters investigate the facts surrounding each accident that has resulted in a claim against the company to determine the extent of the loss and who might be at fault.

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(Continued to page 54)

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Most property and casualty agents represent more than one insurance company. They are independent agents who sell a policy from whichever company has the best plan for the customer's needs.

Their earnings are in the form of commissions from sales. The same commission rate paid for new sales applies to renewals. Renewal payments are usually due every three or five years on many property and casualty policies. Because of this agents continue to receive commissions even if work is interrupted by illness or other causes.

Both life and property and casualty agents must be licensed in the states in which they sell insurance. Most states require an agent to pass a written examination covering the insurance laws of the state and insurance fundamentals.

Applicants for jobs as insurance agents can write the main offices of insurance companies or apply to insurance agencies in their own communities. Personal interviews and tests are used by most companies to determine an applicant's aptitude for selling insurance.

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Claim adjusters make a vital contribution to any insurance company because they investigate losses to discover the facts and settle all resulting claims. Briefly, it is their job to determine the extent of loss, decide who is at fault, and adjust each claim by making payment or by collecting facts that show that no payment need be made.

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Trained men can work as staff adjusters with an insurance company and in other industries. For example, trained investigators are needed by trucking companies, railroads, steamship lines and government offices. Experienced adjusters can also work independently by representing companies that need accident claims settled. Such work is usually done on an hourly fee basis and hundreds of spare-time and full-time investigators and adjusters are at work in all parts of the country.

A unique advantage to this type of work is the great variety of challenges that it offers.

Millions of claims are handled each month in this country in accident, health and workmen's compensation claims. This presents a huge field for those who might be interested in the medical aspects of investigation.

For those interested in police-type work, thousands of thefts, robberies, burglaries and embezzlement losses must be investigated.

Investigators with mechanical ability can specialize in automobile and aircraft adjusting.

These are a few examples to show that claim adjusters can enter into the type of investigation best fitted to individual likes and abilities.

Claim adjusting is a field in which those involved provide a professional service that is needed and respected. It is a human-interest business offering opportunity for either full-time or part-time employment.

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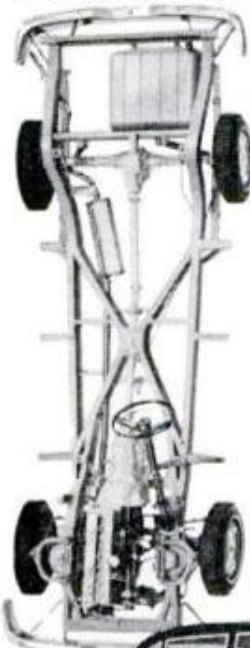
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FREE Bargain catalog. Auto owners, businessmen, hobbyists. Herbert Jamison, 6912 RSM, APO 742, Box 193, New York, New York.

TROPHIES—Awards, 25% discount. Catalog 30¢. Architectural Bronze, Skokie, Illinois.

RECEIVE Worldwide mails. Lifetime 25¢. Bagby, Box 144-E, Coos Bay, Oregon.

MAGNIFIER Flashlight. Ideal for students, lab., shop workers. Magnifies 10 times. Coated lens. Precision made. Battery operated. \$2.98 postpaid. Paul Adams, 1315 Warren, St. Louis 6, Mo.

BUSY People shop by mail. Catalog name brand items. Send 50 cents refundable with first order. G. L. Richardson, 56 Pleasant St., So. Eliot, Maine.

AUSTRALIAN Novelties from kangaroo skin, cuddly Koala bears, lambswool rugs, boomerangs. Samples and catalogue \$3.00. U.S. manufacturers represented in Australia. Details to Pendle Products, P.O. Pendle Hill South, Sydney, N.S.W.

FREE Publication your poem in new poetry volume. Details free. Poetry Press, Ionia 8, Mo.

POPULAR Mechanics readers. Library files protect your copies. Each set holds one year. Complete with date labels. 50¢ per set postpaid. Walter Ashe Radio, 1125 Pine, St. Louis 1, Missouri.

PROBLEMS You can solve through mail. Hard-to-find items located and mailed, new or used. Unwanted surplus sold. Information furnished. Teddy Race, Box 364, New York 28, N. Y.

RECEIVE Offers, opportunities, catalogs, samples, 10¢. Alpoen-IPM, 1652 Dounton, Philadelphia 40, Penna.

CRYST-L-CRAZE Paint for beautiful amazing crystallizing effects. Sample 10¢. Metal tooling catalog 10¢. Groundmaster, Boulder, Colorado.

FREE! Exciting new catalog—Western wear, saddles, riding accessories. Western Saddlery, Box 1864-V4, Fort Worth, Tex.

UNLUCKY? Your solid silver lucky "Leprechaun" airmailed overnight with free history. Only \$2.50. Silvercraft, 10 Albert Walk, Bray, Ireland.

FASCINATING Sellout offers: pictures. Novelties. Stamps. Giant sample assortment 30¢. Books 11 different 4¢. Persil, 436 N. Y. Ave., Brooklyn 25, N. Y.

WE'VE MOVED!

Our NEW Address is

**575 Lexington Ave.,
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We're excited about our move!

For generations, PM's readers have been vitally interested in the latest developments of science, in new industrial processes, in fascinating new home products, in new shop techniques, in dozens of new ways to use leisure time profitably and enjoyably!

And these are the very interests that are expanding most rapidly today.

In order to serve you better, in order to expand our coverage of these fields, we're moving to brand-new quarters. We'll have new automotive and electronic test equipment, a bigger shop, finer facilities for testing new products.

We're making the move to develop an even bigger and better magazine during the exciting years ahead!



INSURED SAVINGS

This new higher rate is far above the national average.
■ Each account insured to \$10,000 by the American Savings Insurance Company of Jackson, Mississippi. ■ State Government Supervision. ■ Employees bonded to \$500,000. ■ Share the wealth of the prosperous, new South-land. ■ Dividends paid two times a year. ■ Savings postmarked by the 20th earn from the first of the month. ■ Air mail postage pre-paid both ways. ■ Fast, gracious service. ■ Free gifts to new savers.

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First Security Savings and Loan Association
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Please open my 5% Savings Account at First Security Savings. I enclose the amount of \$ _____ for a Joint Account Individual
 Send free "The Mississippi Story"

Name _____


Address _____

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CHECK YOUR GIFT

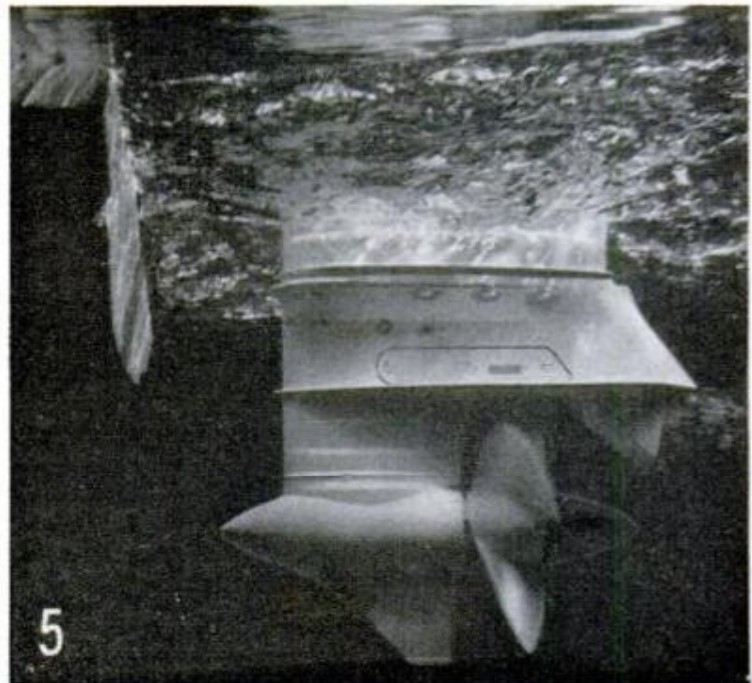
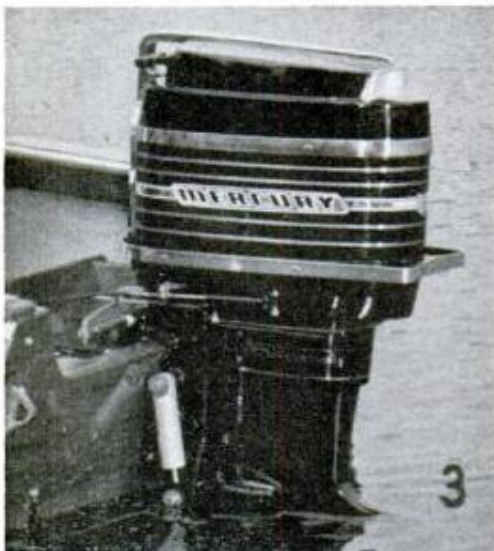
6-piece manicure set in leatherette kit  \$250

Travel clock with luminous dial, leatherette case  \$500

52 piece famous "International" Stainless Steel dinner setting  \$1500

5 1/4% plus choice of gifts \$5000

CHECK YOUR GIFT



OUTBOARDS FOR '63

1. **EXTRA MUSCLE** for Royal Scott brings it up to 45 hp. (shown), as Scott concentrates on detail improvements. New addition: 9.5-hp. motor for high-style fishing boat
2. **ENGINEERING REFINEMENTS**, rather than new power ratings, are offered by Johnson in the firm's existing line of 75, 40, 28, 18 (shown), 10, 5½ and 3-hp. Sea Horses
3. **STRESSING LIGHT WEIGHT** and compactness of its expanded line for 1963, Mercury adds new 20, 35 and 65-hp. (shown) ratings while dropping 25 and 45-hp. models
4. **COLOR OPTION** (gray or blue) is offered by Evinrude on push-button gearshift motors, new in '62. Same range of motors is maintained for coming year; shown is 40-hp.
5. **STREAMLINED** unit on 60-hp. models is retained unchanged by Gale. Most emphasis is being placed on low cost and dependability as Gale makes no major changes

THE ONE AND ONLY *knight-kit*® "SPAN MASTER!"®



WORLD-WIDE 4-BAND SHORT WAVE RECEIVER KIT

ONLY
\$25⁹⁵

NO MONEY DOWN

only \$5 per month on
Allied's Credit Fund Plan

You can hear *everything* on the fun-to-build "Span Master"—far and away the leader in its class for radio coverage, sensitive performance and value. Continuous tuning from 540 kc to 30 mc lets you hear ships, planes, direct broadcasts from Moscow, Berlin, Rome, London, Paris; tunes the 160, 80, 40, 20, 15 and 10-meter Ham bands—plus powerful local AM reception and dozens of other exciting broadcast services.

Bandspread dial and fine regeneration make tuning an easy pleasure. Has headphone terminals and speaker cut-out switch for private listening. Super-sensitive circuit. Easy to assemble from step-by-step instruction manual—includes list of foreign stations and international Morse code. Pyroxylin-covered cabinet with perforated white baffle and satin-chrome control panel. Complete with all parts, tubes, wire and solder. Size, 6¼ x 14 x 6¾". For 110-125 v., 60 cycle AC. Shpg. wt., 8 lbs.

83 YX 258BV. "Span Master" Kit, only **\$25.95**

83 Y 025. Outdoor Antenna Kit..... **\$1.03**

83 Y 027. Dual Headset..... **\$2.08**

Satisfaction guaranteed or your money back!



manufactured by

KNIGHT ELECTRONICS CORP.

A DIVISION OF

ALLIED RADIO

OCTOBER 1962

**GREAT TO BUILD!
GREAT TO OWN!**
packed with endless
listening thrills



Tune world capitals direct



Hear ships at sea



Hear planes in flight



Tune all your favorite local AM programs

- Tunes Shortwave and Broadcast Bands continuously from 540 kc to 30 mc
- Bandspread Control for easy, enjoyable shortwave tuning
- Sensitive Regenerative Circuit for world-wide radio reception
- Built-in Speaker plus headphone terminals for privacy listening
- Transformer Powered for maximum circuit performance

ORDER TODAY

ALLIED RADIO

100 N. Western Ave., Chicago 80, Ill.

Ship me the following:

"Span Master"® 4-Band Receiver Kit 83 YX 258BV

Antenna Kit 83 Y 025. Dual Headset Kit 83 Y 027

Ship No Money Down on Allied's Credit Fund Plan

New Credit Customers Only: Send name and address present employer, how long employed, position, monthly salary; rent or own home, how long at present address; give age (21 minimum for credit account).

\$_____ enclosed (check) (money order)

Name _____
PLEASE PRINT

Address _____

City _____ Zone _____ State _____



By Jim Whipple



Let's Look at the Record of 1962 Versus 1961— How 30 Cars Sold and Some Reasons Why

How do the various makes of cars line up just before the starting gun of the 1963 sales race? Remember that October is the end of the Automotive Year. By November 1st, 95 percent of the 1963 models will be in the showrooms and the sales race of 1962 will officially be over.

The only real measure of success in automobiles, as in any other business, is sales. Not the number of cars a manufacturer was able to stamp out, but how many his dealers actually sold. As we go to press comparable sales results are available for all makes during the first six calendar months.

In the big picture, all five major companies showed gains in '62, which followed a year of mild recession.

However, discounting the general buying upswing, some cars gained a lot more than others, while some actually lost ground. In an uptrend the losses are even more conspicuous and should be weighed more heavily.

Among the compacts, for example, standpat *Falcon* dropped 52,000, while *Rambler Classic* rose 56,000. Much of the buying uptrend in the compact field was soaked up by two cars, Ford's *Fairlane* and *Chevy II*, brand new cars accounting for over 333,000 sales

It appears that *Fairlane's* 173,000 sales

came at the expense of its big and little brothers *Falcon* and *Galaxie* which lost over 100,000 between them; cousin *Comet* dropped 22,000.

Launching a new compact resulted in a happy uptrend for *Chevrolet*. *Big Chevys* rose some 17 percent in sales while *Chevy II* sold nearly 175,000 units from the same salesrooms. Meanwhile *Corvair* stood about "as is," losing some compact sedan and wagon prospects to *Chevy II*, but picking up more and more lovers of the sporty *Monza* coupes and convertibles.

Buick Special racked up the success story in the compact field however, nearly doubling its sales compared to '61s' first six months, thanks to the lower-priced V6 and the top of the line *Skylark*.

Among the low-priced three *Chevrolet* surged ahead of *Ford Galaxie* to nearly double the number of *Biscaynes*, *Belairs* and *Impalas* sold compared to *Galaxies* and *Galaxie 500s*'. Even adding *Fairlane's* 173,000 to balance out *Biscayne* in a price comparison and adding *T-Bird's* 37,000 to balance *Corvette*, *Chevrolet* would still be over 200,000 units ahead.

In the medium-priced cars *Pontiac* scored a 50 percent increase as the entire group moved upwards in tune with, but not ahead of, the industry's increased pace.

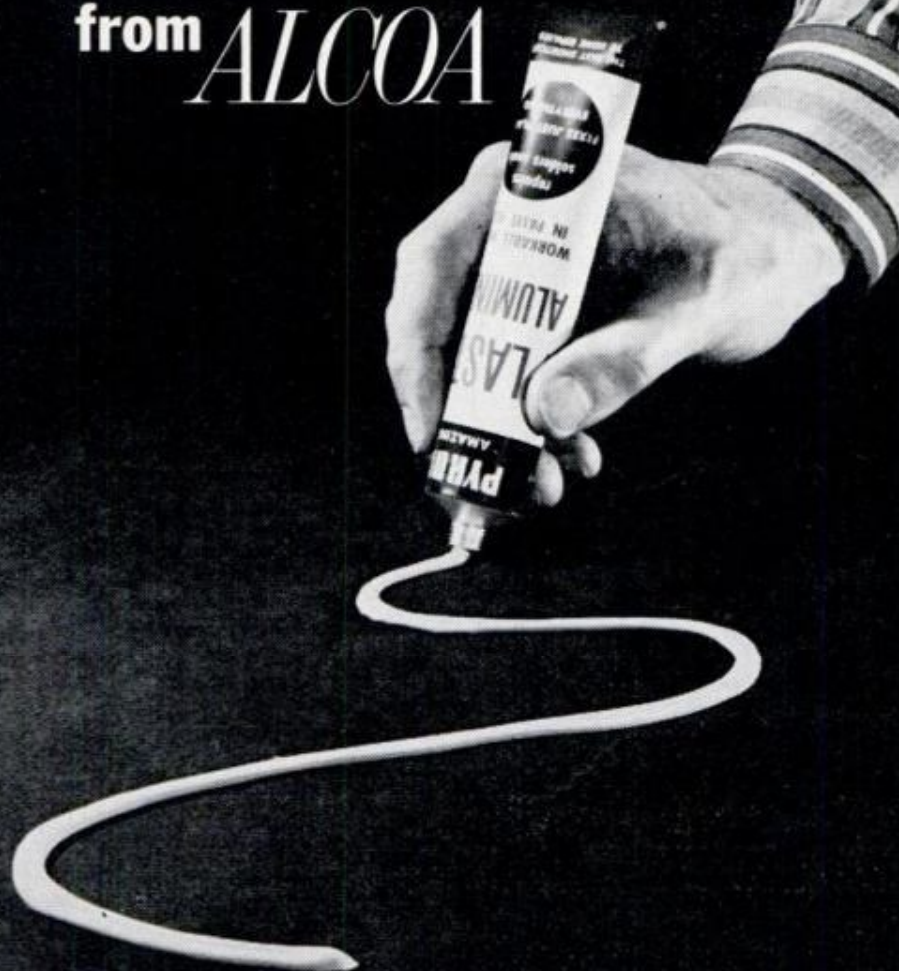
Imperial gained about 25 percent in a field heavily dominated by *Cadillac*.

SEE HOW THEY RAN—Comparative Sales for First Six Months

MAKE OF CAR	1961	1962	CHANGE	MAKE OF CAR	1961	1962	CHANGE
Compacts				Big Four			
Buick Special	40,254	79,534	+ 39,280	Chevrolet*	624,823	753,554	+ 128,731
Chevy II	-----	169,678	-----	Ford Galaxie	373,692	348,916	- 24,776
Comet	90,059	73,049	+ 17,010	Plymouth	91,689	83,017	- 8,672
Corvair	165,032	158,301	- 6,731	Dodge	82,079	74,421	- 7,658
Falcon	239,264	187,117	- 52,157	Medium-Priced			
Fairlane	-----	173,694	-----	Buick	99,028	122,387	+ 23,359
Meteor	-----	39,335	-----	Chrysler	46,971	61,088	+ 14,117
Olds F-85	34,358	46,195	+ 11,837	Mercury	59,354	50,672	- 8,682
Rambler American	77,420	74,012	- 3,408	Oldsmobile	120,472	168,000	+ 47,528
Rambler Classic	140,829	197,145	+ 56,316	Pontiac	128,264	191,141	+ 62,877
Rambler Ambassador	14,317	17,062	+ 2,745	Luxury			
Studebaker Lark	42,811	47,459	+ 4,648	Cadillac	72,791	75,338	+ 2,547
Tempest	52,538	73,122	+ 20,584	Imperial	5,218	6,609	+ 1,391
Valiant	57,572	53,530	- 4,042	Lincoln Continental	15,276	14,779	- 497
Dodge Lancer	31,985	29,030	- 2,955	Sports Coupes			
Volkswagen	89,559	108,462	+ 18,503	Thunderbird	43,424	37,248	- 6,176
				Studebaker Hawk	2,577	5,471	+ 2,894

* Includes Corvette

metal in paste form
made with aluminum powders
from *ALCOA*



Cut repair bills with Pyroil Plastic Aluminum

Think of the things you can fix yourself with Pyroil Plastic Aluminum. Users tell us it seals joints in gutters and downspouts; fills auto body cracks; stops leaks; mends pots and pans; repairs window screens. The list is a long one.

Workable metal in paste form, a good aluminum putty like Pyroil Aluminum is made with Alcoa® Powders. Apply it cold. It dries quickly to solid metal, withstands high heat—adheres to

metal, wood, concrete, glass—even hard plastics.

Once applied, Pyroil Plastic Aluminum can be filed, sanded, drilled and threaded. (Talk about versatility!) Your dealer stocks it or can get it for you. See him today.

Alcoa does not make aluminum putties, but Alcoa Aluminum Powders are used in all the best brands. Cold solders are easy to use, require no tools, heat or flame. Send the coupon today.



Entertainment at Its Best
ALCOA PREMIERE Presented by Fred Astaire
Thursday Evenings, ABC-TV

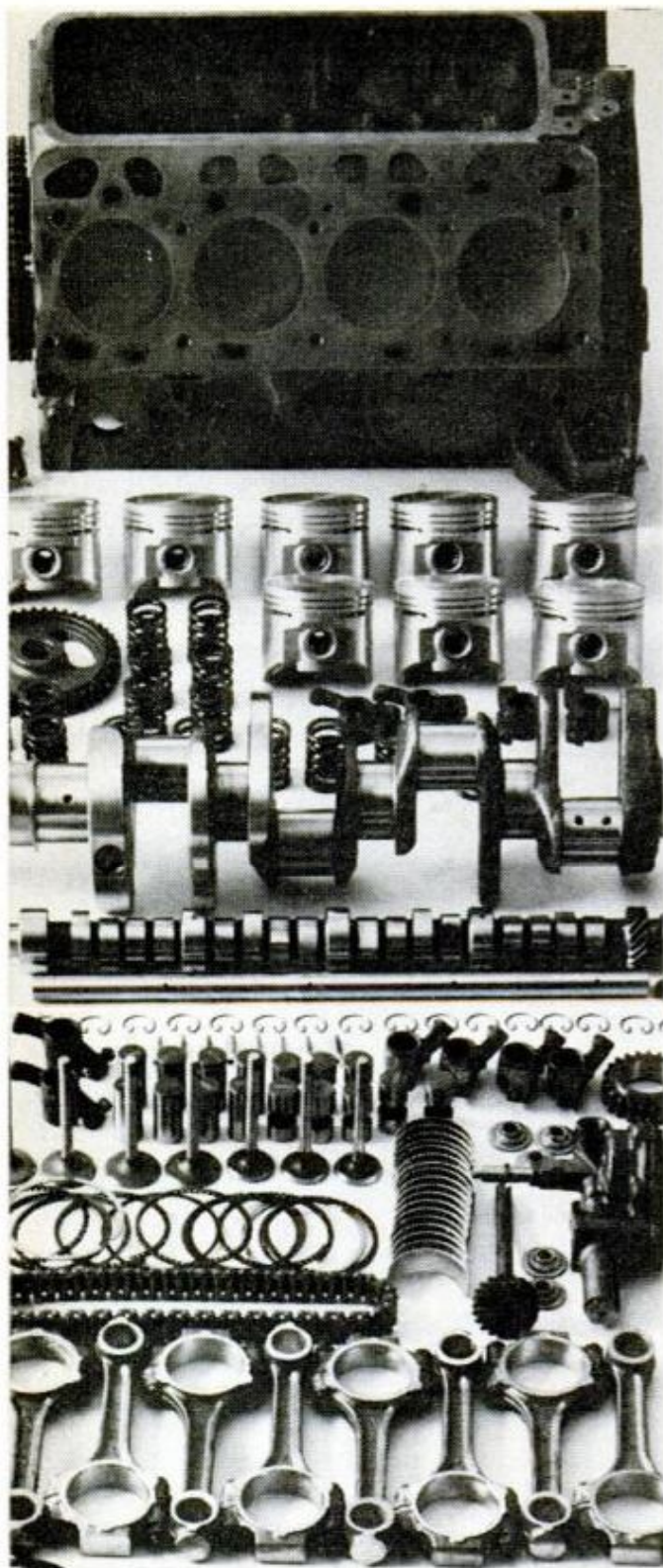
Aluminum Company of America
1743-K Alcoa Building, Pittsburgh 19, Pa.

Please send more information on cold solders made with Alcoa Aluminum Powders.

Name _____

Address _____

City _____ Zone _____ State _____



**all this
depends
on
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A Fram "Wear-Guard" oil filter traps up to 40% more of the dirt and grit that can grind away at moving parts and cause engine damage. Protect your car's engine. Ask for a fresh Fram "Wear-Guard" filter when you change oil.

FRAM
Wear-Guard Filter



Radioactive Reindeer

Strontium-90, a radioactive-fallout product of nuclear explosions, has been found to be highly concentrated in Alaskan caribou, according to Dr. Arthur R. Schulert, biochemist, Vanderbilt University. A native North American reindeer, the caribou is a staple in the diet of Eskimos and has been found to carry 10 to 20 times the level of strontium-90 in domestic cattle.

Dr. Schulert's findings may have some bearing on fallout dangers to humans, animals and plants from a proposed nuclear explosion, Project Chariot on the northwest coast of Alaska, which is intended to excavate a harbor.

The Atomic Energy Commission is now conducting studies to determine if the fallout dangers would pose a potential threat to the entire northern Alaskan food chain of plants, animals and man.

Exercise Lowers Cholesterol

President Kennedy's physical-fitness program has resulted in cholesterol reduction in a group of men subjected to strength exercises. Cholesterol is a waxy fat in the blood stream which may cause coronary heart problems.

The study was undertaken on 42 middle-aged white-collar workers whose average cholesterol levels were above normal. The group met Monday through Friday during the noon hour and began with a small work load which gradually built in intensity.

According to Dr. Lawrence A. Golding, physiologist at Kent State University, the average drop of the cholesterol level in the group was from 261 to 195, with individuals going from nearly 300 to about 150. In addition, the group's physical endurance and strength was greatly increased.

Man and Animal Astronauts

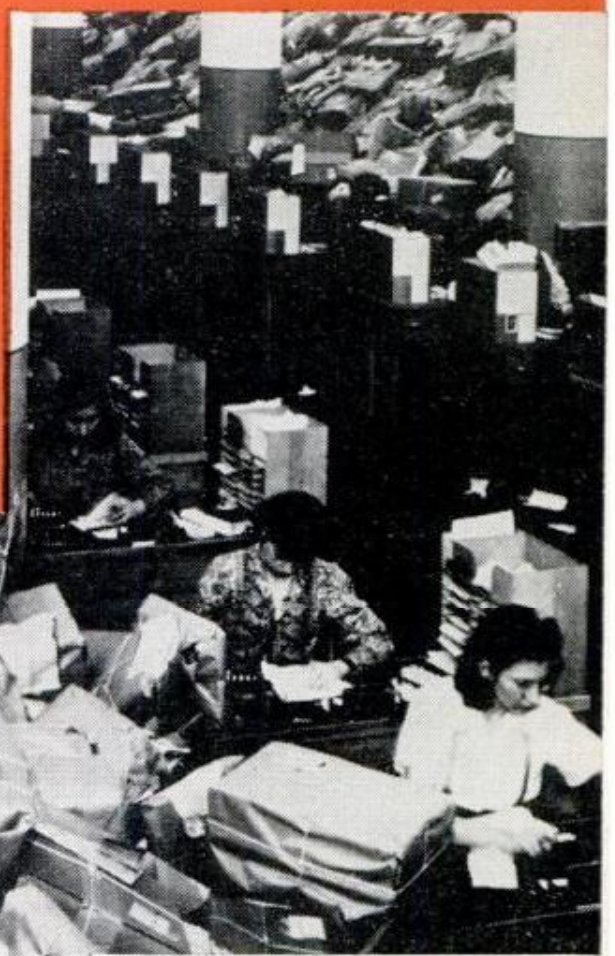
The two-man Gemini space capsule may be sent into orbit containing a man *and* an animal. Biological space experiments, such as deep brain probes or implanted blood sensors, could be tried on the animal. The man could verify the reactions of the animal. In this way, the effect of confinement, weightlessness and immobility for long periods would be studied, according to Brigadier General Charles H. Roadman, National Aeronautics and Space Administration.

For man's welfare, the problems in the health sciences will significantly outweigh the problems brought about by the physical and political sciences, says Dr. Roadman.

(Advertisement)

A number of one-man mail order enterprises are paying their owners an income of \$40,000 to \$50,000.

SPECIAL OPPORTUNITIES



Mail order is big business. Annual catalog sales volume of Sears, Roebuck and Co. is over 700 million dollars!

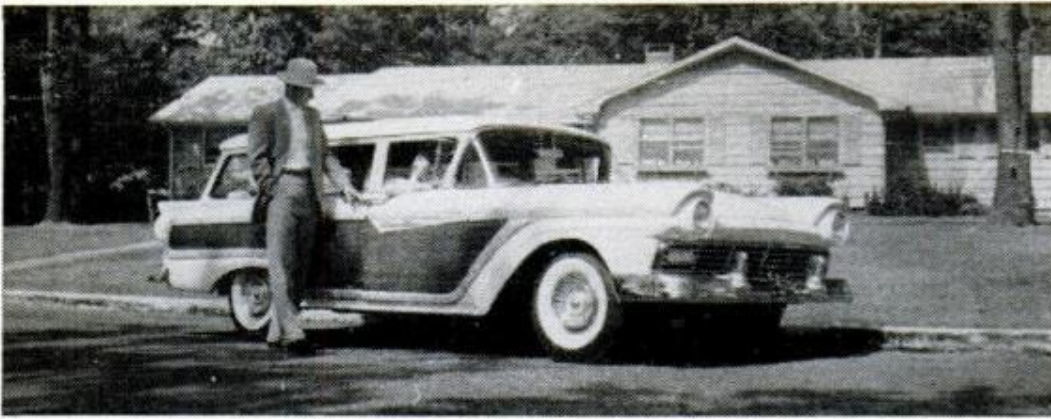
HOW TO START

Your Own Mail Order Business

You can make a fortune by mail. New firms will set you up in a fabulous mail order business of your own! They'll make up your catalogs, prepare your advertising, supply mailing lists and even ship your products for you!

By Robert Stephenson

When Anthony Sambati injured his back and was laid off from work he never dreamed it would be a blessing in disguise. Bedridden for weeks, he decided to start a small mail order business. This was something he could run right from his own home and required very little capital to begin. In fact, Sambati started with less than \$85.00.



After a short time in mail order, Sambati soon had a beautiful home with all the luxuries of a successful businessman.

He figured that a small mail order business might provide a temporary income to support his family until he got back on his feet. His first step was to obtain a franchise from a large wholesale mail order firm which supplied him with all the necessary catalogs and mailing literature. It wasn't long until his spare-time venture blossomed into a booming enterprise. Drawing a small salary and pouring the rest of the profits back into the business, he soon had others working for him! Today he owns a large retail store, his own warehouse and a beautiful home with all the luxuries of a successful businessman.

Sambati's story is typical of a number of men and women who began a small mail order business with absolutely no previous experience, and made a huge success of it. These 'little' people are quietly pocketing big profits every day—many content to keep the business small . . . spending an hour or two each day in the privacy of their own home. No bosses, time clocks or small pay envelopes. No door to door selling, in fact, you never even meet your customers face to face.

Yes, a small one-man mail order business is ideal for anyone wanting a chance to gain financial security and independence. Yet thousands try mail order each year and fail, simply because they don't learn the few simple secrets of success early in the game.

Take the case of Bud Sheer who had been working for a theatre in a small New Jersey town. With only a few hours spare-time to spend each morning, he tried mail order to supplement his regular income. Like many beginners in this field, Sheer was faced with the problem of finding good mail order items which would have a high mark-up and repeat sales potential. But the biggest obstacle was the expense of printing a catalog.

Then he heard about the A. J. Statile Co. of Hillsdale, New Jersey — an organization set up to aid the small mail order beginner.

He wrote to A. J. Statile Co. for full information, sent in his application for a franchise and within a short time the cash began rolling in. Today Bud Sheer *owns* the theatre he once worked for. Sheer attributes his success in mail order to the A. J. Statile Co. Actually, the theatre he owns has become a side investment.

He still uses the beautiful 300 page mail order catalogs supplied by A. J. Statile Co.

How does the Statile Co. help the beginner get a sound start in mail order? Very simply. Just as Henry Ford made automobiles within the reach of the general public—by mass production and large volume.

Let's take a few specific examples:

(1) All franchised dealers of A. J. Statile are offered ready to mail catalogs and sales literature. Each mailing piece has the dealer's name and address printed right on it. By printing millions of catalogs, Statile is able to offer these at a fraction of their regular cost. The artwork and layout costs for these catalogs would run into thousands of dollars for the beginner if he were starting from 'scratch'.

(2) Since all mailing material and catalogs contain your name and address, all orders come directly to you. Yet you don't have to invest one penny in inventory. All merchandise is stocked for you. In fact Statile has over \$3 million dollars worth of mail order merchandise at your disposal.

(3) All packaging and shipping is done for you. You simply send a shipping label to Statile together with the wholesale cost of the items, and the merchandise is shipped directly to your customers under your own shipping label.

(4) A consultation service is provided to answer any questions you may have. You receive a secret list of over 100 national magazines which run free ads. You'll be shown how to obtain free publicity on your own mail order items. In addition, you obtain trade names and addresses of over 150 other mail order wholesalers who drop-ship top mail order items for you. You'll also be given all the government laws and regulations pertaining to a home operated mail order business. These laws are a 'must' for all beginners.

All this valuable information is covered in the Statile Mail Order Survey which every new franchised dealer receives from Statile before they begin. Formerly sold for \$25.00, this survey has become the 'bible' of the trade. Mr. J. M. of Baltimore, Md., writes, "To tell the truth, all the information in regard to obtaining free ads is alone worth the \$25.00 I paid you . . ." J. D. of Kalamazoo, Mich.,

states, "Just a personal note to say I am most satisfied with my \$25.00 investment. Your sales plan is simple and well organized . . ." These are only a few of the many testimonials received praising the Statile Mail Order Survey.

(5) The catalogs and mailing literature offered by Statile Co. cover every conceivable mail order item. You select the field you are interested in . . . **BABY ITEMS, TOYS, APPLIANCES, VITAMINS, BOOKLETS AND**



The thrill of receiving money in your morning mail is one you'll never tire of.

MAIL ORDER COURSES, you name it, Statile has the catalog or mailing piece. Select your market, order your mailing literature and you're in business.

(6) You'll be told how to compile your own mailing lists—and this is the most important part of your business. Many a beginner has fallen by the wayside simply because he mails his catalogs to a poor list of names. Suppose, for example, you offered a beautiful scale model of a 40' Chris-Craft cabin cruiser by mail. You would probably make your mailings to boating enthusiasts and the chances are that nine times out of ten your mailings would show a loss instead of a profit. How would Statile help you solve this particular mailing list problem? He would show you where to get the names and addresses of *actual owners* of 40 foot Chris-Craft cabin cruisers! Surely every owner would like to have a scale model of his own boat. Strange as it may seem, such a mailing list is available to anyone. The secret is where to find it. This is just one example of how an experienced mail order expert giving you personal advice, may mean the difference between success and failure!

This same method of obtaining selective specialized mailing lists may be applied to practically any market . . . selling baby items to new mothers, selling toys to young children, etc., etc.

So much for starting your own mail order business. Now, a word of caution. **OBTAIN YOUR MAIL ORDER FRANCHISE FROM A**

REPUTABLE MAIL ORDER FIRM. Unfortunately, during the past few years a number of ads have appeared in newspapers and magazines offering to start people in mail order. The ads are grossly misleading. Many imply that you can become a millionaire over night if you use their catalogs. Beware! Particularly if they operate their own mail order business direct to the consumer. These firms compete with their own franchised dealers! They could just as well mail all the catalogs themselves. They don't need you.

Other shady firms fail to drop-ship your orders promptly, thereby losing customers for you. In mail order, prompt shipment is an absolute requirement for a successful operation.

Deal only with firms whose business is preparing catalogs and shipping merchandise. They operate on a strict wholesale basis for franchised dealers exclusively. Such a firm is the A. J. Statile Co. Letters from successful franchised mail order dealers speak for themselves. A woman from Milwaukee writes, "It has been better than my expectations." A gentleman from California states "we are quite pleased with the response we are receiving." Another man from Wisconsin writes, "To say the least, I am more than satisfied."

Yes, a small mail order business offers you an opportunity to earn a second income, or—if you work at it in earnest, a chance to strike it rich. The young housewife in St. Louis may be content to make an extra \$20.00 a week . . . the office worker in Los Angeles may be aiming for \$150.00 weekly full time business . . . and the ambitious schoolteacher in Newark may reach \$20,000.00 a year. What is your objective? Set your own goal, pick your own hours, and the sky is the limit.

Even a government report stated that a number of the most successful one-man mail order enterprises make as high as \$40,000 to



Big firms will carry all stock for you. They ship orders direct to your customers using your own shipping labels.

(Advertisement)

Your Own Catalogs of Top Mail Order Items!



• NAME BRAND GIFTS, BABY ITEMS

• CATALOGS OF TOYS, MERCHANDISE

• CORRESPONDENCE COURSES

A. J. Statile Co. will prepare your catalogs, write your sales letters, supply mailing lists and even ship merchandise for you, using your own shipping labels!

\$50,000 a year! But frankly, this is the exception rather than the rule. Most mail order operators are content to earn a comfortable living doing little physical work, but enjoying their work thoroughly! We don't say you'll be a mail order millionaire or another Sears & Roebuck, but if you're looking for a business of your own with financial security, the answer is mail order. If you've already tried mail order with little or no success, don't give up! Try to analyze what went wrong. Success comes only to those who keep trying and learn from their own mistakes. Again we emphasize, deal only with a reputable firm.

The A. J. Statile Co. has been in business for over twelve years.

They gladly furnish bank or trade references upon request. They are probably one of the largest mail order wholesalers in the country. Whether it be toys, gifts, vitamins or appliances—they've got it ready to ship under your label **WITHIN 24 HOURS!**

Firmly convinced that no other business offers the tremendous opportunities of mail order, A. J. Statile, president of the firm, is an outspoken advocate of the man or woman who wants to start in business for himself. As Statile puts it, "by all means, start your own business and start **NOW!** If you want a chance at security and financial independence make your choice mail order. There's nothing like it. Absolutely nothing!"

FOR FREE DETAILS

Mail coupon below — no obligation

A. J. Statile Co., Dept. 43 • Statile Building • Hillsdale 43, N. J.

Dear Mr. Statile:

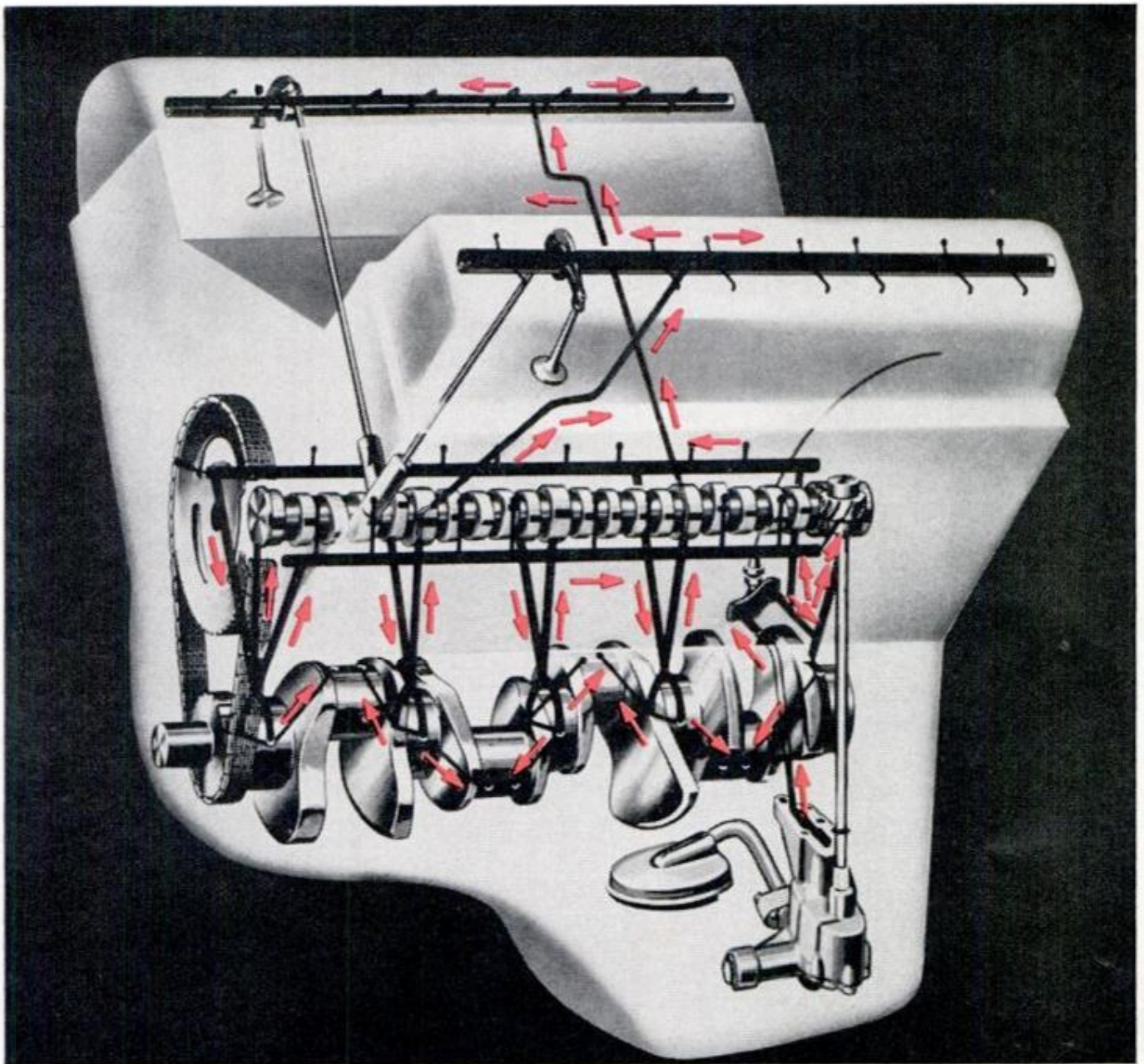
Please send me complete **FREE** details telling me how I may obtain a franchised mail order dealership with your firm. I understand I am under no obligation and no salesman will call on me.

NAME..... AGE..... SEX.....

ADDRESS

CITY..... ZONE..... STATE.....

PREVIOUS EXPERIENCE, IF ANY.....

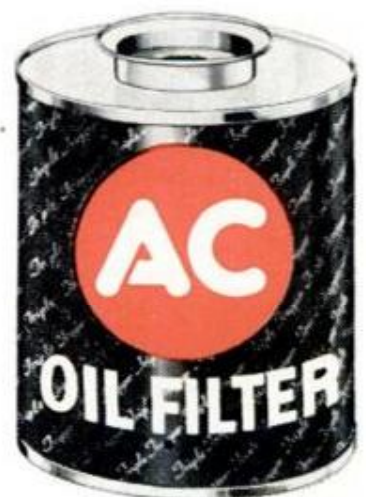


Cut Engine Wear

with the oil filter

that is engineered for your car

As you are well aware, different engines have different oil filter requirements. For this reason, it is important that you use the oil filter that is engineered for your car. Surest way is to specify AC. That's because AC makes oil filters that are tailored to the specific needs of each car on the road. They are carefully engineered to remove dirt and grime from the oil in your engine and to prevent harmful contaminant build-up. See your AC dealer and get the one filter that is specifically engineered for your car.



AC SPARK PLUG  THE ELECTRONICS DIVISION OF GENERAL MOTORS

OCTOBER 1962

84A

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LOOK WHAT'S NEW IN '63 FORD TRUCKS!

NEW FRESH-STYLED PICKUPS— BUILT LIKE THE BIG ONES!

In axles, springs, frame, '63 Ford pickups have the same kind of durable design as big trucks. And you'll find new styling and a new feel at the wheel . . . new easier steering, new smoother shifting, new comfort!



New models! New engines! New reliability features throughout the most complete line ever offered by FORD

NEW! V6 and V8 Cummins Diesels cut engine weight 1000 pounds!

Up to 1000 pounds lighter than other Vee and in-line Diesels, new Cummins engines can add 50,000 ton-miles a year to a highway tractor's earnings. Compact and easy to service, the 588-cu. in. V6 develops 200 horsepower . . . the 785-cu. in. V8 produces 265 horsepower.

NEW! 8-door option for Ford's Econoline Van!

Now you can unload America's most popular Van from the street or curb, front or rear! Econoline saves loading time . . . saves on price, gas, tires and upkeep, too!



NEW! Transistorized ignition saves 3 out of 4 ignition tune-ups!

Electronic breakthrough—Perma-Tuned ignition! Transistors relieve points of heavy current, keep plug voltage high. Points and plugs last far longer; starting is easier; performance is better. No condenser to fail. Optional on Super Duty V-8's.

NEW! City-size Ford Diesels —4-cylinder, 6-cylinder!

New 330-cu. in. Diesels for tilts and 89" BBC models! New 220-cu. in. Diesels for parcel delivery units! In typical city operation, they can give twice the fuel economy of comparable gas engines!



NEW! Low gear synchronized for easier downshifting!

Only from Ford! Standard 3-speed transmissions in '63 Ford pickups and Econolines are synchronized in all forward gears. You can downshift to low while moving without gear clash. Helps maintain momentum, cuts chance of stalling in heavy going. Reduced stress extends gear life, too!

NEW! Over 30 major reliability advances!

New durability in big and small components. Added corrosion resistance in bodies! New weather-sealed electric connections! Lifetime lubricated speedometer cables! All to give you more trouble-free trucks—at Ford Dealers' now!

NEW 89" BBC LINE CUTS LENGTH, ADDS MANEUVERABILITY!

Priced between conventionals and tilts, new short "N" models range from 11,000-lb. GVW to big 76,800-lb. GCW. Both single- and tandem-axle series offer wide choice of Diesel as well as gaso-line engines.



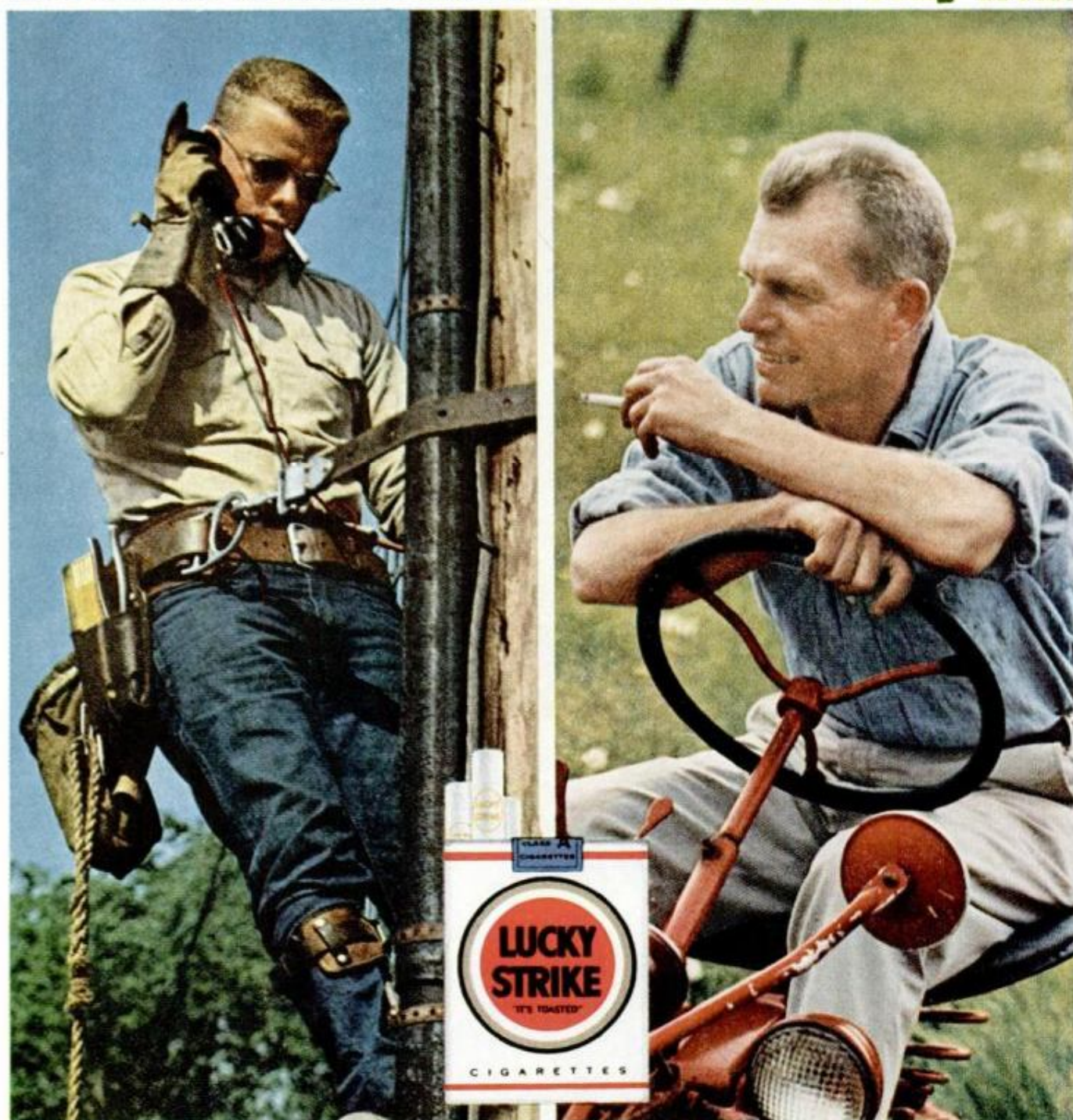
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Buick Riviera

**POPULAR
MECHANICS**

OCTOBER

1962



BUICK'S RIVIERA packs a 340-horsepower wallop, has a 117-inch wheelbase frame under its razor-edge body

The Longer, Livelier '63s

What They'll Be Like to Live With

By Jim Whipple

AT FIRST GLANCE it might seem that the motto of those who styled the 1963 cars was "let's not be too different."

Almost everywhere you look, there's a T-Bird style roof, perched on a comfortably rounded-off rectangular body that spells GM styling.

But a second, closer look reveals the beginning of two striking new styling trends.

One trend substitutes creases for chrome to achieve a crisp silhouette reminiscent of the Rolls-Royce razor-edge school. You'll see it on Buick's Riviera, in the roof and rear quarter panels of the new Chryslers,

and on Dodge's compact Dart (which used to be called the Lancer).

Frankly, we think that razor-edge body lines might, in a year or so, sweep the industry as completely as the late, unlamented fin and wrap around windshield, both of which have finally been laid to rest in '63.

The sharp-edged bodies make more styling sense because they appear functional; the creases come where you have to fold the metal anyway. And after all, what did fins ever do except provide a breeding ground for monster tail lamps?

The second interesting trend, still in the

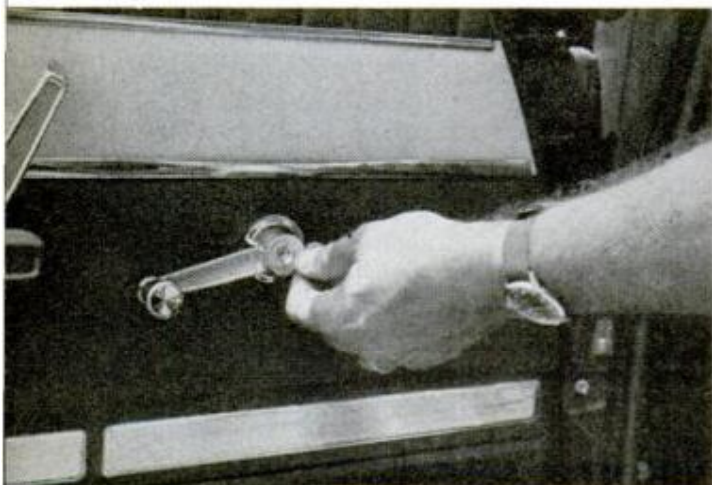
CORVETTE STING RAY, a true sports car, has marine-life look to new fiberglass body, plus "swing" rear axles



Material, designed by the author's firm



DODGE DART and Valiant looked alike, were sized alike in 1962. For '63 (above) they share slant Six engines, windshield, suspensions and drivelines but have different bodies. Valiant's wheelbase is 106, Dart's 111 inches

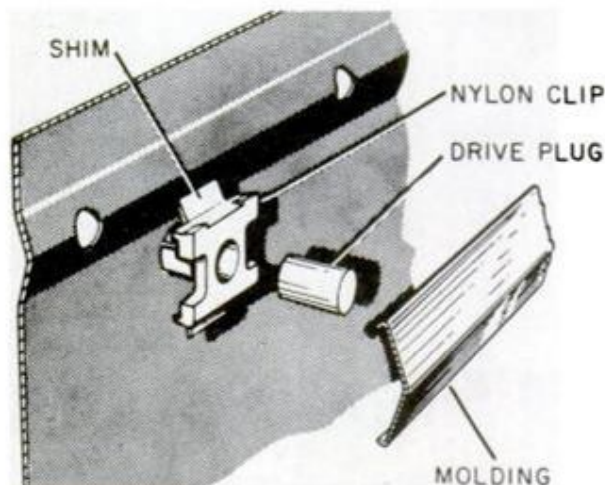


WINDOW CRANKS on Dart, Dodge, Plymouth and Valiant have screws that lock in nylon threads

early stages of gestation as it appears only on two advance-look cars, might be called marine life aerodynamics. It is embodied in the fish-like curvature of Studebaker's Avanti and the new Corvette Coupe.

Most of you have already seen the Avanti, and after you've had a chance to drive it, you'll probably agree that it's a T-Bird with some real hair on its chest. Although it lays no claim to being a full-fledged sports car, among American cars in production trim, its roadability is second only to Corvette's. But for those seeking really capable competition machinery, 1963 may well be remembered as the year of the Sting Ray. That's the fishy title Chevrolet has hung on its startling, new swing-axle Corvette. And in this car, you'll see the most exciting mechanical developments of the year—a year when most engineering departments have been busily refining previous mechanical breakthroughs. More on this car—and this point—later.

As styles, both the razor-edge and the marine life looks are the exceptions for 1963. Most models lean to the conservative, and many have even abandoned the sculptured side panels that provided some wel-



RUSTPROOF, rattleproof nylon clips replace wire in fastening trim moldings on all '63 Chrysler cars

come individuality on '61 and '62 models. Instead, the bread-and-butter models of the '63s use broader, flatter expanses of side paneling.

There's a plus to this approach which stems from its simplicity. On some cars, such as Pontiac's Grand Prix, the smooth flanks lend a touch of elegance. Then, too, the plainer panels should be easier, perhaps even cheaper, to bump out at the body shops.

With a few notable exceptions, the major mechanical news for 1963 involves improvements made in the radical innovations of yesterday. A case in point is the 1963 version of the Pontiac Tempest's independent transaxle rear suspension. The new version is no different in concept, not too changed in form, but at least 100 per cent improved in behavior.

Compliant Suspension

As another example, Ford has switched from a mechanical link plus rubber bumper to a simpler and equally satisfactory spool-type rubber bushing at the front end of its rear leaf spring. This should provide improved compliance or "give" where it is



RAZOR-EDGED styling on roof and rear quarters of '63 Dart, right, contrasts with rounded lines of Valiant, left. Dart is longer overall by seven inches which makes for a bit more legroom and also more trunk space



CONVERTIBLES are available for the first time on all Chrysler Corporation compacts. Above is Dart's on 111-inch wheelbase with choice of manual or automatic top. Front seat may be either three-place bench or buckets

needed for a more comfortable ride.

By a process of evolution, Ford has also come up with a new manual transmission—standard on all Galaxies and Fairlane V8s—which is the first three-speed transmission with synchromesh on all forward speeds in the U. S. auto industry. It will be a pleasure for Americans to slip soundlessly into low after half a century of gear-grating downshifts.

Alternators also come into their own in '63. After weathering their growing pains on Chrysler cars (and credit is due the pioneers), these battery savers will appear on all GM cars except Corvair, all Studebakers and Lincoln Continentals. Ford, Mercury and the Ramblers are sticking to conventional DC generators at this writing.

Long Time No Lube

By the end of the 1963 model year we should know whether the widely promoted "self-maintenance" features of the new cars have really been a boon or a bust. There's no doubt that the trend toward long, interval lubrication is snowballing, as Chevrolet, currently selling three out of every ten automobiles, joins Ford,

Chrysler and other GM divisions in eliminating the 1000-mile lube stop.

A greater use of galvanized body panels and more dipping in primers in '63 should also help to reduce the rusty lacework time has been weaving into aging body parts in previous years.

The Prodigals' Return?

The only totally new engine for '63 is the big Chevrolet's 230-cubic-inch inline Six, of which more later. For the rest of the '63s the much talked about reopening of the horsepower race is more publicity than reality, at least on bread and butter models.

The climb in engine displacements beyond the 400-cubic-inch mark is by way of extra cost (and probably limited production) options rather than basic engines.

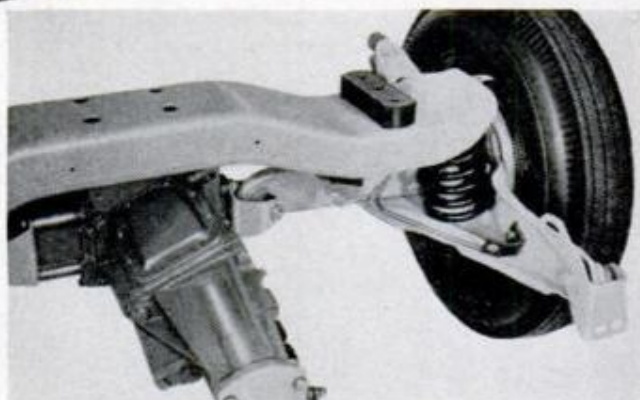
Such policies create the image of power for the maker's product without forcing the customer into buying it.

Thus, happily, manufacturers are not repeating the mistakes of the early 1950s when buyers were forced into a rigid choice between an underpowered Six (if the maker optioned one at all) or an over-carbureted V-8 which required dual ex-



PONTIAC'S TEMPEST LeMans convertible, above, has new grille and sheet metal on unchanged body shell

NO LONGER will Tempests do the Twist when cornered too hard, thanks to completely revised independent rear suspension, right, which has new geometry that controls rear wheel "steering" tendencies



hausts and gobbled up lots of premium fuel. In '63, you can order every car that has a "hot one" (such as Pontiac's Bonneville) with a "cool," regular-gas, two-barrel-carburetor engine.

It would be foolish to deny that in the U.S., styling helps sell cars to men just as fashion sells clothes to women. After all, isn't auto styling about 9/10ths personal preference and 1/10th aerodynamics?

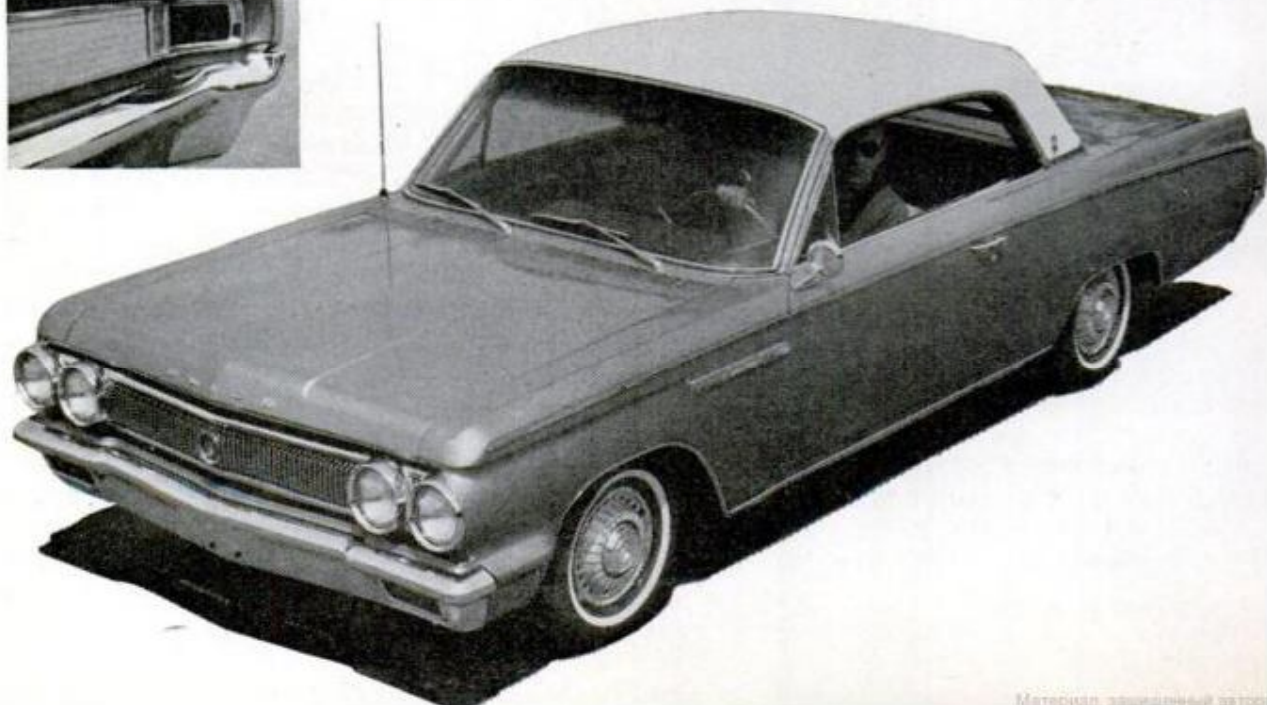
But what keeps you happy with your car after the honeymoon is design, the concept of space relationships inside and outside

the car. It is design, the total sum of all the parts, that determines how straight and comfortably you may sit, how much or how little you must stoop to enter, how easy it is to reach the controls—in short, how pleasant your car is to live with.

In the area of livability, the '63 models continue the encouraging swing back to more sensible interiors. Driver vision has been improved, even though windshield glass areas have been reduced. This is particularly true of Studebaker's Lark and the senior GM lines.



BUICK SPECIAL has rear quarter panels (left) that extend four inches beyond actual end of car to add unusable length. Skylark sport coupe is shown below

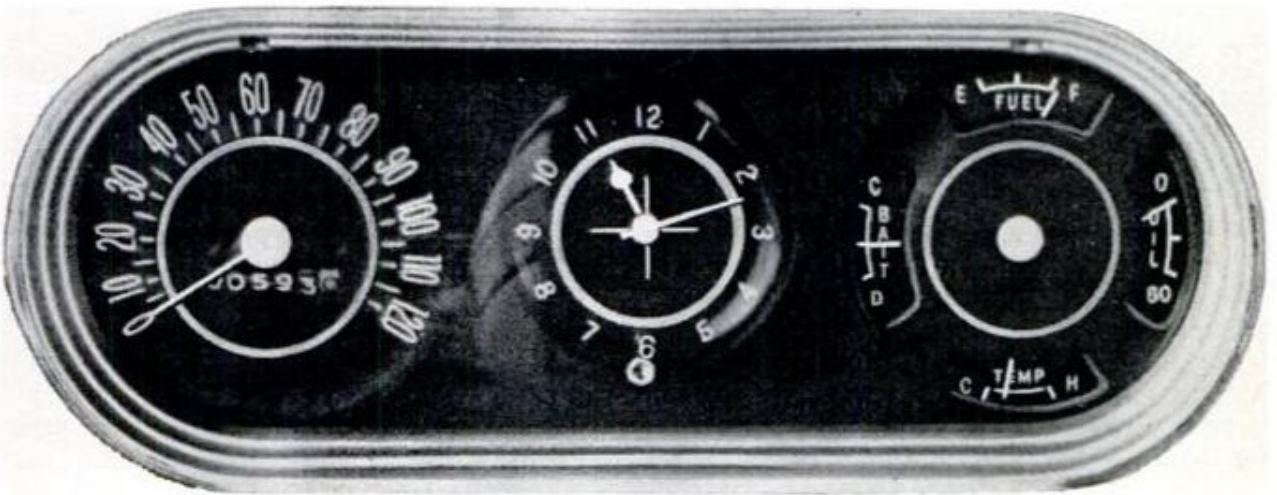




COMET, like its companion compact Falcon, gets a convertible for '63. On 114-inch wheelbase, it will have power operated top, bucket-type front seats and a choice of the 85 or 101-horsepower six-cylinder engines



OLDS F-85 (above) has same inner body-frame structure and greenhouse as '62 model, but fenders, doors, panels are new. Instrument cluster for Chevy II NovaSS (below) has temperature, oil pressure, amp gauges



We second this happy move away from the giant solariums of a few years ago where driver and passenger perspired helplessly while squinting through distorted corner sections.

Wherever body shells have been completely redesigned, as on the '63 Valiant, Dart and Rambler, door openings have been made larger and cleaner, with no more doglegging at the corners and fewer slanting center pillars.

In general, the '63s have stretched a bit, with increases in over-all length (see page 102) ranging from fractions of an inch up to six or seven inches. Unfortunately, these increases do not seem in all cases to

have been translated into extra legroom.

Several transmission tunnels have been reduced due to relocating the engine farther forward, as on the new Olds and Cadillac. In some quarters, this move is considered a mixed blessing, because of the potentially adverse effects on handling.

One truly welcome feature reappearing on several '63's are honest-Injun gauges for oil pressure, generator charge and temperature, in place of the idiot lights which tell you you're in trouble only after you have already arrived there. To date, these gauges show up on only a few 63s, such as some of the Chevy II and Mercury lines, but we can hope that they constitute the



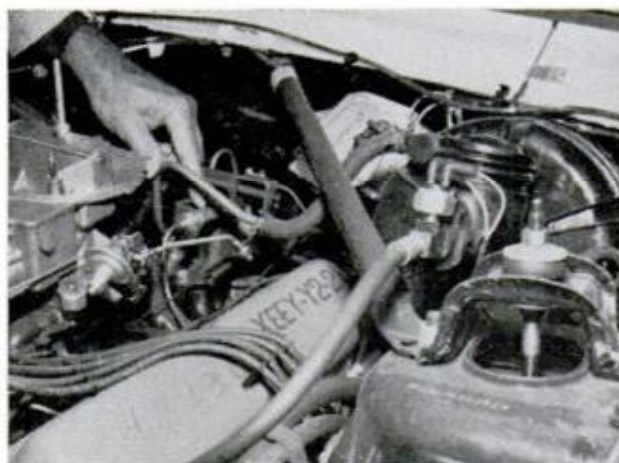
LARK'S ingenious sliding roof is standard on all station wagons; they call it Wagonaire. Panel slides rearward to meet back glass



FOUR-DOOR Larks are on 113-inch wheel base, are very easy to enter



METEOR takes to the air, but two-way stretch of its "compliance" front suspension helps soak up shock



PISTON, on Meteor V8, senses pressure rise as power steering is used, opens throttle to prevent stall

start of a long-awaited counter-trend.

Within the over-all framework of change that makes up the 1963 automotive scene, there are two cross-currents worth special mention.

Boom in Buckets

The first is the battle of the bucket seats, manifested by a seemingly inexhaustible flood of two-door, divided front-seat coupes and convertibles appearing in almost every line. These cars now range from gussied-up two-door sedans like Falcon's Futura, to genuine special body jobs like the Avanti and Buick Riviera.

It all started, of course, with the four-passenger Thunderbird introduced in 1958. After letting T-Bird corner the "personal car" market for four years, the competition has come alive with a vengeance.

With the entry of Riviera and Avanti, as well as Pontiac's sleek Grand Prix, the elegant Olds Starfire and Studebaker's restyled Hawk, a real effort will be made to

take some of the play from the 'Bird, which sold over 37,000 cars in the first six months of 1962.

The second big trend running through the industry for 1963 is a reshuffling of car names, prices and sizes that we'll call, for lack of a better term, the size shakeout.

For the past three model years, the industry has been tossing trial balloons at the American car buyer in an effort to determine "how small is compact?" or, in other terms, what sizes of automobiles and what performance levels could be sold and in which price categories.

Size Realignment

After this feeling of the public's pulse, the industry has come up with a series of size changes for '63 that add up to a market realignment based on the truism that most people expect to pay more money for a bigger car. Or (if you flip the coin), that smaller cars should cost less money. Now, the lowest-priced cars will generally be, as



RAMBLERS have completely new unit bodies for '63. Shown above is Classic four-door. Although wheelbase has been upped from 108 to 112, over-all length has been reduced by over an inch. Windows are curved



STATION WAGONS have all-new bodies too, but there's still a trace of the dipped roofline that's been a Rambler wagon trademark since 1955. The three-seat model, above, continues to use a swing-out rear door

in the past, the smallest. And all "Big Three" cars are again full-sized.

That's the general picture. Now, we'll switch from wide angle to close-up lens and see how the engineering and design changes have affected each car.

Valiant, and its Chrysler Corporation stablemate, Dodge Dart, are the most changed cars in the lower-priced group of compacts. Neither resembles the other or its 1962 predecessor.

The only sheet metal they share are some inner structural parts, the windshield and cowl area and the station wagon bodies. Only body parts retained from the '62s are the floor pans and body sills that form the frame areas in the unit construction bodies.

Valiant looks so different that you'd think it's road behavior would be quite a fresh experience. Actually, it is little changed, primarily because Valiant uses the same mechanical components as in '62. These include the torsion bar suspension at front, leaf springs in the rear and

a choice of 101 or 145-horsepower engines. Wheelbase is 106, down half an inch, while over-all length has gone up two inches from 184 to 186.

Weight change is slight, so that performance of the standard 101-horsepower engine is about on a par with Falcon's premium 101-horsepower engine. But Valiant's extra-cost, 145-horsepower slant Six should out-perform all of the smaller compacts except Chevy II and Rambler by a wide margin.

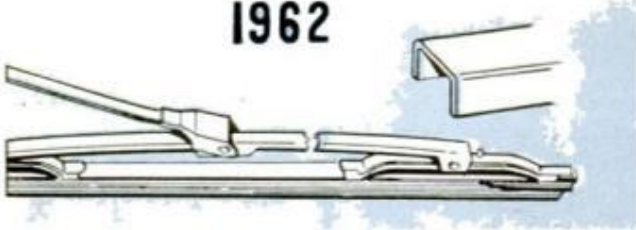
Both the Valiant sedan and station wagon are more rigid structurally. We drive-compared these cars against a like-new '62 Valiant and found that the slight body shake encountered on rough roads in the '62 model was absent from both of the '63s.

Seating position and the new windshield has improved forward vision and the '63 wipers now work in parallel, overlapping their strokes to clean a center area that was a dangerous blind spot on earlier models.

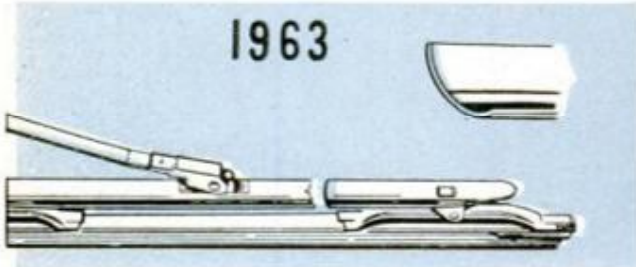


PLYMOUTH gets new rooflines, bulkier looking body that's three inches longer.

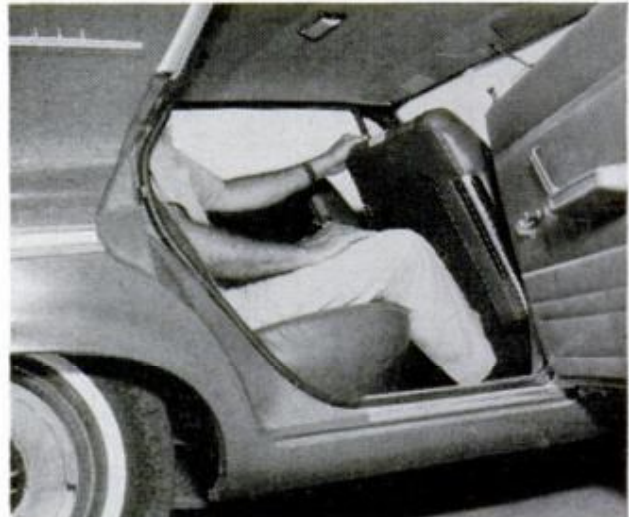
1962



1963



AIRFOIL shape of wiper blade bar on Chrysler Corporation cars presses it to windshield at high speeds



LEGGROOM in Plymouth's back seat is as good as Ford's or Chevrolet's despite shorter wheelbase

The three-speed automatic transmission is still controlled by a set of pushbuttons on the left of the instruments, leaving Valiant and Dart the only cars in the compact field to have pushbutton control (Rambler returns to steering column lever control for '63). Valiant's parking lock lever combined with the automatic transmission control setup has been retained, but the foot-operated parking brake has been replaced by a cane-type pull handle under the panel. Plymouth engineers felt that a hand brake was more convenient for manual transmission operation as you synchronize the release of that type of parking brake when the clutch is engaged for up-hill starts.

Valiant's station wagon is cleaner with more cargo space between the rear seat and the enlarged tailgate opening. A new convertible is available with bucket seats in the Signet series as a four-passenger car, or with a bench-type, conventional front seat for five-passenger capacity in V-200 series. Either model comes with manual, spring-counterbalanced top or with automatically-operated top.

Dodge Dart, successor to the Lancer,

shares engines, transmissions, suspension and drive train with Valiant, but has a five-inch longer wheelbase (111 vs. 106) and a ten-inch increase in over-all length (196 vs. 186). It's also seven inches longer than the '62 Lancer. This extra length has given the car a slightly smoother ride, an inch and a half greater legroom in the rear seat and 5.4 cubic feet of added trunk space.

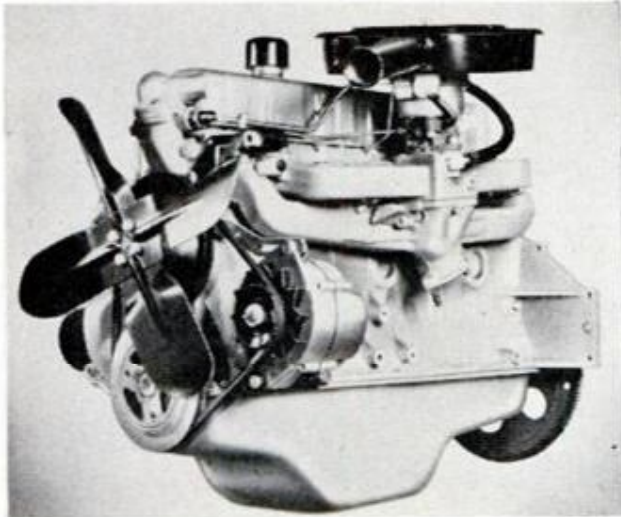
Like Valiant, Dart has an 18-gallon fuel tank, up four gallons from last year's tank capacity. Unfortunately, both cars still use the same horizontally pitched fuel filler pipe in the left rear quarter panel that has meant spilled gasoline for the past several years for Lancer and Valiant owners. This is the price paid for locating the spare tire under the flat luggage compartment floor—a design that does help to produce a larger, more useful trunk.

Custom Fit Your Seating

On its bucket-seated convertible and GT hardtop, Dart has front seats that adjust on their bases. By loosening bolts you can raise or lower, tilt forward or backwards, as well as move seat fore and aft on its tracks. The new Dart also shares with



CHEVROLET has smooth new sheet metal over unchanged body shell and flaring fin low on body that's much like '61-'62 Cadillac's. Four-door hardtop has a brand new roof that's slimmer. Entire car has a hint of the razor-edged styling seen on Buick Riviera



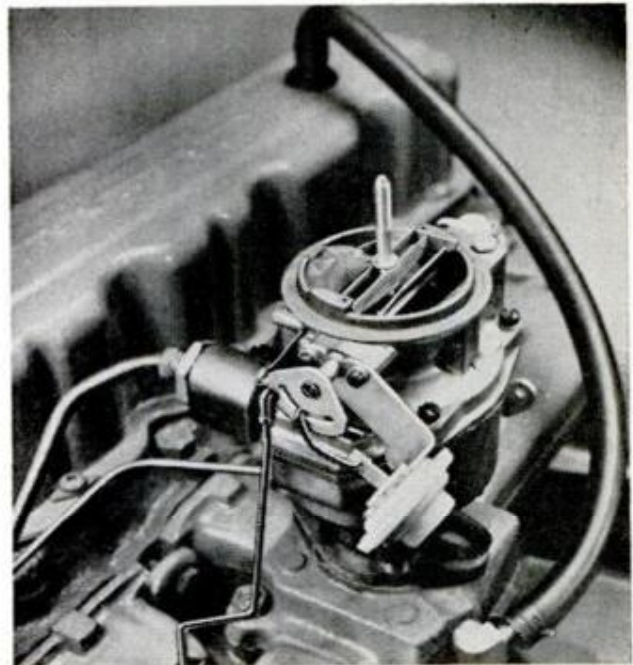
NEW SIX for '63 Chevrolet has seven main bearings, short stroke (3.25 in.), is 150-lbs. lighter than '62 Six

Valiant such practical improvements as rustproof nylon clips that fasten 80 percent of the exterior trim and nylon-threaded center-screw fastenings for all window cranks; these strengthen the attachment and can be removed by common Allen-type insert wrenches.

Instead of pushbuttons and vacuum servos to control air flow dampers, the new Dart uses three simple push-pull knobs to control the heating. Direct, ram-air ventilation for summer cooling is through hinged doors below the instrument panel; these replace the remote control dampers on the 1962 Lancer.

Rambler. After seven years of styling and restyling—fins came and fins went—Rambler has come up with an all-new body for its Classic (108-inch wheelbase) sedans and station wagons.

This car was designed and put into production while George Romney, the apostle of "bigger on the inside, smaller on the outside," was still heading American Motors, and is a perfect reflection of his philosophy. It is 1.2 inches shorter, 1.1 inches narrower and 2.9 inches lower, yet has lost only fractions of an inch here and



CARBURETOR on the new Chevrolet Six has automatic choke with heat-sensing unit next to exhaust

there from an interior that's noticeably larger than that of the average compact.

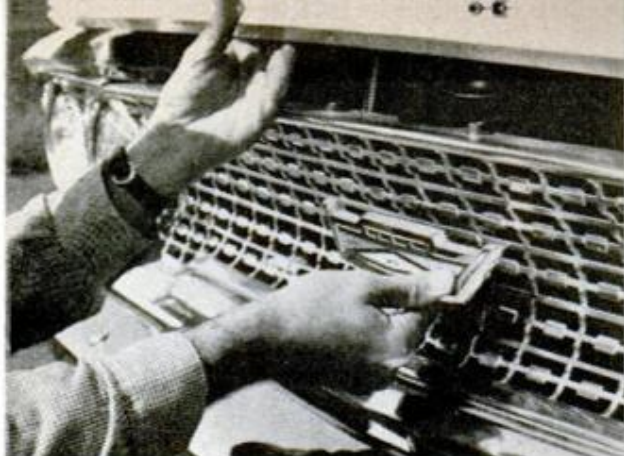
Wheelbase has been increased from 108 to 112 inches, which has enabled the designers to make a useful enlargement of the rear door opening to aid entry and exit.

Under-the-hood changes are few. The basic engine is the 127-horsepower overhead valve Six, while Ambassador models (they have more side trim strips, fancier interiors) are powered by the 250-horsepower V8 used in the past. Three-speed manual, overdrive and three-speed automatic transmissions are available with either engine.

A new and more readable instrument cluster is no longer flanked by pushbuttons on automatic transmission models, as the control has been returned to the steering column. There's no E-stick transmission available for the Classic yet; it remains an exclusive option for the Rambler American.

Suspension is coil spring all around as in the past, with ball joints in front (new in '62) and torque tube at the rear.

Rambler's American substitutes vertical for horizontal grille bars.



FORD'S new patterned grille has useful ornament that wins title of 1963's most accessible hood latch



GIANT tail lamp on '63 Fords outshines editor's size 7½ head (no trick shot), should give ample warning



DODGE'S whale-toothed grille swallows human hand in search of a relatively inaccessible hood latch



NEW STERN and rear window on six-inch longer '63 Dodge makes for neater, more conventional styling

Lark. Bob-tailed rear deck and broad grille for 1963 remind you of the '62 model, though a trim strip has been added to the deck and the grille's texture has been changed.

Above the hood and side panels, however, every piece of glass and metal has been changed. The roof is much flatter, all door posts and window frames have been slimmed and Studebaker has wound up with a car that's both easier to look out of and easier to look at from the outside.

Studebaker engineers have added a new water pump on Sixes and V8s, and a dual master cylinder braking system with separate hydraulic lines leading to front and rear brakes. A new aluminum housing removes 40 pounds from the Six's automatic transmission. All brakes are now self-adjusting, and as an option, you may have Avanti's power-assisted disk front and finned-drum rear brakes on any Lark Six or V8 model of the '63 line.

Airy Wagon

Lark has also switched to alternators across the board. On all station wagon models, Lark has come up with a refreshing innovation called Wagonaire. It consists

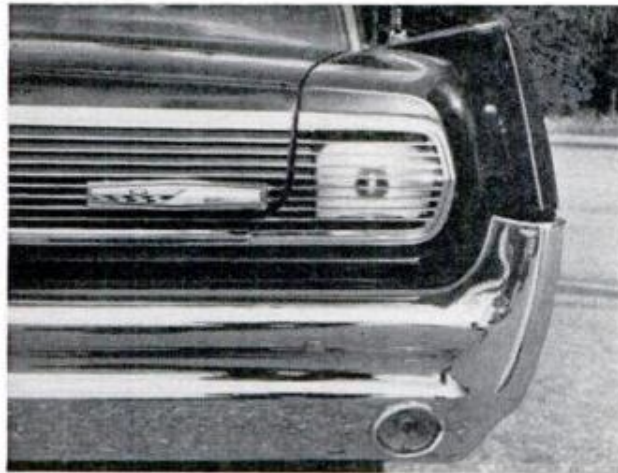
of a sliding roof panel that leaves the entire rear compartment third seat area open. Surprisingly enough, it's standard at no extra cost.

Chevy II, an all-new car in '62 gets a new radiator grille as its only significant appearance change. There's a new model hardtop called the Nova SS, with bucket seats and a floor stick control for Power Glide automatic transmission. Engineering changes include adoption of self-adjusting brakes and Delcotron alternators as standard equipment. The instrument cluster is changed to include space for a clock and, on the Nova SS models, a full set of gauges replace the idiot lights for alternator charge, coolant, temperature and oil pressure. Praise be, indeed, but why exclude buyers of sedans and station wagons who need and desire full instrumentation just as much as the sporty types who buy the bucket seat hardtop or the convertible?

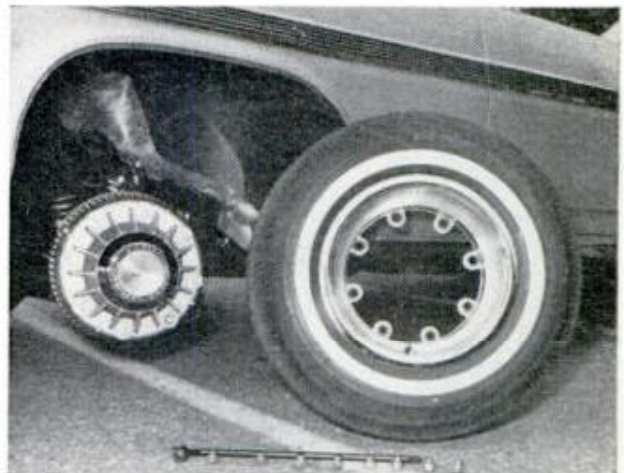
Corvair. You may have difficulty spotting a '63 Corvair, which has changed only the front panel trim strip and tail lamps. Corvairs will have self-adjusting brakes. But as of introduction time, they will go with conventional generators, instead of alternators.



PONTIAC'S sleek Grand Prix shows how beauty grows when trim goes. Note over-under lamps



PEEK-A-BOO tail lamps on Grand Prix Pontiac are hidden behind extension of die cast trim bars on the rear of trunk. Other Pontiacs have more conventional, exposed tail lamps. All models share same bumpers

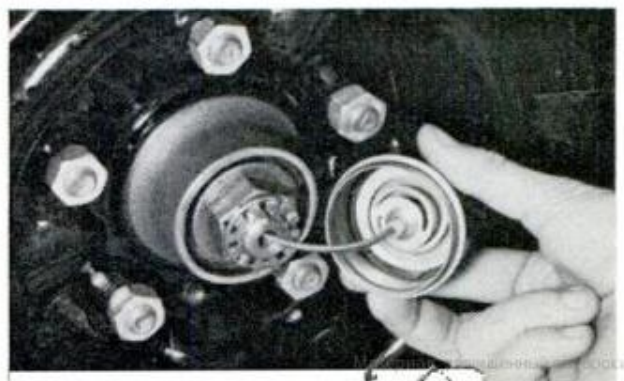
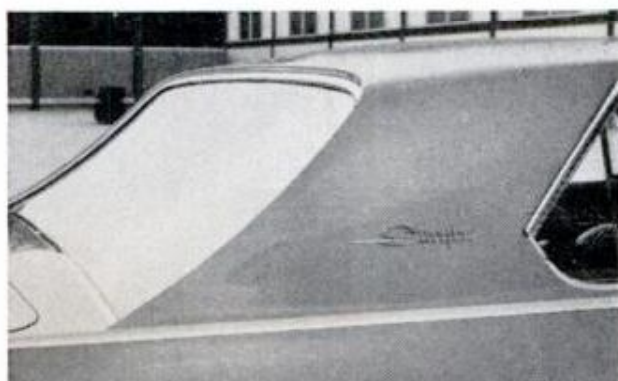


ALUMINUM hub and drum unit is optional on Pontiacs for '63. Wheel rim has eight steel tabs that fit over studs in face of drum. This feature makes for lighter wheels and cooler brakes less prone to fade



OLDSMOBILE Super 88 shown above, has plainer panels with a minimum of sculpture. Roof of four-door hardtop is new for '63. Starfire two-door hardtop, below, has unique concave-curved backlight

SPEEDOMETER drive cable on Oldsmobile runs in kink-free curve from instruments through left front spindle. It attaches to dust cap on hub, thus eliminating former complicated gearing and cable routing





BUICK WILDCAT has grille and rear deck treatment distinct from other series. Turning lamp ahead of front wheel is new, is visible from the side

← **TILTING** steering wheel is optional on Buicks, Pontiacs and Oldsmobiles. Left hand at lever unlocks it



All popular options such as the four-speed manual transmission and the Turbo-charged 150-horsepower engine are continued. The Lakewood station wagon has been dropped, perhaps because it offered about half of the space available in a Chevy II.

Tempest, F-85 and Buick Special. Among the intermediate compacts, the most notable changes are the new exterior sheet metal on Tempest, F-85 and Buick Special.

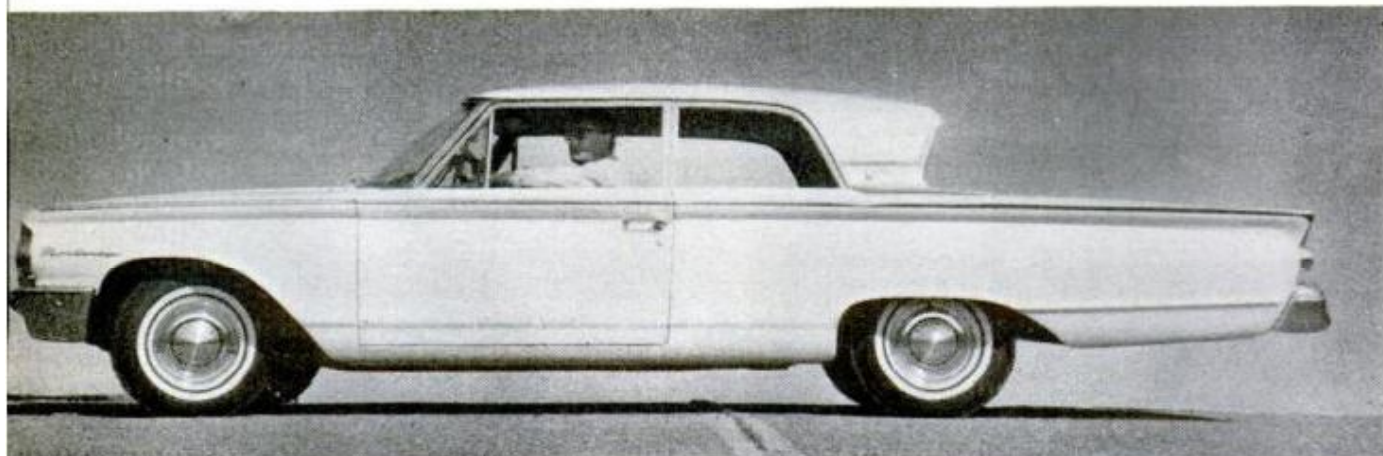
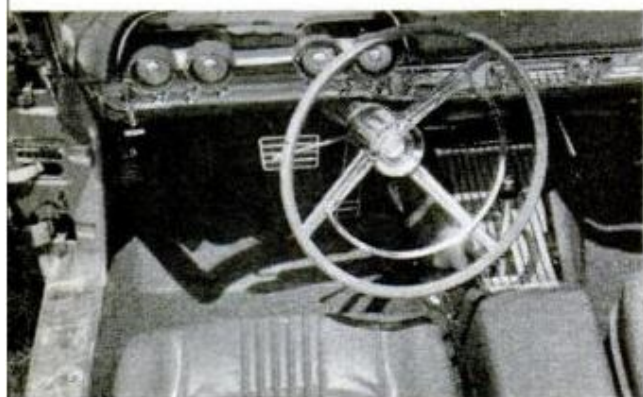
Wheelbase and body shells remain at 112 inches on all three. Extending the sheet metal, primarily in the rear quarter panels beyond the rear of the trunk to fit extensions of the bumper gives a "false rear" increase in overall length of 3.7 inches on the Buick Special, 4.2 inches on the F-85.

By eliminating the sculptured gooves in body side panels, designers have made the cars look bigger—wider as well as longer. Actually, width is up 1.8 inches on the F-85 as a result of a flared rear quarter panel, while Tempest width is up two inches.

Tempest's length has been increased a full five inches—to 194.3 inches. However, three inches of this increase show up in additional and useful luggage space.

← **MERCURY**, on the other hand, offers option of same swing-away steering column seen on '62 Thunderbird

MOST NOTICEABLE new feature of Mercury is the reverse slope rear window, formerly on Lincolns





CHRYSLER 300 has an impressive new grille with the familiar crossed bars. Newport's grille is plain mesh

Weight has not increased appreciably, say engineers at Buick, Pontiac and Olds, as the extension of a few inches in overhang involves a relatively thin band of sheet steel. The whole stretchout of the B.O.P. compacts is somewhat like letting out the hem in your daughter's dresses as she mushrooms between sixth and seventh grades. And just as in certain growth periods in little girls, Tempest, Special and F-85 are beginning to lose that cute look which was a result of their small size.

Inside these three B.O.P. compacts, the passenger package size is exactly the same, and in some dimensions smaller than the Chevy II. Perhaps the most important practical result of the restyling, other than Tempest's larger trunk, are some really effective, full-depth bumpers for both Special and F-85.

Mechanically, F-85 and Special are little changed. They share new self-adjusting brakes, better insulated suspension bushings, and Delcotron alternators.

No More Stormy Walking

Tempest has undergone some interesting mechanical changes in its rear suspension.

An entirely new set of control arms are used. One is fastened to the differential for lateral location of the wheel; the other is pivoted on the body-frame sill for fore-and-aft location. Coupled with an inch increase in tread, the altered geometry of this new setup (coil springs are the same) has cancelled out the rear-wheel steering effect that had '61 and '62 Tempests living up to their names with some pretty stormy behavior on rough roads or when cornered hard. Now the rear end no longer "walks out" from under, creating a nasty oversteer condition. For '63, the Tempest's handling is predictable and pleasant.

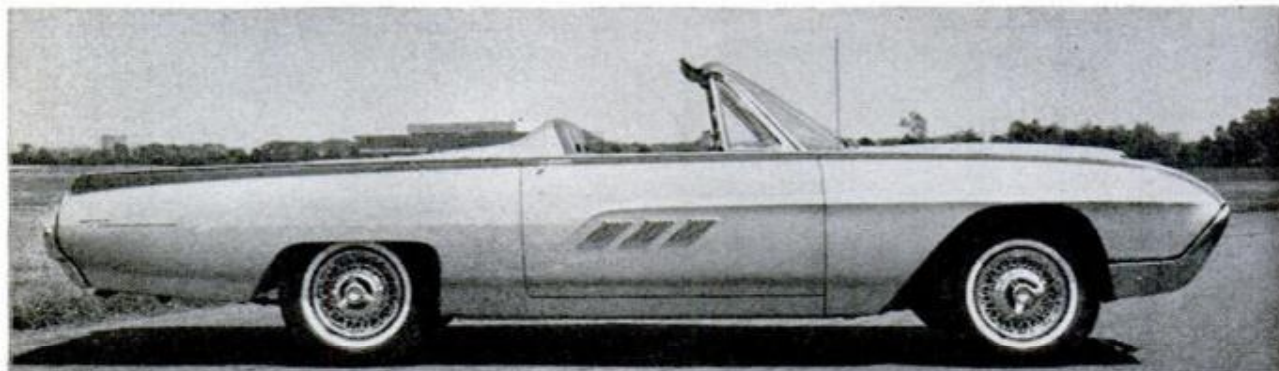
The slanted, 195-cubic-inch, four-cylinder engine remains the standard powerplant for Tempest. For an optional V8, though, Pontiac has switched from the 215-cubic-inch aluminum V8, used on Buick

CRISP, uncluttered lines on this Chrysler New Yorker four-door hardtop are typical of the new Rolls-Royce-reminiscent, razor-edge styling. Only the windshield and inner body parts remain unchanged from 1962





BUICK'S RIVIERA is another '63 model displaying unadorned, razor-sharp lines. Riviera comes only as a pillarless two-door model, has bucket seats, center console and options some real leather upholstery



THUNDERBIRD, in contrast to Riviera, with which it will compete, sticks to rounder contours and its torpedo-like styling. Crease in front fender and dummy vent louvers on door are notable '63 styling changes

Specials, to a 326-cubic-inch version of Pontiac's big, cast-iron V8.

This engine was created by reducing the bore of the big engine from 4.06 to 3.75 inches. Its horsepower is rated at 264. Now that's a lot of muscle to put in a car weighing in the neighborhood of 3000 pounds, especially when it means 150 pounds more weight on the front wheels than in the already nose-heavy four-cylinder Tempest.

PM test-drove the V8 and found it to have a good deal more understeer than desirable. We recommend power steering as a must on this car.

Ford's Fairlane and Mercury's Meteor retain their 1962 unit bodies with wheelbases of 115.5 and 116.5 respectively. Added to both lines are four-door station wagons and two-door pillarless hardtops. The hardtops have more steeply sloped windshields and shorter greenhouse areas. Both Fairlane 500 and Meteor hardtops are available with conventional bench type or bucket type front seats. The buckets go with a fancy interior package called Sports Coupe on the Fairlane and S-33 on Meteor. Station wagons are available in Squire trim, that is, with imitation wood paneling on their sides.

Standard engine on both cars is Ford's 170-cubic-inch 101 horsepower Six. Although efficiently designed with minimum weight for their size, both Fairlane and Me-

teor need more power than the 156 foot-pounds of torque provided by the Six. But it does have hydraulic valve lifters for '63 to make it quieter.

As optional engines, both cars have the 221- and 260-cubic-inch light cast-iron V8s introduced in '62. Their horsepower and torque ratings are 145 horsepower and 216 foot-pounds for the smaller and 164 horsepower and 258 foot-pounds for the larger.

Full Synchro Transmission

Both V8s on either Fairlane or Meteor come with Ford's new, fully synchronized three-speed manual transmission which should be more attractive to many than the two-speed-and-torque-converter automatic. The smaller V8 with overdrive teams with the all-synchro transmission to make a very flexible power package. Like the other cars in the group, Fairlane and Meteor have self-adjusting brakes. With overall lengths of 197 inches for Fairlane and 202 for Meteor, they are the largest of the intermediates and have a bit more interior space than Tempest, F-85 or Special.

Comet, by virtue of its 114-inch wheelbase and 194.8-inch overall length, falls in the intermediate compact group. Mechanically, though, it is virtually identical to Falcon, one of the smaller of the compacts.

Biggest of Comet's 1963 changes is the

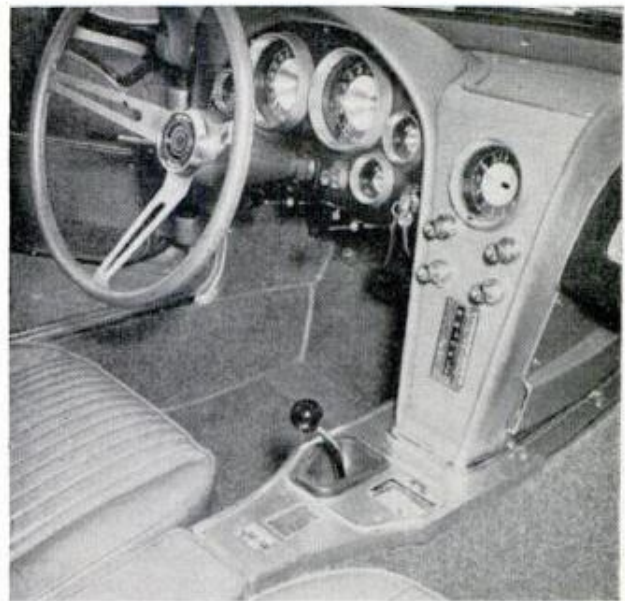


BONAFIDE BOMB is Corvette Sting Ray, above in its convertible version. Entire fiberglass body is new

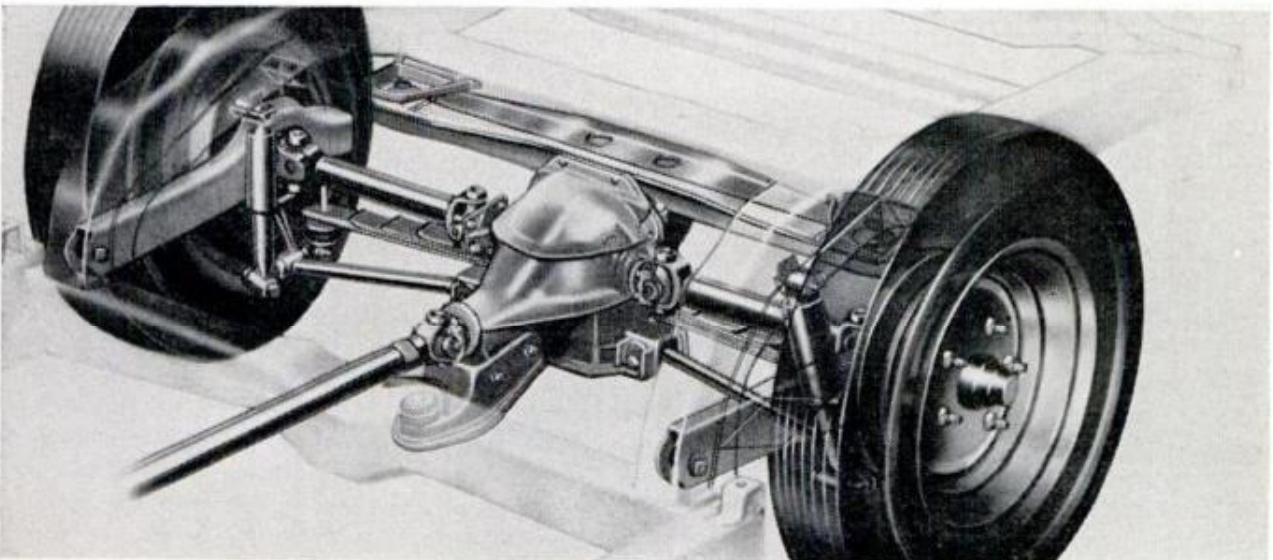
DUAL HEADLAMPS set in pivoted body sections, may be closed (above) or opened (right) electrically



FASTBACK contours of the Sting Ray coupe, below, will be view that other motorists will see most of



CORVETTE'S cockpit, right, is snug but comfortable. Rear wheels, below, move up and down independently as axles attach to frame-mounted differential via universals. Single leaf spring supports rear of car



Sizing Up the '63s

MAKE of Car	WHEELBASE			OVERALL LENGTH			OVERALL WIDTH			HORSEPOWER RANGE	
	'62	'63	Chg.	'62	'63	Chg.	'62	'63	Chg.	'62	'63
BUICK Special	112	112.1	+ .1	188.4	192.1	+3.7	71.3	70.2	-1.1	V6 135, V8 155	V6 135, V8 155
LeSabre, Invicta	123	123	—	214.1	215.7	+1.6	78	78	—	V8 280-325	V8 280-340
Electra 225	126	126	—	220.1	221.7	+1.6	—	—	—	V8 325	V8 325
Riviera	—	117	—	—	208	—	—	76.6	—	—	V8 340
CADILLAC 62	129.5	129.5	—	222	223	—	79.9	79.7	-.2	V8 325	V8 325
Fleetwood	129.5	129.5	—	222	223	—	79.9	79.7	-.2	V8 325	V8 325
Series 75	149.5	129.5	—	242.3	243.3	+1	80.6	79.9	-.7	V8 325	V8 325
CHEVROLET	119	119	—	209.6	210.4	+ .6	79	79.4	+ .4	Six 135, V8 170	Six 140, V8 195
CHEVY II	110	110	—	183	183	—	70.8	70.8	—	Four 90, Six 120	Four 90, Six 120
CORVAIR	108	108	—	180	180	—	67	67	—	Six 80-102-150	Six 80-102-150
CORVETTE	102	98	-4	176.7	175.3	-1.4	70.4	69.6	-.8	V8 250-325(†)	V8 250-360(†)
CHRYSLER											
Newport, 300	122	122	—	214.9	215.3	+ .4	79.4	79	-.4	V8 265-305	V8 265-305
New Yorker	126	122	-4	219.3	215.5	-3.8	79.4	79	-.4	V8 340	V8 340
DODGE	116	119	+3	202	208.2	+6.2	76.5	76.5	—	Six 145, V8 230	Six 145, V8
DODGE DART	106.5	111	+4.5	188.8	195.9	+7.1	72.3	68.7	-3.6	Six 101-145	Six 101-145
FALCON	109.5	109.5	—	181.1	181.1	—	70.6	70.1	—	Six 85-101	Six 85-101
FORD Fairlane	115.5	115.5	—	197.6	197.6	—	71.3	71.3	—	Six 101, V8 145	Six 101, V8 145
Galaxie	119	119	—	209.3	209.9	+ .6	79.2	79.9	+ .7	Six 135, V8 175	Six 135, V8 164
IMPERIAL	129	129	—	227.1	227.8	+ .7	81.7	—	—	V8 340	V8 340
LINCOLN											
CONTINENTAL	123	123	—	213	213	—	78.6	78.6	—	V8 300	V8 320
MERCURY Comet	114	114	—	194.8	194.8	—	70.4	70.4	—	Six 85-101	Six 85-101
Meteor	116.5	116.5	—	203.8	203.8	—	71.3	71.3	—	Six 101, V8 145	Six 101, V8 145
Monterey	120	120	—	215.5	215	-.5	79.5	—	—	Six 135, V8 170	V8 250-385(†)
OLDSMOBILE F-85	112	112	—	188.2	192.2	+4	71.6	73.4	+1.8	V8 155-215(†)	V8 155-215(†)
88, Super 88,											
Starfire	123	123	—	213.9	214.4	+ .5	77.9	78.0	+ .1	V8 280-330	V8 280-330
98	126	126	—	220	221.5	+1.5	77.9	78.0	+ .1	V8 330	V8 330
PLYMOUTH	116	116	—	202	205	+3	75.4	75.6	+ .2	Six 145, V8 230	Six 145, V8 NA
PONTIAC Tempest	112	112	—	189.3	194.3	+5	72.2	74.2	+2	Four 110, V8 185	Four 110, V8 260
Catalina	120	120	—	211.6	212.1	+ .5	78.6	78.7	+ .1	V8 215	V8 NA
Bonneville	123	123	—	218.6	219.1	+ .5	78.6	78.7	+ .1	V8 235	V8 NA
RAMBLER American	100	100	—	173.1	173.1	—	70	70	—	Six 90-125	Six 90-125
Classic,											
Ambassador	108	112	+4	190	188.8	-1.2	72.4	71.3	-1.1	Six 127, V8 250	Six 127, V8 250
STUDEBAKER Lark*	109	109	—	188	188	—	71.25	71.25	—	Six 112, V8 180	Six 112, V8 NA
Hawk	113	113	—	—	—	—	—	—	—	—	—
Avanti	120.5	120.5	—	204	204	—	71.3	71.3	—	V8 210	V8 NA
THUNDERBIRD	—	109	—	NA	—	—	NA	—	—	—	V8 NA
THUNDERBIRD	113.2	113.2	—	205	205	—	76	76.5	+ .5	V8 300	V8 340
VALIANT	106.5	106	-5	184.2	186.2	+2	67	68.8	+1.8	Six 101-145	Six 101-145

NA NOT available at presstime.

*Lark includes 108" wheelbase for two door models, 113" for wagons and four-door models.

(†)Horsepower given is for standard engines unless noted (†) in which case figures are for lowest and highest ratings.

addition of a convertible with power top that's available with bench or bucket-type individual front seats.

Powerplants for Comets are 85 or 101-horsepower versions of Ford's junior Six which began its career with Falcon and is also found on Fairlane and Meteor. This faithful engine now has hydraulic tappets and positive crankcase ventilation. An interesting option for the sporting driver is a four-speed floor shift fully synchronized transmission that's optional on any Comet model at extra cost.

Ford, Chevrolet, Plymouth, Dodge. All-new exterior sheet metal over unchanged

body shells is almost the rule among these four cars of the high volume, full-size field.

Ford, Chevrolet and Plymouth are unchanged in wheelbases at 119, 119 and 116. Dodge, however, was upped from 116 to 119 inches. As a result, Dodge picks up a couple of useful extra inches of rear seat legroom and, by virtue of a six-inch increase in overall length (202 to 208 inches) gains an additional 10 percent of trunk capacity. This body change was made by adding to the rear floor-frame structure and to the quarter panels. In spite of the size increase, weight increases only 45 pounds.

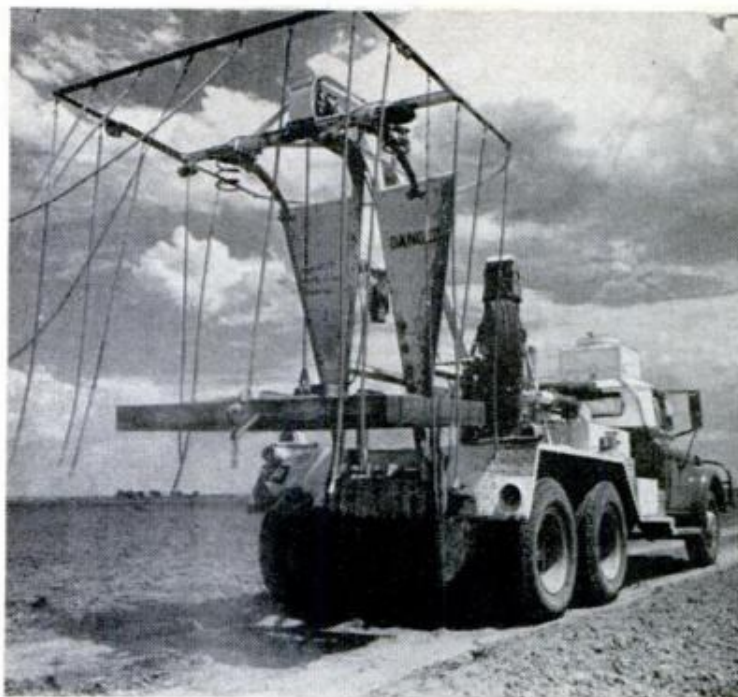
(Continued on page 238)

Texas Thumper Locates Oil

Dropping a heavy weight on the ground is a safer, less expensive and quieter way than dynamiting to find oil, reports the Humble Oil Co. of Houston, Tex.

"Thumping" costs less than half the expense of blasting; it's done with a 6000-pound steel plate suspended from an arched frame over the back of a truck. The slab is raised nine feet and dropped with a thump every few truck lengths along a line.

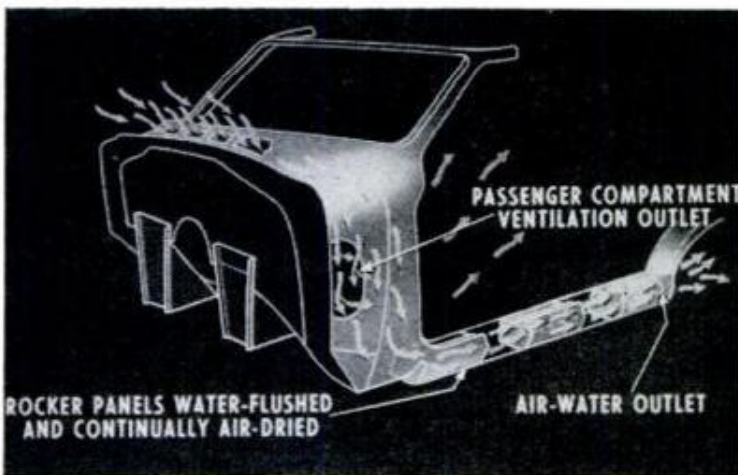
Seismic technicians lay out 96 geophones in star patterns at the ends of this line. An instrument truck receives the reflected impulses and tape records them for a geologic profile of the area.



Wash 'n' No Wear For Rocker Panels

Chevy II's engineers designed the new car's cowl ventilation system to flush road salt and other corrosive agents out of the rocker sills.

Water enters the vent during rain or washings and flows through the sills and out drain holes at the rear. With the car moving, enough air flows from the vent through the sills to dry them out.

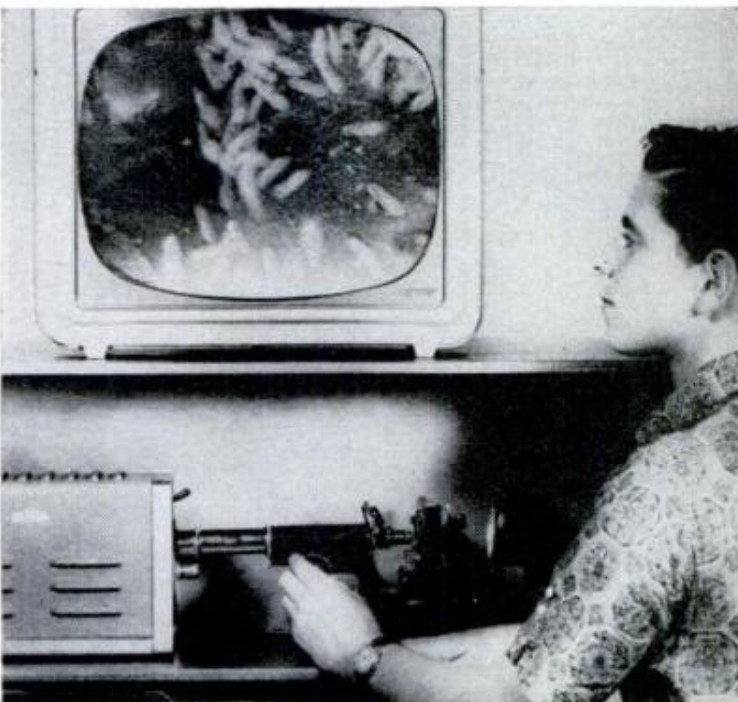


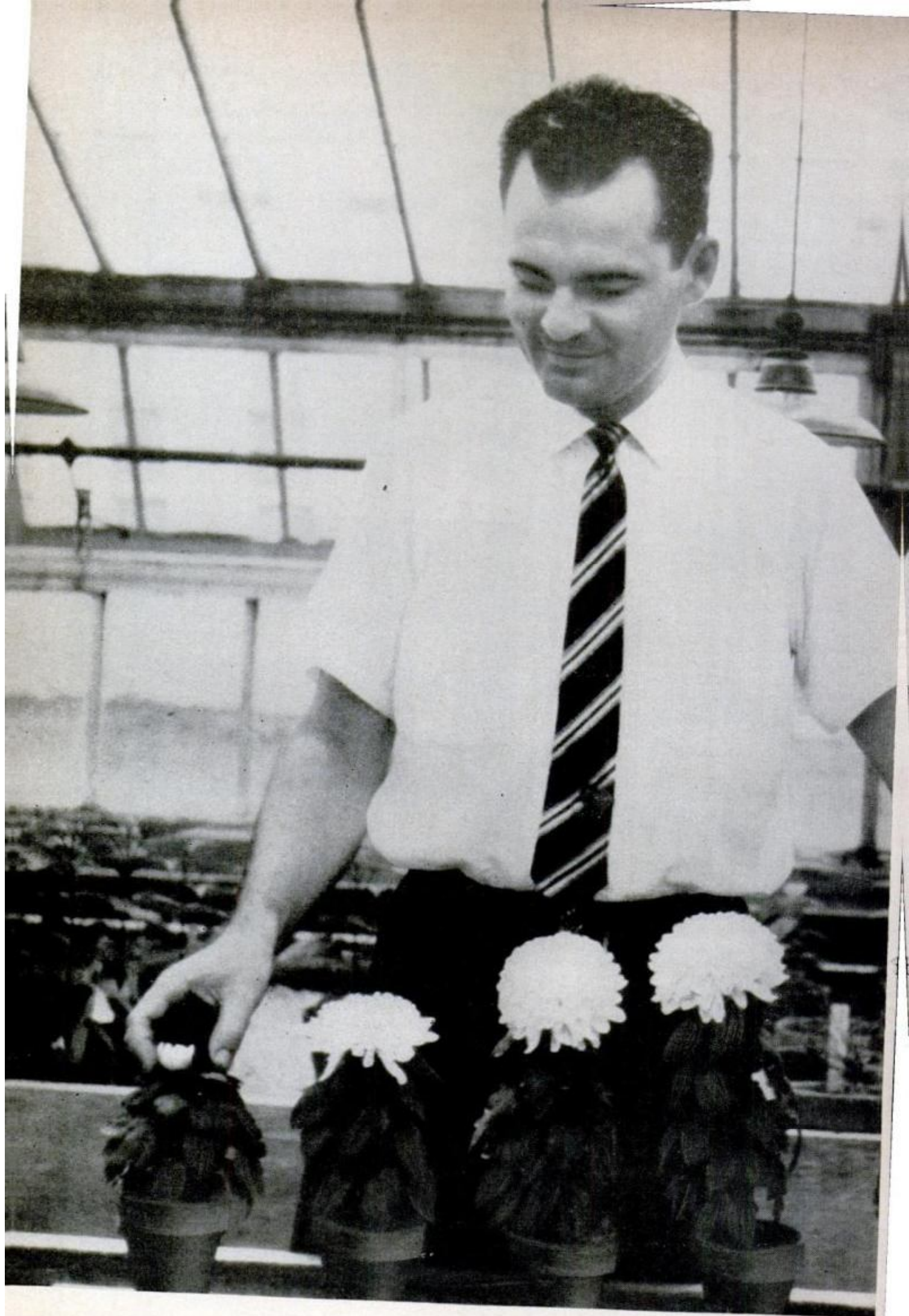
Closed-Circuit TV Looks into Microscope

Coupling a closed-circuit television system with a microscope enables Avery Ugent, 14, of South Miami, Fla., to enlarge a microscopic display to television-screen size. A drop of water, filled with one-celled life, can be viewed at one time by all 32 students in Avery's science class.

Reversing the polarity of the TV camera makes the black areas white, and the white black. This provides a negative display, which, coupled with the use of the contrast control on the monitor, brings out the organisms more clearly. The feeding, reproducing and motion can be clearly seen.

A turret lens on the microscope permits several magnifications to be used.







Try your own experiments with these strange growth-regulating chemicals. You can develop

Tom Thumb Plants . . . Full-Size Blooms

By James N. Miller

HOW TALL do you like your flowers? When do you want them to bloom? Surprisingly enough, you'll soon be able to make nature deliver your answers to both of these questions!

Four remarkable new chemicals are making their way from the fields of experimental agriculture to the plots of the home gardener to help you tailor-make your plants. They will, for example, allow you to grow short-stemmed flowers with full-size blooms. One of the chemicals also will help you get May flowers to bloom in January, if that is when you wish blossoms.

These chemicals are called Phosfon, CCC, Amo-1618 and cardavan. All told, they can dwarf more than 50 different varieties of potted and garden plants. In addition, Phosfon has proven capable of getting azaleas to bud when government scientists desire them to, and, further, it has initiated blooming of camellias, rhododendrons and other woody shrubs. These experiments point to the time when you will be able to order not only how, but when, your garden will grow.

The first of these four growth retardants to reach the market is Phosfon. It is manufactured by the Virginia-Carolina Chemical Corp., and like the others, it was developed through work at the research stations of the Department of Agriculture. It is available in three formulations today; two are for commercial use; the other, a one percent powder for home gardeners, is sold for about a dollar in 1½ ounce packages which contain enough of the chemical to treat, for example, 30 mum plants for height control. "When added to the soil at potting time, or applied as a drench during forcing, Phosfon reduces the height of the upper stem without serious effect on time of flowering or

TRY THESE



ADD POWDER to potting soil for dwarfing mums. Place four-week-old plants in pots containing mixture

flower number and quality," say researchers at the government's Beltsville, Md., experimental station. They've used it successfully on chrysanthemums, Easter lily and poinsettia plants, on holly, petunia, marigold, red maple, salvia and coleus, among other plants. Growers may have to modify the Beltsville techniques, due to the fact that the effect of the chemical may vary according to the section of the country, soil mixture, forcing procedure and plant variety. Here's how Phosfon was used in a couple of instances at the experimental station:

Potted lilies—Powder was added to the potting soil at rates of 1 to 1½ ounces of 10 per cent Phosfon (the commercial formulation) per cubic feet of soil. A Phosfon drench, applied during forcing, when plants were 5 to 7 inches high, proved to be as effective as the powder when used in potting soil. The solution contained 5 ounces of the 10 percent powder in 4 gallons of water; it was applied at the rate of one cup per six-inch pot.

Chrysanthemums—Dr. Marc Cathey, Beltsville horticulturalist, reports success in dipping clay pots in a very dilute solu-



DRENCH four-week-old mum during forcing process with Phosfon solution. Use one cup per six-inch pot

tion. Dipping takes a few seconds; the porous clay absorbs enough Phosfon in 5 seconds to produce an attractive, easy-to-handle, compact mum plant. Peat pots may be used also; they require a few seconds longer soaking but the pot can be planted right into the soil and roots will grow through as the peat disintegrates.

Treated plants have stronger stems, resist breaking due to bloom load and do not sprawl as do untreated plants. The compact growth of cushion and button types of mums are further enhanced by treatment with Phosfon.

The chemical, says its manufacturer, "does not produce phototoxicity or affect the size or quality of blooms when used at the recommended rate. Some varieties show a slight delay in blooming."

Manufacturer's direction for the home gardener illustrate the simplicity of normal use. "Remove one quart of soil (a hole five inches across and three inches deep will give a quart) from the location where the rooted chrysanthemum is to be planted. Place soil in container. Sprinkle one-half level teaspoon of Phosfon over the soil and mix it uniformly. Replace soil in the hole

FOUR METHODS YOURSELF



DIP clay pot containing young mum plant for a few seconds into a dilute solution of Phosfon retardant



DUNK a peat pot containing plant of type you want for a few seconds. You'll have to experiment

and plant rooted cutting in the center of the treated areas. Follow your normal schedule of watering, fertilizing and plant care." The manufacturer could not add, "And stand back!" of course, but he might almost have said, "Lean forward!" to watch the unusual and truncated growth.

Chemicals used as braking tools to hold back the stem growth of a plant and hold it at a desired height have looked promising since 1949 when researchers at Beltsville applied nicotinium compounds to the stems of the Black Valentine snap bean. While the yield of beans was not affected, the stem length was cut in half.

Early Experiments

Research had started in the 1930s, but plants dwarfed then had low yields of grain, fruit and flowers. In 1950, with interest in dwarfing reviving, Beltsville scientists reported that an ammonium compound, Amo-1618, shortened plant height by fully two-thirds. When applied to the soil, it dwarfs mums.

Although poinsettias scarcely responded to Amo-1618, a single change in the compound has recently produced a new but

unstable chemical, cardavan, that can dwarf a tall-growing poinsettia variety down to half or a fourth of its normal height. At the moment, Amo-1618 and cardavan are said to be too expensive for regular commercial use; furthermore, they have not been authorized by the USDA for registration and availability to commercial growers. However, CCC, the fourth member of the new group of retardants is expected to be used, eventually, as freely as Phosfon.

Atomic Substitution

Less than three years old, CCC was announced in November, 1959, by Dr. N. E. Tolbert, biochemistry professor at Michigan State University. He found that as much as 30 percent of the total soluble phosphorus in a plant root, and sometimes in the leaves, was present in the form of phosphorylcholine. In an effort to block action of this compound in the plant, Dr. Tolbert altered it chemically by substituting a chlorine atom for the OH group of choline.

This new chemical, one atom different from the naturally occurring one, was chlorocholine chloride, now known as CCC.



CHEMICALS react this way in summer: Plant, left, untreated; then plants treated by Amo-1618, Phosfon, CCC

UNDERWAY: TAILOR-MADE PLANTS

When it was fed to wheat seedlings, the chemical surprisingly altered their growth. Today CCC is used by one of Dr. Tolbert's research associates, Richard Lindstrom, for growing poinsettias that have brighter and more decorative red and white "flowers" than normal. While normal plants are as much as six-feet tall, and sprawling, Lindstrom's CCC-treated poinsettias are only about 24 inches in height and are compact. Furthermore the bracts, as the blooms are called, are of normal size.

Four Chemicals

In the current Beltsville studies, these four chemicals—Phosfon, CCC, Amo-1618 and cardavan—are being used in tests on 22 kinds of woody plants and 17 kinds of foliage plants, shrubs and trees. Also, other potential retarders made from phosphonium, ammonium carbonate and choline compounds are being tested. Thanks to the new chemical tools which will emerge from this research, florists are assured of handling many attractive flower varieties

that normally grow too tall for satisfactory potted plant use.

Tailor-made plants are another fascinating possibility in the offing, according to the Beltsville researchers. Scientists are intrigued by the fact that the short and stocky plant growth obtained from treatments with CCC is just the opposite from the tall and elongated growth obtained by treatment with gibberelic acid, a type of plant growth stimulator which made the headlines a few years ago. The actions of the two types of chemicals are mutually antagonistic. It is quite possible that accurate control over plant growth might be obtained by teaming the two types of regulators. It might be possible to make a stem and flower within centimeters of the size you want!

Improved Vegetables

Vegetable crops also are being improved by use of dwarfing chemicals. For instance, Amo-1618 is helping breed new soybean varieties at Beltsville. In winter green-

Winter



ALL reduce about the same in winter. Plant, left, untreated. Amo-1618, Phosfon, CCC. Effect is being tested

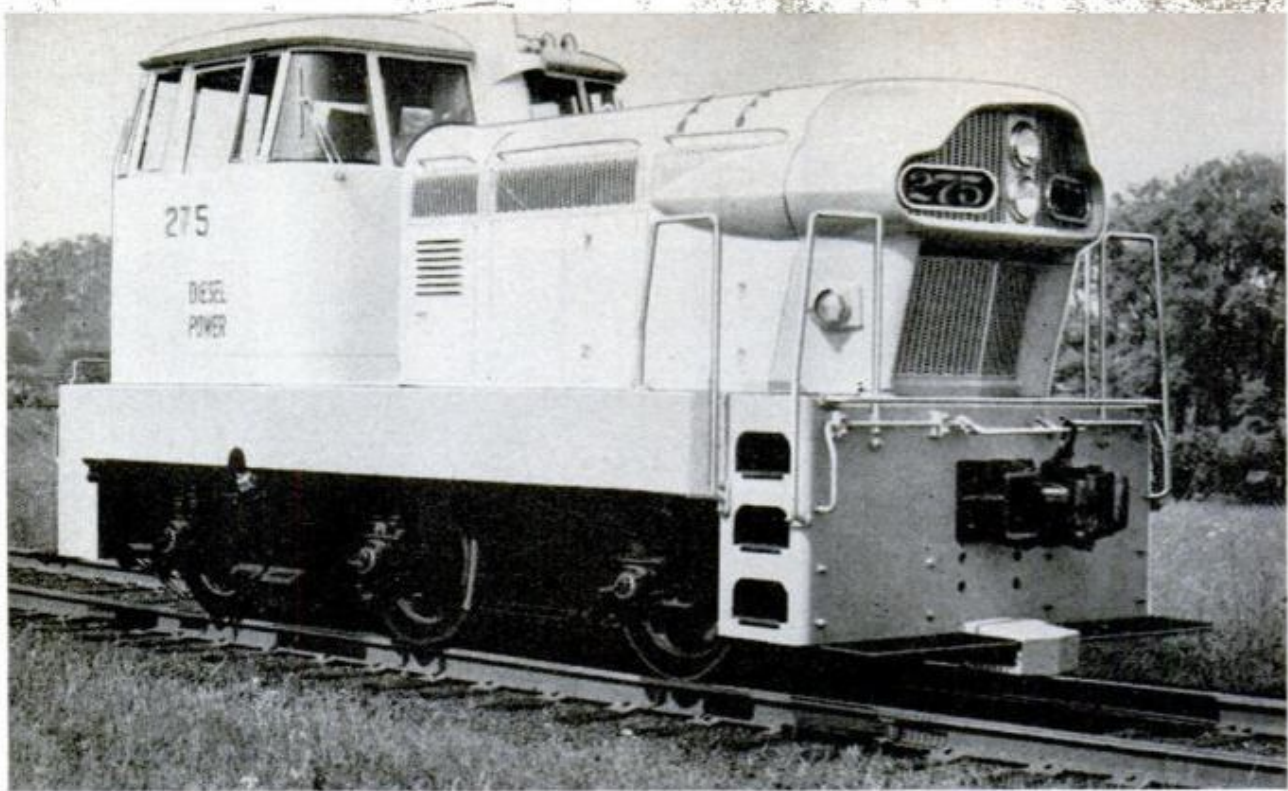
houses, soybean plants normally tend to develop over-active, thin-stem growth. This condition hampers the geneticist who would like, and could use, more compact plants for easier tending and tailoring. Amo-16-18 helps here. It is being used, specifically, to develop experimental plants less than half of normal height, but completely normal in other characteristics. Similar experiments with other crop plants will be tried soon.

The immediate outlook in this new field of agricultural science depends to a great extent on what researchers turn up about plant physiology. Little is known about how and why the growth-curtailling chemicals operate in plants as they do. When they acquire such knowledge, plant "inventors" will be able to avoid much of the slow trial-and-error testing now required in developing useful treatments.

Then, in all probability, we will be able to add chemicals to the soil about our flowers and plants and sit back to watch the wonderful and helpful results—flowers and plants the size we can best use growing at the time most desirable for us to use or enjoy them! ★★★

HOME GARDNER'S first step: Adding 1½ teaspoons of Phosfon to soil to dwarf a potted mum cutting





"Kit" Locomotive Is a Do-It-Yourself Project

Building from a variety of components, the user of a new do-it-yourself locomotive can tailor the machine to the size, power and track gauge he requires. Parts supplied by General Motors Diesel, Ltd., of London,

Ontario, will produce two basic locomotive types: A double-engine two-truck model and a single-engine unit with three axles. Engines available are a 275-horsepower V8 and a 400-horsepower V12.



Portable Photocopy Machine

For traveling executives or others who need to make quick copies of reports while in the field, a copy machine has been built into an attache case.

The machine can accept any original up to nine inches wide. Cut-sheet negative and positive papers are stored in the top of the case. The unit can be used in either artificial or daylight conditions; it has an 8-watt, 12-inch green fluorescent lamp, rheostat-controlled, to compensate for varying shadings of the original. The 12½-pound unit is sold at \$149.50 by Anken Chemical & Film Corp., Newton, N.J.



Wide-Screen Microscope

Specimens under the lens of a new reflecting microscope can be viewed by several persons at a time in the large illuminated screen of the instrument.

The new battery-operated 'scope magnifies 50 to 100 times, and its projected picture on the viewing screen can be seen as far as 10 feet away. Brightly illuminated, the screen permits photographs to be made.

Recommended by the manufacturer for use by students, teachers, professional and amateur researchers, it is available for \$8.99 from Superior Products (Import Div.), 34 East 12th St., New York 3, N. Y.



Indoor Heat for Outdoor Pools and Patios

On cool summer days and nights, a gas-fired radiant heater can warm up a 20-foot outdoor area. Portable, it can be rolled about, or it can be installed permanently.

Operated with either LP or natural gas,

the heater has a safety shutoff. It is 8 feet high with a 34-inch reflector. The portable unit is \$199.50. It is sold by Mountaineer Products, 5143 W. Diversey Ave., Chicago 39, Ill.

Look and Listen

Avid sports fans who carry a radio to the game can now look and listen at the same time with a combination of radio and field glasses.

The tuning range of the four-transistor radio is a full 535-1605 KC and the antenna is collapsible. It's equipped with a built-in speaker, earphone and battery.

The 7 by 50-mm. field glasses feature coated lenses and center focusing.

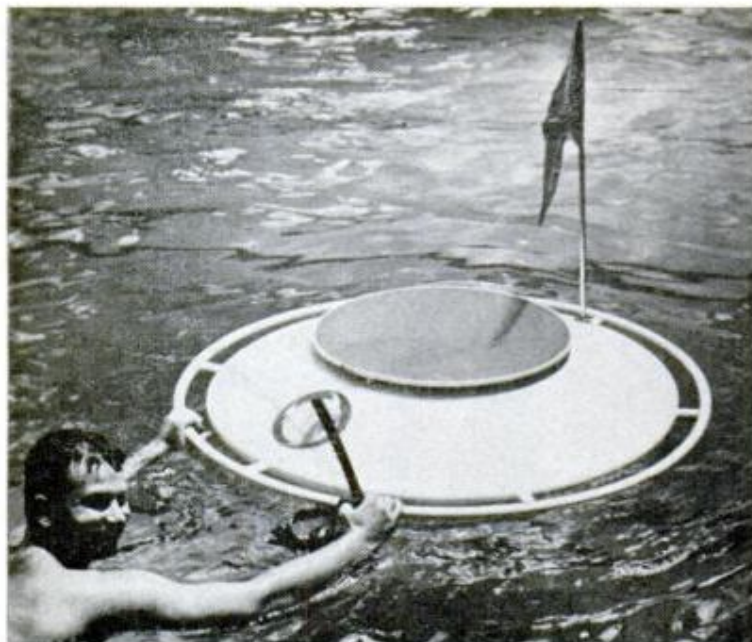
The unit costs \$37.50 from Al Monte, 1254 W. Jefferson Blvd., Los Angeles 7.

QUOTE

"A mediocre student is never going to hurt anybody as a mathematician, because he's not going to be one. He's just going to work at it and eventually fail. . . . But a mediocre student in some institutions can become a high-school teacher and then can continue to do damage the rest of his life."

MR. STERLING M. McMURRIN
U.S. Commissioner of Education





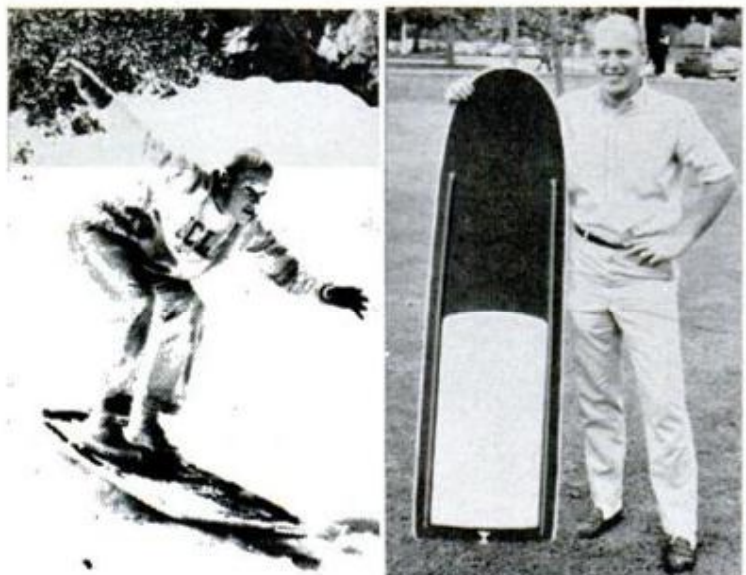
SAUCER, driven in water by propeller, travels over land on special trailer. It's by Leslie Perhacs, U. of Calif.



SAFETY BENCH slides easily on sled-type runner base when hit by players. It was designed by G. W. Clapp, Jr., Auburn, U.



SURFBOARD for snow is operated the same way as a surfboard in water. It won an award for Steve Nelson, U. of California



Aluminum Designs Shape Products of Tomorrow

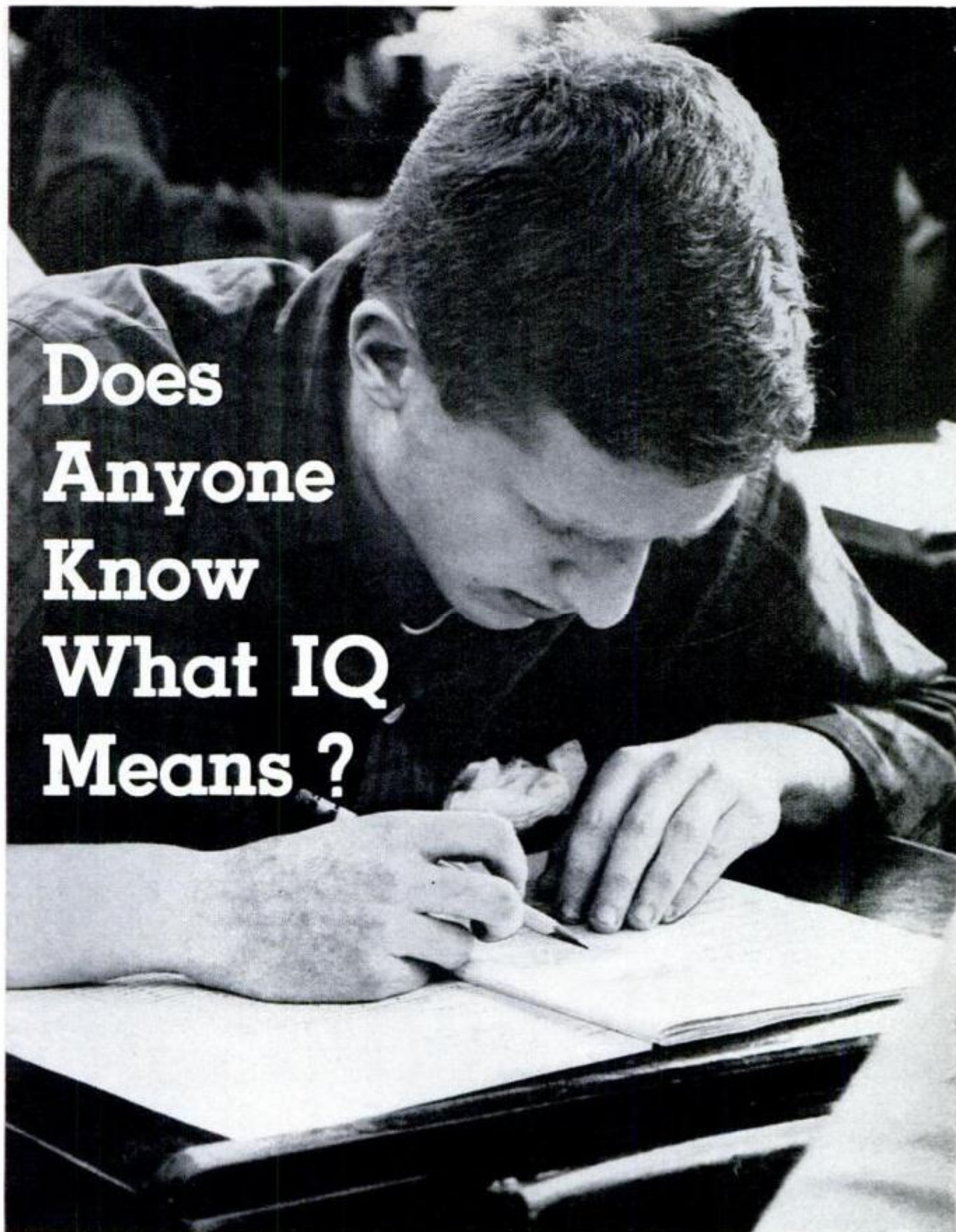
Skin divers can travel farther, football players can hit benches without injury and there's a new snow sport—all as a result of designs by students in the Alcoa Student Design Merit Awards program for 1962.

Water Saucer is a battery-powered sea sled which transports up to four skin divers and serves as their operating base. The sled, based on the disk-shaped Mexican guitar fish, gives divers great range to reach unexplored areas and safe transport back for the exhausted.

Safety Bench

A safety bench for football players replaces conventional massive wooden benches and helps eliminate injuries to players who are pushed out of bounds. The unit is lightweight, slides easily when hit, and is padded on lateral surfaces and on the corners. It supports several husky players and provides a comfortable arm rest.

Sno-Surfer is a jaunty application of surfboarding to snowy slopes. It's lightweight, resistant to snow sticking and needs no waxing. An abrasive tread area stabilizes the erect rider, who stands near the rear, guiding the surfer by weight movement.



Does Anyone Know What IQ Means ?

By Theodore Berland

Your child's advancement in school, your promotion in your work—both may depend upon IQ test scores. How scientific are these tests? Can you improve your IQ? Should teachers disclose IQ scores to parents? This year an estimated 10 million American school children will take tests designed to measure their intelligence. At the same time, some seven million adults—more than half of the people in the



PRESCHOOL YOUNGSTERS can be tested for intelligence by their responses to questions and instructions

U.S. looking for jobs—will take similar tests in personnel offices across the continent.

Today, Americans are in the "brain numbers" game as never before. For children, scores on IQ tests (often called "mental ability," "aptitude," "mental alertness" tests) can mean demotion or special instruction leading to a skip in grades. For many adults, a magic IQ number can mean the difference between getting or not getting a job.

It's small wonder, then, that IQs are talked about wherever young parents and wage earners meet. Still, most people have a poor understanding of what IQ scores mean or even of what IQ tests measure. They don't realize that intelligence tests measure more than one thing, that they are not infallible, that they can't guarantee success or failure in life, that intelligence can change during a lifetime, or that a person can work to improve his IQ.

Before you can understand what intelligence test scores mean, you first have to know what intelligence is and how it is measured.

A New York designer of intelligence tests, Dr. David Wechsler, defines intelligence as a person's ability "to act purpose-

fully, to think rationally and to deal effectively with his environment.

Another test designer, Dr. Thelma Gwinn Thurstone of the University of North Carolina, says that "intelligence is not one thing, but a combination of several different abilities tied up in a package that is labeled intelligence." In its broadest meaning, she adds, intelligence is a person's ability to adjust to the problems of life.

Tests to measure intelligence date back to 1904, when Paris schools used one designed by Dr. Alfred Binet, a French physician, to weed out dull pupils. Dr. Binet's test came to the U.S. in 1910 and was revised several times, particularly by psychologists at Stanford University.

In general, the Stanford-Binet test assesses intelligence by measuring a person's ability with words, ability with numbers, ability to reason and his memory. It does this by a series of mental hurdles. You answer the first questions easily, then begin to fail more and more items as you go on to "higher" intellectual hurdles. Finally you come to hurdles just too "high."

Each of these hurdles, in effect, is a mental age. A preschool child, if he is of average intelligence, should do the items on the first hurdles easily: Point to the toy for "drinking out of," point to the doll's hair, name a key and a chair, repeat numbers 4 through 7, etc. But he may have more trouble with the items on the next hurdle: Matching circles and squares or answering "Why do we have houses?"

This is how the Stanford-Binet renders a "mental age" score. This mental age is then divided by the child's chronological age and multiplied by 100 to give Intelligence Quotient or IQ. For example, a six-year-old with a mental age of eight would have an IQ of 133 ($8 \div 6 = 1.33$; $1.33 \times 100 = 133$). This is one of the few intelligence tests that produce IQ scores directly.

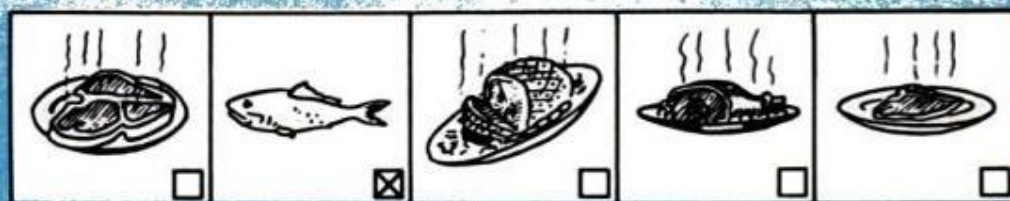
Such general intelligence tests are widely used and very reliable, but they have to be given to one person at a time by a clinical or school psychologist. During World War I, psychologists designed pencil-and-paper IQ tests for the Army that could be used to screen large groups of recruits. So, instead of a psychologist asking for word definitions, a printed form would ask: "Gun is to shoot as knife is to (fly, glove, meat, hurt, cut)." Or: "Distance means the same as (seldom, far, old, dark, space)."

General intelligence tests had another limitation—they told nothing about the specific parts of intelligence. So, in 1938 the late Dr. Louis L. Thurstone sorted

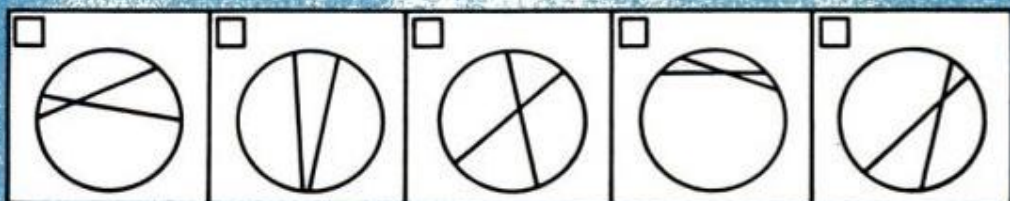
Nonverbal Test Is Made Up of Pictures

A nonverbal test of the type devised by Science Research Associates helps measure the intelligence of those who don't handle language well—such as new immigrants. Try it. Mark an X in the box of the most different picture in each row. Note in the sample that four pictures show meat and one shows fish. Therefore, the fish picture is most different.

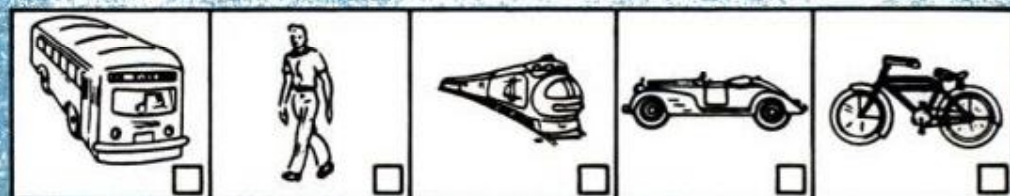
SAMPLE



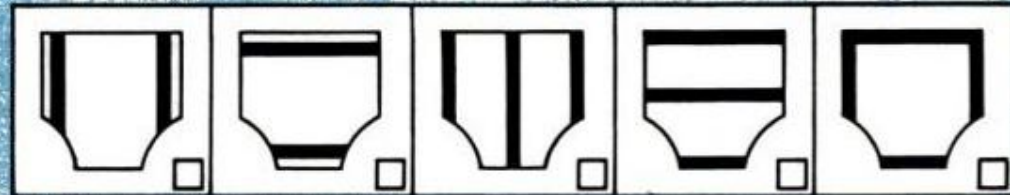
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2



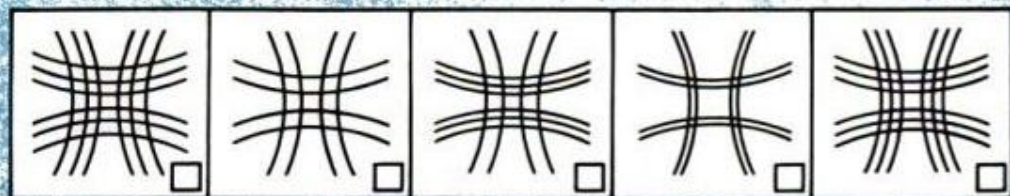
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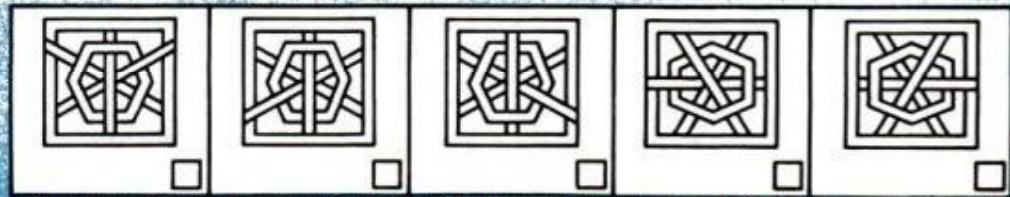
4



5



6



Answers on page 117

out seven factors of intelligence after testing hundreds of University of Chicago students, high-school students, and grade-school pupils. He called these the "primary mental abilities:"

Space, ability to visualize objects; *Number*, ability to do simple arithmetic; *Verbal comprehension*, ability to understand words; *Word fluency*, ability to use words; *Memory*, ability to memorize; *Perception*, ability to quickly recognize similarities and differences between objects; and *Reasoning*, ability to find the underlying principle.

With his wife, Thelma, Dr. Thurstone devised tests to measure these abilities. Today there are a host of similar tests. The scores of these ability tests are converted to percentiles that can be arranged to form a "mental profile."

Each ability score tells its own story. For instance, a high Verbal Meaning score—above 75 percentile—means a person well understands ideas as expressed in words and could be a successful secretary, teacher, editor, or librarian. A high Space score indicates probable success as a designer, machinist, or pilot. High Reason-

ing scores indicate probable success in science and mathematics.

High scores on both Verbal Meaning and Reasoning indicate "scholastic aptitude"—whether or not a student has what it takes to go further in school.

And, by adding up the individual scores and weighting Reasoning and Number, a total percentile score is derived. This can then be converted to an IQ score.

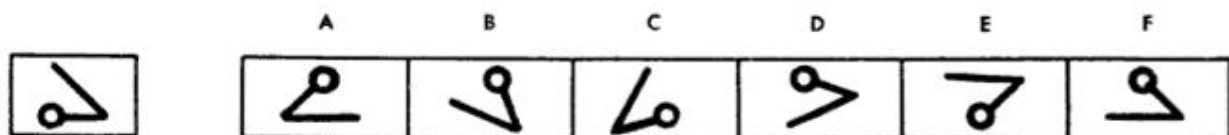
The major purpose of intelligence tests hasn't changed since they were invented at the beginning of the century. Primarily, IQ tests are for schools—to help teachers sort out the good, average, and poor students. A good teacher could do this by herself, but it would take her several months. A test can do it for her in an hour. Also the teacher would tend to compare each child with his classmates, or with previous pupils. She couldn't compare each pupil with the millions of others his age in this country, as mass IQ tests can.

Whether schools should disclose their children's IQs to parents is a highly controversial point these days. On one side are such authorities as Prof. James B. Bonder, of State Teachers College, West

Try These Sample Tests for Four

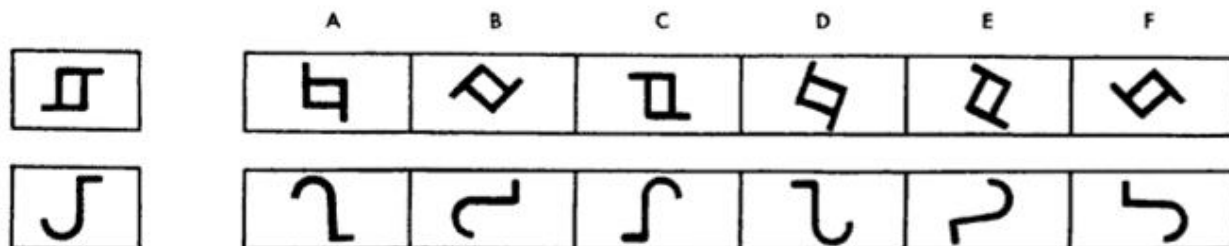
SPACE

In the row of figures below, mark an X in the box of **every** figure which is **like** the first figure. Do **not** mark the figures which are made backward.



You should have marked an X in A and in E.

In the two rows below, mark an X in the box of **every** figure which is **like** the first figure in that row. Answers are on the facing page.



NUMBER

At right are three columns of numbers which have been added. Add the numbers for yourself to see if the answers are correct. Mark each one right or wrong.

A	B	C
17	35	63
84	28	17
29	61	89
—	—	—
140	124	169

MACHINES have been designed that can test mental abilities. The one shown at the right tests reasoning

Chester, Pa., who says: "I believe school staffs should tell you your child's IQ. For them not to tell you is about as sensible as testing your child's eyes and then not letting you know whether or not he needs glasses."

Others, such as Dr. John A. R. Wilson, director of student teaching for the University of California at Santa Barbara, don't agree. There are psychological hazards, he warns. Parents can make a child with a high IQ cocky and push him too hard. A dull child's parents might let him drop out of school without even trying. "Children," says Dr. Wilson, "will have a better chance to become their best selves if parents generally don't know the score."

A Michigan mother who learned of her grade school son's 140 IQ used this score as a form of blackmail. "Well," she told the boy, "now that we know you're smart, I'd better see perfect grades on your report card." Unless the somewhat lazy boy brought home straight As, he didn't get



of the Primary Mental Abilities

VERBAL

In each of the following problems, mark an X beside the word that means the same as the first word.

1. INSIDIOUS A. Treacherous B. Slovenly C. Capricious D. Elemental
2. BENIGN A. Naive B. Kindly C. Effeminate D. Prosperous
3. STRINGENT A. Calm B. Tight C. Desperate D. Strict

REASONING

Add the next letter in each of the following series:

1. a x b y a x b y a x b —
2. a b m c d m e f m g h m —
3. r s r t r u r v r w r x r —
4. a b c d a b c e a b c f a b c —

ANSWERS

Nonverbal test: 1. Second from left (the only circle with inner lines not crossing); 2. Second from left (the only picture showing a human); 3. Fifth from left (the only figure in which all solid lines are on outside edges); 4. Second from left (the only person not playing); 5. Third from left (the only figure with an unequal number of lines vertically and horizontally); and 6. First from left (the only figure in which two crossbars of the central design are on top of the surrounding frame).

Space test: In the first row, you should have marked A, D and F.
In the second row, you should have marked C and F.

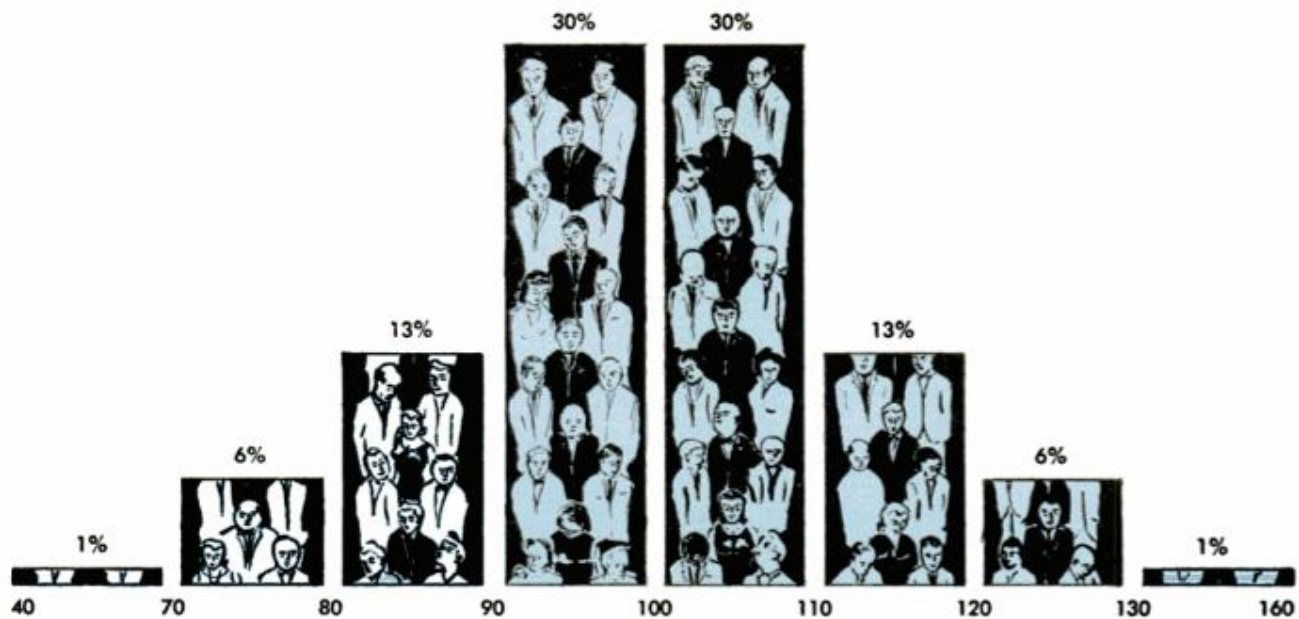
Number test: A. Wrong; B. Right; C. Right.

Verbal test: 1. A; 2. B; 3. D

Reasoning test: 1. y; 2. i; 3. y; 4. g.

The last four problems are from the Primary Mental Abilities test prepared by Science Research Associates

Distribution of Intelligence in a Normal Population



SIXTY PERCENT of the people in a normal population group are within the 90 to 110 IQ range. The remaining 40 percent are distributed equally on each side of the 100 mark in the manner shown in this drawing

the bicycle or whatever else she had promised him.

This is how parents, armed with an IQ score, can put undue pressures on their children.

Test devisers shudder at still another specter of disclosed IQ scores: Fathers and mothers competing with other parents on the basis of their children's IQs—over poker or bridge tables, at the back fence, on the golf course.

"A test score by itself means very little," says Dr. Henry Chauncey, president of Educational Testing Service, Princeton, N.J. "It takes meaning only in relation to all other information about an individual. The wise and sensible user, therefore, does not make decisions on the basis of test scores alone. On the other hand, the kind of information provided by good tests cannot be ignored by conscientious educators seeking all possible information about students before making important decisions."

As an example of the kinds of pressures placed on school systems to reveal pupils' IQs, New York State schools now, *by rule*, have been forced to make some test records available to parents, but not IQ scores. This ruling followed a report by a committee from Columbia University's Teachers College that pointed out that a little knowledge is a dangerous thing and that IQs are merely numbers, without expert interpretation.

Unfortunately, there are many teachers who don't know how to use IQ scores

properly, either, says Dr. William Buel of Science Research Associates, Chicago. (SRA is a major publisher of intelligence tests.)

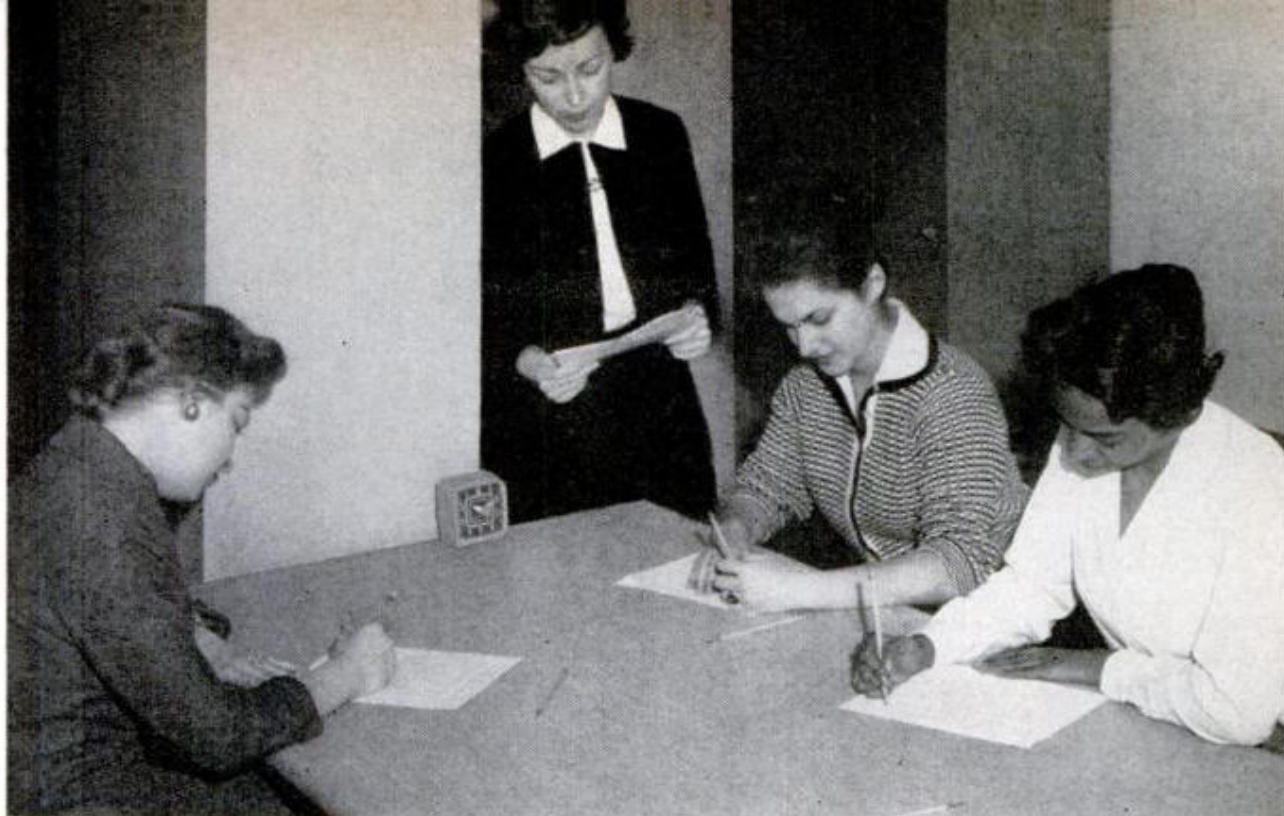
In the first place, he says, the absolute numbers mean little by themselves. The difference between an IQ of 125 and one of 126 is no difference at all. "We can't even tell the difference between IQs of, say, 170 and 180," he says. "It may mean one question on the test. All we know is that one is a notch higher than the other. Both are in the highly superior range."

Also, he points out, the differences at each end of the scale are different. This is because quotients are derived by mathematical division. You can demonstrate this to yourself by looking at IQs of 80 and 85 versus IQs of 120 and 125. First, divide 85 by 80; then, 125 and 120. In the first case, the result is 1.0625; in the second it is 1.0416. So IQs of 80 and 85 are further apart than those of 120 and 125.

For another thing, says Dr. Frederic Weinfeld, also of SRA, IQ scores shouldn't be looked at as numbers, but as to where they fit in bands. IQ scores have a built-in error of 10 points in 65 percent of tests taken. The roughest Stanford-Binet bands, for instance, are these: 60-87 poor; 88-112, average; 113 to 140, good.

People with IQ scores below 60 are mentally retarded; those above 140 are mentally superior. (Einstein, who never took an intelligence test, was estimated to have had an IQ of 207.)

Another danger in interpreting IQs lies



LOOKING FOR JOBS, some seven million adults will take intelligence tests this year in the U.S. Some firms have reported a high correlation between test performance and later job performance—and promotions

in treating them as measures of capacity. Intelligence tests can only give you a score that tells how good you did on them. They cannot tell you what your capacities are; capacities can only be inferred.

Likewise, an IQ can not accurately predict how well you will succeed in life. They can generally tell whether a student should go to college and generally predict how well he'll do once he gets there.

A person with a 120-130 IQ is considered "good college material." But what about the school he intends to attend? Students at Massachusetts and California Institutes of Technology, for instance, have mean IQs of 145; students at the average college have 110-120 IQs; students at teachers' colleges average 100 IQs.

Success at college also depends on other things, like personality, that IQ tests don't measure. There are no points in intelligence tests for creativity or for motivation. A highly-motivated boy with an IQ of 100 could still become an engineer, if he went to a second-rate college and worked hard. The roster of Ph.D. degree holders in the U.S. includes people with 86 IQs.

"Good modern tests can measure reasonably well what a person *knows*, less well what *interests* he has, and only poorly what he *is* and *may become*," says Dr. Chauncey.

What's true with Ph.D. degrees is also true about success in specific jobs. Yet industry more and more relies on intelligence tests to screen job applicants. And check-back studies indicate that the tests

are doing what they're supposed to do.

About 80 percent of our larger companies use intelligence tests today. There are few major corporations in the U.S. which don't use these tests in some job screening, says Mr. Jean Maier, director of industrial test research at SRA. Usually the IQ is reserved for office job applicants and for executives. Few companies give all prospective employees IQ tests.

Most personnel offices use tests you can take in 15 or 20 minutes. These aren't full-scale intelligence tests, but are designed to measure only specific key parts of intelligence—verbal ability and reasoning, usually.

Two companies, Proctor and Gamble and Lockheed Aircraft, pioneered in employee testing programs as early as the 1930s. Sears Roebuck and Co. was a late-comer, but today has probably the most extensive employee testing program in the country.

Companies don't like to reveal how well their IQ tests do in screening applicants, because it gives away an advantage they have over competing companies. Five years ago, for instance, a leading electronics firm realized that it was spending \$10,000 to train each computer salesman—and many trainees never made the grade. Now, with a simple pencil-and-paper test which costs less than a dollar, applicants who don't make a minimum score can be quickly eliminated.

Without revealing any company names,

(Continued to page 232)

Floating Military Truck Goes Anywhere

Now under development for the armed forces, a 1500-pound truck can travel over any terrain, even water, without extra gear.

The water-tight aluminum hull and rear-drive 55-horsepower engine can carry four men and their equipment across rivers or up to 75 miles per hour on a straight-away.

Made by the Fletcher Aviation Co. of El Monte, Calif., the *Flair* is light enough to be airlifted seven at a time by large cargo planes or one at a time by helicopter, and rugged enough to be used in rough terrain.

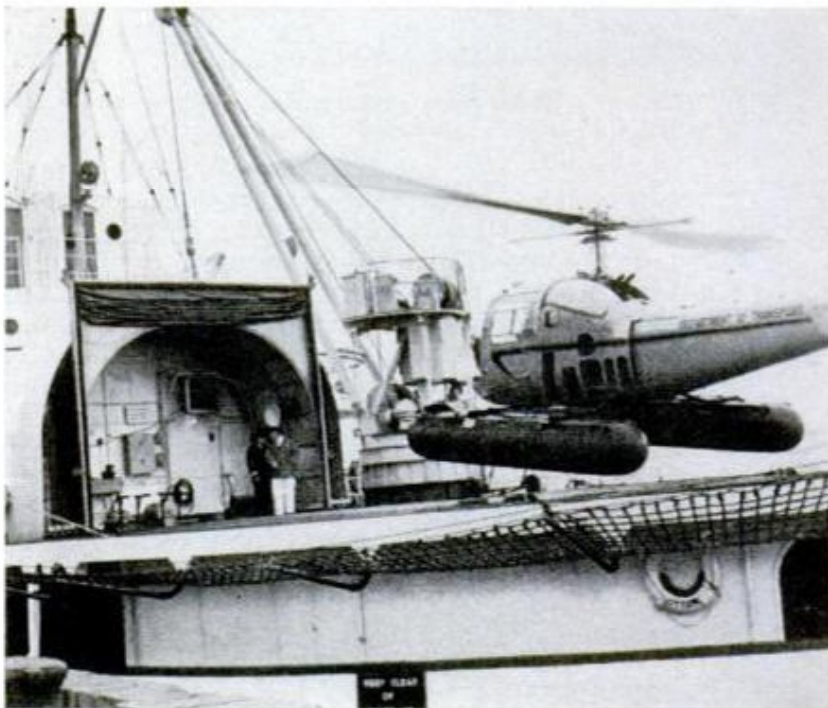


Telescoping Hangar Saves Shipboard Space

Conceived for use aboard cramped ocean vessels, a hangar that retracts permits a helicopter to land on its small heliport, then extends to cover it up.

Produced in Canada for the Canadian Marine Service, the telescopic hangar measures less than 10 feet retracted and more than 48 feet when extended.

The first of these hangars was installed aboard an ice breaker, the CMS *Wolfe*, and several more have been installed since. Apart from space saving, the hangars protect the helicopters from the corrosive effects of salt spray and sea air.

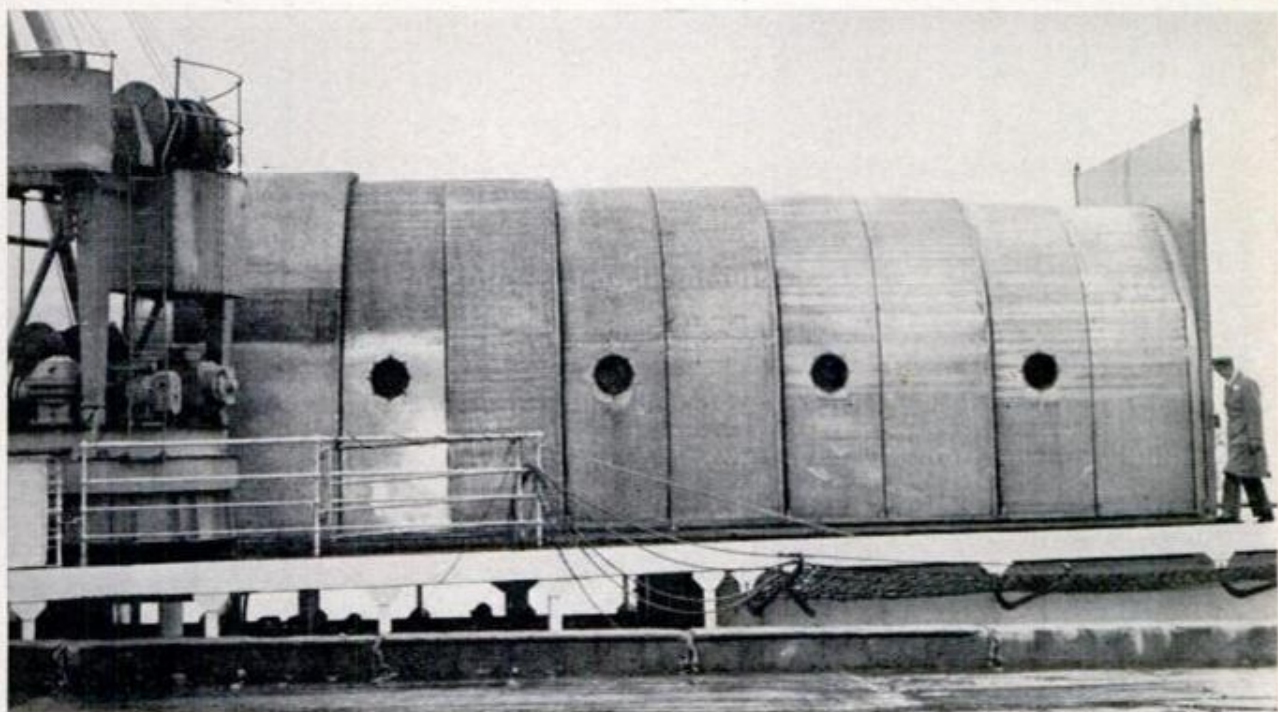


Balloon-Borne Cable Connects Two Islands

Japanese engineers, faced with the problem of connecting two transmission towers—located on islands separated by a one-mile strait too turbulent for boats—solved the dilemma by using balloons. Steep inclines made helicopter approach impossible.

One hundred balloons were used to suspend a messenger wire of 9 mm. (2/5 inch) diameter to make the initial connection. It was then replaced with 15 mm., 20 mm. and, 35 mm. wire and finally with the 35.2 mm. (1 2/5 inch) permanent power cable.



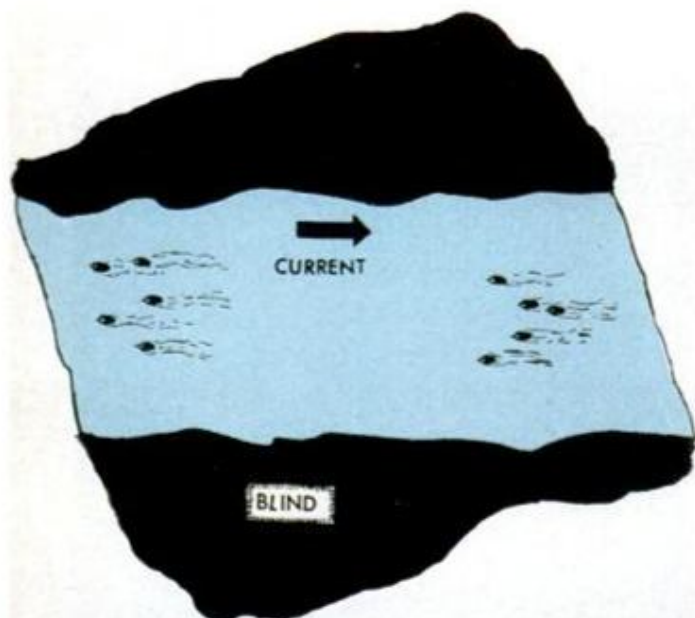


There's more to luring ducks into gun range than simply setting out some decoys. If they spot your spread for a phoney—and ducks are smarter than most hunters think—you're in for a quiet day. But attention to some small details, taking advantage of wind, water, weather, cover and the lay of the land, can change an ordinary bunch of decoys into an inviting spread that'll pull ducks in for you consistently. . . .

By William W. Hunter

1. The Split-Spread Trick

When shooting over moving water, you can bring decoying ducks in right where you want them by splitting your decoys into two groups with a space between them. The newcomers will usually drop into the open space, right in front of your blind.



Tips on Decoys



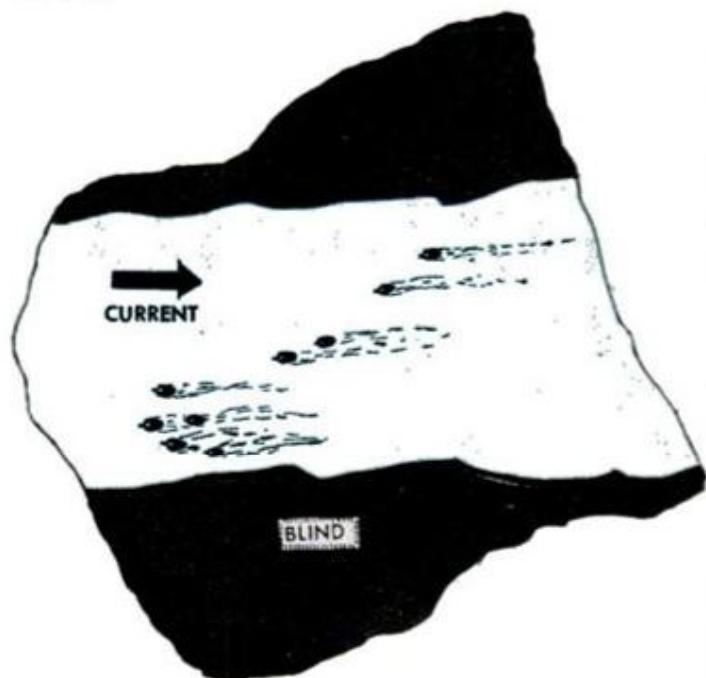
2. The Extra Wing Gambit



Real ducks don't always look like stiff, painted decoys—they stretch and ruffle their feathers like chickens. Save the wings from a few ducks and attach them to some of your decoys with rubber bands as shown; they simulate a resting duck stretching his wings and will help give your spread some realism.

3. The Fall-in-Line Trick

Ducks follow each other like sheep sometimes. A line of decoys set up to look like a flock of newcomers joining the main flock will not only allay the fears of wary flights, but will make your spread easier for low-flying ducks to see.



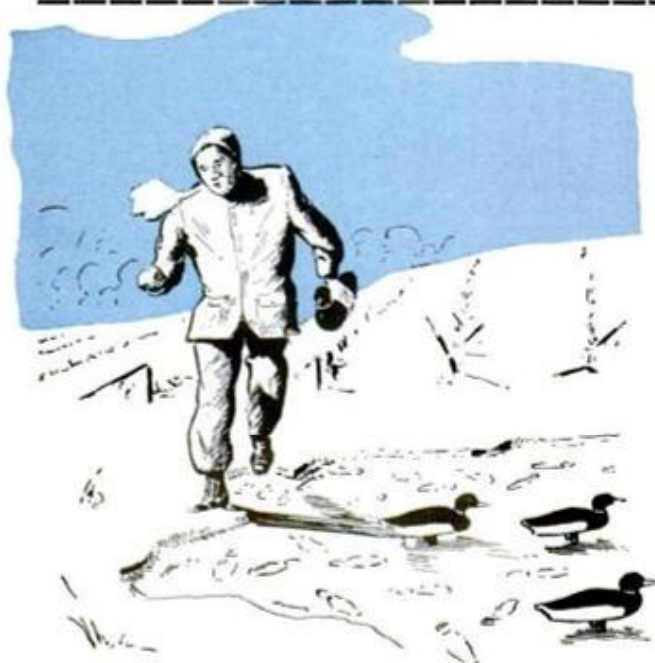


4. The Rippling Decoy Ploy

Nothing looks phonier than a spread of motionless decoys on glassy-smooth water. Anything you can do to add some motion will make the decoys look more lifelike. One good trick, on moving water, is to set up rocks upstream from your decoys to make an eddy in the current. It'll provide the blocks with constant motion.

5. Hiding in the Wind

Since ducks almost invariably land into the wind, and keep their eyes on their landing spot during their approach run, you can hide best downwind from your decoys. The approaching ducks' view will slide over the blind to focus on the spread. Also, when you stand to shoot, the ducks must then fly upwind to escape.

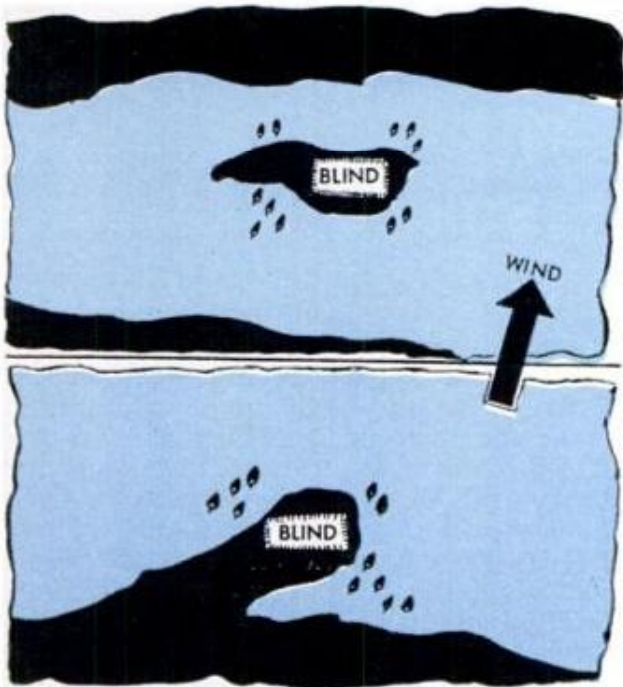


6. The Fake Snow Sign

Smart ducks, looking over decoys set out in fresh snow in a field, look for signs of their feeding. You can simulate this by stamping down the snow in the area around your decoys until the area looks like a popular feeding spot. Be careful, though, not to leave telltale muddy footprints—just pack down the snow.

7. Three Field-Shooting Tricks

Remember, when shooting over a dry-land spread: Always face the decoys into the wind, just as on water. Never place one decoy in line behind another—the real ducks always feed on their own path but parallel to the others. Always tip the decoys' chests upward a bit to make the spread more easily visible from above.



8. The Ideal Blind Location

Have as much visible water around your blind as possible—a small island or point of land is perfect. Spot your decoys in small groups like contented ducks. Pick a spot with a minimum of cover, and use a minimum of natural cover for your blind. Ducks are less suspicious when few hiding places show.

9. The High-Ground Trick

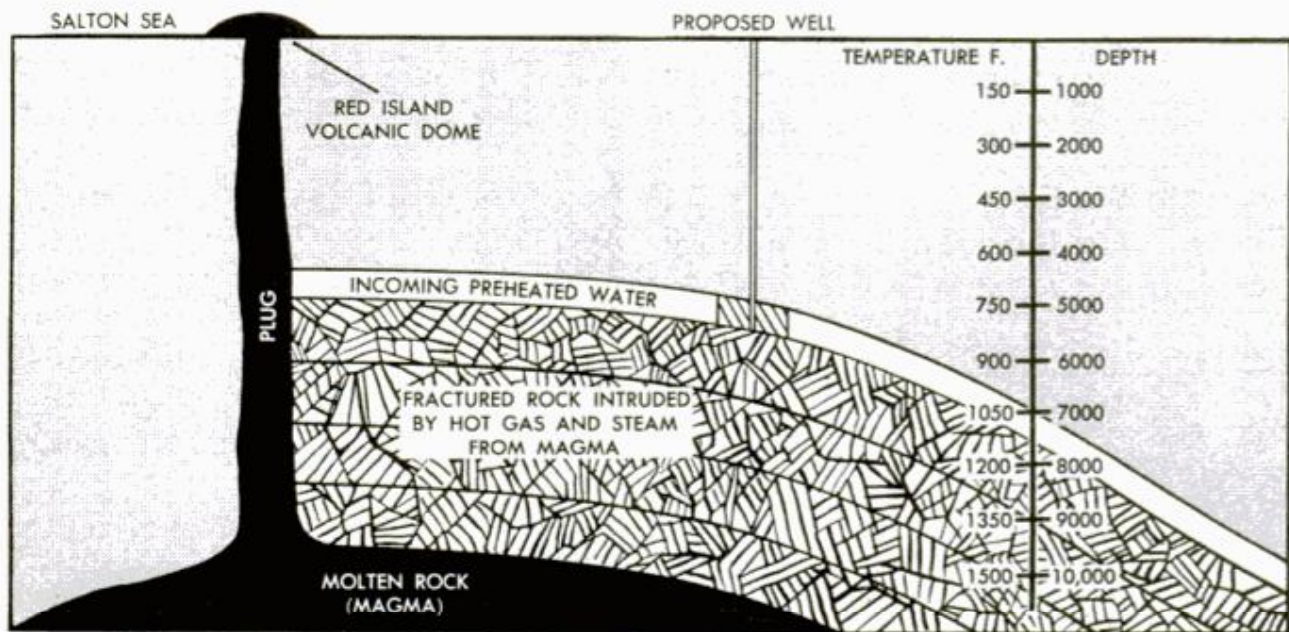
Smart ducks like to feed on high ground so they can spot approaching danger. A flight of ducks won't join your decoys if they think they're feed-

ing in a dangerous low spot. If visibility permits, place your blind in that low ground—tall cover will look more natural in the low spots.



They've Tamed the Power of Volcanoes

By
**Floyd
McCracken**



PROFILE of earth under Salton Sea shows how area functions as automatic boiler when well penetrates it

THE WILDCATTERS who departed California's Imperial Valley in disgust in 1957 after their drills struck steam instead of oil left behind a rich discovery—of heat, hot water and minerals—that today promises to be a new source of electrical energy and a chemical industry for the region.

What they didn't know, but what geologists have since learned, is that the area under the Valley's Salton Sea holds a store of hot water. The water is held under great pressure in fragmented rocks; either it was entrapped by an ancient earth movement or it has been squeezed from the rocks by pressure and heat.

Texas oilman Joseph I. O'Neill, Jr. is putting down 10 wells to test the heat-producing potential of the area's 14,000 acres.

The heat is a residue from five extinct volcanoes whose vents were plugged by cooling obsidian. This rock gleams in two black domes that rise 100 feet above the Valley floor. Two earth faults are believed responsible for the drill-exposed rocks being hot. San Andreas Fault runs north-south along the eastern side of Salton Sea. It has been responsible for California's major earthquakes. Obsidian Fault branches from San Andreas and courses southwestward between the obsidian domes and the well sites. Slippages along these cleavages have fragmented Earth's mantle, permitting volcanic heat to rise within reach of rotary drills. A thick blanket of alluvium

effectively prevents the heat from escaping.

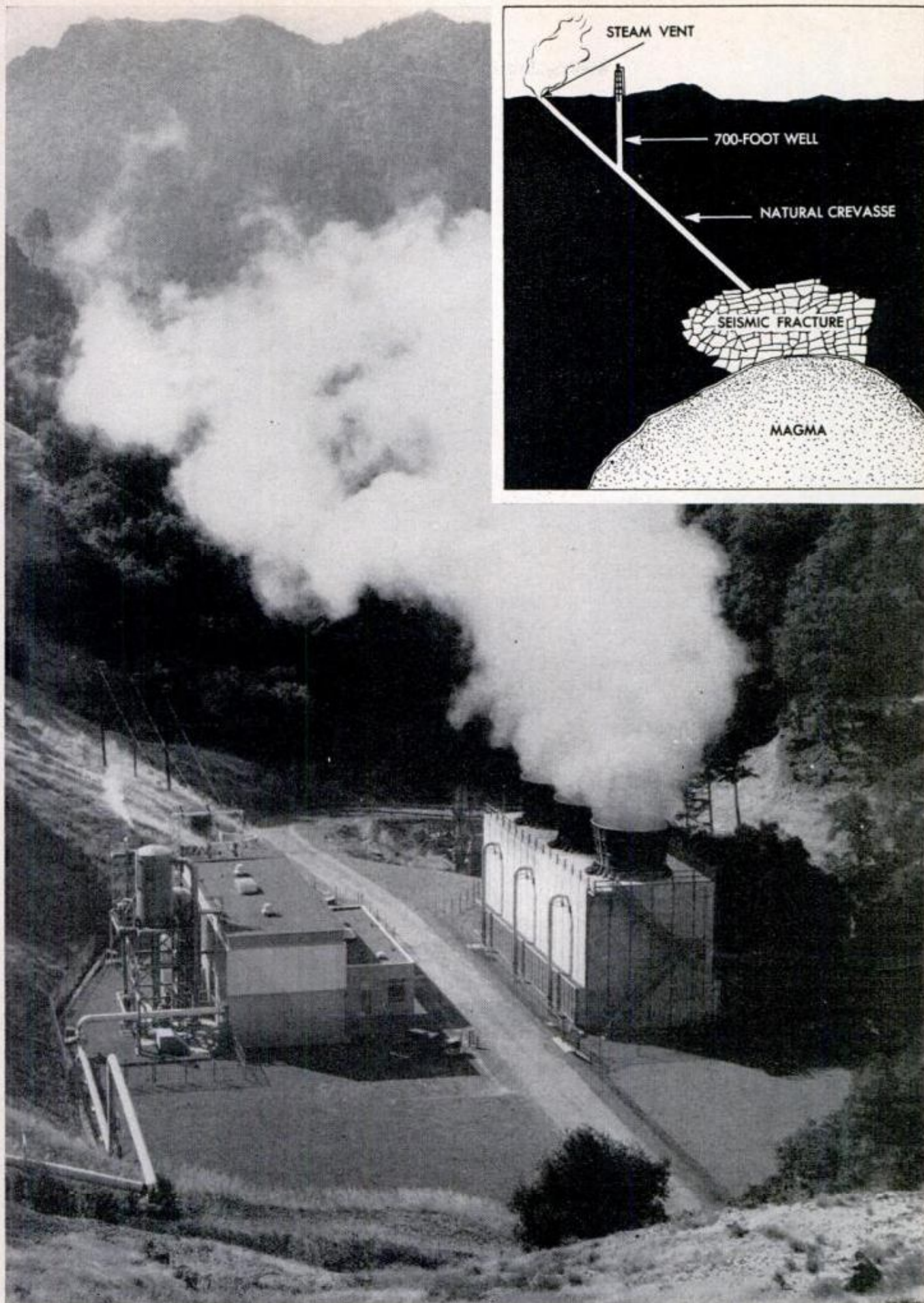
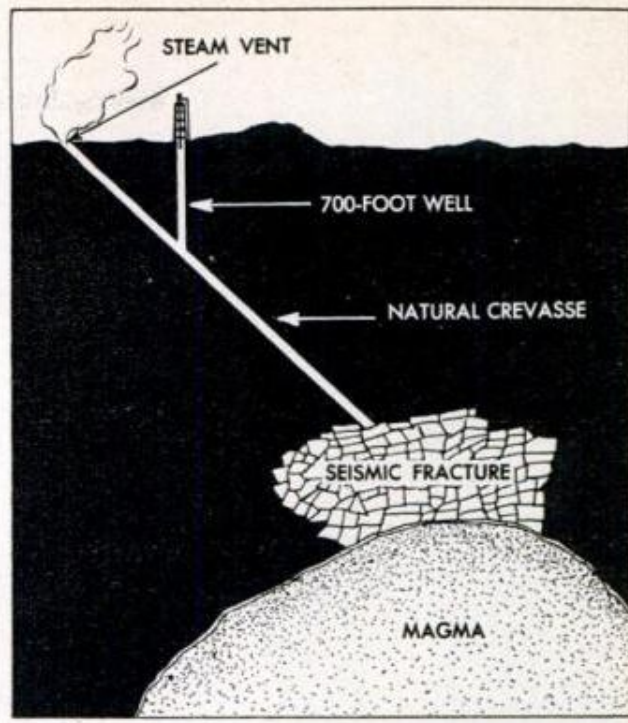
This phenomenon is unique in the engineer's experience with magmatic heat. Other areas are producing usable steam from the magma, but they are tapping steam-filled crevasses reaching deep into the earth. Such crevasses exist in California (at the Geysers, north of San Francisco), New Zealand, and in Italy where magmatic steam produces usable energy.

The drillers for heat energy have bypassed the wildcatters' well, although they are drilling near it. Of the two steam wells drilled so far, the second, at a depth of 5230 feet, has temperatures of 715 degrees. Well-head flow conditions give a per-square-inch pressure of 200 pounds, a heat recording of 400 degrees. Engineers estimate that this will produce 10,000 kilowatts which, with minerals produced, will add up to an annual value of some \$600,000.

Steam from this well, if condensed, would produce 400,000 gallons of pure water.

Since the well's output is 32 percent mineral by weight, the water is run into a flash vessel that functions much like a conventional boiler. Steam flashing to the top is used in a turbine; mineral-laden brine drains away at the bottom. When operating properly the system produces virtually pure steam.

The developers regard their property as a boiler with an inexhaustible fuel supply, a boiler that has its own fireman.



ENERGY at the Geysers geothermal steam plant north of San Francisco is tapped in a more conventional way than it is tapped at the Salton Sea. Here, as in other magma heat areas around, the engineers tapped steam-filled crevasses that reach far into the earth. This plant will produce 25,000 kilowatts of energy



Quick Picture Brooches

Camera and "darkroom" are mounted on a single tripod in a new street-side photographer's rig that produces pictures in brooches that can be pinned to clothing.

Sensitized picture blanks are fed by cartridge into the camera, exposed and then developed in a process that uses chemicals in rubber squeeze containers. Priced at \$89, the camera is sold by PDQ Camera Co., 1546 W. Cortez St., Chicago 22, Ill.



Bowler or Fortune Teller?

Even though they look as fragile as fortune teller's crystals, transparent acrylic resin bowling balls can roll down an alley at 60 miles per hour (or faster) and scatter rock-maple pins along with the best of them.

The ball, tested and accepted by the American Bowling Congress, is a product of the Wondercraft Company of York, Pa. It's made of DuPont Lucite.

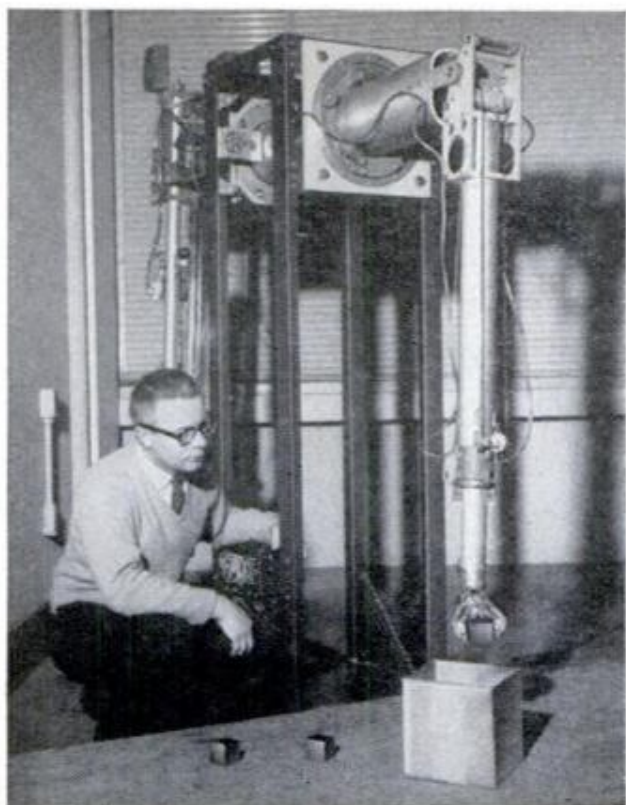
Disappearing Act: Controls Vanish at 40,000 Feet

Condensation trails, unwanted by-products of high-altitude flight which betray the presence of an aircraft when the aircraft itself can't be seen, may disappear.

Scientists at the Air Force Cambridge Research Laboratories developed a chemi-

cal method to prevent ice crystals, formed in the engine exhaust, from becoming large enough to scatter light visible from the ground. The upper of the two pictures below shows normal contrails and the other shows them cut off on one side.





Hand Has a Brain

There is a mechanical hand groping around at Massachusetts Institute of Technology that works with wooden blocks much the way a child does. The hand, equipped with 30 sensing devices and equipped with an artificial intelligence (in the form of a program in an electronic computer), explores its environment, locates a block, determines its size, picks it up, puts in a box. Should the hand run into an obstacle, it picks its way around it.



Siphoning Simplified

You can remove liquids from cans and tanks without risking a mouthful of high octane with a new plastic handler that sucks up half a gallon at a time, then squirts it out on demand. The accordion-folded plastic body does the job for handling fuels or other chemicals, or even watering plants.

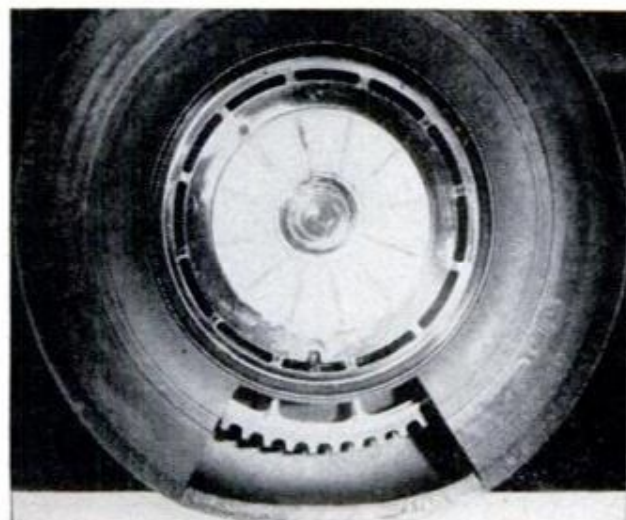
Made by Diamond F Sales, 921 Sherman St., Akron 11, Ohio, The Gasser sells for \$1.98.

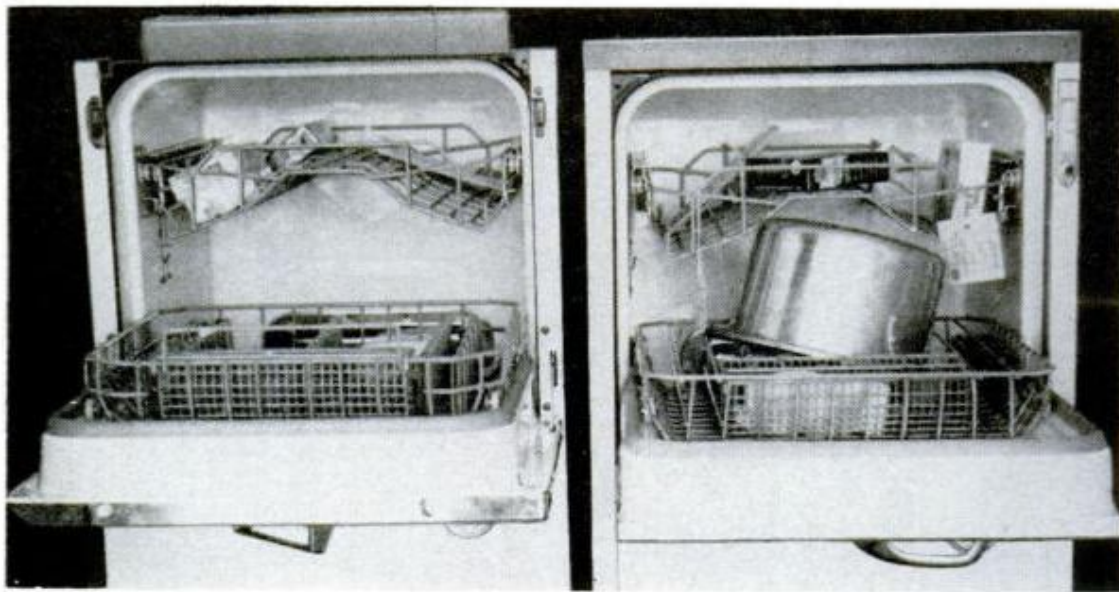
Built-In Metal Spare Keeps Car Rolling

Bolted to the center of automobile wheel wells, cast-aluminum inserts will hold a deflated tire two inches from the rim in case of a blowout or puncture. The rail's own rubber tread grips the inside of the tire to maintain traction, yet flexes with the tire

allowing the car to be driven to the nearest service station. The car can travel several miles under full control.

The manufacturer of the rail insert is Posi-Trac Rail, Inc., 711 Taft, Houston 19, Tex.





COOKING POT, too large to fit in dishwasher at left, fits in similar model from same maker. Best way to solve this dilemma, when inch might make difference, is to bring pot to store

THERE ARE two major factors in buying a dishwasher, things to know before shopping and things to look for while shopping.

Things to know:

How much space? Some kitchens are too small for some models. Check yours against the available models.

Water pressure. Dishwashers operate on water pressures from 15 to 150 pounds, but it must be *steady* pressure. Fluctuations seriously affect operation.

Clear drains. When dishwashers start pumping, they dump their water in a hurry. Drains must flow fast.

Hot water. All units require 140-

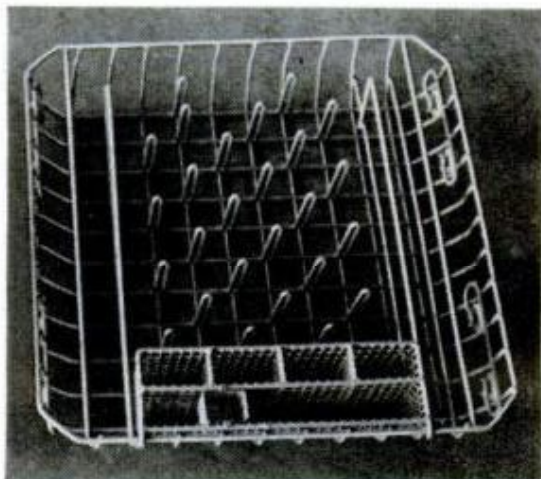
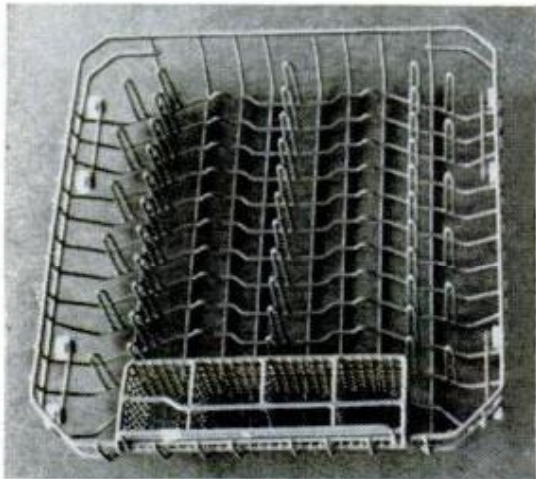
degree water or better, up to 12 gallons per cycle. Best check: If you have a clothes washer, and it works, the water is hot enough.

Wiring. All types use 110-volt, 60-cycle current, but they draw plenty at times. You should have a 15-amp. branch circuit just for the dishwasher, or plan its use for times when your other appliances are not operating.

Additional factors include whether portable dishwashers will roll through doorways, piping for built-in models and distance of electric sockets.

The physical factors of your own

LOADING RACKS change design constantly. Old type (left) dictates which dish will go where. New random type (right) is more flexible, allows almost any dish to be placed anywhere





FRONT LOADER allows user to work all around with less stooping, but needs space to front



TOP LOADER requires less floor space, but is harder to load. User must bend to load

kitchen can help you decide which type of dishwasher is best: Portables that can be rolled away and stored; built-ins that are installed inside existing cabinetry; free-standing types that are installed like ranges or clothes washers; or sink-combinations that are included in a complete sink-and-cabinet unit. The advantages and disadvantages of each type are given in the chart on page 133.

Things to look for while shopping:

Loading design. This is the most important use factor. Although front-loaders are becoming more common, both front-loaders and top-loaders have advantages and disadvantages. These are also given in the chart.

Capacity. This is probably the most ballyhooed advertising factor, and the most over-rated. Capacity claims are mere yardsticks of dishwasher size, not dishwasher quality, and many have been known to be exaggerated by 20 percent anyway. Standard claims of from 8 to 12 place settings are possible, but just loading 12 settings is difficult and the wash job is not as good as with a smaller load. Also, these ratings do not include pots, pans and serving dishes.

You can figure your needs by piling a full day's dishes and utensils on the table and counting them. The standard setting per meal is five

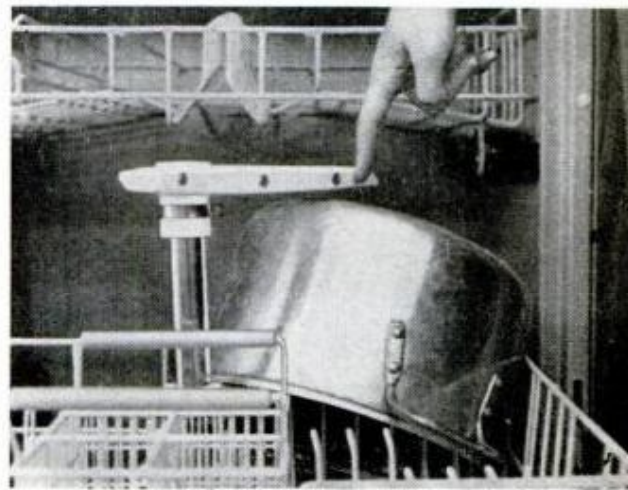
pieces of china, a glass, and five pieces of silver. Figure how many settings your family generates in a day, add pots and pans normally used, and you'll come close to the capacity your dishwasher needs.

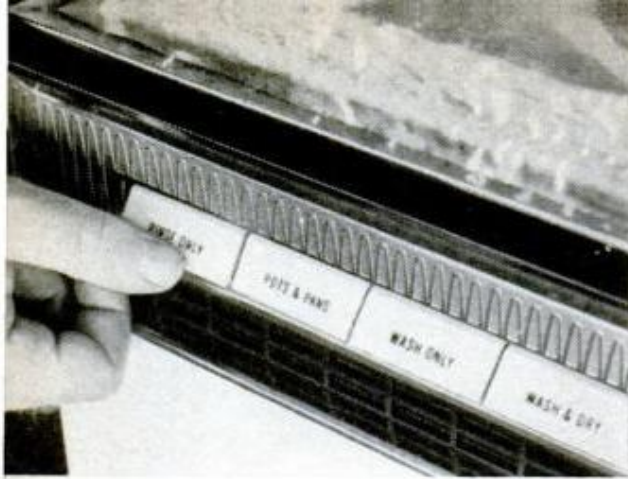
One tip: Take along your wife's favorite large saucepan or pot when looking over new machines. See if it fits in the one you want. Some don't.

In the end, you'll do better by thinking "How many loads?" rather than "How much per load?"

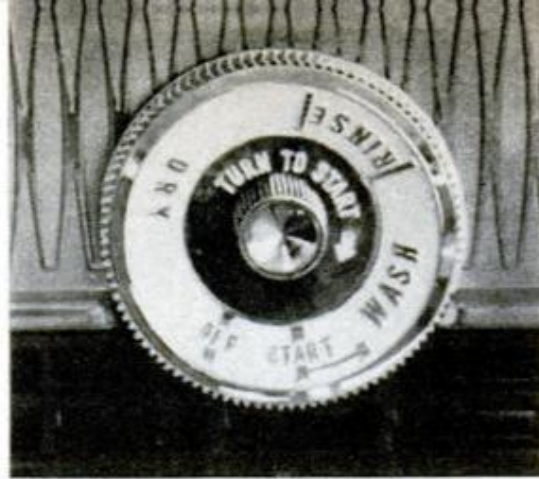
Racks. More important than capacity is the ease and flexibility of loading arrangements on the racks. There is no current standard, in fact

SECOND ROTOR ARM cuts clearance, capacity. Here it barely clears huge cooking utensil

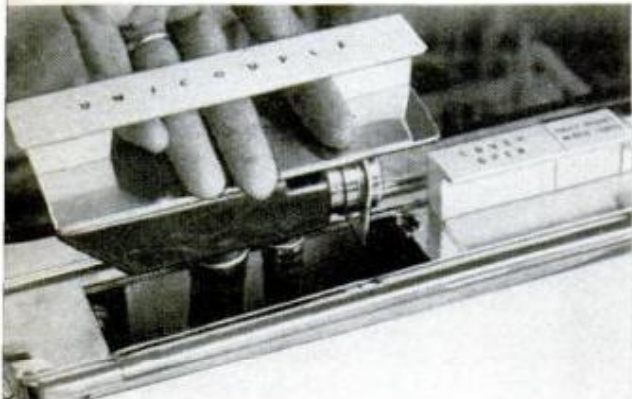




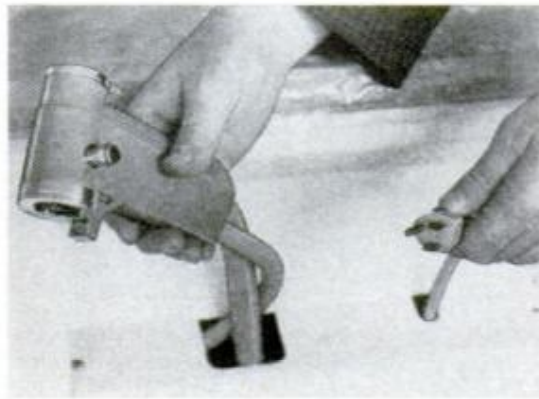
'RINSE ONLY' cycle allows dishes to be held over for full day, from breakfast to dinner



SIMPLE CONTROL is all that's really needed. Easy to read, large enough to operate simply



HOSE STORAGE is easy in this model, includes sturdy grip for easier handling and hookup



HOSES AND CORDS both need storage compartments. Straightforward design is good

some plants change their racks annually. The latest, one which other manufacturers are frantically copying, is the "random rack" which consists of a series of pegs only—no slots, cup hangers, etc.—allowing any item to be placed anywhere.

The racks are usually plastic-coated steel wire. Nearly all have the same plastic material, but the heavier the wire underneath, the stronger and longer-wearing it will be.

Controls. All that's really necessary is a control that is easy to read, that shows where in its cycle the machine is, and that allows the user to skip cycles or to repeat them by just adjusting the control. Anything more complex is gingerbread.

In almost every case, the difference in controls is the difference in price between the high and low-price models.

Special settings such as "Fine China and Crystal" or "Pots and Pans" are mere variations on the normal cycle. Worthwhile special cycles are "Rinse Only" and "Short Cycle." The first is good when a few dishes must be carried over until there is a full load. The rinse keeps

food from caking on the dishes. The short cycle is handy for large batches of slightly soiled dishes.

Washing action. There are three main mechanical designs for washing dishes, the impeller, the rotor arm and the spin-tube.

The impeller is probably most used now. This is a powerfully driven propeller mounted in the bottom of the tub, which operates in a pool of water throwing it against the dishes.

Most newly designed machines are using the rotor arm. This is a revolving fixture with jets on its upper surface through which water is both pumped and thrown at the dishes.

Least-used is the spin-tube, a cylinder that spins about its long axis spraying water through jets along its sides.

Machine washing requires only that hot water with detergent reach the dishes with enough velocity to have a scrubbing action. All three designs do it, although the rotor arm gets closest to the dishes, so probably is the best design.

Extras. Most accessories are decorative—and expensive. A worthwhile extra is a maple chopping-block top,



CYCLE DIAL on this automatic is in awkward position near floor, where it's hard to read



FILTER SCREEN should be easy to get to, remove or replace. Good ones last much longer

ADVANTAGES

PORTABLES: No installation. Can be moved from house to house. Trade-ins simplified. Low first cost. Service accessibility usually better. Has same capacity.

BUILT-IN: Out of way. Quiet when installed properly. Always ready to use. Adds to house value. Can be purchased with FHA loan when part of kitchen remodeling. Has low first cost when purchased with house.

FREE-STANDING: Installed like any appliance. Moves to another house relatively easily. Trading and changing simple. Shares most advantages of built-ins.

SINK-COMBINATION: Fits same 48-in. space as normal sink. Preplumbed, prewired for simple installation. Is the only answer when space is really tight.

TOP-LOADING DESIGN: Smallest floor-space requirement. Easy to see into. Simple construction.

FRONT-LOAD DESIGN: Easiest to load. Uses full capacity. Permits top to be used as table.

WATER TEMPERATURE BOOSTER DESIGN: Maintains necessary water temperature where water heater is inadequate.

GAS-FIRED WASHERS: Heats own water. High heat eliminates separate dryer devices. Unit is fast, works at 180 degrees.

DISADVANTAGES

Noise level usually higher. In the way in busy kitchen. Requires "plugging and unplugging" at each use. Ties up sink while working. Seems to vibrate more.

Usually higher in cost, and must be installed, at further cost. Service access not always simple. Won't fit all kitchens. Not for renters. Trade-ins restricted to brands that will fit "hole."

Is a pretty big package for many kitchens. More expensive than most portables, many built-ins. Not offered by all brands.

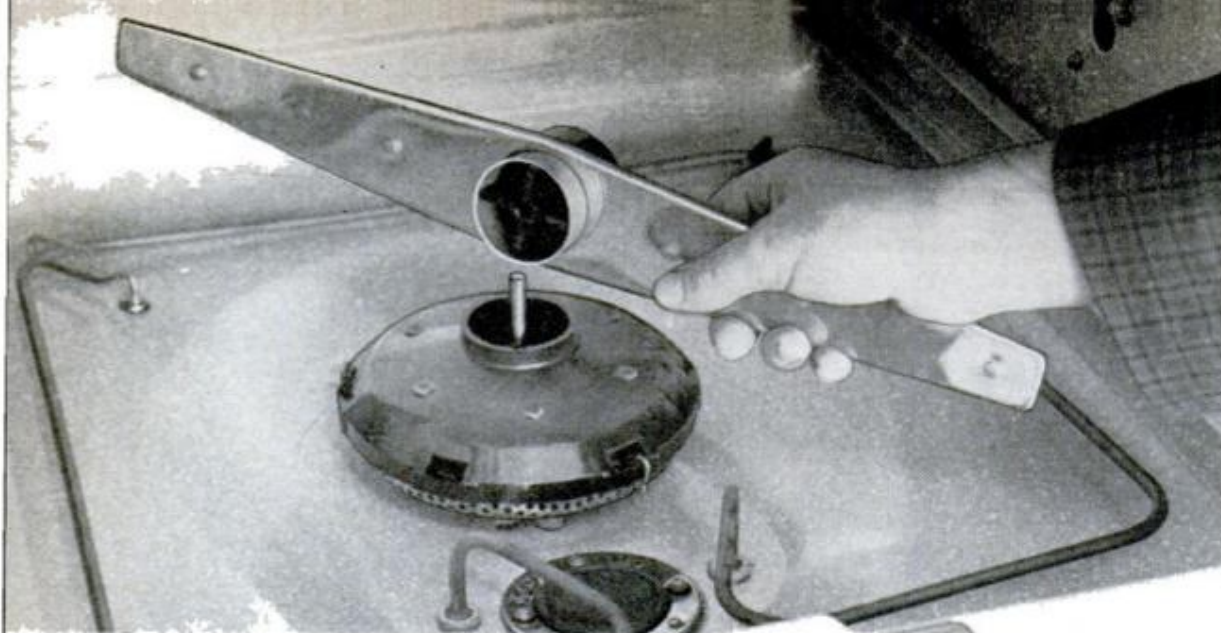
High cost. Does not allow all sink styles. Only offered by two brands.

Hardest to load. Requires much bending. Requires space overhead. Capacity slightly cut in upper rack. Top cannot be left in use as table space or work area.

Has more hardware. Requires space to front, nearly doubling floor-space needs. Not easy to see into.

Draws more current. Slows cycle if much heating is necessary.

Comes only as built-in. Require gas piping as well as water, electricity. Is "new" to the market.



ROTOR ARM should lift out easily for occasional cleaning. Main rotor here is on direct drive. If machine has second rotor (page 131), top rotor is usually operated by water pressure only

which turns the dishwasher top into a usable work surface.

Some machines offer automatic rinse and detergent dispensers, but not all work well.

Some machines have rather special features, such as an electric unit that heats its own water and the gas-fired unit that needs no dryer. Both are covered in the chart.

The dealer is important in purchasing a dishwasher, and should be judged on his service ability as well as his price. Most dishwashers are sold on a year's parts and service warranty, and offer less trouble than the average clothes washer. Users, however, are less familiar with dishwashers, creating service problems.

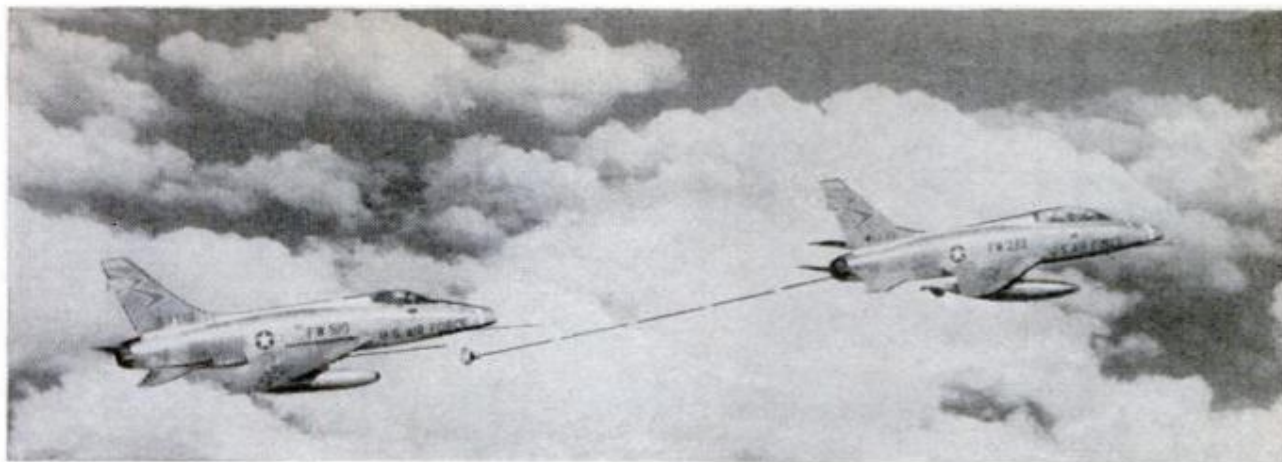
Dealers who offer free home trials—and some do, because dishwashers are “low saturation” items, meaning relatively few people own one yet so they get special treatment—claim they sell nine out of ten they place in homes. If you can find such a dealer, it's probably the best way to buy. Such dealers don't offer the best discount price, but they do offer something else—the chance to change your mind.

Dishwashers are priced about like clothes washers, retailing from \$175 up. And what do you get for your money? Convenience—a task done mechanically that hardly anyone enjoys doing by hand. And time—time to spend doing other things.

For the mother of several children, for the working wife, for the family who entertains a lot, the purchase may make sense. ★ ★ ★



SINK CONNECTOR works easily on this model with large thumb latch (top). Side button on same connector (bottom) operates bypass to get water from faucet while dishwasher is in operation



Fighter Feeds Fighter in New Midair Refueling Technique

Because of the high rate of fuel consumption of jet fighters, extended missions require wing tanks or midair refueling or both. Aerial tankers, usually four-engine cargo planes, have usually performed these missions. Now, to speed up the process,

F-100 *Super Sabres* have been outfitted with refueling equipment for other F-100s at the Misawa Air Force Base in Japan. Two tanks slung beneath the fuselage carry the 57-foot hose and 900 gallons of fuel. Connecting speed is around 300 knots.

Portable Planetarium

Small enough to be wheeled around on a cart, a planetarium can be used in projection domes 16 feet in diameter.

The planetarium projects planets, the moon and sun, galaxies, morning and evening glow, even satellites. It projects 2500 stars down to the fifth magnitude.

It is sold by Wyle Laboratories, 128 Maryland St., El Segundo, Calif., for \$7500 with a 16-foot fibreglas dome.

Back-Seat Platform

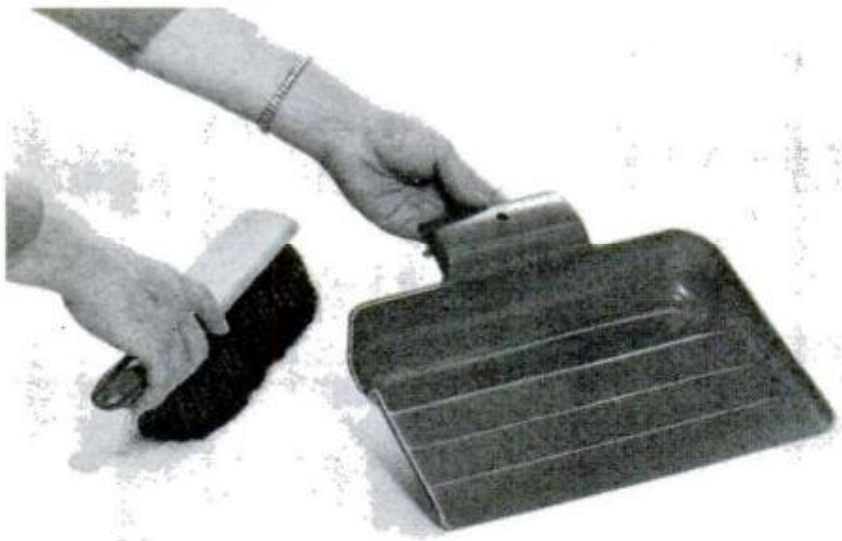
Sedans can do some station-wagon chores with an Auto Platform—two pieces of hardboard with adjustable steel legs that convert rear-seat areas to a flat space for light hauling or a sleeping and play area for small children. The maker says the platform will support up to 600 pounds, yet attaches without screws or tools. Approved Products Co. prices it at \$7.95, f.o.b. 1625 South 6th Street, Milwaukee 4, Wis.



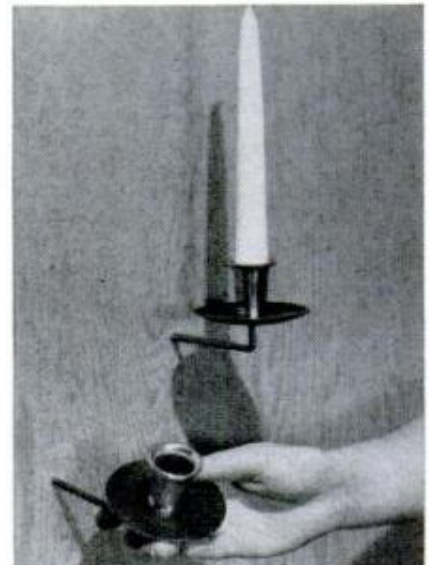


FIRE STARTER IN PAPER CUP is made of paraffin and dry wood shavings. It burns for 10 minutes, igniting barbecues, campfires, fireplaces. Box of 50, \$2; Fire Starters, Dept. 90, P.O. Box 711, Tacoma 1, Wash.

WHAT'S NEW FOR Your Home

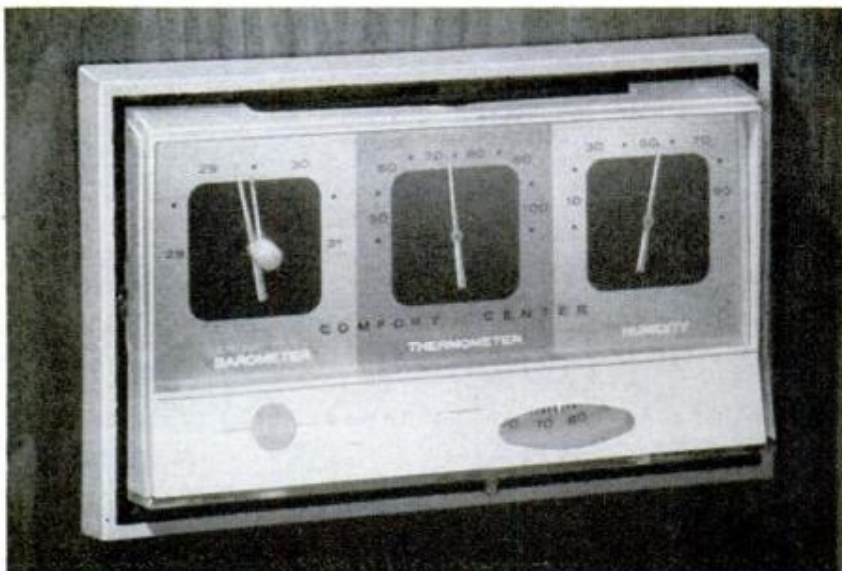


MOLDED PLASTIC DUSTPAN has a deep-trough well with pouring spout for easy emptying and grooves to catch and hold dirt. Several nest together to save storage space. Fox Specialty Co., Lowell, Mass.

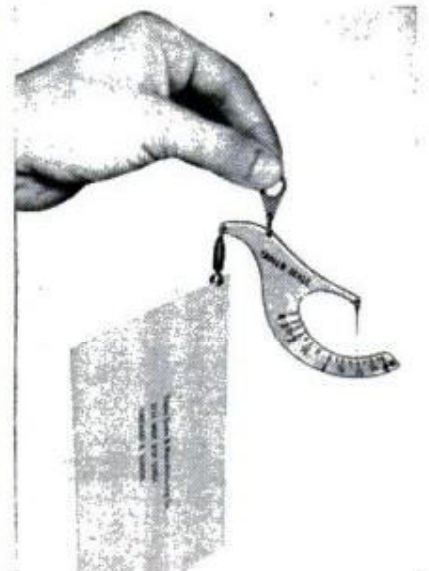


SCREW-IN CANDLE HOLDERS create wall sconces. Price: 85 cents; Beagle Mfg. Co., 91 Beacon Pl., Pasadena

HOME THERMOSTAT-CONTROL UNIT has barometer, thermometer, humidity indicator and warning light to indicate when furnace air filter needs changing. It's sold by Sears, Roebuck and Co., and costs \$30



MAIL SCALE weighs up to four ounces. Costs \$1.50; Triner Scale & Mfg. Co., 2714 W. 21st St., Chicago





ONE OPENER for all jars, bottles, cans. Costs \$1; from Geo. F. Maier, 1408 Comanche Dr., Rockford, Ill.



HANDY PHONE AID has memo pad, pen index, ashtray. Costs \$4; sold by Omar's, Dr. 756, Indio, Calif.

PLASTIC SOLE fits on iron, prevents shining, sticking, burning. Costs \$4; Tri-Point, Albertson, Long Island



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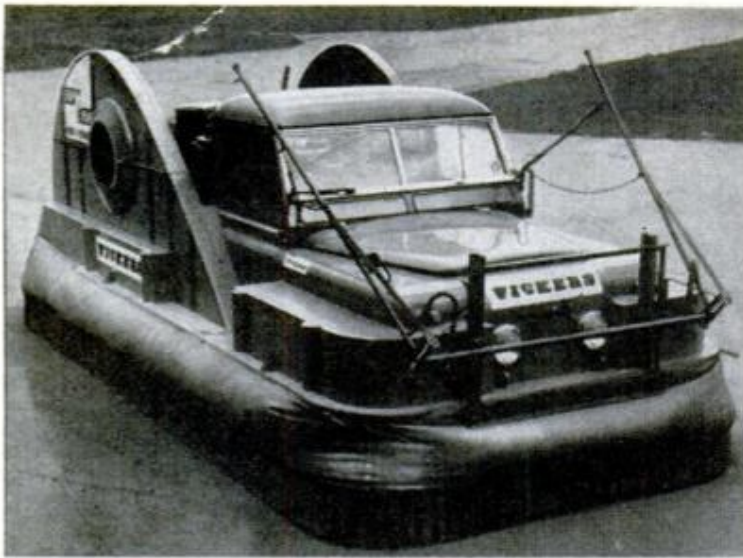


DISHWASHER-SINK-CABINET COMBINATION can be installed with minimum remodeling in space left by old sink. It's made by Kitchen Aid Home Dishwasher Div., Hobart Mfg. Co., Troy, Ohio, in several models

SILVER SPRAY-CLEANER PREVENTS TARNISH for months, and cleans flatware and jewelry without scratching or abrading. A 7-ounce can costs \$2.49; Minnesota Mining Co., 900 Fauquier St., St. Paul 6, Minn.



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Truck Made Into Air Car

Converted from a utility vehicle, an English ground-effect machine never actually leaves the ground but is able to drive over boggy terrain with ease.

Called the Vickers Air Cushion VA-3, it consists of a standard utility vehicle, the Land Rover, and an air-pressure system that produces 40-pounds-per-square-foot pressure underneath the vehicle.

It was demonstrated recently at the Vickers factory in Swindon, England. Several other British air-cushion machines have been built in recent years.



Predicts Life Span

How long will you live?

A machine developed by the National Institute of Mental Health may be able to predict future physiological changes — disease and even death.

The electronic Psychomet uses a series of 10 lights and 10 keys to test a subject's motor activity and associative-activity speed. The lights go on in a preset pattern and the patient responds by operating the keys.

Recorded data is analyzed to foretell physiological changes. The machine was originally designed to study air-traffic controllers.



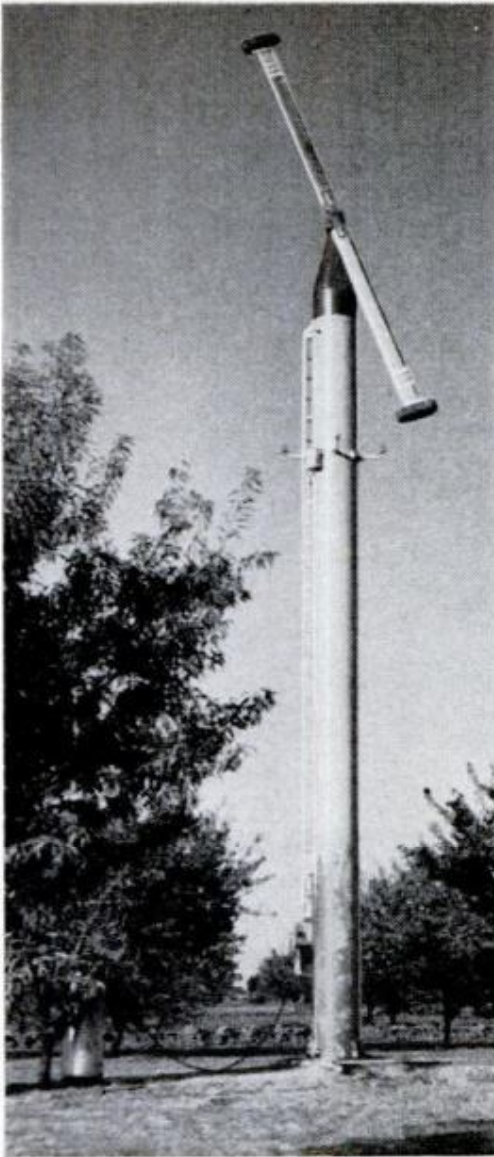
Transfer Color Murals

Color murals, painted by well-known artists, can be transferred to any painted surface with a do-it-yourself application.

The preprinted mural, on a sheet of specially treated paper, is taped against the wall, then rubbed with a special stylus to transfer it in full color to the wall.

Once applied and allowed to harden for a few weeks, the mural is washable but can be removed without marring the wall. More than 50 designs are available, including landscapes, city views, and abstracts. Some can be cut apart and spaced around a room. The size range is from three feet square to four by twelve feet. They are priced from \$5 to \$45.

The manufacturer is Art Transfer Co., Merchandise Mart, Chicago 54, Ill.



Anti-Freeze Breeze

Frost damage to crops can be prevented by a heat-and-wind machine that provides protection for up to 40 acres.

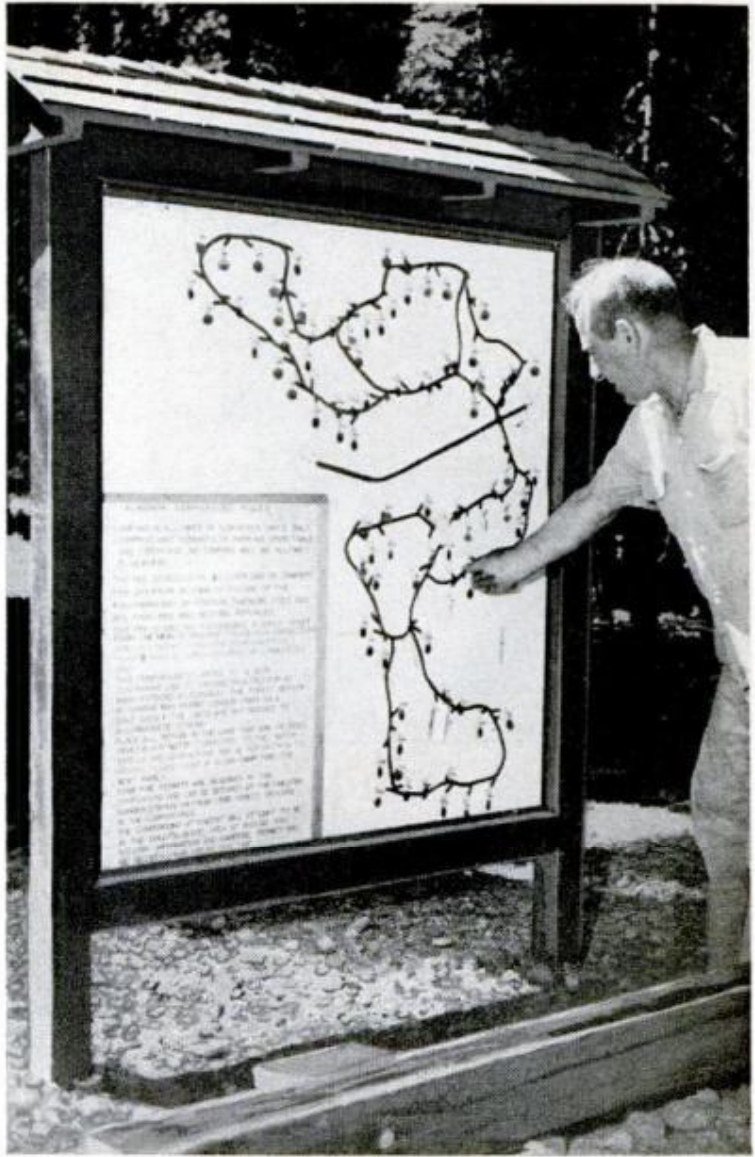
The 25-foot propeller atop the tower is powered by two ram-jet engines which produce 70 pounds of thrust to rotate the blade at 550 revolutions per minute. The machine is made by Hipp Welding Inc., PO Box 28, Palo Alto, Calif.

Pen Holds Own Paper

Pen and paper are combined in one small package by a new ball-point that carries its own supply of paper.

A small roll of note paper inside the pen can be pulled out like a window shade when needed. A fresh paper supply is installed by unscrewing the end and inserting a new roll. The pen costs \$4.95 and is available from J. A. Bennett & Co., Osgood, Ind.

OCTOBER 1962



Campers Serve Selves to Camp Sites

Solving the problem of selecting and assigning public camp sites in one easy stroke, the California Forest Service has installed self-service camp-site selectors in three campgrounds.

The arriving camper gets a picture of the entire grounds and finds the rules at the same time on the big signboard. He removes a marker to reserve the site he wants. The marker matches a tag posted at the site. Campers even use the board to leave messages for others. The system works 24 hours a day, and has freed rangers for other duties.



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TRACTOR CLOWNS, like clowns at any stampede, amuse crowds between events. In this case, he's doing a "Look, Ma! No hands!" routine on baby tractor

By
Rafe Gibbs

Tractorjack Stampede!

NO ONE HAD EVER held a competition for tractors before, but the Chamber of Commerce of Moscow, Idaho, thought someone should.

So the First Annual Tractorjack Stampede was organized with resounding success. There were so many entrants that the committee had to stop taking them.

The contestants were judged in seven

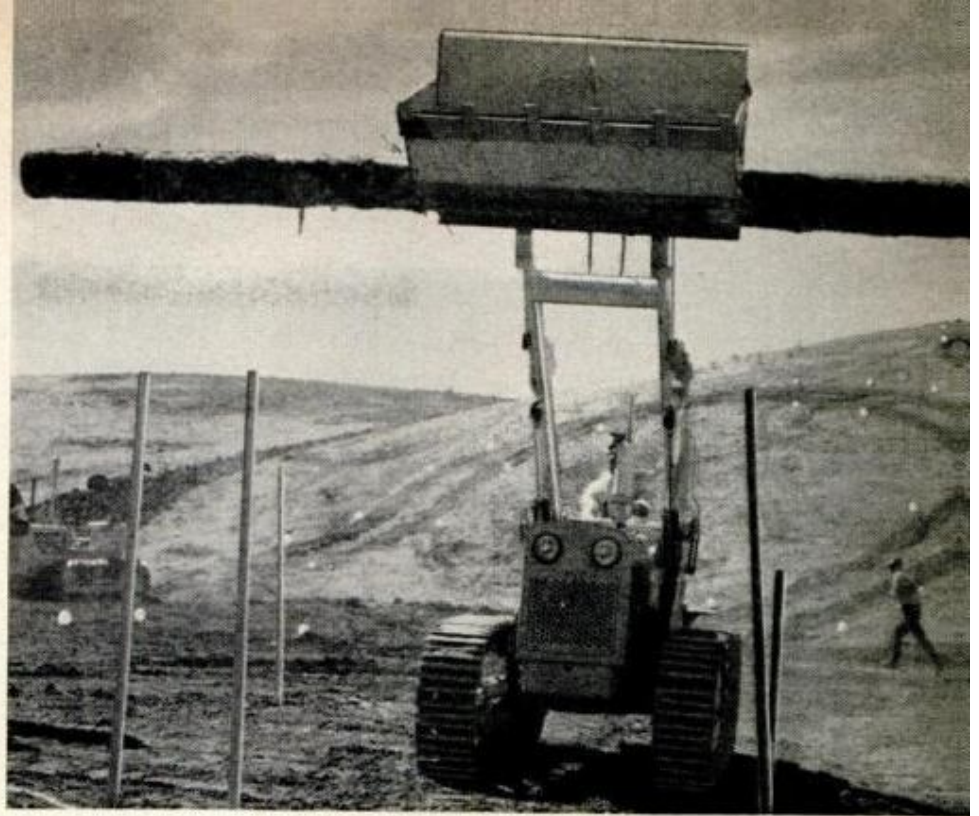
events, with only the top three competing in the seventh, a steeplechase.

The first six events included cross-steering on a combined pull; racing over a marked course, grabbing a numbered pig from a pen and carrying it back to the starting point; a trailer pull over a hilly course; boulder bulldozing; log lifting; and balancing on a log.

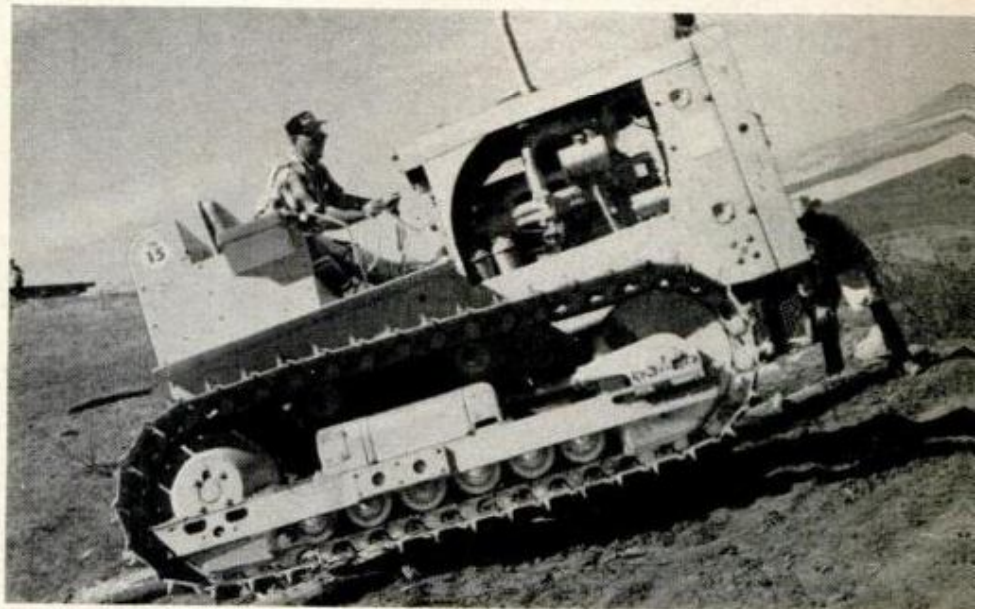
BOULDER BULLDOZING consists of rolling three huge boulders down marked course without scraping up too much dirt. Event was won by Idaho lumberjack



LOG LIFTING event requires tractorjacks to hoist large log with small clamshell attachment and put it back between stakes without ever touching the stakes



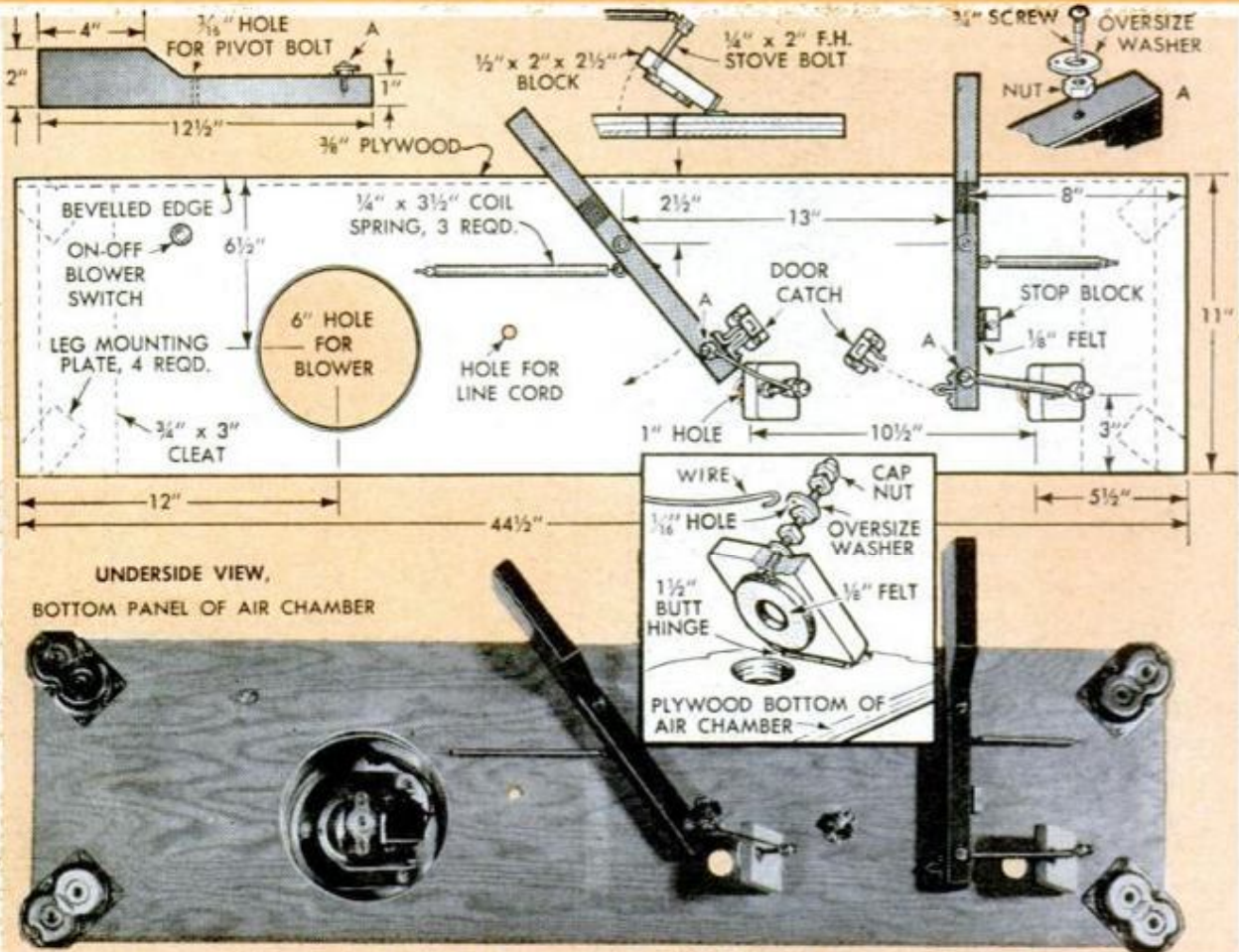
TRACTOR BALANCING on log was won, not surprisingly, by another woodsman. Contestants drive onto log and balance tractor, front and rear ends in air



TRAILER PULL was on winding course marked by balloons. If balloon broke, it cost points



CONVERT YOUR ACCORDION INTO



LOOKING UP underneath you see blower, volume-control arrangement, and plates to attach legs

BASS AND TREBLE ASSEMBLIES project from front panel so keyboards will be level and in alignment. View shows assemblies before adding grilles. Opposite page shows how grilles add to appearance



AN ORGAN



By G. W. Stamm

YOU, YOUR FAMILY, and your friends will all be fascinated with this portable chord organ that can be made easily from an accordion, substituting a silent electric blower for the bellows. Being small and lightweight, it can be carried by one person and easily transported in a car. You can connect it to a long extension cord and have music at your garden barbecue.

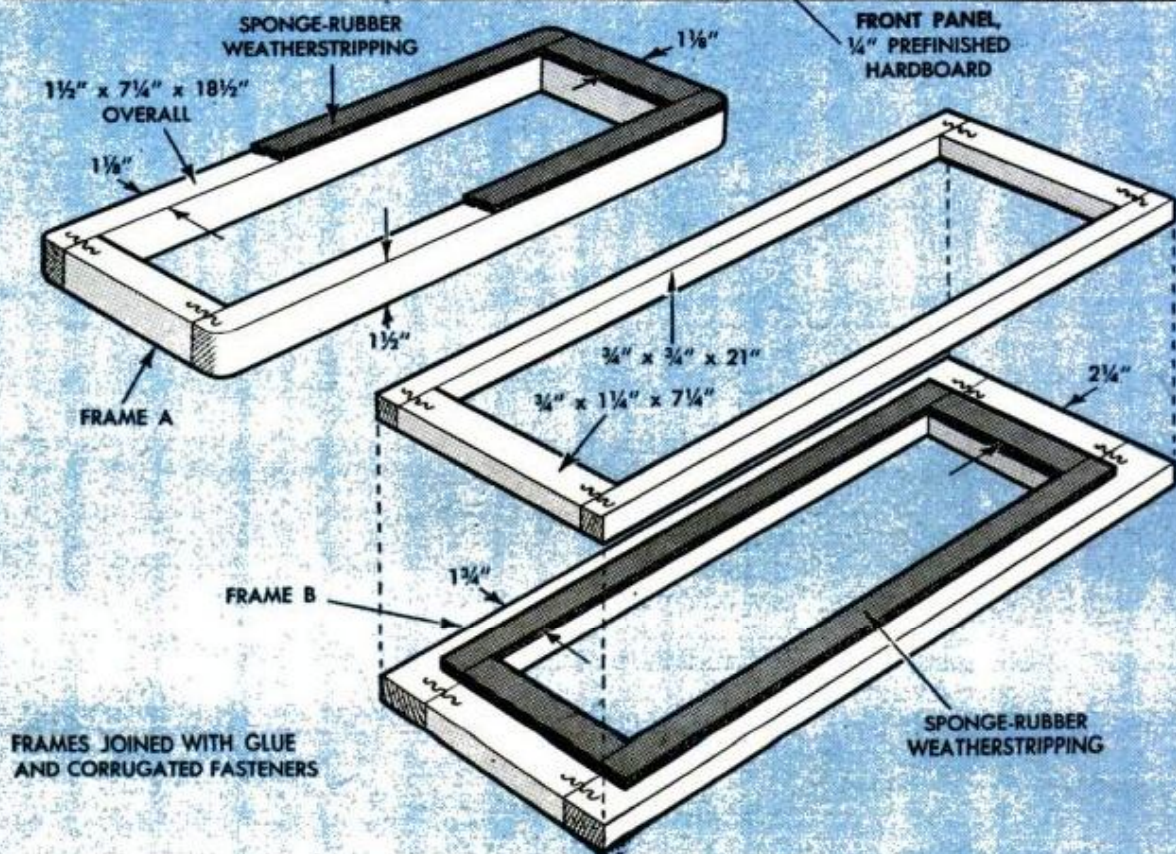
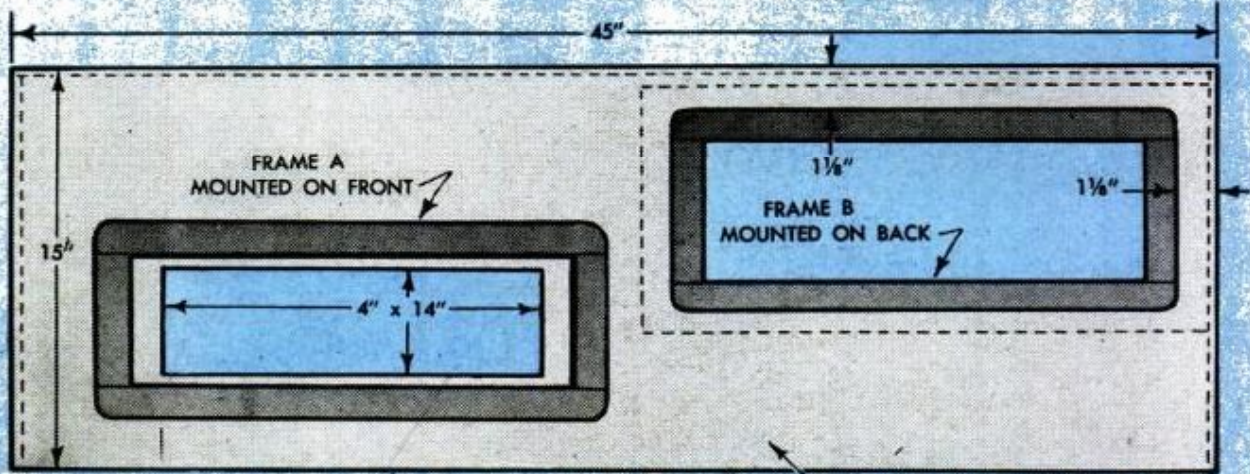
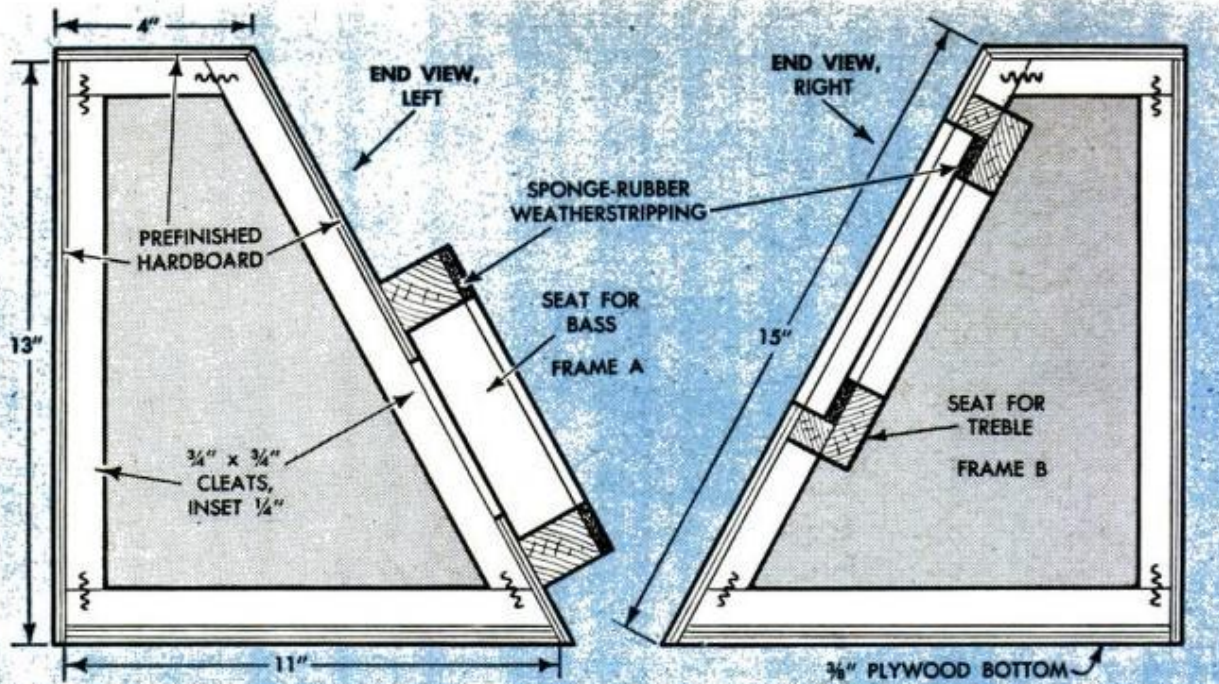
Selecting the Accordion

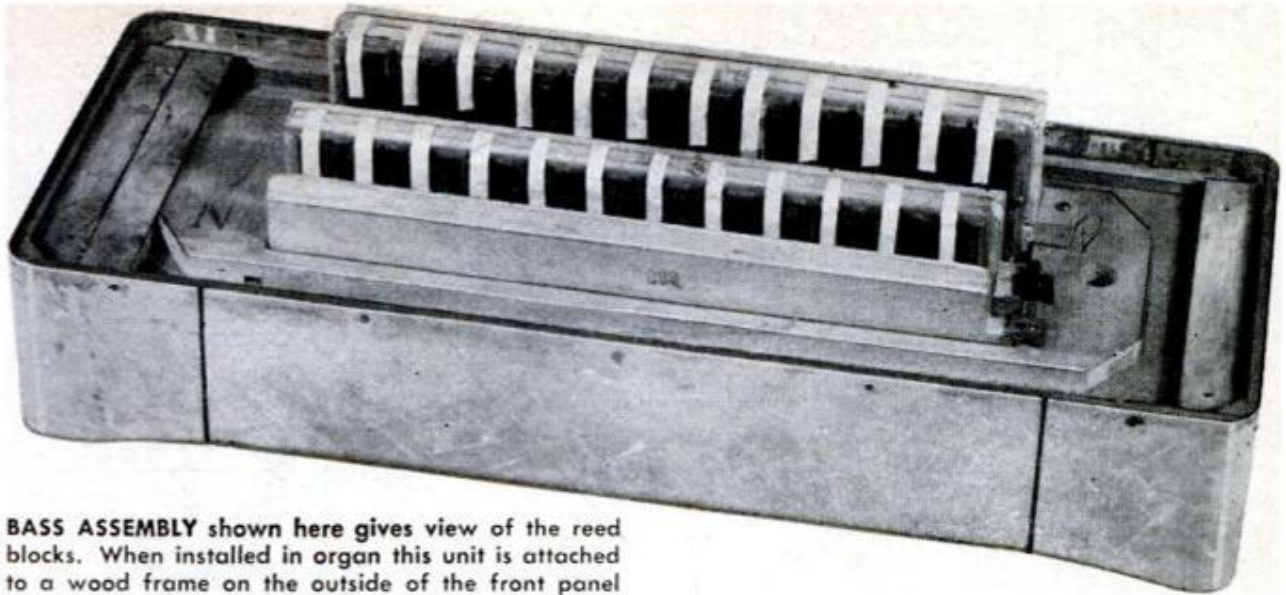
You may have an old accordion or you may want to buy one secondhand for the purpose. No alterations are made that will

prevent changing the instrument back to its original purpose should you desire to do so. Accordions come in a number of sizes and with 12, 48, 80, 120, and 140 bass keys. One having only 12 bass keys is too small. For best performance use a 120 or 140-bass with 41 treble keys and a keyboard not less than 18½ in. long.

Case Construction

As it serves as the air compression chamber the case must be airtight. It can be built of ¾-in. hardwood-faced plywood if you wish to finish it with stain and varnish,





BASS ASSEMBLY shown here gives view of the reed blocks. When installed in organ this unit is attached to a wood frame on the outside of the front panel

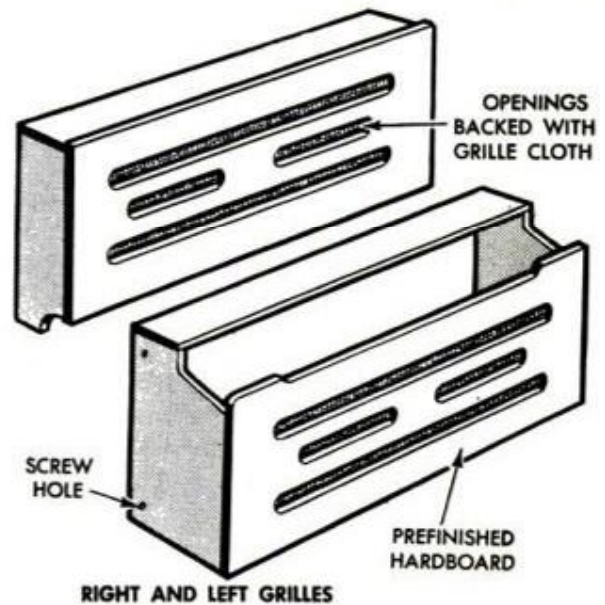
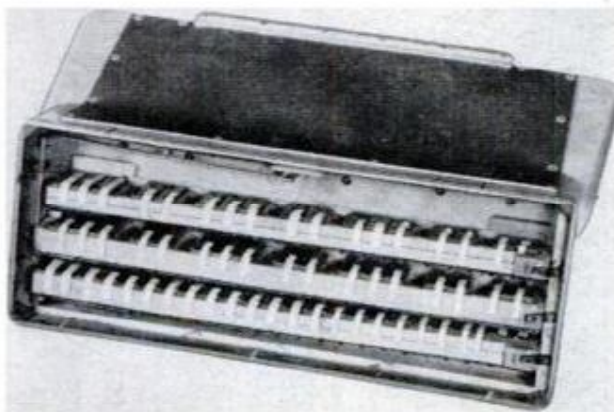
or from 1/4-in. plywood to which plastic laminate is cemented, after the case has been completed. The original case was made of 1/4-in. Marlite, a prefinished, wood-grained wall paneling.

Case dimensions to house the bass and treble assemblies of your accordion may vary a little from those given here, which are for a 120-bass Hohner having a 7 1/4 by 18 1/2-in. body—about as large as 120-bass models are made. For a larger instrument than this you increase the size of the case to suit. For a smaller one, use the case size given here but place the keyboards farther away from the ends.

The angle and width of the front panel, and the width of the top often differ slightly from those shown here because angles at which treble keyboards of accordions join the bodies vary from 60 to 65 deg. To determine the angle for your front panel hold the treble keyboard perfectly level so you can measure the angle of the housing where it will be joined to the panel. After having determined the angle and widths of front

(Continued to page 228)

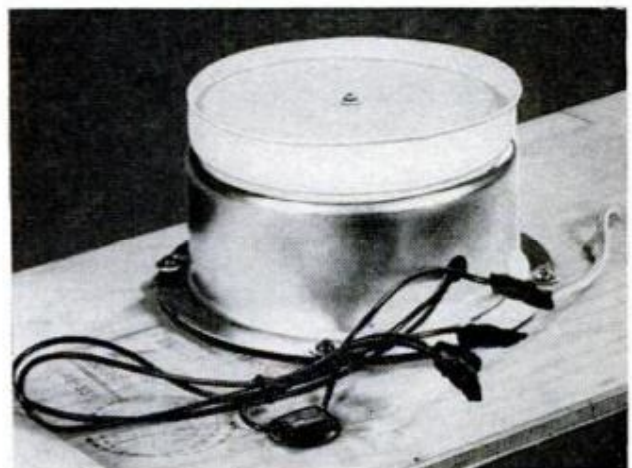
TREBLE ASSEMBLY showing how strips of adhesive tape are used to seal apertures of the suction reeds which are not used but will allow air to escape



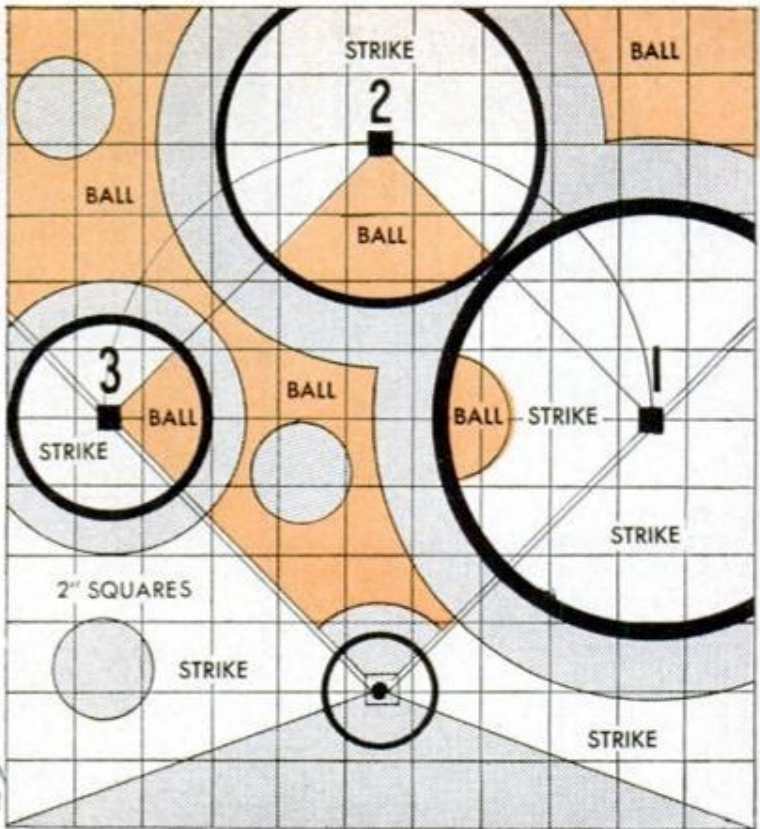
RIGHT AND LEFT GRILLES

GRILLES that cover part of the projecting accordion assemblies were made of prefinished hardboard wall paneling to match the case. Slotted openings which are backed with grille cloth, are neatly cut by first boring holes at the ends of the slots, then sawing from hole to hole with a jig or coping saw

SILENT BLOWER especially designed for organ use draws in air through hole in bottom of the case and provides plenty of air pressure for maximum volume



DART BASEBALL



Here's a game that's sure to make a big hit with baseball fans of all ages. Make the playing board from wallboard, painting in the markings as indicated, and mark a throwing line on the floor 10 ft. from the board. Designed for an even number of players, each "team" throws until three outs are made, and the normal rules of baseball apply. Scoring is as follows:

1. Black areas count as base hits, the number depending on the base (1 for 1st,

2 for 2nd, 3 for 3rd, etc.).

2. Gray areas count as outs.

3. Colored areas count as balls.

4. White areas count as strikes.

5. Darts landing between the double lines running from home plate through first base and from home plate through third base count as foul balls.

6. When dart hits on the line, ruling is always to the player's advantage.

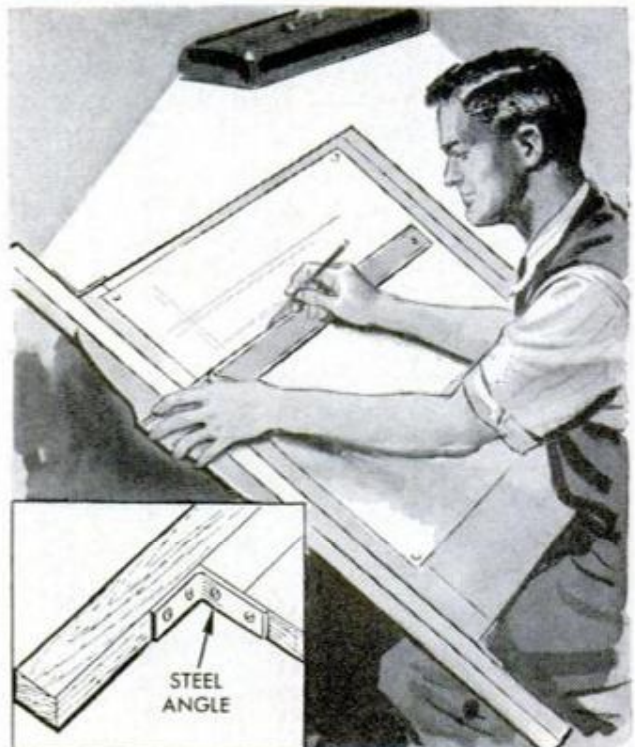
—David Eddy

Longer Reach

You can do more accurate work near the top and bottom of your drawing board if the T-square edge is extended so as to provide full support for the square in all positions. Use a 1-in. strip of wood the thickness of the board and extend it about 4 in. beyond the top and bottom of the board. If you attach it with angle irons, the strip can be taken off simply by removing four screws. Wax the edge of the strip to provide a smooth surface for sliding the T-square.

—Richard Hanscom

Twisting crepe paper to make party decorations is a time-consuming job if done by hand. Next time, do it the easy way. Tie the strip of crepe paper to a hooked wire and chuck the other end of the wire in a hand drill. A few turns of the drill and the crepe paper is twisted, ready to pin in place.—R. M. Woodbury



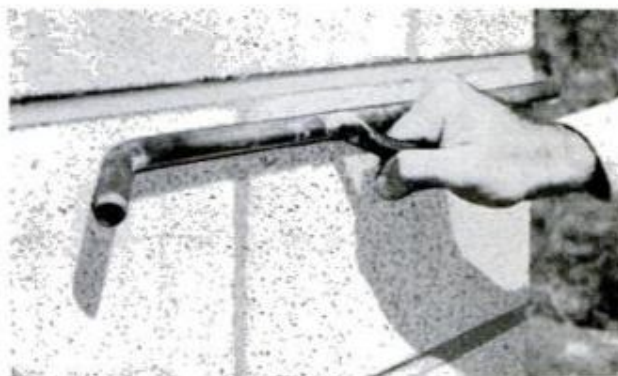
Substitute Cord Clip

A lost clip that keeps a hearing-aid cord from getting in the way or catching on things, can be replaced with a necktie clip. Fasten the cord as shown or run it through the open part between the pivot and teeth before putting the clip on the lapel. Or, you can completely eliminate a clip and conceal more of the cord by providing a buttonhole under the lapel, making it large enough to permit passage of the ear mike.

Squeaky floors usually result from minute rubbing movement between top and subfloor, although either floor may be rubbing on the nails holding it. To cure, drive spirally-fluted floor nails through both floors where squeaking occurs. Set nail heads just below surface, fill holes with wood putty, and sand flush. Flat-head wood screws driven in counterbored holes also do the job. Holes are filled with boat plugs of the same wood as floor to conceal screws.

Concave Mortar Joints

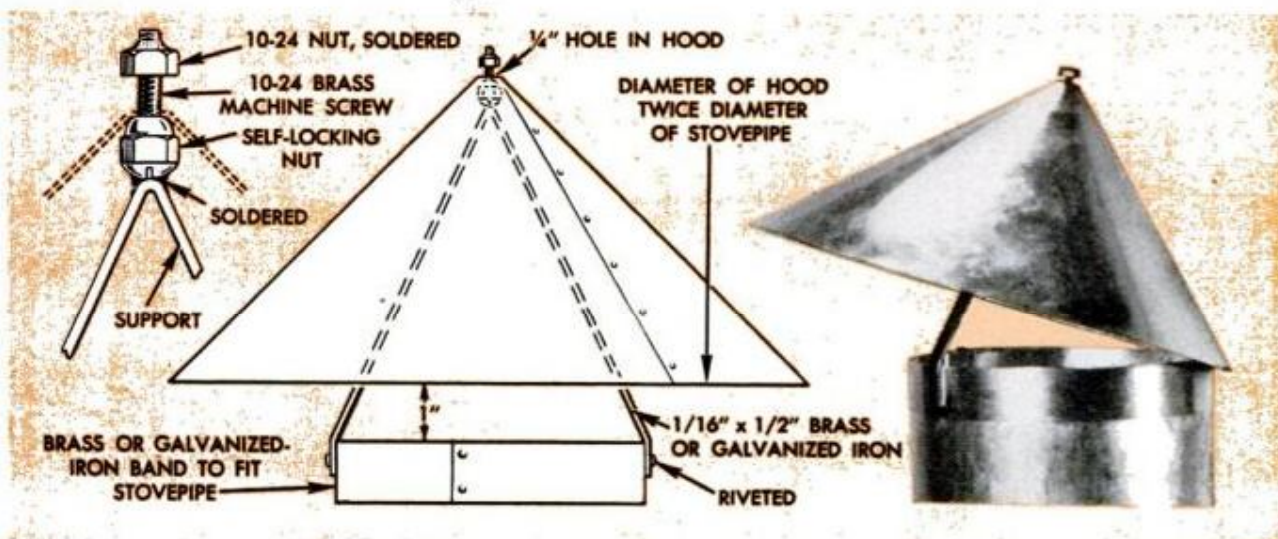
This lightweight jointer for concrete-block and brick work assures concave joints that are smooth, without irregularities often caused by short tools. It consists of a 24-in. length of electrical conduit of a diameter to suit the joint width. Bend one end smoothly at an angle and weld on a metal handle so the tool balances in your hand. Wash the tool clean after each joint is struck.—*Richard Huhta*



Tilting Cap Stops Downdraft in Pipe Flue

Annoying downdrafts in a pipe flue that were previously impossible to stop by many devices tried, ended when this automatic tilting cap was used. A slight wind tilts the pivoted cap, lowering it over one side of the flue to shield it, but leaving the

other side open and actually increasing the draft. The side of the cone slopes at 45 deg. to its base which is twice the diameter of the flue and comes 1 in. above it. Construction details are shown in the drawing below.—*Robert Micals*

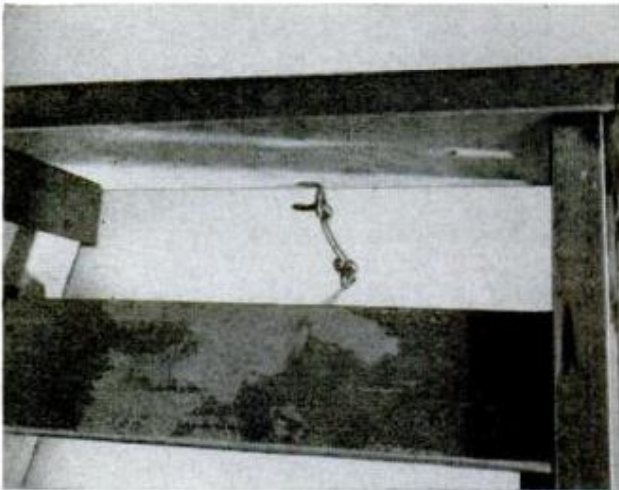
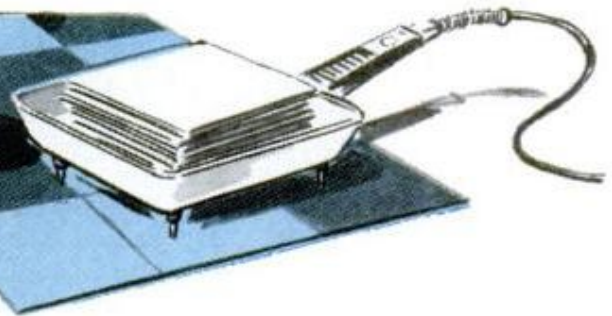


Solving

HOME PROBLEMS

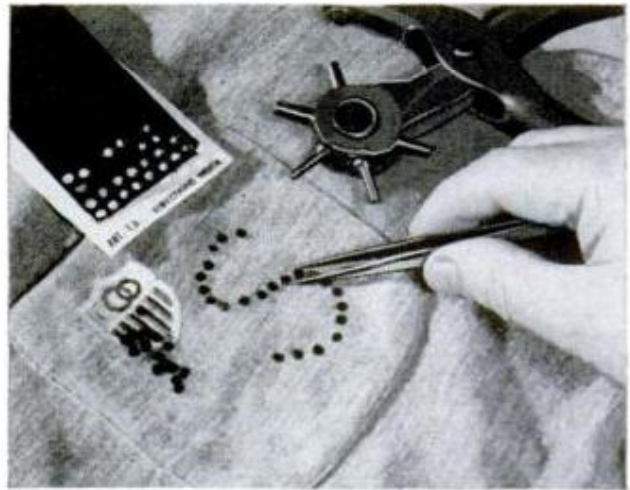


SAVE STEPS when installing asphalt or vinyl tile on a cold floor. Instead of warming tiles in oven to make them pliable, plug in an electric skillet where you're working and set the temperature control to "warm"



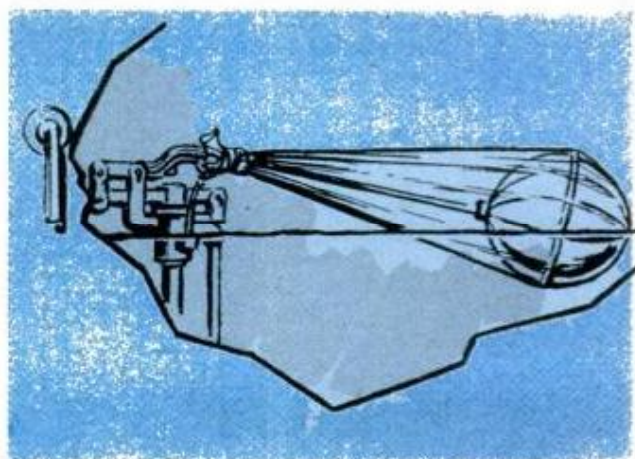
STEPLADDER takes up a lot of floor space when you store it in a leaning position. To hold it flat against the wall, install a screen-door hook on the wall and a screw eye on the underside of the top step

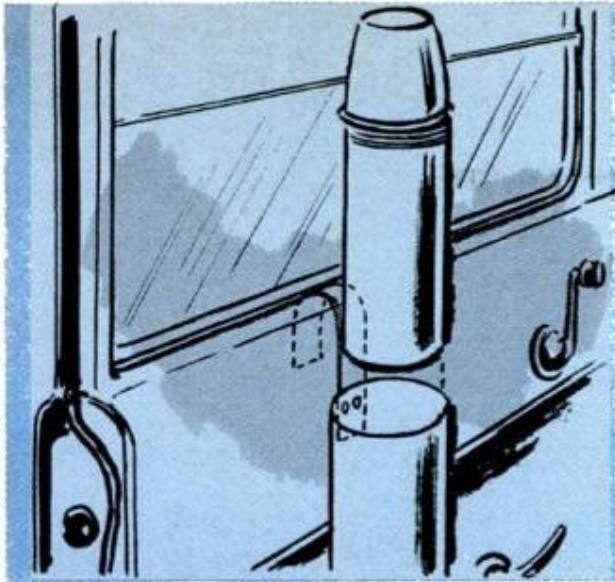
WOOD PUTTY may be tinted to match almost any color work by mixing in small amounts of scrapings from colored blackboard chalk before adding water. Mix it well, or the result will be a marbled effect



ANYONE CAN MONOGRAM shirts, sweaters or blouses by using press-on mending cloth. One novel method is to perforate the cloth with a punch and lay out a dotted initial with the punched-out disks of cloth

EMERGENCY REPAIR for leaky ball float in closet tank permits continued operation until float can be replaced. Empty float, then enclose it in a plastic bag extending up stem and tie end of bag tightly





VACUUM-BOTTLE HOLDER which hangs from the inside of the car door can be made by riveting a strip of light metal to a tin can slightly larger in diameter than the bottle. Bend the end of strip to form a hook



UPHOLSTERY COVERS are often difficult to slip back over foam cushions once you have removed them for cleaning. You'll find that dusting the cushions with talcum powder will make them slide in easier



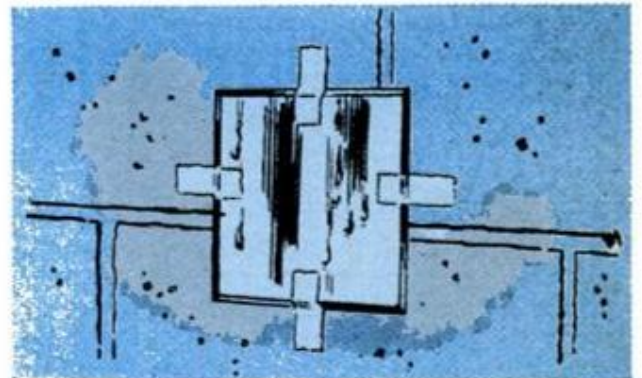
ENLARGED BUTTONHOLE which allows the button to slip out is an annoyance. To repair it, mount a piece of press-on mending tape on the reverse side and make a slit in the tape with a knife or razor blade

EASY WAY TO REMOVE jelly glass from boiling water is to slip a dipper under it and insert a wooden spoon in the top. Use dipper to lift glass out and invert it over the sink to drain, holding with spoon



OCTOBER 1962

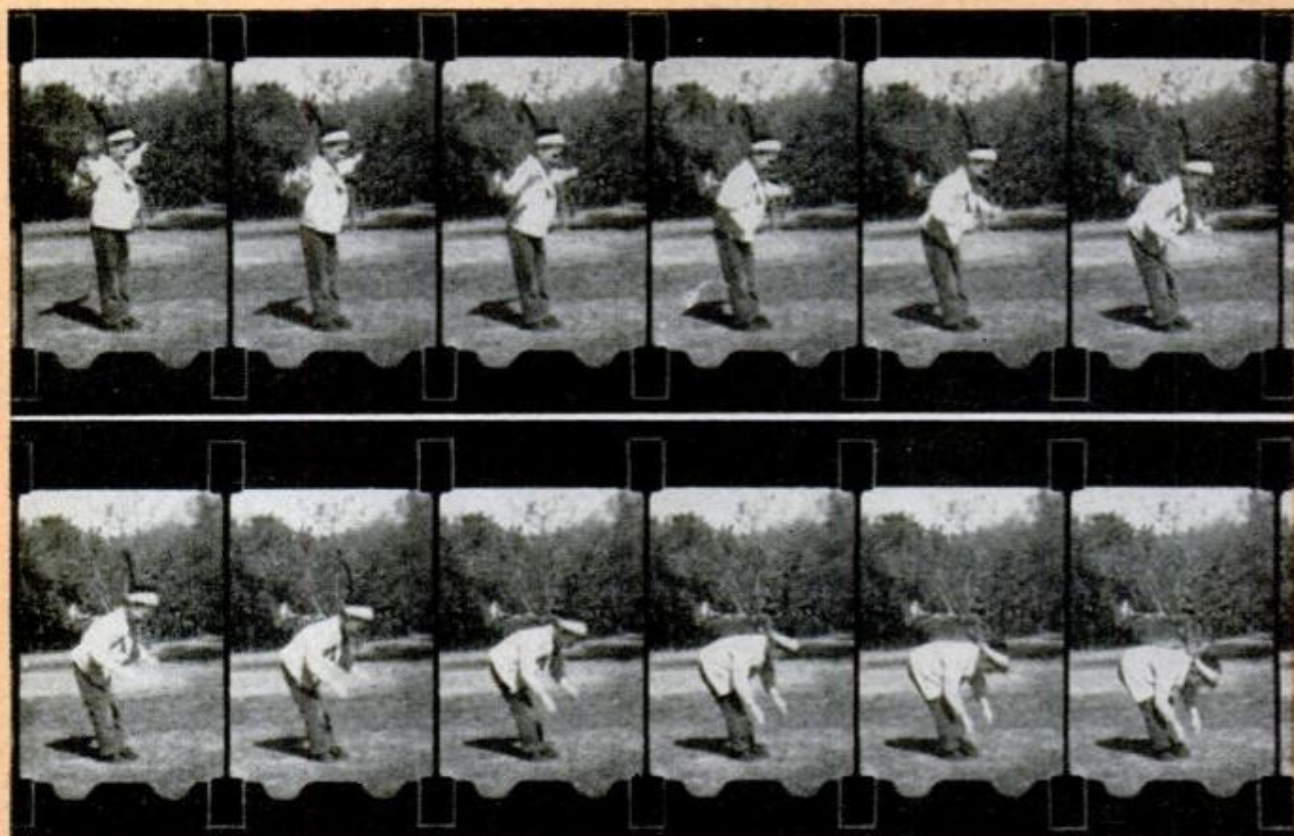
TO DISCOVER whether the moisture in your basement is condensation or seepage, tape a small mirror over a moist zone. If condensation is the problem, the mirror will soon be covered evenly with condensate



WANT AN EXTRA SHELF in your basement without all the bother of installing masonry anchors? For the extra one, make up a pair of U-shaped hangers from 1x2 stock, nail these to the joists to support the shelf



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SEQUENCE of about 18 frames gives approximately one full second of action. Can be viewed anywhere

HOME-MOVIE FUN WITH A ZOETROPE

By Louis Hochman

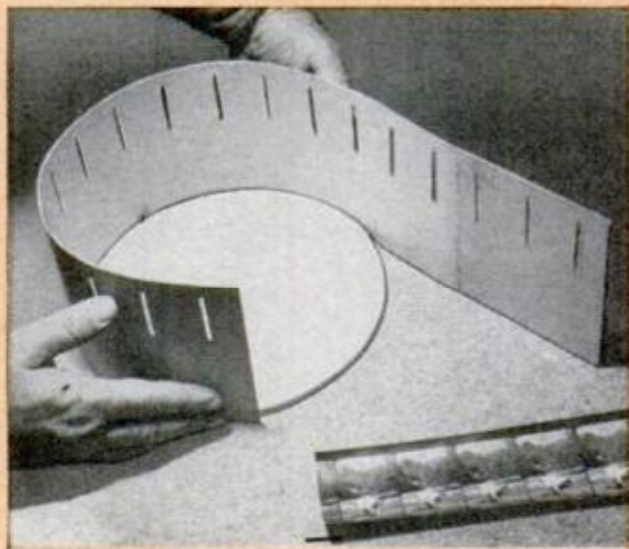
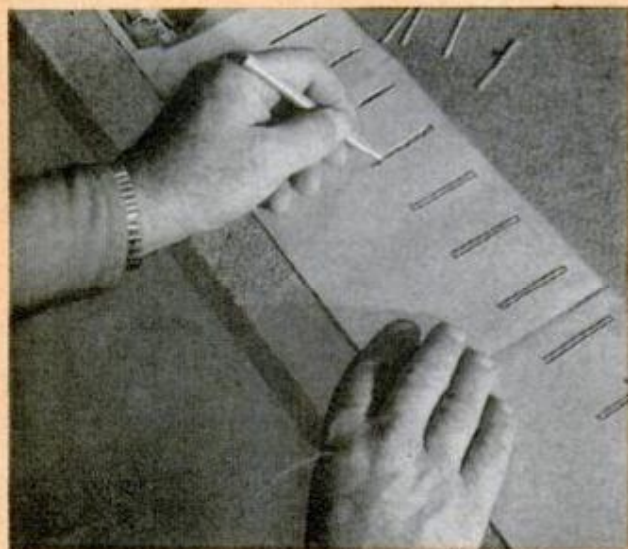
THE OLD-FASHIONED zoetrope which was a forerunner of modern motion pictures, can be updated to provide hours of entertainment for young and old by adapting it to your home-movie activities. Originally, a band of drawings made in the form of an animated cartoon strip was placed inside a drum and below a series of slots, or windows. By spinning the drum, the drawings would come to life in animat-

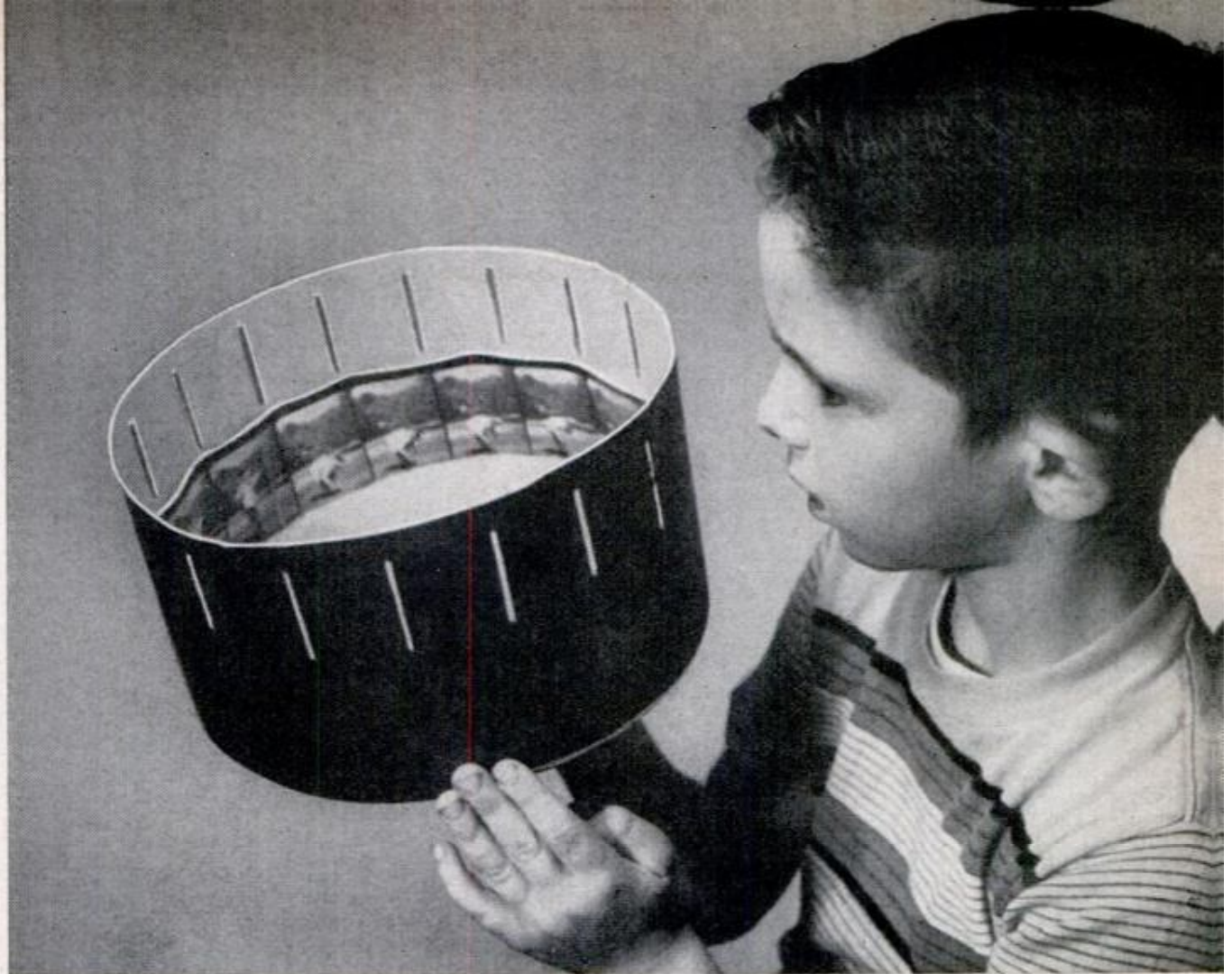
ed action when viewed through the revolving slots. For home-movie fun, you simply shoot special film strips of your friends and family to take the place of the cartoon strip. What's more, you can view these animated strips anywhere without need of projector, screen or darkened room.

The zoetrope shown was made of cardboard wrapped around a plywood disk and fitted with a short dowel handle as detailed.

SLOTS CUT in cardboard strip give the picture strip its animation when the zoetrope is turned by hand

SLOTTED CARDBOARD STRIP is glued to plywood disk with ends meeting in butt joint. Joint is taped



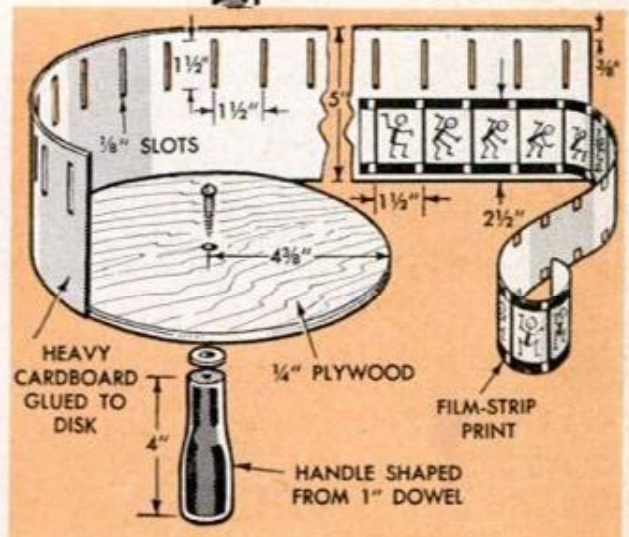
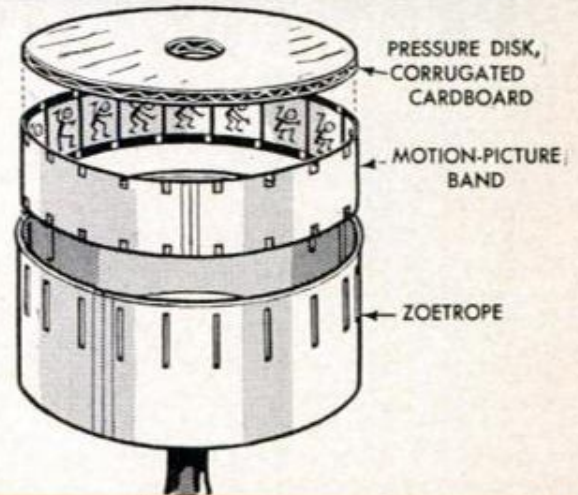
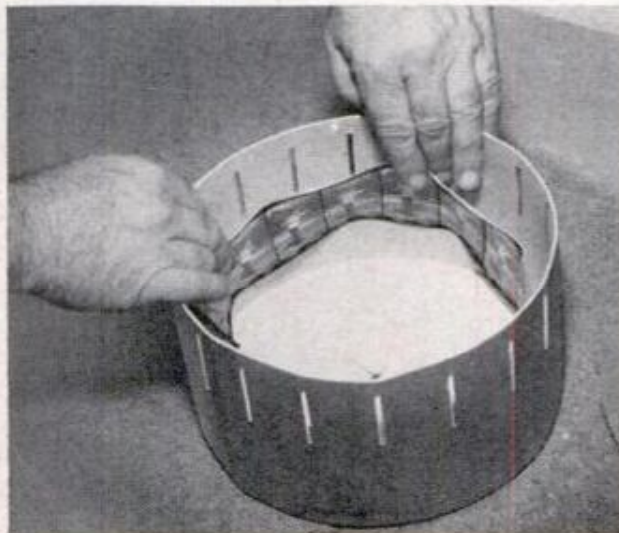


HERE'S HOW zoetrope is operated. Look through slots and rotate unit slowly to get animated picture

It was designed to hold an 18-frame picture strip, or band, which at 16 frames per second, covers a little better than a full second of action. First cut an 8 $\frac{3}{4}$ -in.-dia. circle of $\frac{1}{4}$ -in. plywood and drill a $\frac{1}{8}$ -in. hole through its center. Next, cut a strip of heavy cardboard 27 $\frac{1}{2}$ in. long by 5 in. wide, taping shorter lengths of cardboard to-

(Continued to page 218)

PICTURE STRIP is placed inside and held in position with pressure disk to fit and pressed in place

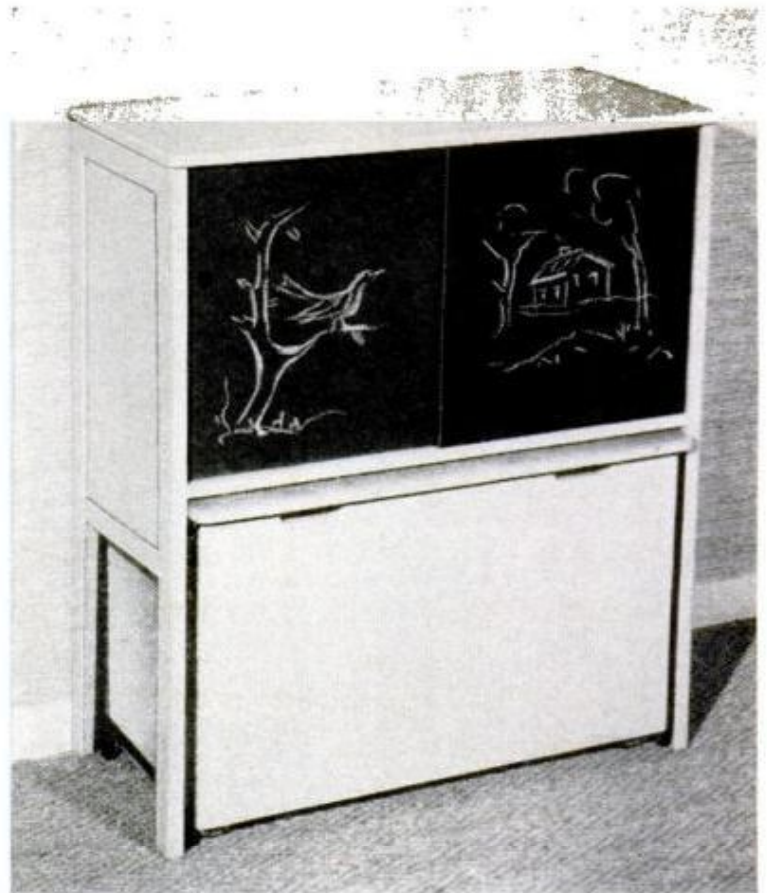


Here are four more pieces of functional play furniture in simplified modern Swedish design which you can build

PART II—Conclusion

Combination Blackboard Cabinet, Toy Bin and Table

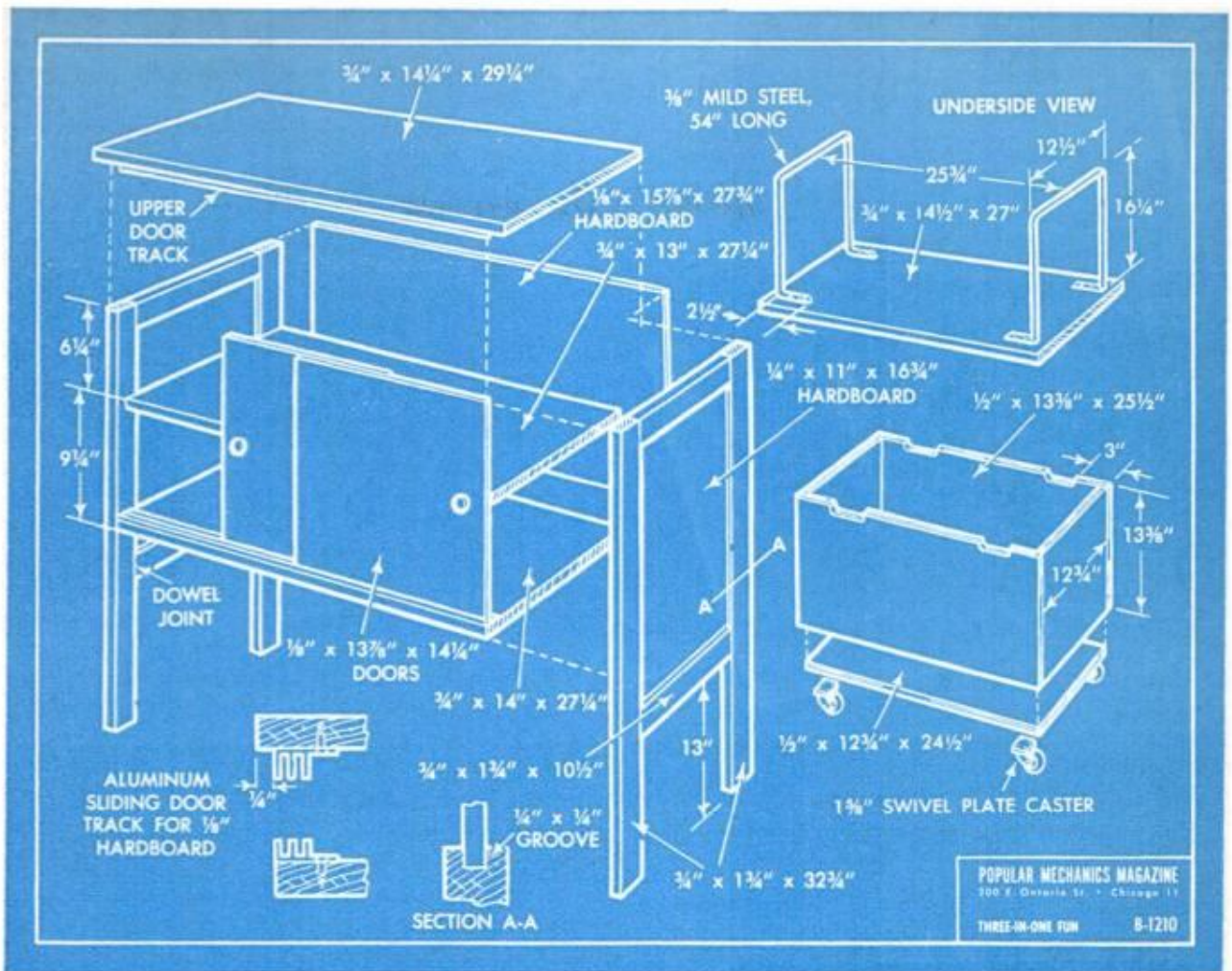
TELESCOPING together to occupy minimum space, the assembly of play furniture pictured on this page consists of three separate pieces. There is a simple cabinet having two sliding blackboard doors and shelf storage space, a metal-leg table, and a toy bin on casters. Tots can either stand up to draw on the blackboards, or they can sit on the table which is only 17 in. high and provides plenty of space for two to sit side by side. Then they have separate but adjoining blackboards, which is conducive to learning to share and cooperate.



PLAY-FURNITURE FROM SWEDEN

Constructional details of these pieces are given in the drawing on the facing page. Ends of the cabinet consist of white-pine frames grooved to take hardboard panels. The side members of the frames extend to form legs. Although a panel thickness of $\frac{1}{4}$ in. is given in the drawing, you can use $\frac{1}{8}$ -in. tempered hardboard. The grooves can be cut with either a dado head on your circular saw or with the saw itself, but the dado head will assure uniformity in the width of all grooves. You can stop the grooves in the leg members at the position of the lower crosspieces, finishing the grooves by hand with a chisel, or you can run the grooves the full length of the leg members and fill the lower portions with strips of contrasting wood. The crosspieces have tongues that fit the grooves in the leg members. The cabinet ends are assembled with waterproof glue and are clamped overnight, after checking for squareness. Joints may be reinforced with dowels also if you wish.

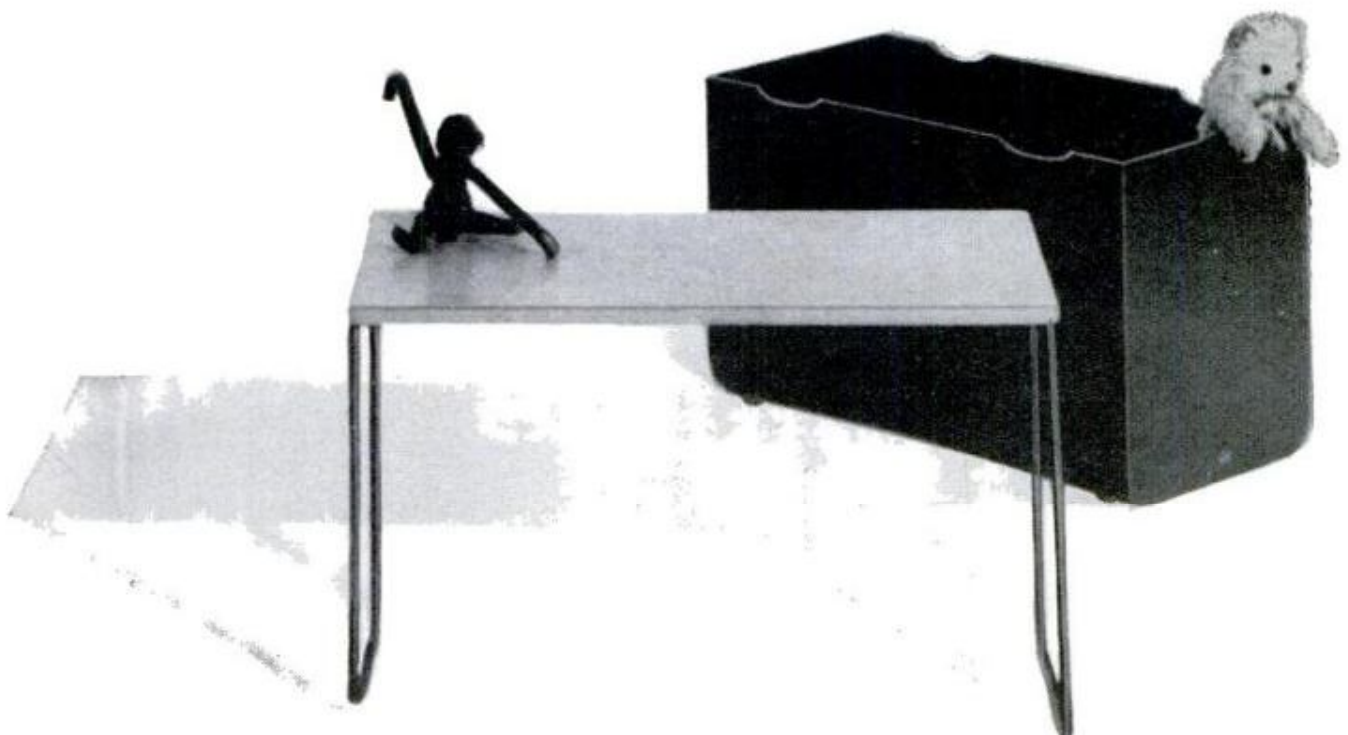




Pieces of stock are built up to the proper widths for the top, bottom, shelf, and back by doweling and edge-gluing. The 1/8-in. blackboards (painted hardboard) are fitted in aluminum tracks attached to the top and bottom. After assembling the ends, bottom, and shelf, you attach the back and top.

Using glue and 8 or 10d. finishing nails at joints will provide sufficient strength for ordinary service, but increased holding power is obtained by using flat-head wood screws in counterbored holes, concealed with boat plugs or screw-hole buttons.

Ends and sides of the bin fit over the





PONY HEADS with dowel "ears" for handholds lend realism to teeter board that pivots 9 in. above floor

bottom and may be joined in the same way as the corresponding edges of the Horse Cart shown in Part I. Rubber or plastic casters do not leave any traces of rust on carpeting during humid weather as steel casters do. Notches at the top edges of both sides serve as hand grips to pull the bin out from under the cabinet.

Like other pieces of this type of furni-

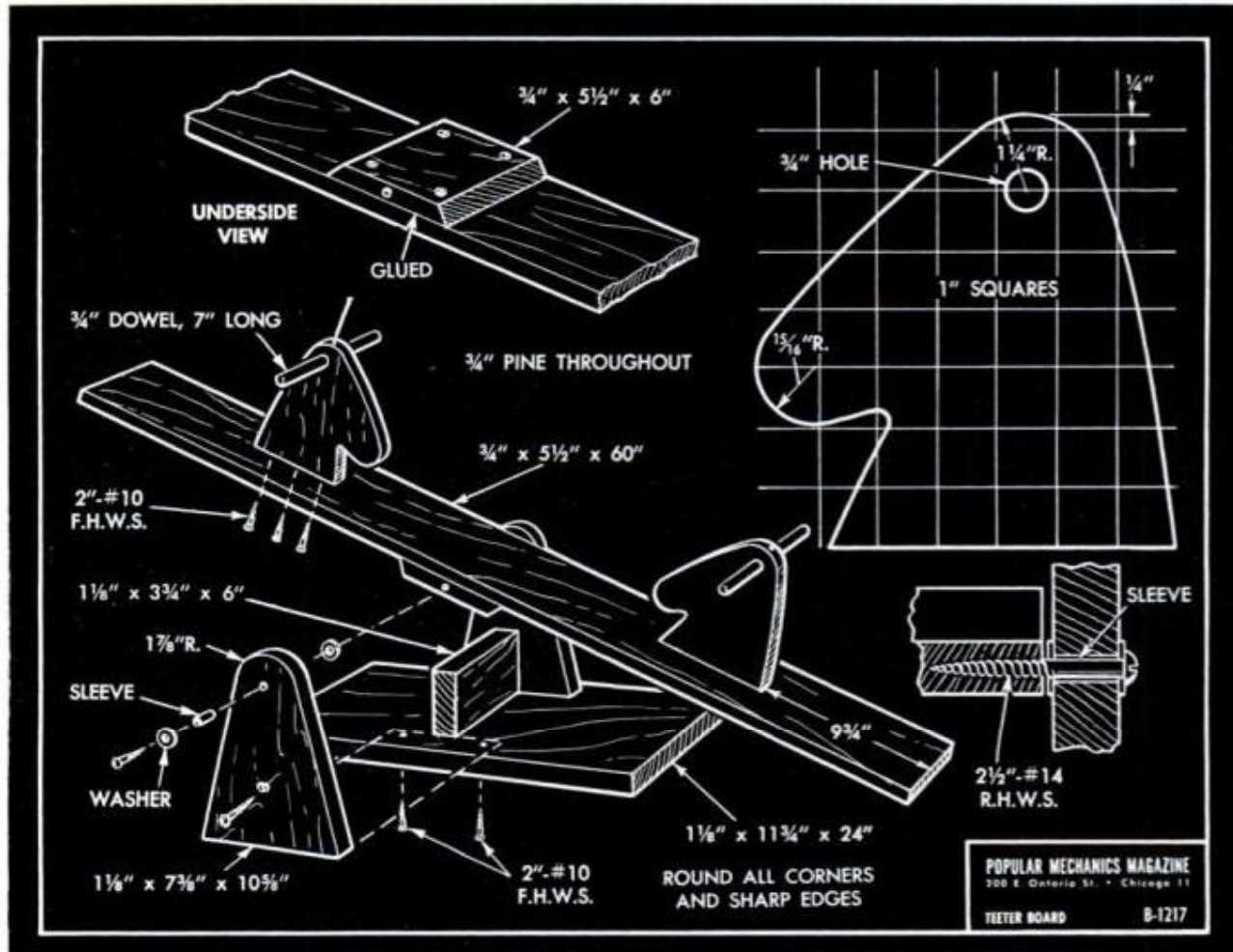
ture, edges should be "softened" by sanding as explained in Part I. Cabinet and table top are oil-finished but the bin and table legs are finished with a nontoxic enamel of a color that matches or complements the color scheme of the room.

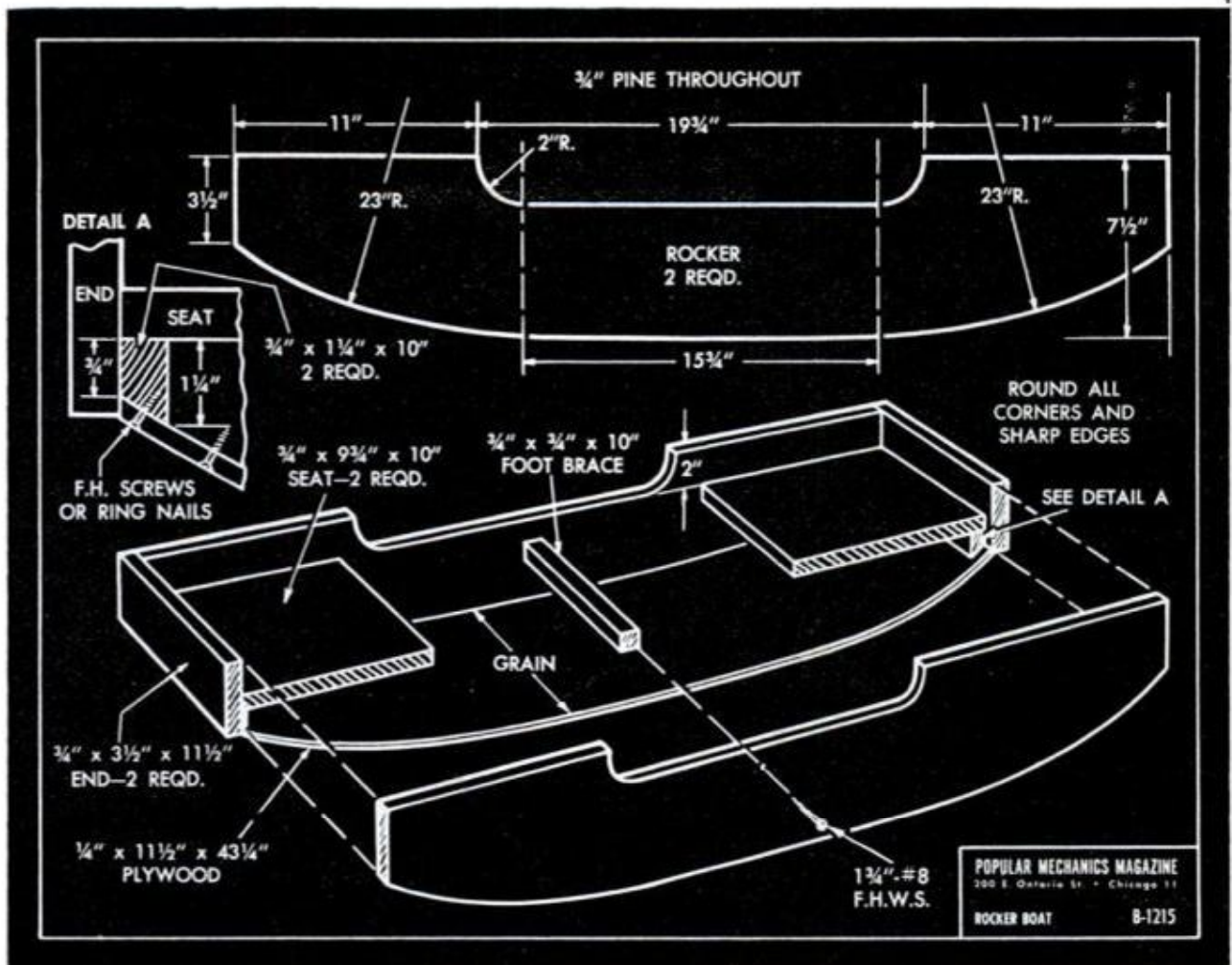
Teeter Board

Tots just love to go for a pony ride on this teeter that daddy can make in an evening or two. Flat-head wood screws for assembling give the required holding power. The screw holes that show may be counterbored slightly so you can hide screw heads as already described. There's practically no risk of injury from splinters if you sand the wood surfaces and carefully round edges and sharp corners before applying the oil finish. For small tots, two screws that serve as a pivot assure sufficient strength. For a stronger pivot use a carriage bolt that passes entirely through the cleat—or, you can use two cleats spaced to accommodate the bolt between them.

Rocker Boat

Sides, seats and ends of the Rocker Boat are made of $\frac{3}{4}$ -in. white pine, but the bottom is a piece of $\frac{1}{4}$ -in. plywood or $\frac{1}{8}$ -in. tempered hardboard. The bottom is attached to the sides and to cleats on the ends





with flat-head screws or ring nails. All constructional details are shown in the drawing. As the width is only 11½ in., the riders can hold onto both sides for support. An alternate handhold may consist of a U-shaped metal rod, inverted and attached to the sides with two screws at each end of the rod.

Table House

Whether it's a circus arena, rodeo, a bandstand, theater stage, or an Eskimo igloo, an imaginative youngster can form almost anything with this Table House and attached folding screens. The table ends and the screens are framed panels of identical size. The frames are mitered at corners and are grooved to take hardboard panels which then are covered with self-adhering sheet plastic of various bright colors. The table top is ½-in. plywood to make it lightweight. Rigidity is obtained by gluing and nailing cleats along the edges. Then the table ends are screwed to the top. Note that the oval-head wood screws which are used to fasten the ends to the top are fitted with bright cup washers. For extra strength chair braces are used as shown in the drawing. Flat steel links at the corners of the screens form hinges. The screws holding them are left a little loose, which

ROCKER BOAT for tiny tots has action with safety, is simple to build, has plywood or hardboard bottom



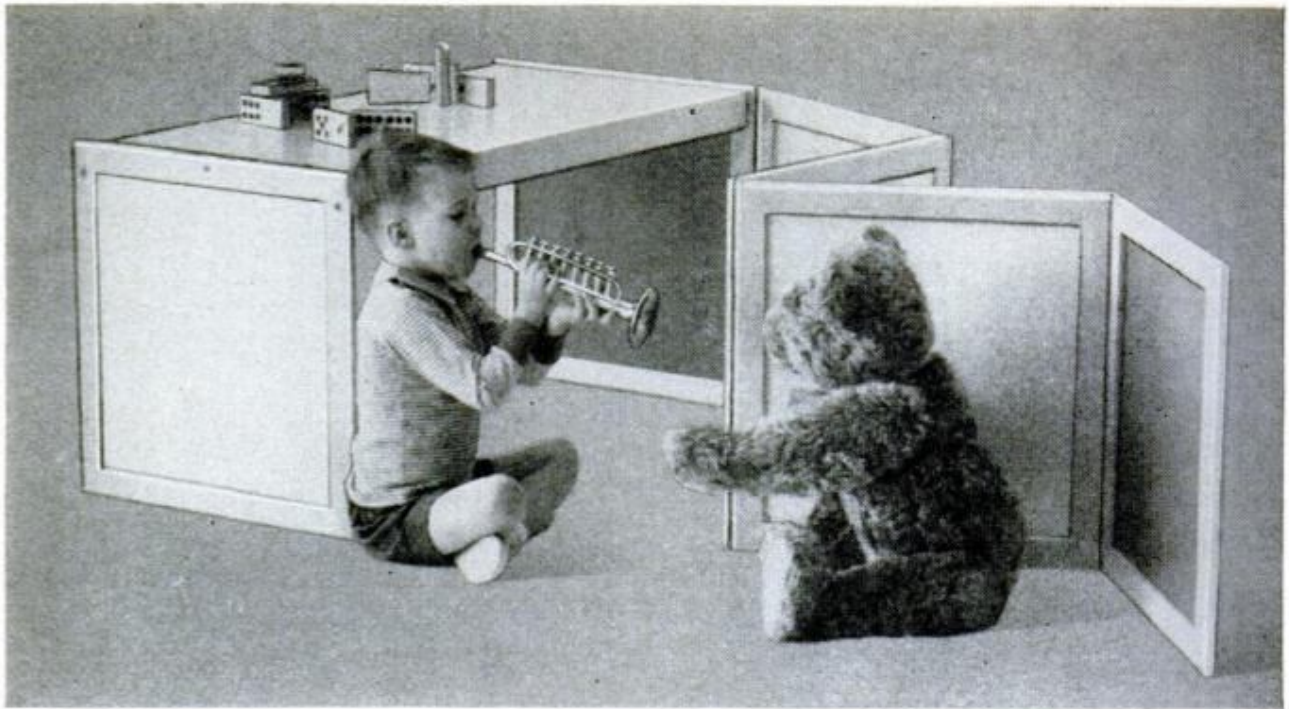
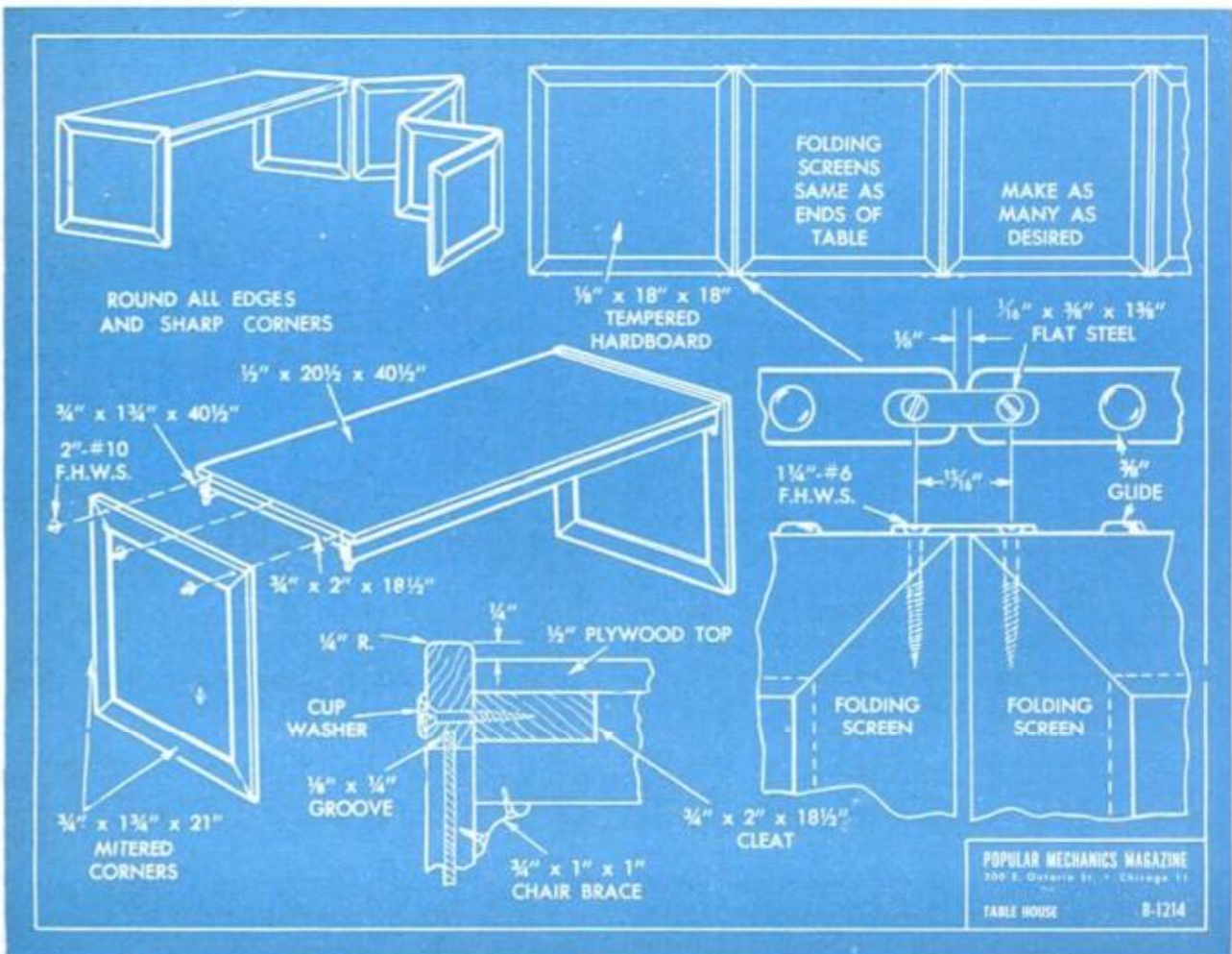


TABLE HOUSE with colored screens makes almost anything from circus arena with performing bear to an igloo

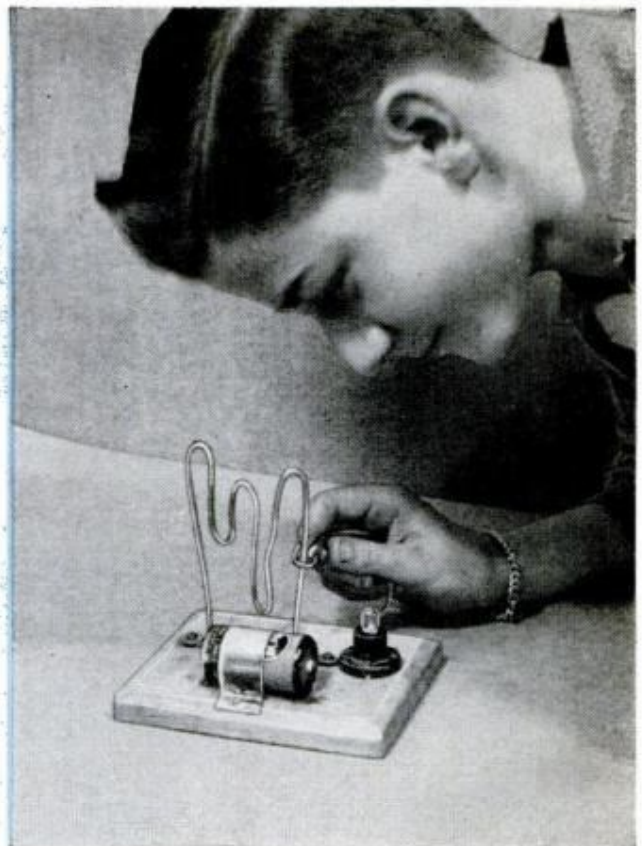
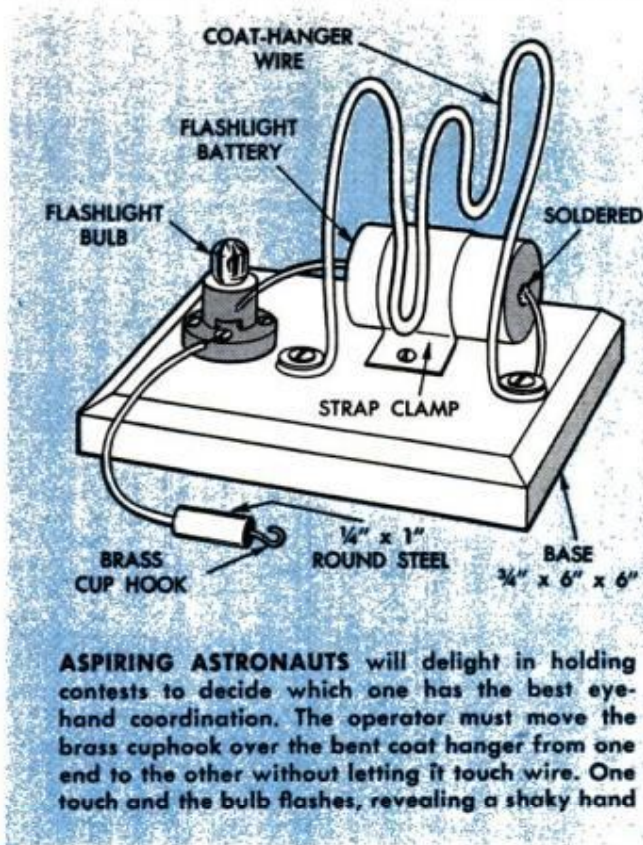
permits moving the screens at any angle or folding them together when not in use. Plastic furniture glides on the bottom edges of the screens and table will prevent the hinges from scratching wood or tile floors. Finish the exposed wood parts natural. ★ ★ ★

PLANS AVAILABLE

Large 17 x 22-in. blueprints detailing construction of each of these nine pieces are available at 50 cents each. Simply address Blueprint Department, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, giving the plan number of each blueprint desired.



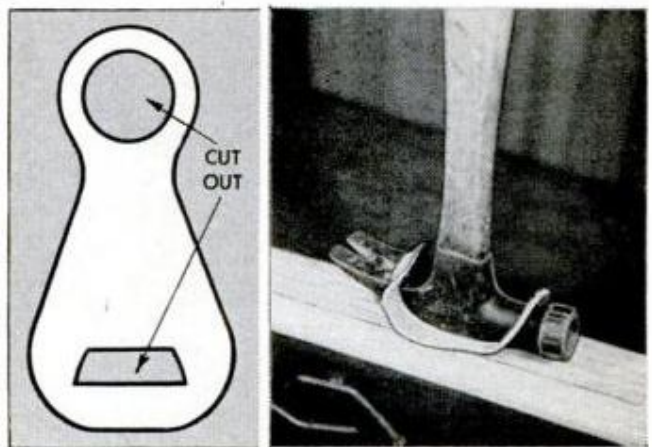
Nerves of Steel? Coordinate With This Electric Tester



Hammer-Head Shoe Protects Surface

Common practice in pulling nails from molding or other finished stock you plan to reuse is to protect the surface of the work from dents with a wood block placed under the hammer head. However, if you have a lot of nails to pull, it will pay you to pad the hammer head with a slip-on, non-marring shoe of soft, heavy leather. The job will go twice as fast without having to bother with a block. Simply make a pattern to fit your hammer, following the general outline pictured at the right, and cut the protective shoe from an old leather pocket-book, camera case or shoe.

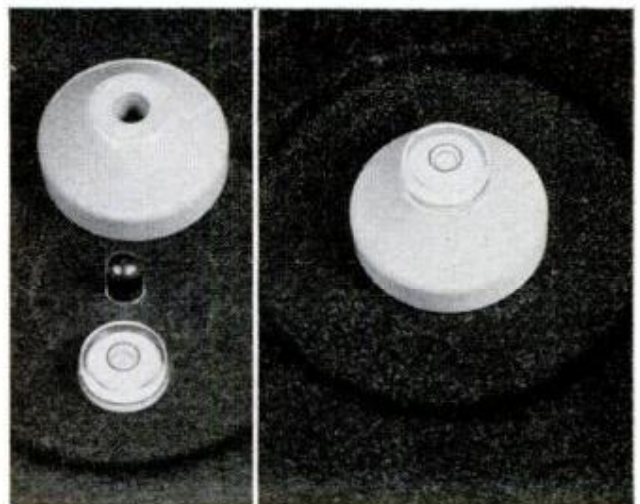
—Arthur R. Tanner, Jr.



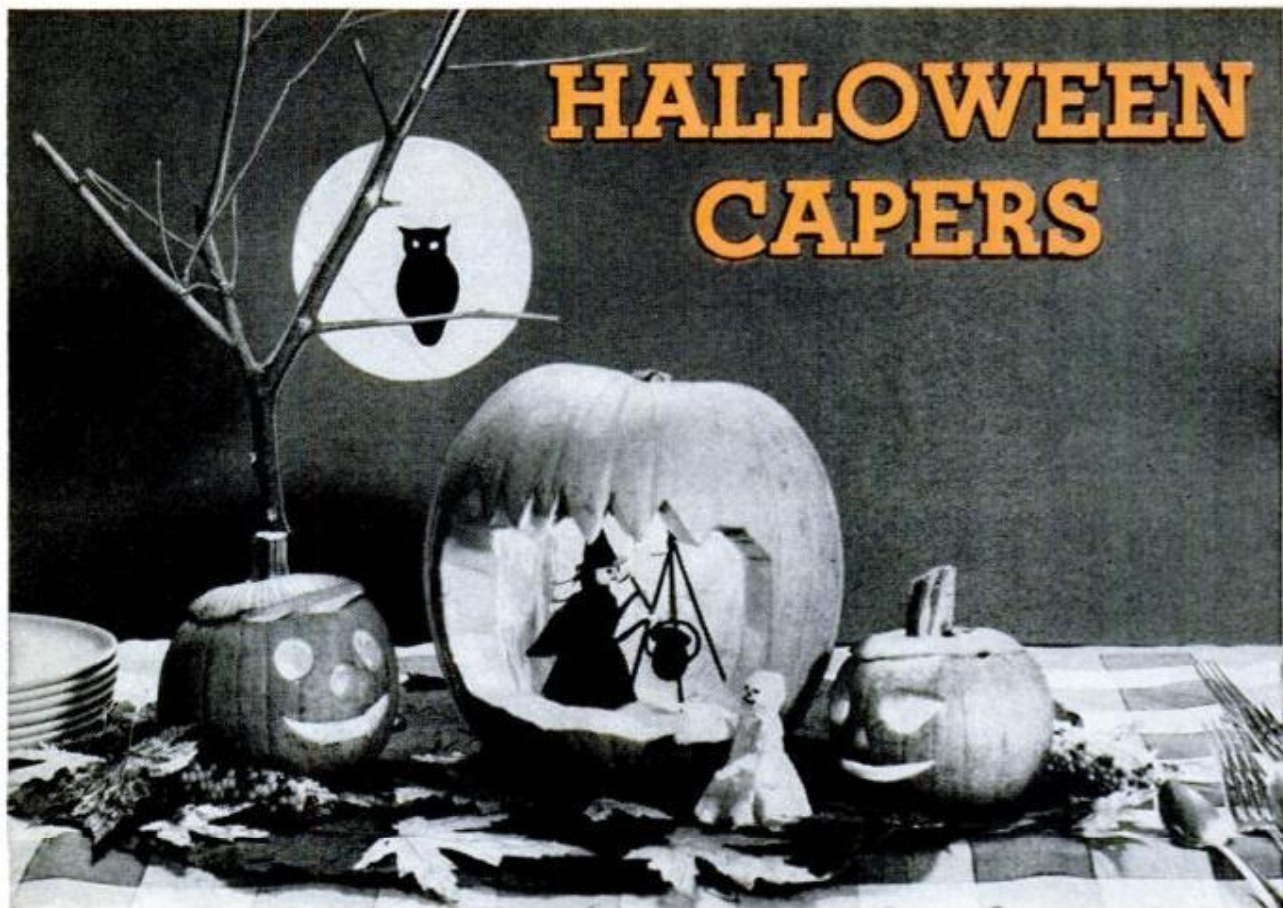
Leveling Phono Turntable

A level turntable is a must when playing hi-fi and stereo records and a convenient way for holding a level for checking it is to cement a button level to the top of a standard plastic cone center which is sold in music stores for centering 45-r.p.m. records. When pressed down over the turntable spindle, the cone-supported level will permit you to level the table dynamically while it is rotating. In playing 45s, of course, you can leave the center, level and all, right on the spindle where it will always be handy and won't be misplaced.

—Art Trauffer



HALLOWEEN CAPERS



1. WITCH'S DEN is an appropriate table decoration that helps stimulate the atmosphere of fun and gaiety

By Willard and Elma Waltner

NEW LOOKS AND ANIMATION in jack-o-lanterns for table, window and porch displays can lend a touch of distinction to your Halloween party this year. Or, you may just want to please the kiddies with something different. New, decorative

effects are the Witch's Den, a table-top display, the all-vegetable face of Personality Pete, and the deep-etched features of Jolly Farmer Brown. Animation is furnished by Jack the Winker. For illumination, 7-watt night lamps in outdoor Christmas-tree



4. ONION EYEBALLS with raisin inserts for pupils are pierced with toothpicks which are pressed into lower eye sockets. Teeth are white beans



5. PINNED-ON EARS are sections of green pepper which are fastened to sides of the head with toothpicks. Latter are easily inserted in holes punched with darning needle



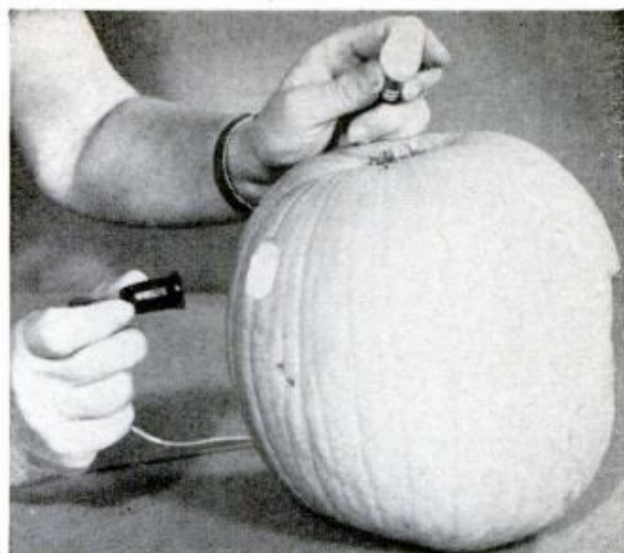
6. CROOKED CARROT NOSE lends a touch of humor to "Personality Pete." End of carrot is trimmed to fit snugly into a hole punched in wall with apple corer



2. CREPE-PAPER DRESS hides witch's framework of pipe cleaners. Tripod also consists of pipe cleaners wrapped with crepe paper. Here is a wooden bead

sockets are handy to use. The sockets can be passed through holes cut in pumpkin walls with an apple corer.

The Witch's Den, Fig. 1, makes an arresting decoration on a buffet table. A big pumpkin is needed for this. The jagged cavern opening shows the witch stirring her brew in the cauldron. The long, crepe-paper skirt conceals her skeleton and three legs made from pipe-stem cleaners as shown in Fig. 2. A wooden bead forms the head. The tripod is made either from tiny twigs or from pipe cleaners wrapped with crepe paper, and are lashed together at the top. The kettle is crepe paper shaped on a wooden bead. You can also make a ghost, using a similar skeleton and a cotton-wad



3. CHRISTMAS-LIGHT SOCKET is pushed into a hole punched through the pumpkin wall with an apple corer. Small night light screws into socket from inside

PUMPKIN CARVING PATTERNS



8. WAILING GOBLINS are some of the unusual effects you can produce by distorting mouth and eyes



7. BUTTERNUT SQUASH provides a tam or toupee. Bottom is trimmed to fit on head. Hole that fits on pumpkin stem holds squash firmly. Completed job is shown at the right





9. OUTLINING FEATURES with a wax crayon or with quick-drying ink is first step for "sculpturing." Use big pumpkin having wall no less than 1 in. thick



10. FACE CONTOURS are carved in bold relief. The skin of the pumpkin is removed from the entire face area which is best done as you proceed with carving

head. Robe it in white cleansing tissue, draping it over the head and tying around the neck. Paint on the features. The cavern has a small light just under its ceiling and near the back. Fig. 3 shows the lamp socket that is inserted through a hole in the back wall. It is nestled in the hole.

Flanking the Witch's Den are two small, grinning urchins, also lighted. The bare "tree" is a small branch that can be set in a plaster-of-paris base. The large harvest moon with the silhouetted owl is glued to the rear part of the tree. The assembly then is arranged on a piece of crumpled brown crepe paper on which autumn leaves and colored popcorn are scattered.

Personality Pete, Figs. 4 to 7, has distin-

guishing features to give character—pearly teeth of white beans, a carrot nose, onion eyeballs with raisin pupils, green peppers for ears, and an acorn-squash hat. If you want some highly accentuated features follow the patterns in Fig. 8.

Jolly Farmer Brown, Figs. 9 to 12, challenges your skill at sculpturing pumpkins. For this caricature you need a large pumpkin with a wall not less than 1 in. thick. After sketching the features with a crayon or felt-tipped, quick-drying ink dispenser, you carve the features rather deeply as you would when whittling wood or carving soap, in order to get a good three-dimensional effect. Peel off all of the outer hard skin for the face after outlining it. A thick-

13. JACK THE WINKER, shown completed at the left, is set on a window sill and contributes to the fun of the occasion by incessant winking at passers-by

14. WINKING EYE has 10-watt lamp in standard-size socket fitted into the side of small tin can. End of can is pressed into "flesh" surrounding eye slit





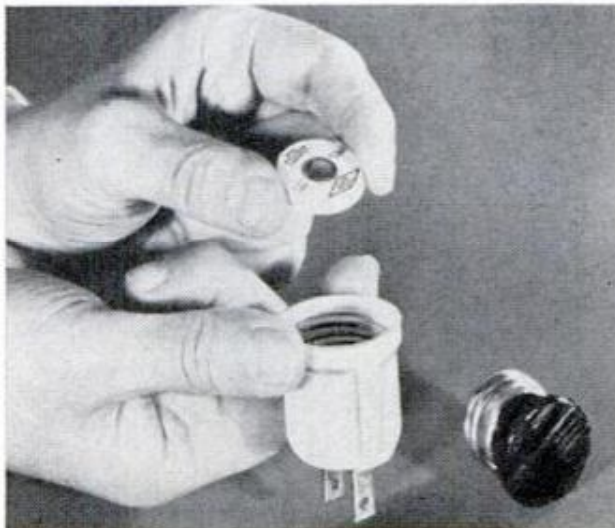
11. ACCENTUATE the sharply carved features more with water colors or tempera, which will adhere to the "flesh" after setting the pumpkin aside to dry

walled pumpkin gives you plenty of leeway in sculpturing. When finished, set the pumpkin aside to dry until there are no more drops of water on the surface. Then you can apply water colors or tempera to accentuate the features. Finish the job by adding a straw hat and corn-cob pipe, and of course include a lamp.

Jack the Winker, Figs. 13 to 15, will intrigue everybody as he sits in the window and winks at passers-by. One of his eyes is round, the other is a narrow slanting slit. Inside there are two lamps. One lights up the nonwinking eye continuously. The other is a round 10-watt lamp installed through the side of a small can as in Fig. 14. The edge of the can is pushed into the flesh of the pumpkin inside of the head so it comes behind the winking eye. The light of the first lamp cannot be seen through the winking one, which intensifies the winking effect.

A 60-watt Christmas-light flasher of the

15. DROP-IN FLASHER such as used for Christmas-tree lights, is placed in the socket after which the plug of the cord for the winking eye is screwed in snugly



12. STRAW HAT AND PIPE are the finishing touches on the caricature of Jolly Farmer Brown that make him just as colorful in daytime as he is at night

drop-in type is placed in a standard lamp socket to which the winking-eye line is plugged. Fig. 15 shows the flasher, socket and plug. The latter screws down on the flasher unit firmly. Winking starts when the flasher warms up.

Fig. 16 shows "skin carving" of a pumpkin. Instead of cutting entirely through the wall to form features, you make outline cuts about $\frac{1}{8}$ in. deep and then strip off the outer skin between the cuts. When illuminated, the features then will show up distinctly. Also, they are illuminated more uniformly than features consisting of open holes cut entirely through the wall. ★★★

16. "SKIN CARVING" consists of outlining features with shallow cuts to permit peeling off skin between them; results in uniform illumination of features





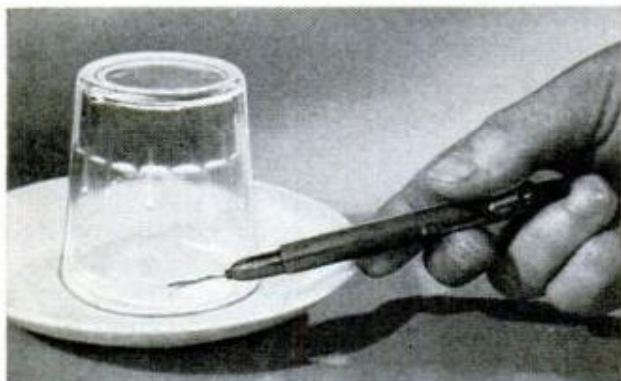
KEEP THESE IN MIND

Rodent Guard

You can prevent rats and other rodents from slipping in through the ventilating tiles in the foundations of outbuildings by simply inserting eavestrough strainers in the tiles. These strainers are made of heavy wire and come in various sizes. Select a size that fits snugly in the tile, and it will provide an effective barrier to rats and even mice.—*G. E. Hendrickson*

When repairing cracks in plastered walls, do you find that the patching plaster begins to harden before you finish? Next time, mix your patching plaster with full-strength white vinegar instead of water and it will extend the drying time.

—*R. N. Bauman*



Weather Eye

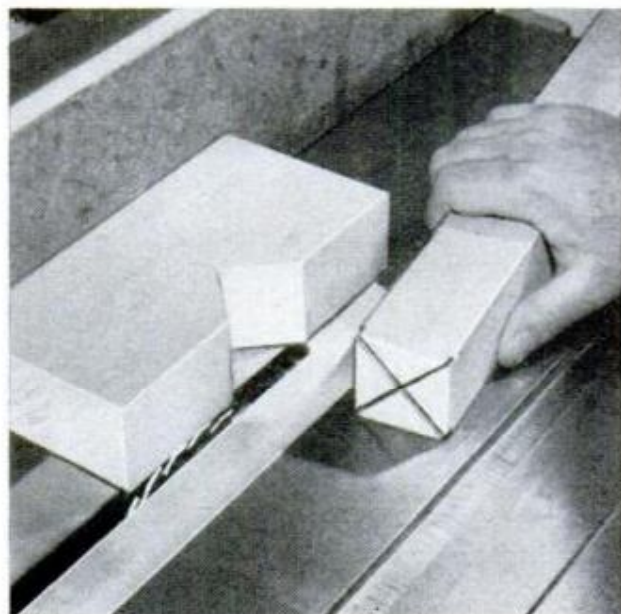
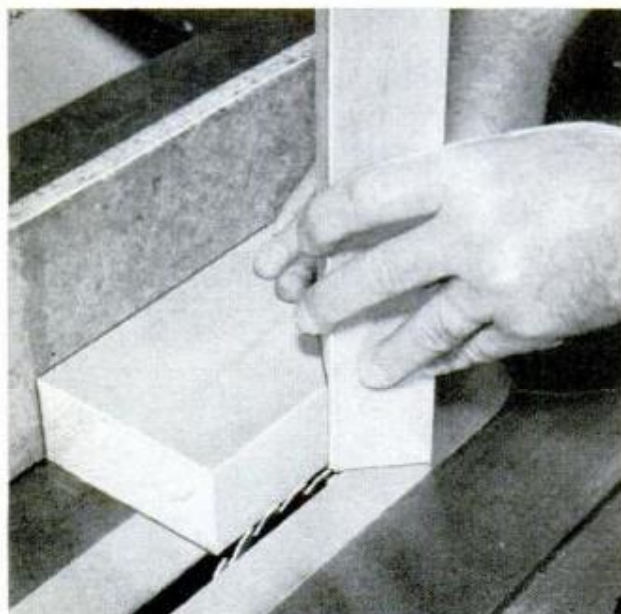
In less than a minute you can make a barometer which will forecast the weather a day in advance. Pour about 2 oz. of mineral oil (crankcase oil) into a small drinking glass, cover the glass with a saucer and invert the two. Then, using a grease pencil, mark the present oil level on the glass. An increase in atmospheric pressure, indicating fair weather, will tend to force the oil in the glass to a level above the mark.

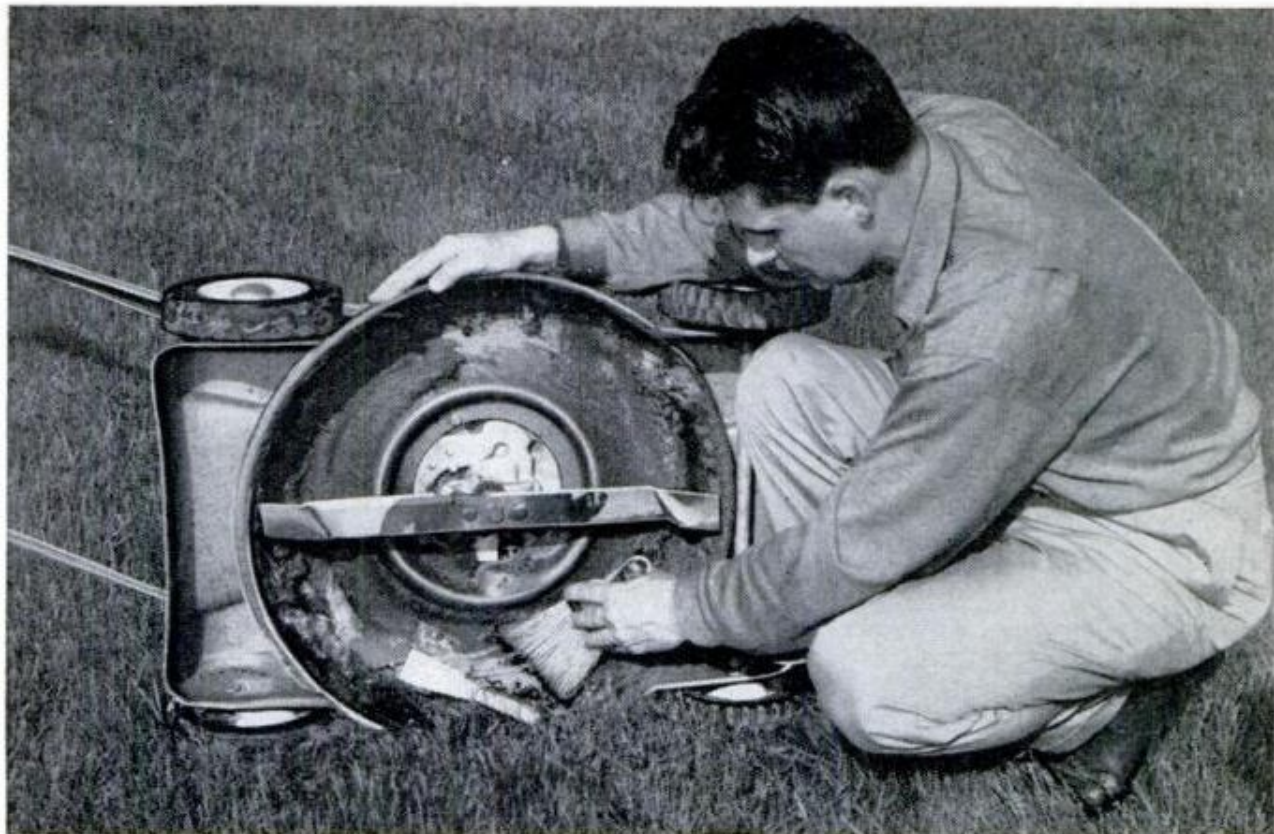
—*Ken Murray*

Jig for Centering Turning Squares

That diagonal corner-to-corner kerfing of square stock for centering and engaging the spurs of the live center on your wood lathe can be done with a handsaw, but here's a better way. Make a sliding jig to ride along the ripping fence of your table

saw from a 6 or 8-in. length of 2 x 4, cutting a 90-degree included-angle notch in one edge. This notch should be just deep enough to take the square standing vertically as pictured. Center the blade on the corner. Make two cuts. —*W. E. Powers*





USE PUTTY KNIFE, wire brush, a whisk broom to remove all caked grass cuttings. Wash away loose material

Winter-Store Your Mower

THE GRASS has given its last spurt of green growth, there's a chill in the air, and yesterday you imagined (though you couldn't be sure) that you saw the first few snowflakes.

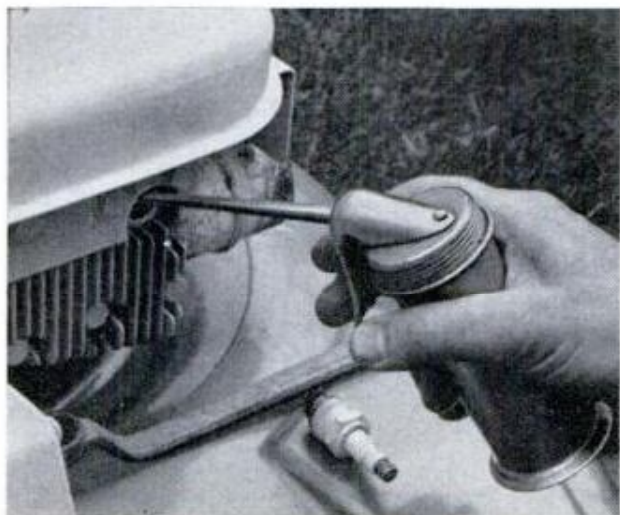
Now's the time to put away that power mower. The big temptation is to shove it into the garage and forget it until next

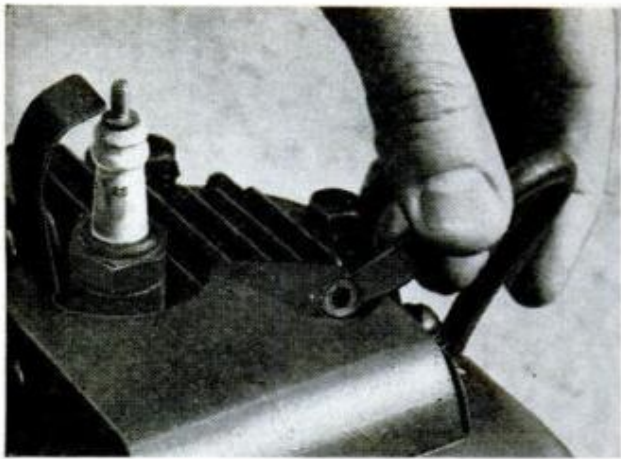
spring. There are storm windows to put up and garden plants to bed down for the winter. After all, you won't be pushing the mower around the lawn any more this year.

But if you neglect your mower now, you'll regret it, come spring. When you wheel it out for the first go-around, it will be in no better shape—and may be in much

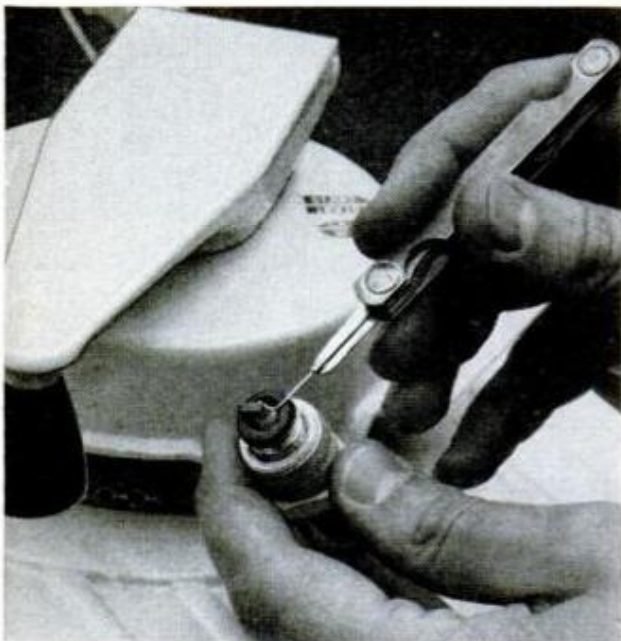
DRAIN CRANKCASE, right, while engine is still warm after burning all fuel. Refill case with No. 20 oil

REMOVE SPARK PLUG, force a good ounce of No. 20 oil into cylinder. Crank engine slowly to distribute oil



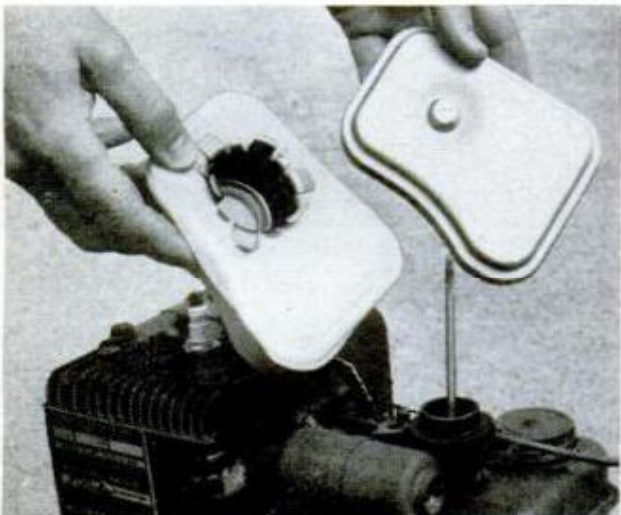


REMOVE CABLE from the spark plug and clean the terminal with fine steel wool. Clean the threads and terminal seat on plug. Leave cable disconnected



INSPECT THE PLUG electrodes, clean thoroughly and check gap. Make sure gap is in accordance with manufacturer's instructions. Replace plug finger-tight

AIR CLEANERS on newer mowers have foamed-plastic inserts which are cleaned to remove dirt and gummy deposits. Follow manufacturer's cleaning instructions



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worse shape—than when you put it away. In fact, improper storage can ruin a mower.

On these pages are the 12 basic steps in preparing a mower for storage. The mower shown here is a typical rotary, probably the most common of all power mowers. The tips given here apply generally to all:

- If you have a four-cycle reel-type mower, give the engine the basic cleaning and storage treatment shown here. In addition, thoroughly clean both the bed knife and the reel blades (it's also a good idea to sharpen them, or have them sharpened, at the same time) and readjust them. Run a film of oil along both sides of all blades, and lightly oil all moving parts.

- If you have a two-cycle rotary, follow all the steps shown here except, of course, you won't refill the crankcase with oil as the lubricant is mixed with the fuel.

- If you have an electric mower, follow the blade and housing clean-up procedures shown here. In addition, check the cord for worn or frayed spots, and check the condition of the socket on the mower, and the socket and plug on the cord.

The biggest source of damage to a gasoline-powered mower, improperly stored, is fuel—gasoline remaining in the carburetor, fuel filter, fuel lines and tank. Left for months in the engine, gasoline will form gummy deposits on all of these parts. Such deposits not only may make the mower difficult or even impossible to start when you wheel it out in the spring, but may so foul the flow of fuel that the entire engine may have to be torn down and cleaned.

It's essential, therefore, that the first step in mower layup—a step not shown in the photos—is draining the fuel tank completely and then operating the engine until it coughs its last gasp from exhaustion of the fuel. This not only cleans the tank, but the fuel line and carburetor. ★ ★ ★

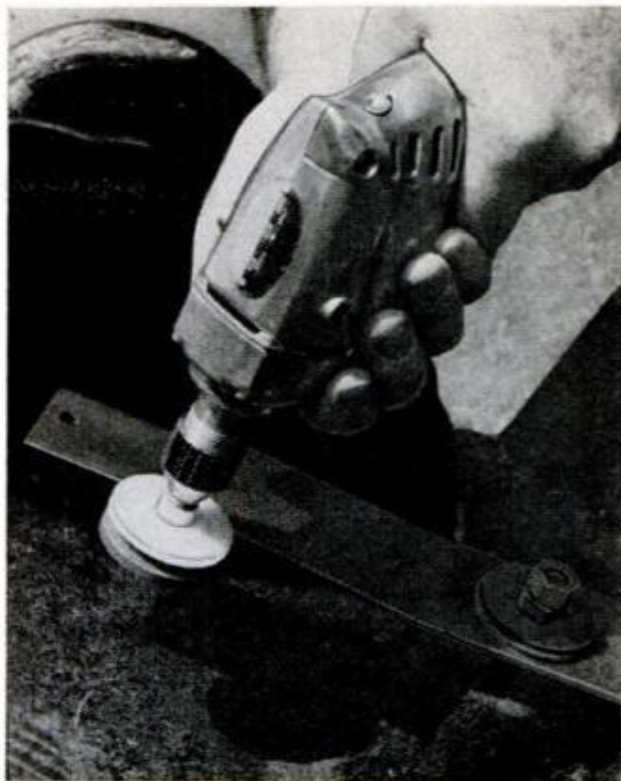
ON OLDER MOWERS service the air cleaner as directed in your owner's manual. Do a thorough job as air cleaner servicing is a factor in long engine life



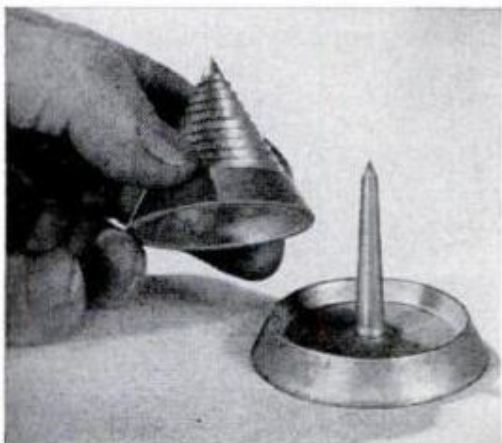
POPULAR MECHANICS



WHEN REMOVING cutter bar, be sure to keep parts in order. Mowers differ in this assembly. Examine each part closely. Replace unduly worn or damaged parts

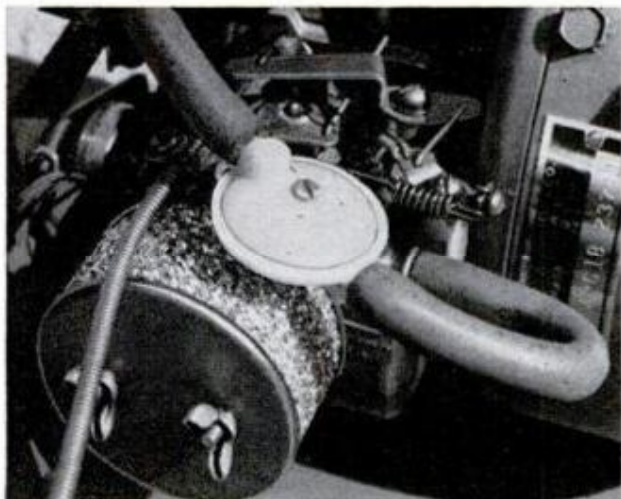


SHARPEN BLADE so mower is ready to go come spring. Don't grind off more metal than necessary to obtain a good cutting edge. Sharpener shown does good job



AFTER SHARPENING always balance blade. Take it to a mower service shop where it can be checked on a balancer like that pictured at left. Or, do the job yourself by clamping a strip of sheet metal in a vise with edge up. Lay blade across edge and center hole on the edge. File off metal at the heavy end until blade balances perfectly. Oil blade, then replace

FUEL FILTERS on mowers are of different types but yours may have one like this. Go easy on screw when you take it apart for cleaning. Follow instructions



STORE MOWER in a clean corner of garage or basement where it will be dry and, nothing will fall on it. Cover it with a sheet of plastic which extends to floor





Treat Wood Before Calking

You may avoid costly repairs later if you spray the cracks and openings between siding boards with wood preserver and termite repellent before calking. Such cracks often have been exposed to the weather for years, and it's possible that dry rot has already set in. If so, such precautionary spraying will prevent it from spreading.

A small insecticide sprayer is perfect for applying the preservative. Use a Penta solution thin enough for spray application. If you reduce it yourself from the concentrate, be sure that you use the thinner recommended in the instructions to assure that calking will adhere. Hold the sprayer close to the surface to be treated and apply the preservative generously. Then wipe off any overspray and allow the surface to dry thoroughly before calking the crevice. Follow procedure when calking, making sure you apply a uniform bead of calking material.—*Ken Murray*

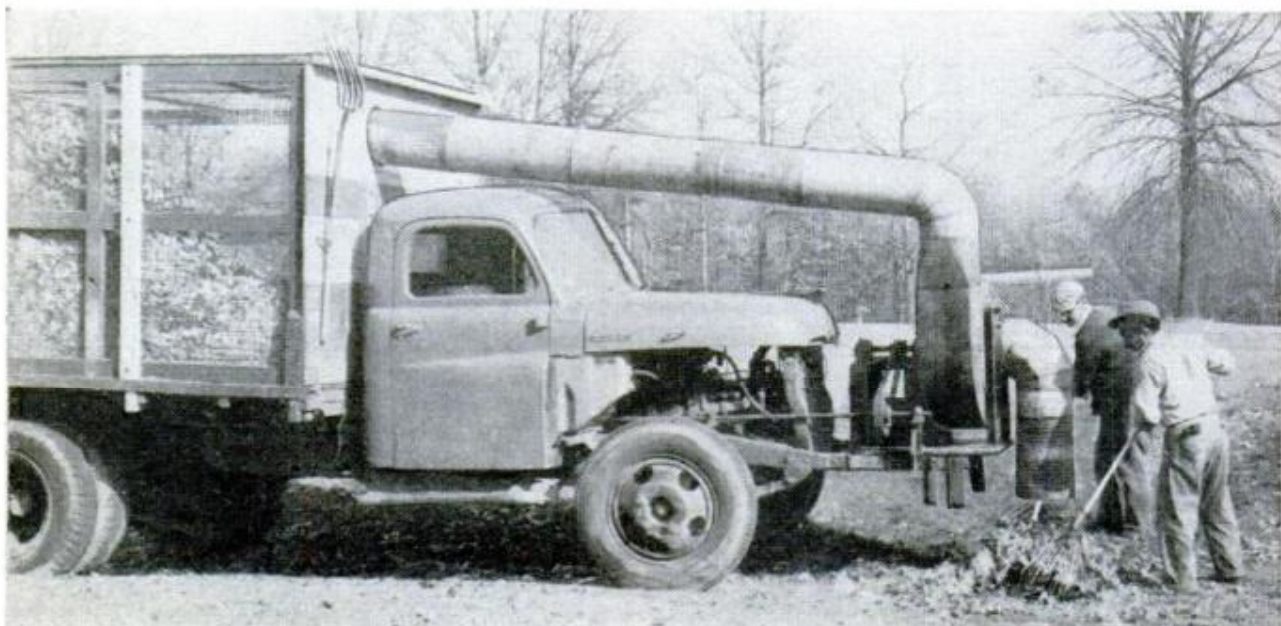


Tip for Myopic Skindivers

Prescription-ground diving goggles and masks are too expensive for most skin or scuba divers who wear glasses. A far simpler and more economical solution is to remove the bows from a spare pair of glasses and wedge them into your diving mask. If the mask is too large for the glasses to fit snugly, use safety pins and water-resistant tape to secure them. In any case, make sure they are fastened securely.—*Michael Lamm*

Giant Vacuum Gathers Autumn Leaves

Clarence Bailey, greenskeeper at the Mill Creek Golf Club, Youngstown, Ohio, came up with an unusual solution to the problem of keeping the links free of leaves. He mounted an old blower unit on the front end of a truck and ran heating ducts from this to a wire-mesh cage on the truck body. The blower is driven by power takeoff. Men with hand rakes windrow leaves under intake duct and they are blown back into cage



FLOODLAMP

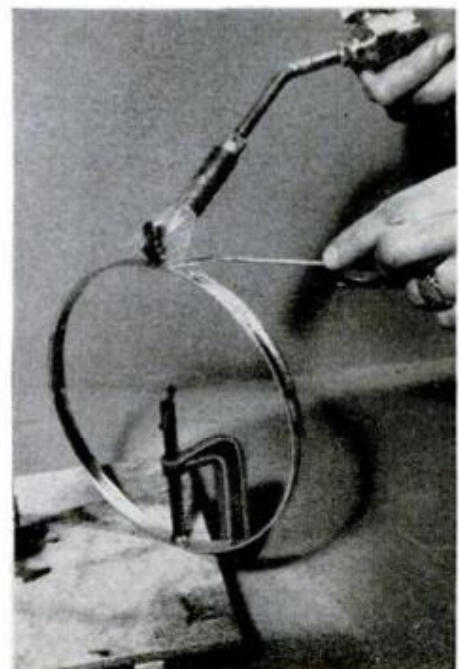
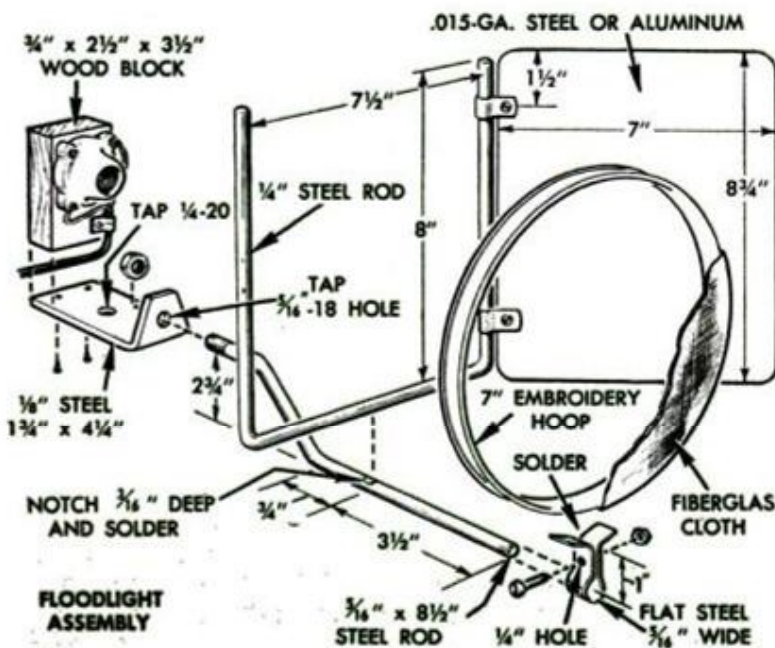
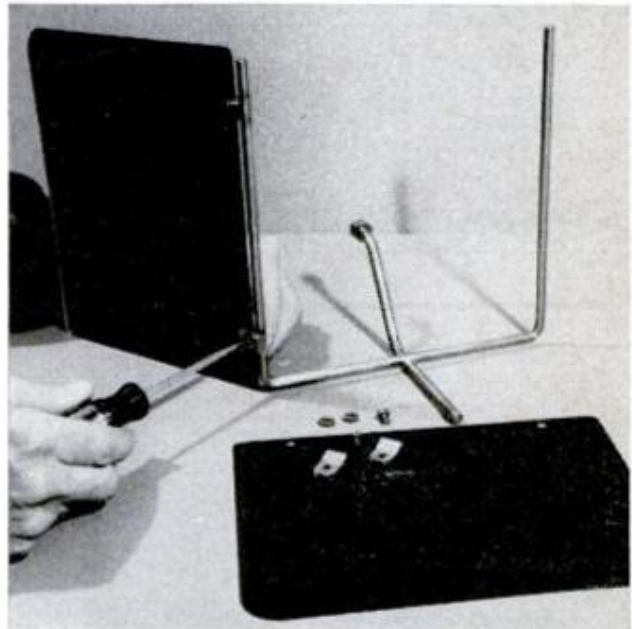
With Barn Doors

FINE VARIATIONS of lighting for better pictures are possible with this controllable floodlamp which is easy and inexpensive to make. Two sheet-metal vanes permit delicate control of background lighting, a diffusing screen softens too brilliant light, and a pan head permits quick beaming of light where wanted, also locking the lamp in position.

The framework that holds the vanes and diffusion screen attaches to a steel plate which mounts on the pan head. The heart of the unit is an RFL-2 sealed-reflector floodlamp. This turns into a porcelain surface-type socket fastened to a wooden block held on the steel plate with screws. Tape the exposed terminals to prevent shocks or shorts and fit a through switch in the cord so the lamp can be turned on and off conveniently.

Drill and tap the plate for the screw of the pan head. Bend the forward end at right angles, then drill and tap it to take the threaded end of a 5/16-in. steel rod to which you braze the U-shaped vane holder. File a round-bottom notch across the rod to fit the vane holder and to provide good contact for silver soldering or brazing. This can be done with a gas (propane) torch and is just as easy as soft soldering, but provides a great deal more strength. Bend an offset in the rod to clear the lamp.

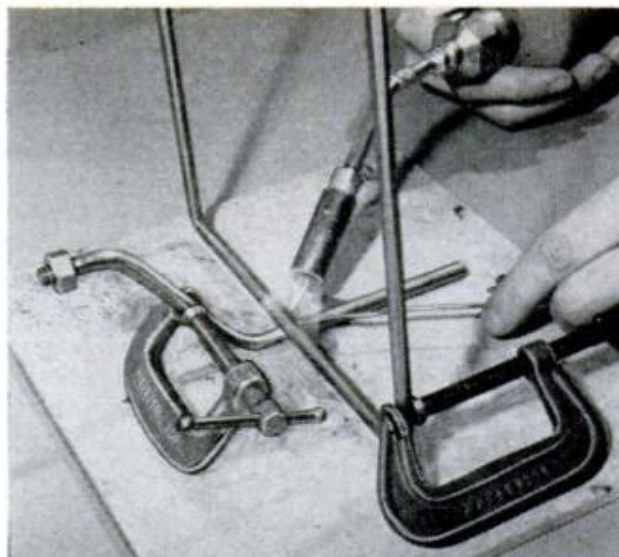
Make the vanes of 26-ga. sheet steel or aluminum. Round the corners, file off the





READY FOR USE, swinging vanes control background lighting and diffuser softens too brilliant light

sharp burrs, and paint the surface toward the light a matte black. Next, form the hinges from a piece of sheet steel about .010 in. thick (No. 30 ga.). These should be a friction fit on the holder so that the vanes will stay put in any position. Machine screws and nuts holding the hinges on the doors are turned to tighten or loosen the fit on the rod supports.



BRAZING VANE HOLDER to support rod after filing notch in latter and applying C-clamps to hold pieces

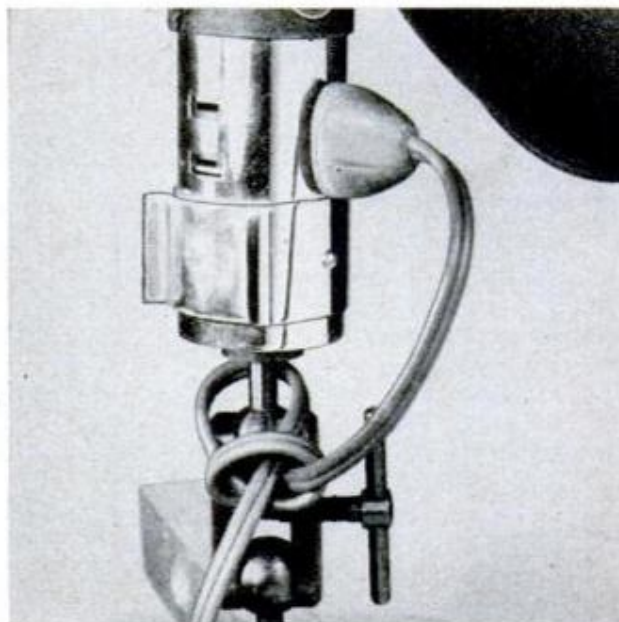
The diffusing screen consists of a 7-in. embroidery hoop and a piece of fibreglas cloth. Make the bracket from sheet steel about .040 in. thick (No. 18 ga.), forming it for a friction fit on the rod and making it adjustable for tightness with a machine screw and nut. Solder or braze the bracket to the embroidery ring as in the photo to complete the job.—*Martin D. Koehler*

FOR CAMERA BUGS



Tape Always at Hand

Several strips of masking tape stuck to the inside of your camera carrying case, will be instantly accessible for sealing opened cartons in which you have put exposed roll film. When so protected it is impossible for rolls of exposed film to slip out of the cartons if contents of the case are shuffled about, and possibly becoming lightstruck along the edges.—*O. A. Nelson*



Keeping in Contact

When cords to extension flash units are subjected to strains and tugs, connections may be loosened just enough to prevent the bulbs from firing. To avoid this trouble simply tie the cords around the base of the flash-bulb holders as shown so that the cord movement will not be transmitted to the plugs. Any tug on the cord will be on the knot.—*Bill Toman*

NEW FOR SHUTTERBUGS NEW

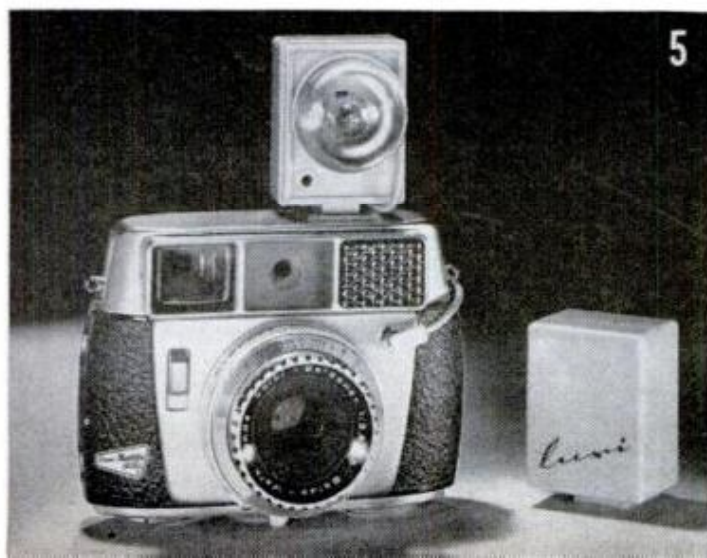
1. REVERSIBLE UMBRELLA REFLECTOR provides a good diffused source of illumination when used with a primary light source, such as flash, sunlight or speedlight. The umbrella is reversible: One side is white nylon and the other aluminized Mylar. Collapsed length is 22 in. Model No. 36, \$39.95. Photo Lectronic Research, 141 W. 42 St., New York 36, N.Y.

2. AUTOSET 35-MM. CAMERA features automatic exposure control over wide range of shutter speeds and lens openings. Indicator signals if film has been advanced after previous exposure. For flash exposures, you dial guide number, setting it opposite distance setting. Camera includes coupled view and range finder. Less than \$90. Ansco, Binghamton, N.Y.

3. ROLL-FILM WASHER washes film rapidly, forcing the hypo to rise over top of tank. Two jet openings at the base swirl the water as it is forced up and over the top. Washer holds two 120 or 620 reels, or four 35-mm. reels. Pressure is controlled from the water faucet. Priced at \$19.95 from Standard Photo Supply Co., 43 E. Chicago Ave., Chicago 11, Ill.

4. ZOOM 8 REFLEX MOVIE CAMERA is capable of focusing from four feet to infinity for all focal lengths. New shutter-governor provides quiet running and stopping. Retaining all important features of previous model, camera includes push-button zooming, through-the-lens viewing and automatic electric eye. Less than \$215. Eastman Kodak Co., Rochester 4, N.Y.

5. MATCHBOX-SIZE BC flash unit fits accessory shoe of any camera. The holder uses AG flashbulbs and a 1½-in. dia. silvered aluminum reflector—weighs only 1¼ oz. An ejector button assures easy removal of bulb. Flash unit is priced at \$4.95; top-grain leather case, \$1.75. Distributed by Kling Photo Corp., 257 Park Ave. South, New York 10, N.Y.





When Your Car Quits ...

miles from professional help what you can do in improvising an emergency repair determines whether you walk home—or ride

By Paul Weissler

WHEN YOUR CAR stops on the road rather suddenly—and this can happen half a county away from help—it's usually some simple thing or something that's been developing without giving any warning. Locating the trouble is only half the problem; the other half is to devise some means of making an emergency on-the-spot repair that'll get you back to the main highway, to the nearest gas station, or maybe all the way home.

Confronted with such an emergency a good Saturday mechanic would think of several possibilities before he even got out of the car. For example, a jerky, sputtering stop would remind him that he hadn't filled the tank at the last gas station. But he'd also remember that on most cars the fuel tank is so shaped that there's still eight to ten miles of going left in it after the engine sputters out. So, he would drain

what's left of the gas from the tank, pour in about the same amount of water (or the winter fill of water and antifreeze) from the radiator, pour the precious mite of drained fuel back into the tank—it will remain on top of the water—and take off for the nearest gas station, or as near as he can get before the engine conks out again. Whether he makes it to the station or not, he must remember to drain the water from the fuel tank before adding fresh gas. No harm will be done, that is, if Saturday mechanic doesn't forget to drain the water. Otherwise there's trouble.

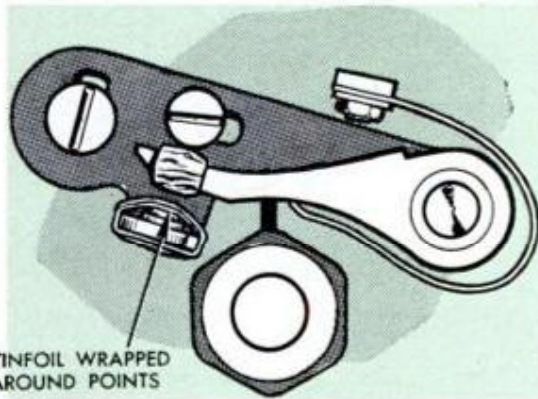
But that's only one example of what can happen. Here are several case histories of unexpected car failures that have stopped Saturday mechanics and others far from help, and what they did to get going again. Some are old tricks, well known to older-generation auto mechanics, but remember-

FUEL TANKS of most modern cars will contain six to ten miles of going after the engine sputters to a stop. Drain gas, add water and then replace

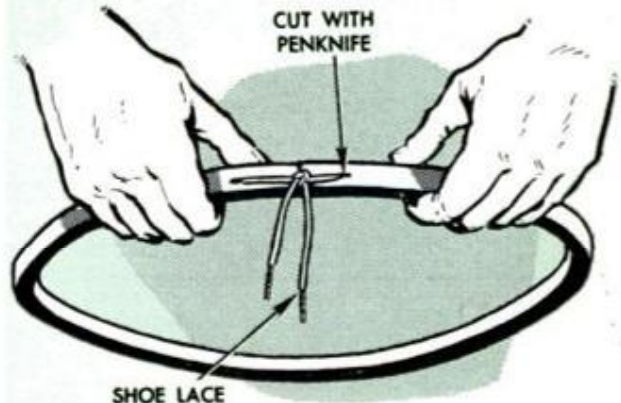


WRAPPING BURNED POINTS with foil usually will get you to nearest station and necessary replacements

IN AN EMERGENCY driver made do with a broken fan belt joined with shoelaces. Crude, but it worked



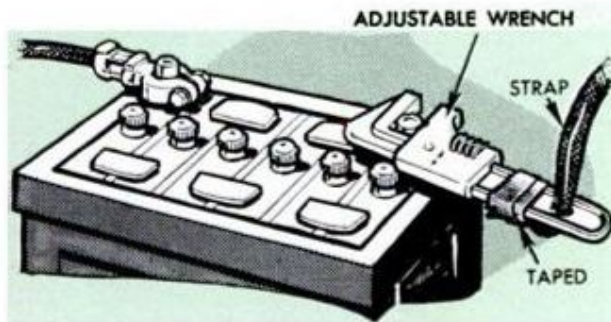
TINFOIL WRAPPED AROUND POINTS



SHOE LACE

A HUNTER, miles from anywhere, discovered a parted ground strap. Detail below shows how he improvised

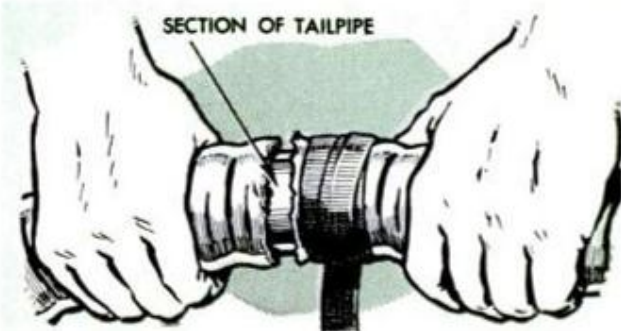
ONE DRIVER repaired a leaking upper hose with tail-pipe section and tape. He made it all the way home



ADJUSTABLE WRENCH

STRAP

TAPED



SECTION OF TAILPIPE

IN THIS CASE a baby-food jar served as a fuel filter bowl and saved a picnic. Any small jar also might do

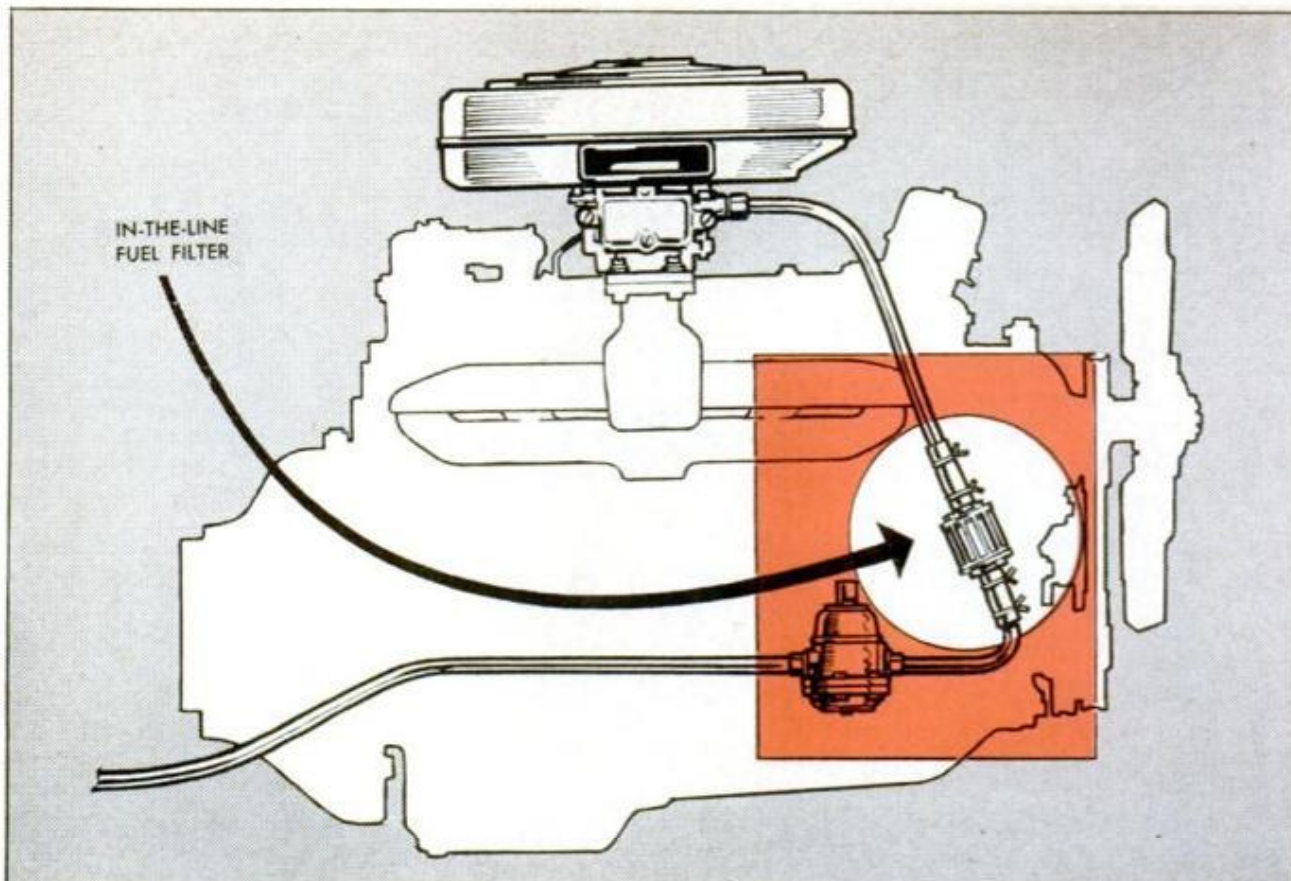
THIS DRIVER found coil lead loose and carbon-brush assembly missing. Repair—ball-point pen spring



BABY-FOOD JAR



SPRING FROM BALL-POINT PEN

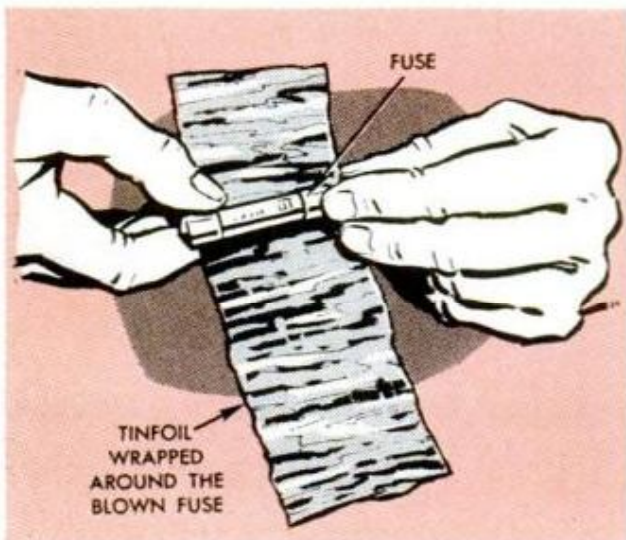


IN-THE-LINE FILTER protects fuel system, keeps carb clean. Install according to manufacturer's instructions

ing them may well save you a long walk.

Burned breaker points stopped a car nearly 20 miles from a source of standard replacements. What to do about it?—with nothing seemingly at hand to do with. But the driver was more than ordinarily resourceful. Searching the car he found a package of chewing gum in the back of the glove compartment. He stripped the foil wrapping from a couple of sticks of gum, folded it tightly and wrapped a piece about each point, being careful not to ground the

WHEN FUSE fails, wrapping it in foil and replacing can get you home or within reach of a replacement



moveable contact point. These improved "points" took him nearly half of the way to help, before the foil burned through and left him stalled again. He disassembled the distributor and repeated the performance and with this second set of foil points he made it to within walking distance of a gas station.

Another driver was stalled by a broken fan belt on a little used rural road. He was about to give up and start the long walk back when he thought of his shoelaces. Why not use one as belt lacing? To think was to act, for it was getting late in the day. He cut a small slit about an inch from each end of the broken belt and drew the ends together with the shoe lace. But this lace, being worn, let go after only a few miles. He relaced the belt with the second shoelace, the last one, of course. This one, being less worn than the first, held until he made a gas station. Of course, his car was equipped with manual steering. The laced belt would not have held under the additional load of a power-steering unit.

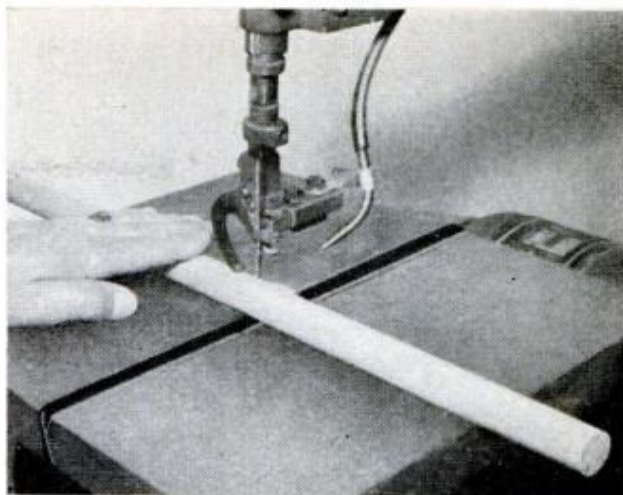
A hunter, driving a one-track trail to a remote lodge, was stalled by a ground strap corroded so badly by battery acid that it let go. He discovered the defective strap when he attempted to start the station wagon for the return trip. It took a while for him to contrive a way out of such

(Continued to page 214)

SHOP SHORT CUTS

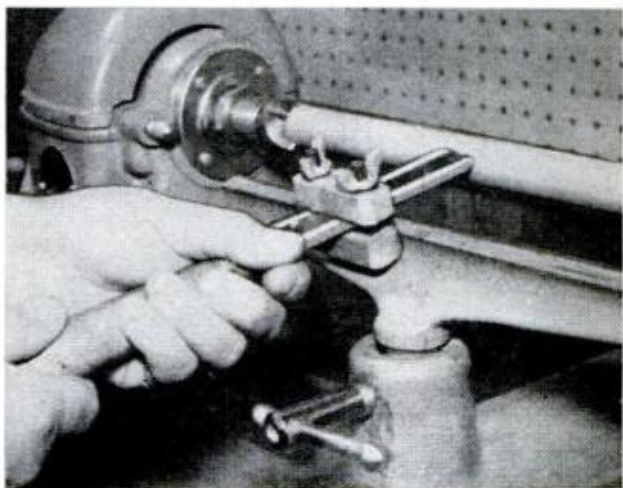
Nonslip Grip

Occasionally, when cutting a dowel on the jigsaw, the blade will grab suddenly and break. To prevent this, stretch a length of friction tape over the table, adhesive side up, with one edge just clearing the blade. Twist the ends of the tape so you can stick the adhesive side to the table flanges as pictured. Then just roll the dowel into the blade slowly, holding it firmly until the blade cuts through.—*G. E. Hendrickson*



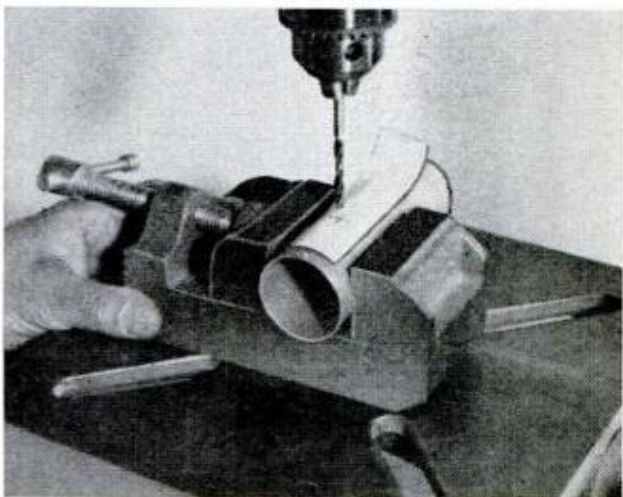
Made to Measure

You need a straight cylindrical turning in wood, no dips or bulges in it from end to end. Free hand, this is no simple trick on a wood lathe. There's a faster, easier way: Caliper two grooves, one near each end of the work, to the diameter required. Then measure from the back edge of the tool rest to the bottom of each groove. Set the rest so the measurements are equal. Drill and clamp two short strips of hardwood to the gouge with stove bolts and wing nuts as pictured. Now you're set to use the back edge of the tool rest as a guide.—*H. Hanscom*



Drill Spotter

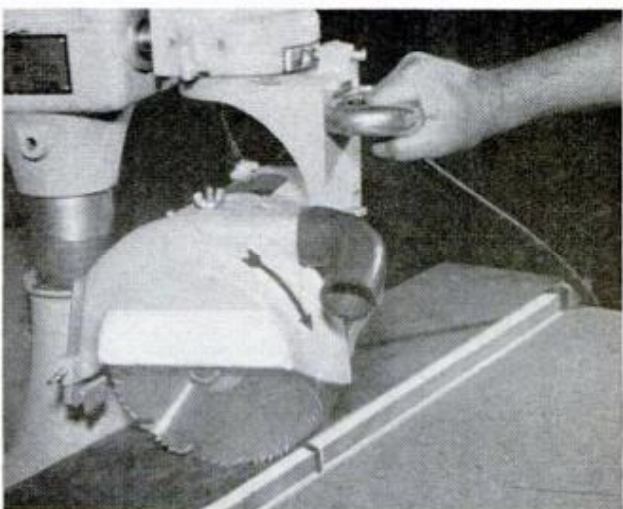
Starting a drill bit on round or tubular stock can be done quite accurately simply by spotting the hole with an X-mark on a strip of tape pressed firmly onto the surface as pictured. The tape holds the drill, keeps it centered until the point bites in. This kink will serve only for starting small drills, $\frac{1}{8}$ in. or less. If you need a larger hole, go through first with a pilot drill, using a $\frac{1}{16}$ or $\frac{3}{32}$ -in. drill bit. Then strip off the tape and go through with a drill bit of the required diameter. Use very light pressure when drilling.



Step Table

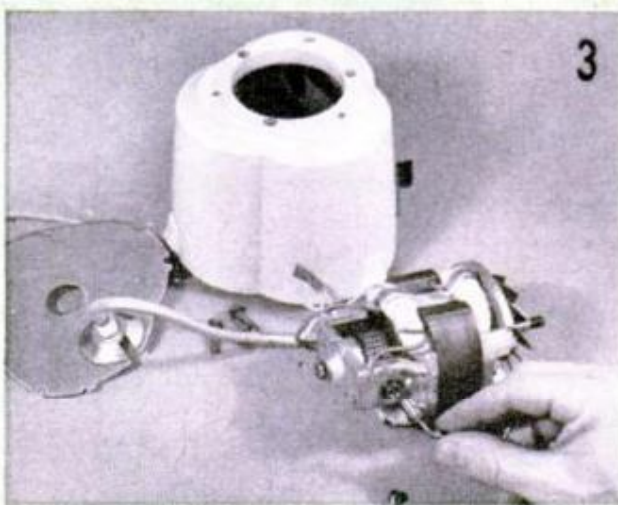
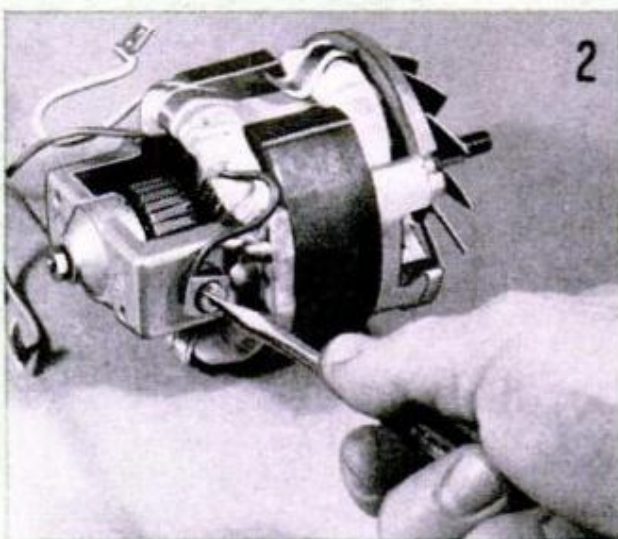
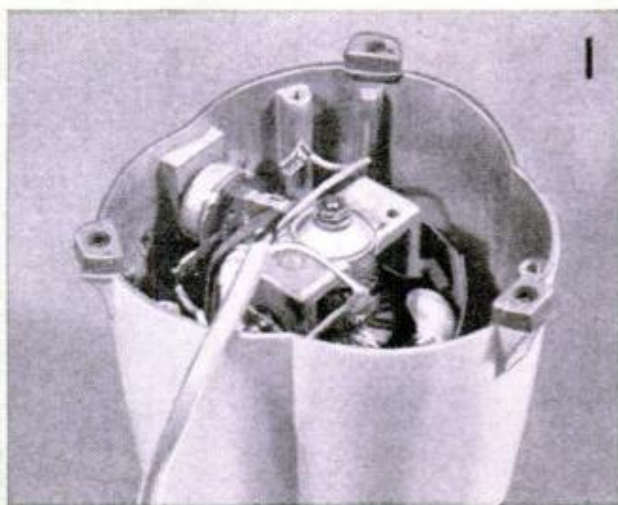
Most of you radial-saw owners will find this kink useful and timesaving when using the tool for several operations that differ but follow in sequence. Place a piece of $\frac{1}{4}$ or $\frac{3}{8}$ -in. plywood in front of the fence with one edge against the fence. Mark around the edges of the original table and cut the plywood to this size. Attach to the table with several screws. Now, when you need to adjust the blade from a 90-degree cut to a miter cut, just push the carriage back past the fence. Since the rear surface is lower, you can swing the blade into any angle position without having to raise the arm. You'll find this a real convenience.

—*Arthur Shults*



ELECTRIC BLENDER

Household



ONE THING to keep always in mind in connection with routine operation of your food blender is to be careful about what you put in it. It will grind and blend almost anything edible to a pulpy, appetizing mass but a peach or prune pit or a gravel particle that goes in with a few lettuce leaves—well, a blender just isn't built for crushing pits or stones! Other than that you haven't much to worry about in its operation, unless you drop it, or you have had it a long time.

Cords usually go first, but not always. When something goes wrong—the unit doesn't operate properly or won't run at all—the experienced appliance serviceman generally thinks first of the power cord and the motor brushes. That's your cue in fix-it-yourself. If there's reason to suspect the cord, go over it inch by inch, looking for breaks, a cracked plug or a wire loose, either at the plug or the other end of the cord at the terminals. If you see anything wrong with the cord, or if it looks like it might go bad, replace it.

With the cord examined and passed, the motor brushes are next. To get at them you have to take things apart. When you turn the unit over and remove the bottom plate you'll see something like that pictured in Fig. 1. Likely you'll have to take the motor out to reach the brush retaining screws, Fig. 2. Remember when you turn out screws, easy does it. And don't let the brushes pop out when the retainer is loosened; they're spring-loaded, you know. If the brushes are still good—

Appliance Fix-It File

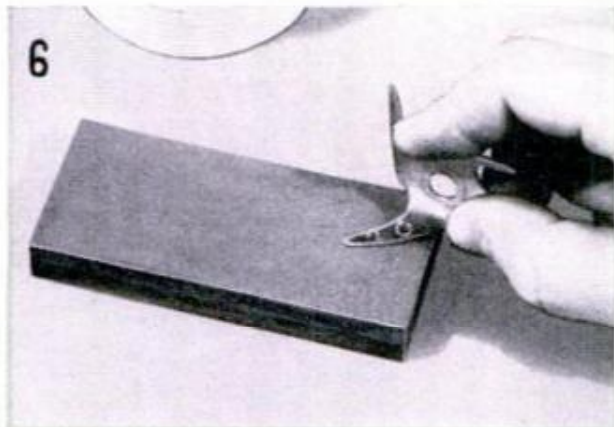
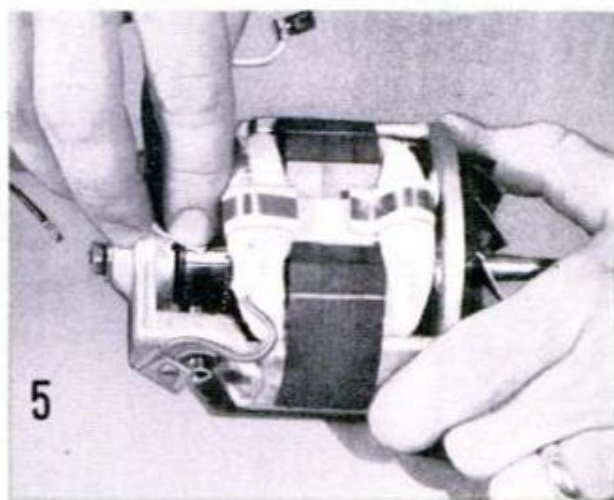
not badly worn, cracked or chipped—make sure that you put them back just as they came out. Don't turn them over or interchange them, Fig. 3. This is important as in use the ends of the brushes have worn to an almost perfect seat on the commutator. If you turn them over or interchange them, you'll get an imperfect contact and a stream of sparks from each brush when the motor is running. This can cause rapid wear of brushes.

Anytime you have the unit apart so that the motor can be seen, examine the commutator. If the brush track appears reasonably clean and a uniform color, just wipe with a dry cloth and let well enough alone. But if it appears blackened and slightly pitted, then it's permissible to clean it with a piece of fine sandpaper as in Fig. 5. Don't use emery cloth or any similar abrasive as just one grain of these abrasives can cut out an armature bearing in no time.

Often in servicing it may be advisable to test the resistance in the switch. This is done as in Fig. 4, by applying the common lead to the power terminal and the ohm lead to the high and low-speed terminals in turn (most blenders have a two-speed switch). The ohmmeter will register the amount of resistance in the switch. If this seems high, the switch should be replaced.

The three or four-blade cutter in your blender must be quite sharp to do a good job of blending. Touch up the blades on an oilstone as in Fig. 6, being careful to get a uniform bevel on each blade.

—John Pennington



FARM TIMESAVERS

Sack Trap

When spreading dry fertilizers in an open field the empty sacks often become a problem, especially on a windy day. With no stone or other weight handy, the empties may be blown into the next county. One farmer, after covering most of a neighbor's field gathering wind-blown fertilizer sacks, carried a three-tined pitchfork. As the sacks are emptied into the spreader he stacks the empties and drives the fork tines through the stack as pictured.

—G. E. Hendrickson

Household iodine is always a good substitute for penetrating oil when you have need to loosen a rusted nut or capscrew without danger of twisting off the head of the screw or the bolt.—Charles V. Mathis

Made to Measure

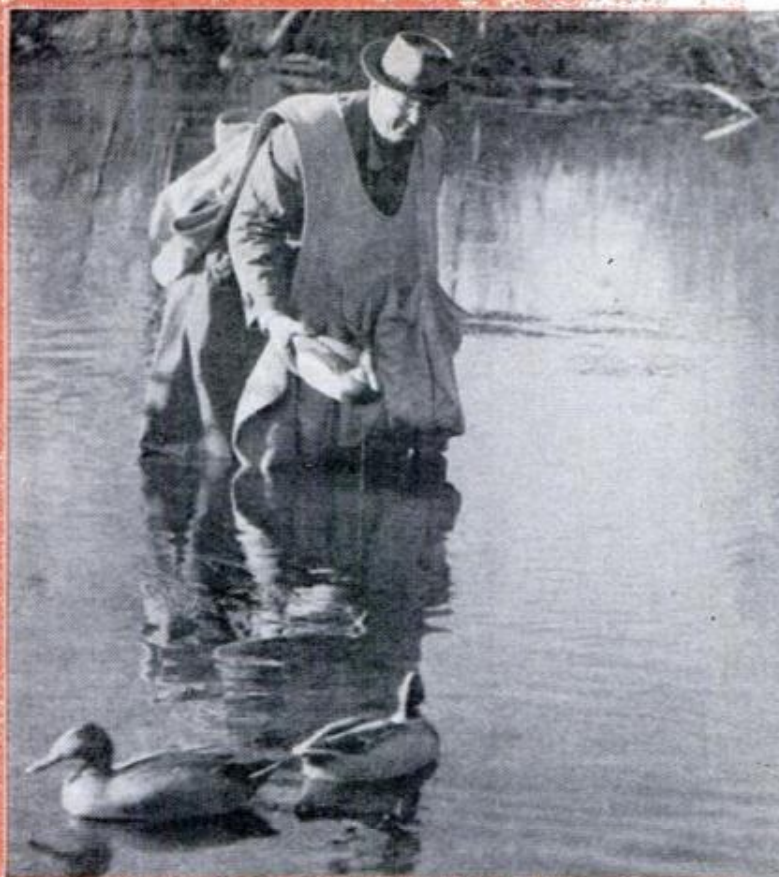
Holding a bushel basket or other container under a grain chute from an overhead bin while you measure a given quantity is a three-handed job—one to operate the shutoff slide and two to hold the basket. One farmer, having frequent need to do this kind of thing, drilled a 1-in. hole through opposite sides of the chute, the holes just below the slide. Then he cut a $\frac{3}{4}$ -in. dowel to a length that would permit sliding the handles of the basket over the ends and passed it through the holes, the ends projecting about equally. With this arrangement the basket is placed in position directly under the chute and is held while a given quantity of grain is measured into it.

Open Door

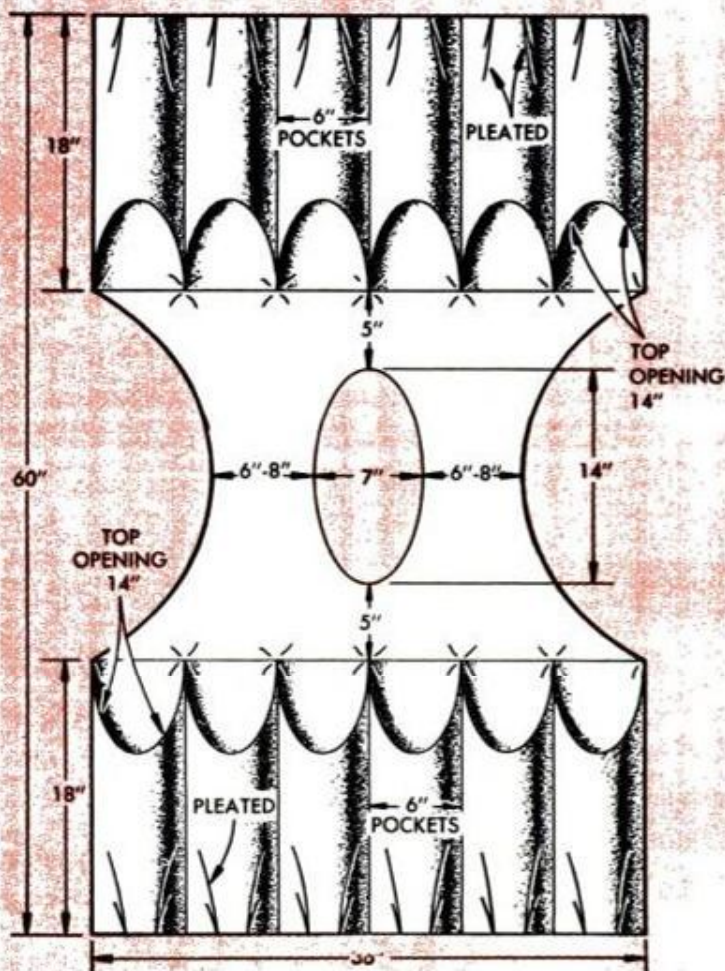
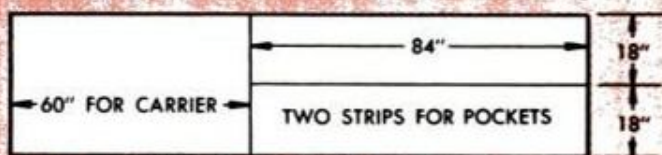
Instead of propping the trap door into the hay loft open with a short strip which is likely to be misplaced and unavailable when needed, a hinged prop, or stop, was made and attached directly to the underside of the door. The stop roughly triangular in shape, was cut from a 2 x 6 and positioned so that when the door is raised, the stop is pushed slightly past the 90-degree position and the door lowered so that the stop bears on the frame.

Solder filings mixed with paste flux often make it possible to solder small parts which are difficult or impossible to clamp together or that are of such a shape that they will move out of place when touched with wire solder or the tip of the gun. Spread the paste-filings mix on the joining members and solder with torch flame.—Paul D. Brey





DECOY TOTE COAT



IF YOU'VE EVER missed that perfect jump shot at puddle ducks because of the sack of decoys on your back, you'll go for this canvas tote. Just load your rack of twelve decoys, one to each pocket, drop the thing over your head and shake it down a little to distribute the load comfortably. You've still got both arms free to put a scatter-gun on any duck that gets up unexpectedly from a small backwater or spring hole while you're on the way to the blind or when you're shooting a river or ditch from the banks.

And when you finally do get to the blind, drop off the rack of decoys, lift the tote over your head, fold it and you've got a reasonably comfortable cushion to sit on for the long wait. The tote requires about 4½ yards of medium-weight canvas. Cut it into three strips as in the upper detail, then cut an oval opening in the carrier piece and cut to the shape indicated in the lower detail to fit over your shoulders. Hem the edges and sew on the pockets, six at each end. Note that each pocket is pleated at the bottom and has a 14-in. opening at the top. Bar-tack each pocket at top and bottom corners so they'll take rough useage without tearing.—William W. Hunter

Prepare Your Outboard NOW for Next Season

Tips on outboard layup,
plus plans for PM's
Motor Minder stand

By Arthur Mikesell



CLOSE YOUR EYES and try to picture that first launching early next spring. Winter's chill may still be strong in the air, but the sun speaks of warmer days to come and you feel a familiar urge to be out on the water. Your boat rocks quietly at the dock, small waves gently lapping against the hull, and you're ready to go. What happens next? That depends on what you do *right now*.

The best way to insure trouble-free boating next year is to spend an hour or so going over your motor before you hang it up to hibernate for the winter. Routine end-of-season maintenance may save you from the necessity of a major overhaul later on.

Any fuel remaining in the motor during storage will form harmful deposits in the fuel system. The easiest way of emptying the fuel system is to disconnect the line to the fuel tank while the motor is running and let it run until all fuel is exhausted. Since the cooling system should be flushed with clean water, you can combine these operations by letting the motor run in a clean garbage can filled with water until the fuel in the line is exhausted.

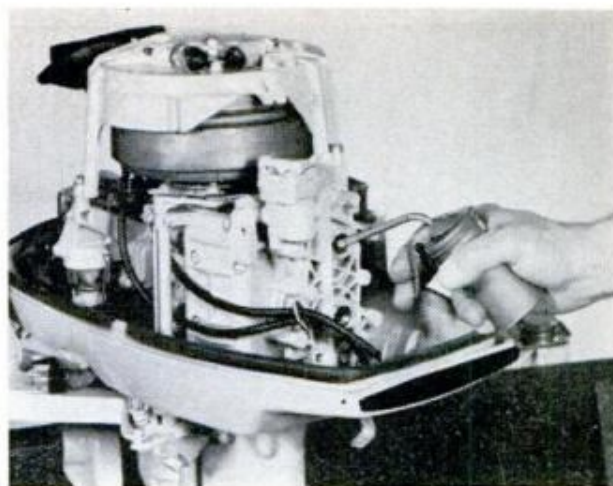
Water left in the powerhead and water pump is an invitation to rust. More important, if you store your motor in an unheated shed or garage, water in the cooling system may freeze and cause serious damage. When you have clamped the motor upright on its storage rack, close the throttle all the way and either pull the starter or rotate the flywheel by hand to expel water from the cooling system.

After emptying the fuel and cooling systems, you can go to work on the powerhead. Remove the shroud and wipe all accessible parts with solvent. Gasoline is fine for this job, since it leaves an oily film which will prevent rust. However, be sure to take all the normal precautions against fire—plenty

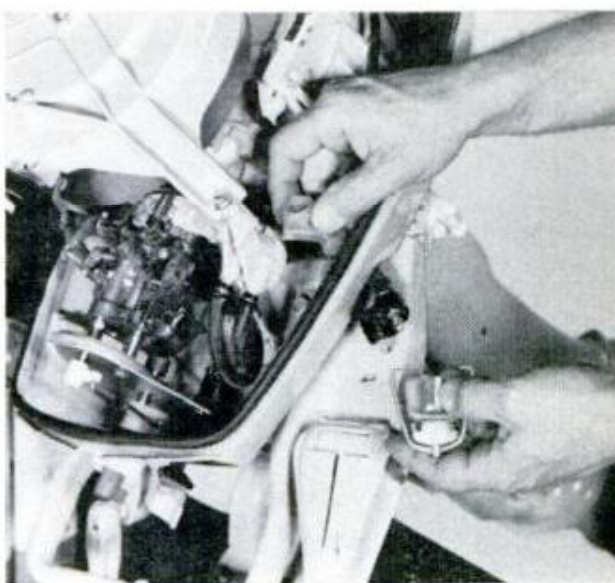
TOUCH UP SCRATCHES on the shroud, lower unit and fuel tank with matching paint from a spray can. Be sure to mask adjacent manufacturer's emblems etc.



OCTOBER 1962



SQUIRT SEVERAL DROPS of #10 oil into each cylinder while you have the spark plugs out, then rotate flywheel to distribute it evenly over internal surfaces

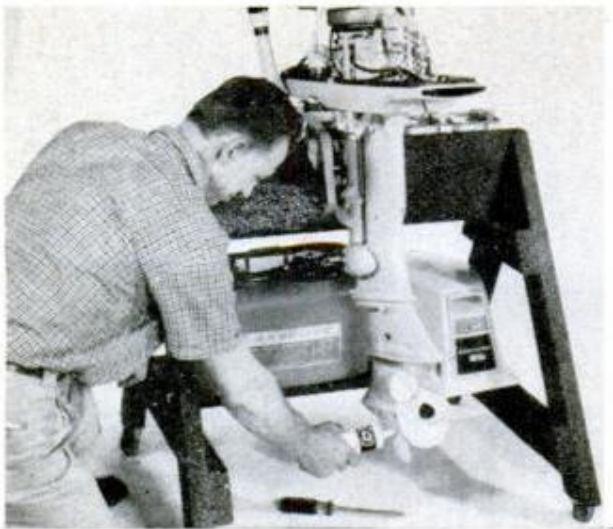


REMOVE AND CLEAN sediment bowl and filter. When replacing assembly on carburetor, make sure that the gasket fits snugly and check carefully for leaks

SILICONE SPRAY lubricant discourages corrosion and protects the rubber cover gasket. Cover all exposed surfaces of the powerhead with a light even coating



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DRAIN LOWER UNIT and refill with fresh gear lubricant. Grease must be forced into gear housing until it shows at vent hole, indicating cavity is filled



PROPELLER SHAFT may be coated with hardened grease. Remove this with steel wool and apply a new coat of water-resistant grease before replacing prop

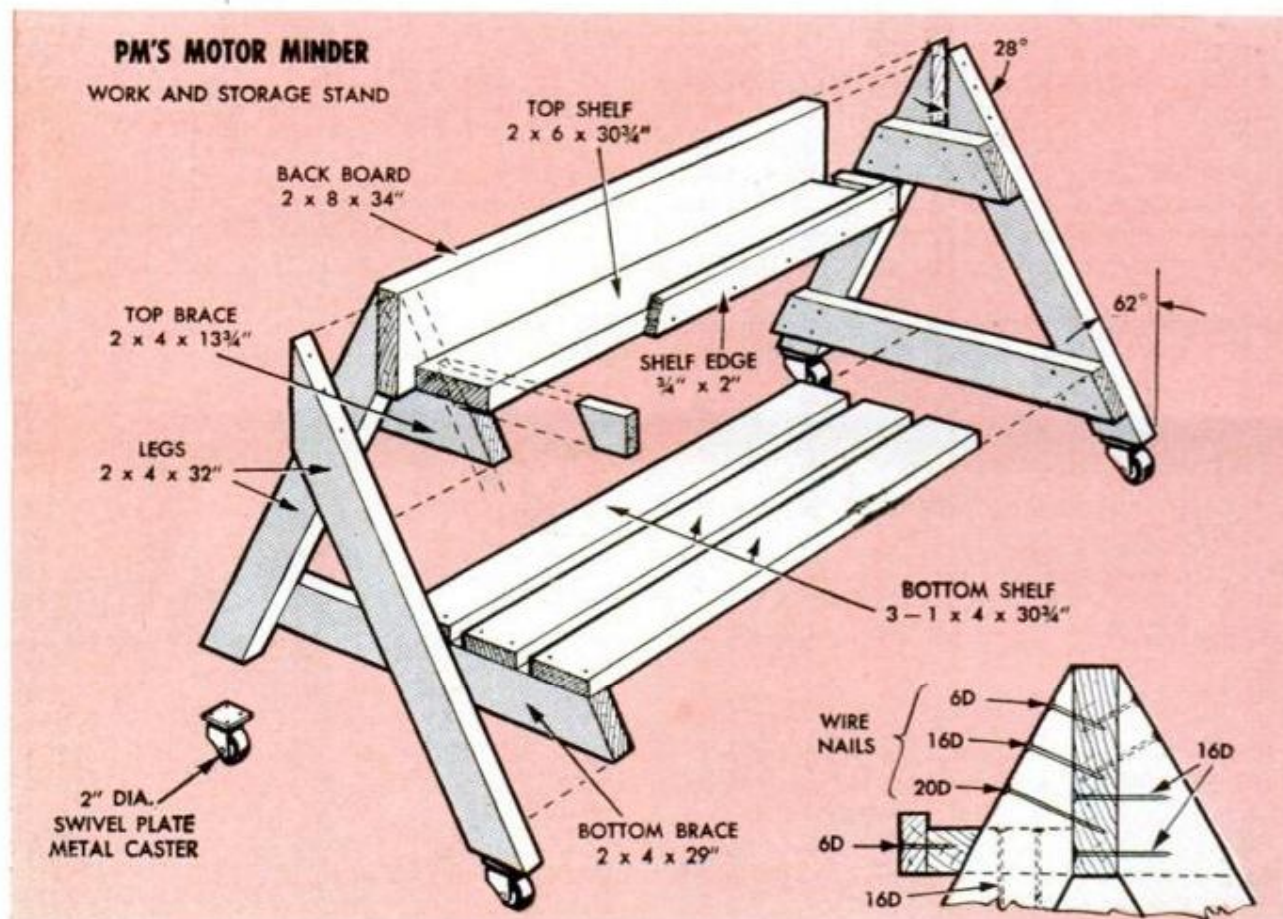
of ventilation, no smoking and burn any rags used. While wiping, check all linkage points for bent levers, loose-fitting joints and corrosion, especially on sliding parts. Make any adjustments necessary, and if you find a damaged part, tag it for replacement. Remove rust with emery or crocus cloth, and grease all linkage points with the proper lubricant.

Next, remove the spark plugs and check them for wear. If electrodes are only slightly worn and plugs show brown to grayish-

(Continued to page 212)

PM'S MOTOR MINDER

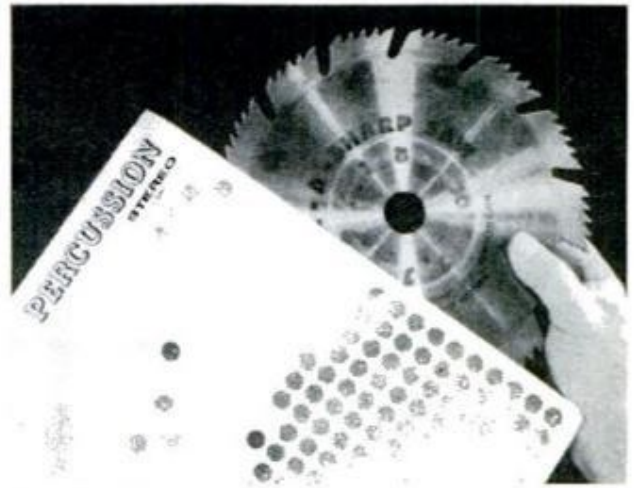
Here's a combination storage stand, workbench and carrying cart that you can build in an evening. Designed by Kenneth G. Hawkins, it not only provides a handy rack for storing your outboard in the proper upright position, but also has shelf space for the fuel tank, battery, and common maintenance equipment. You can vary the dimensions to suit your motor.



SHOP SHORT CUTS

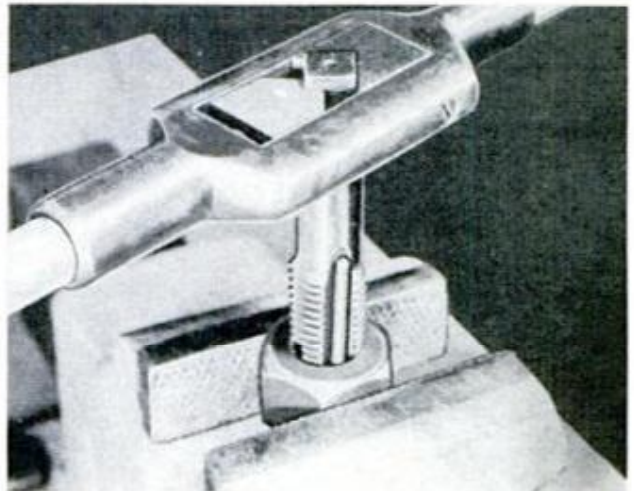
Saw-Blade Sheath

Storing or transporting a circular saw blade without suitable protection over the teeth always involves the risk of cutting yourself and also of dulling the teeth. A simple solution is to slip the blade into a discarded phonograph-record jacket. In case you don't have one, make one from a suitable piece of cardboard folded and sealed along two free edges by using some 1-in. masking tape.—*John Mihalick*



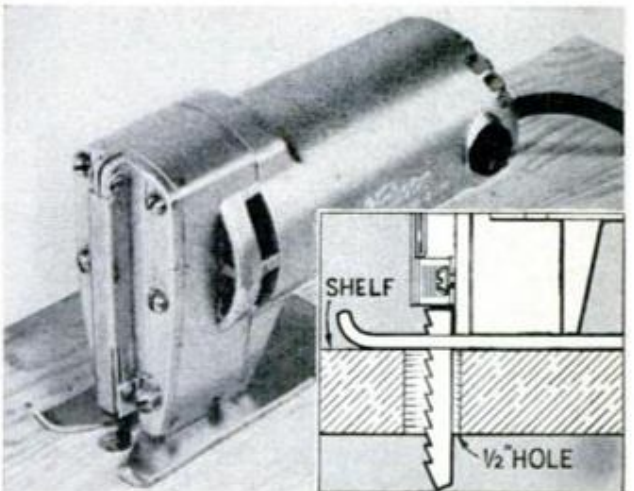
Tap Cuts Oversize

Next time you have to thread a hole that is a little too large for the tap you have, or to slightly enlarge a tapped hole of the same thread size, use this effective method. Push a short length of drill rod of the right size in one of the flutes when starting the tap and leave the rod there until you have run through the work. Numbered twist drills can be used and provide a wide range of sizes. A drill is inserted so only the shank end makes contact between the tap and work.—*H. J. Gerber*



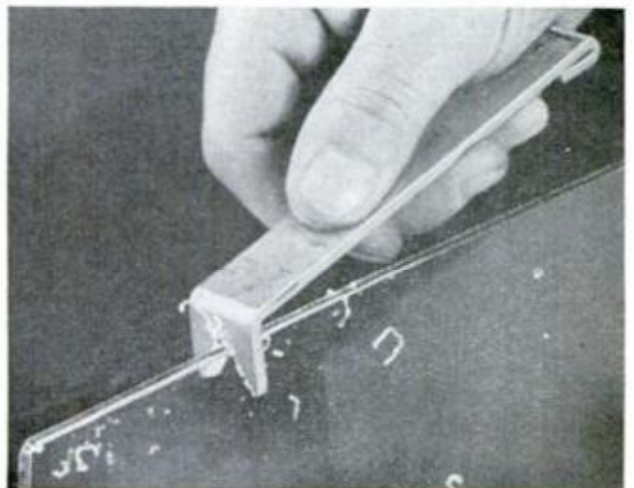
Storing Saber Saws

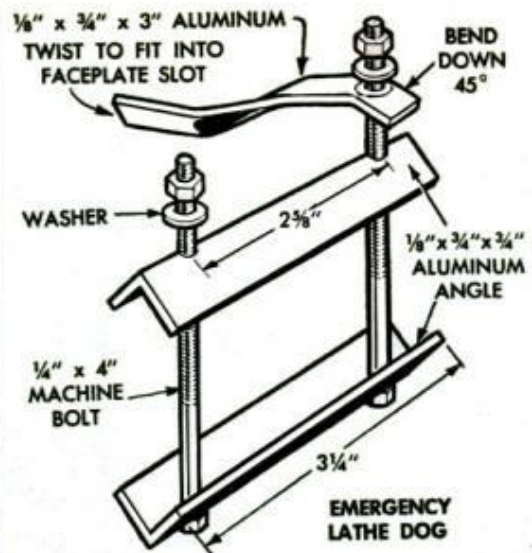
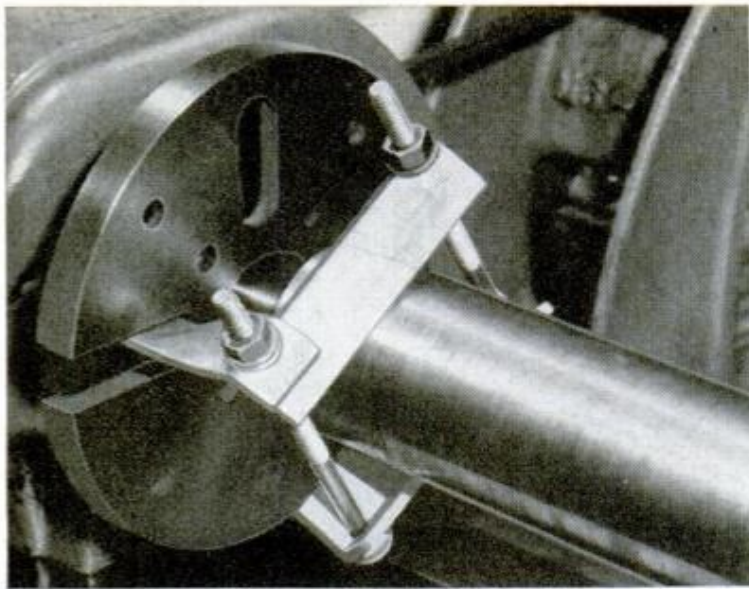
A good way to store your saber saw where it will be accessible instantly, yet fully protected against damage, is to set it upright on a narrow shelf with the blade projecting downward through a 1/2-in. hole. The shelf should be narrow to avoid piling it with other items. Since a bent blade may result from laying the saw against other tools on a benchtop, it's a good idea to bore another hole at the rear of the bench to accommodate the saw temporarily between moments of using it.—*William B. Eagan*



Handy "Deburring" Tool

Removal of sharp burrs from the edges of sheared plastic or aluminum sheets can be done with speed and ease by using the little tool shown here. It is made from 1/8 by 3/4 or 1-in. flat steel. One end is bent at right angles and the other is doubled for a comfortable grip. A V-notch is filed or ground in the bent end. Sides of the notch are dressed to a slight angle, forming sharp edges on the inside so that the tool will cut as it is pulled. It should be held upward at an angle in order to prevent cutting your fingers while drawing it over the burred edges.—*Bernard W. Draper*

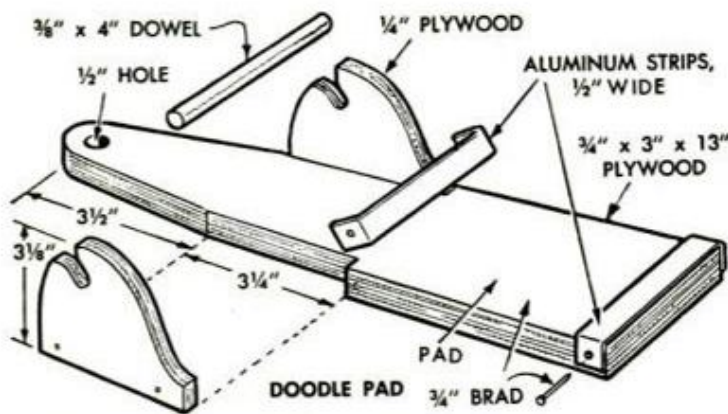




Emergency Lathe Dog for Large-Diameter Work

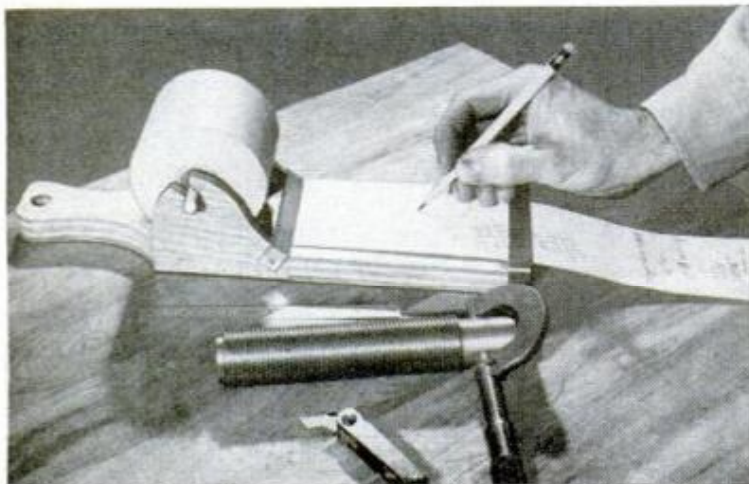
You have a small metal-turning lathe and a comparatively large-diameter workpiece to turn down between centers. The regular dog won't take the work. So, what do you do? You make an emergency dog from two short pieces of aluminum angle, two $\frac{1}{4}$ -in. machine bolts and a flat piece of aluminum about 3 in. long to serve as the tail. The photo at the left shows such an improvised dog in use; the detail at the right shows how it's made. Of course, you don't have to

follow the dimensions exactly. Your workpiece may be even larger than that pictured and you make the dog to suit. To drill aluminum angle on the corner as is required, file a flat at the point where the hole is to be drilled, spot it, and then go through with a small pilot drill first. Then you can get the larger drill started easily. Twist the flat piece so that the free end drops into the faceplate slot as pictured. Keep your fingers clear of the dog!—*Manly Banister*



Shop Doodle Pad

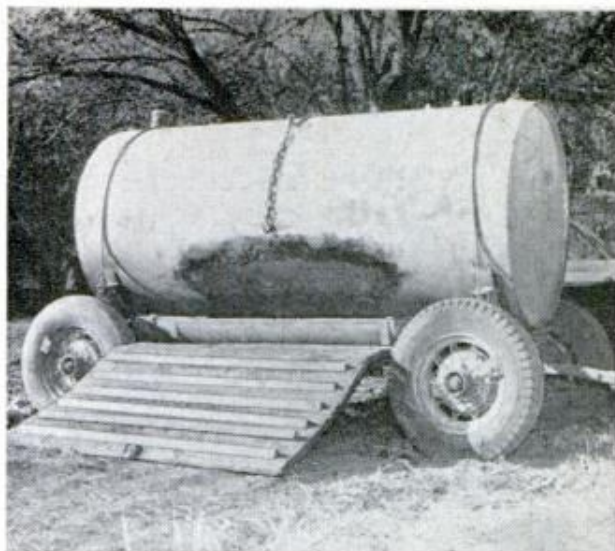
Things to remember, shop supplies to be purchased, one-minute sketches of projects in process or the planing stage, can be penciled on this doodle pad for ready reference. After you've purchased the adding-machine roll which is used as the paper supply, making the rest of the pad is a simple one-evening project. Plywood serves as a base and it's made so that the complete pad can hang on the wall or sit firmly on a bench. Note that both sides of the base are notched for supports, or bearings, which carry the paper roll. Aluminum strips, one serving as a paper hold-down and providing an edge for tearing off, the other as a guide to align the paper strip as it comes off the roll are bradded to the base. Nothing is critical about dimensions or fit of the parts and the sweep of the curves can be anything that suits your fancy. The pad also comes in handy for jotting down the week's grocery list. Hang it on the kitchen wall.



FARM TIMESAVERS

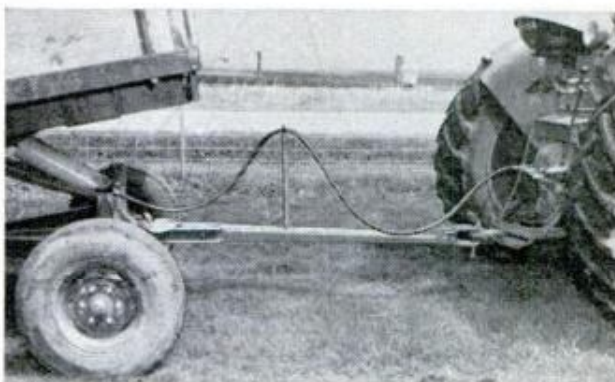
Up the Ramp

This portable hog waterer has a swing-up ramp made nonslip in any weather by lengths of steel angle inverted as pictured. The ramp is held in the up position by means of a chain. The water trough is supported on a welded-steel framework alongside the supply tank and is fed by a float-controlled valve. This arrangement makes for fast, easy transport to and from the lot when the tank is empty, also for tractor transport from one location to another to prevent the formation of mudholes around the waterer.—*Paul D. Andre*



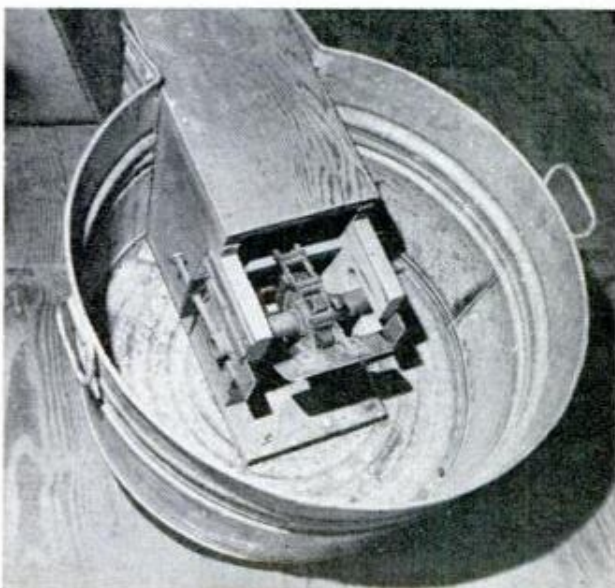
Spring Support

There's no chance of the hydraulic hose connecting the tractor with the lift cylinder being damaged or pulled loose when it's carried on this support which is a heavy coil spring from an old cultivator, one end being bolted to the trailer drawbar as pictured. A steel ring is welded to the top end of the spring and the hose passed through it. Spring will return to original position if struck or pushed sidewise.



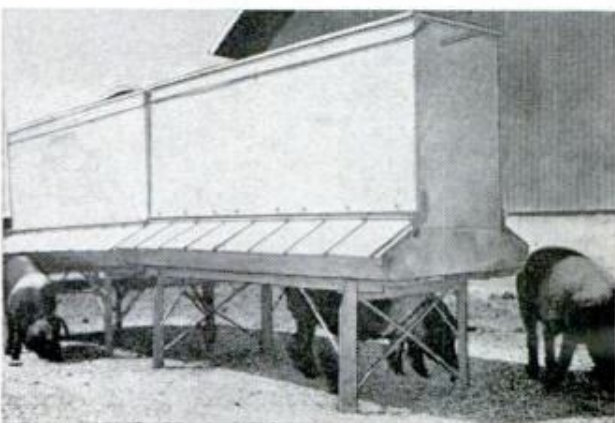
Washtub Hopper

An ordinary washtub forms the hopper for this homemade small-grain elevator. Note that the tub is cut away on one side to permit the lower end of the elevator to drop into the opening. The cut sides of the tub are bent outward and nailed or screwed to the wood sides of the elevator chute to form a grain-tight joint on both sides. The tub is just the right size to catch a scoopful of grain without spilling and the elevator flights pick up the grain without scattering it about. If the tub is required to support all or nearly all the weight of a fairly long elevator chute, it may be necessary to reinforce the bottom with a disk cut from flat steel.—*Wayne Floyd*



Feedlot Cafeteria

By mounting hog feeders on angle-steel frames, or stands, one livestock feeder found that cattle soon learn to raise the tilting lids of the hoppers and reach the feed or concentrate. The feeders hold several days' supply, saving time and preventing waste. The angle-steel frames are joined by welding stretchers and braces to angle steel legs. For easy tractor transport from one location to another, the legs might be fitted with channel-steel runners.—*A. M. Wettach*



PUT A BEND IN WOOD

Simple procedures that enable craftsmen to make almost any desired bend in bendable woods

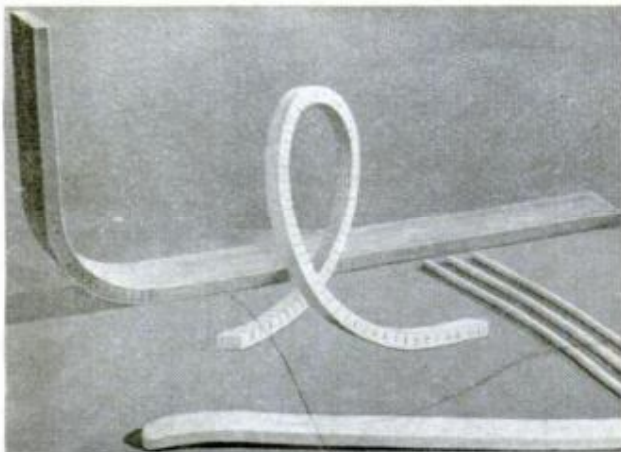
By Manly Banister



1. APPLYING HEAT with electric iron will cause $\frac{1}{4}$ -in. plywood to take a moderate bend. Fasten as you go

OFTEN YOU as a craftsman have admired a fine example of bent woodwork and said to yourself, "if I could only do that. . ." You can. Just look at the two photos below which picture examples of wood bending done with simple, inexpensive equipment that can be assembled by any craftsman. You probably already have some of the necessary equipment such as the household iron, shown in use in bending plywood in Fig. 1, or the radial saw and bandsaw used in kerfing, Figs. 7, 8 and 9.

2. SOLID WOOD can be bent by kerfing, steaming, boiling or with cauls. Bending by kerfing is well known to old-time carpenters, also cabinetmakers

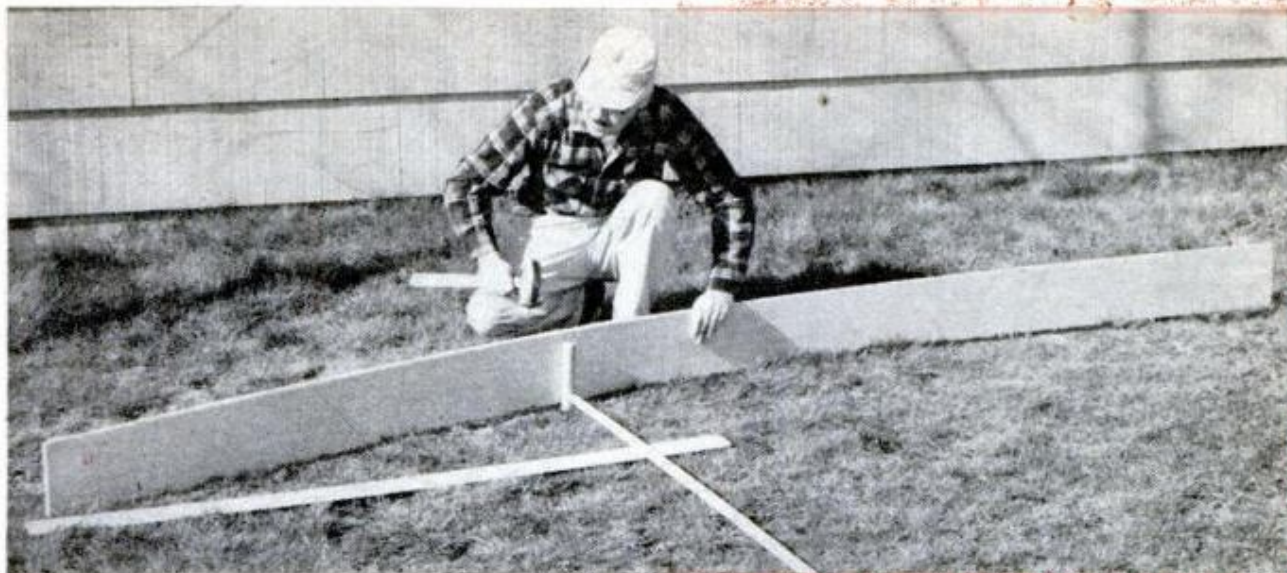


But for kerf bending you don't even need these power tools. Kerfing can be done with a backsaw, using a guide to make sure all the cuts are square across the stock and are made to a uniform depth.

Some kinds of wood bend more readily than others. For example, hickory which has been properly prepared by heating, soaking or steaming, will bend almost back on itself without splintering or breaking. Ash, properly prepared, will bend quite easily. This also is quite generally true of

3. AN EXAMPLE OF WOOD BENDING by lamination of layers of thin stock joined layer by layer with glue. Piece will hold bend even though left freestanding

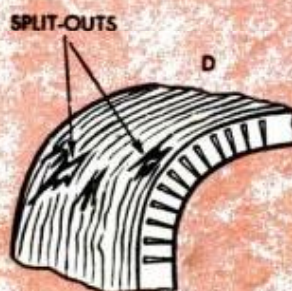
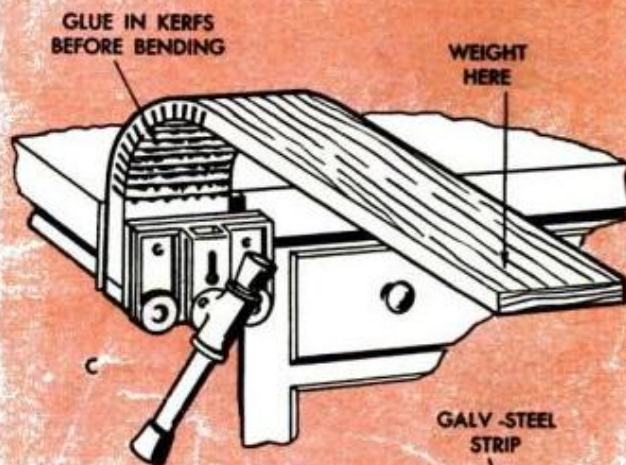
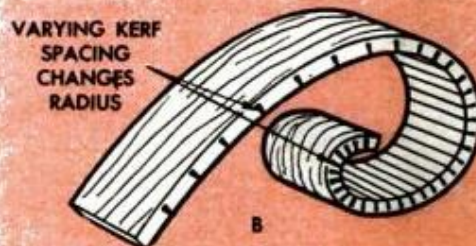
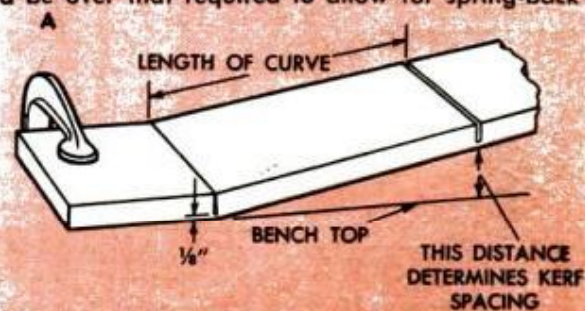




4. LONG STRIPS and even wide boards can be bent by soaking or heating part to be bent and staking on any level area in the yard until dry. Degree of bend should be over that required to allow for spring-back

the domestic oaks. On the other hand, the more dense, fine-grained woods such as birch and maple are more difficult to bend in the solid. If you build up to a required thickness by gluing and laminating thin strips of these woods, then bending is easily done by clamping the strips between shaped cauls, as in the various methods of caul bending, Fig. 18. You can put a sweeping bend in a long strip or board simply by soaking the piece and staking out in the yard as in Fig. 4.

Old-time carpenters and interior trimmers were familiar with the method of kerf bending, Fig. 5. The trick in obtaining the degree of curvature desired is in the spacing, number and depth of the kerfs. As you can see in Fig. 5, detail B, the curvature can be varied by spacing of the kerfs. And the bend can be easily held by applying glue in the kerfs before bending as in detail C, Fig. 5. To determine the space between kerfs you work from the known radius. The bend you plan to make is an arc of a circle. First, determine the circumference of the circle. Then divide 360 by the number of degrees that will be included in the bend (arc). As an example, for a right-angle bend divide 360 by 90. The answer, of course, is 4. Divide the length of the circumference by 4 and the answer will be the length of the curve you desire. Mark this distance, or length, on the work where the curve is to be and make the first kerf at one end of the portion that is to be curved. Then clamp the board to a table or bench as in A, Fig. 5, also Fig. 6. Raise the end opposite the kerf until the edges of the kerf meet. Then measure the distance from the lower edge of the board (a second kerf is shown in detail A at this point) to the bench top and you've got the spacing of the kerfs for that particular job.

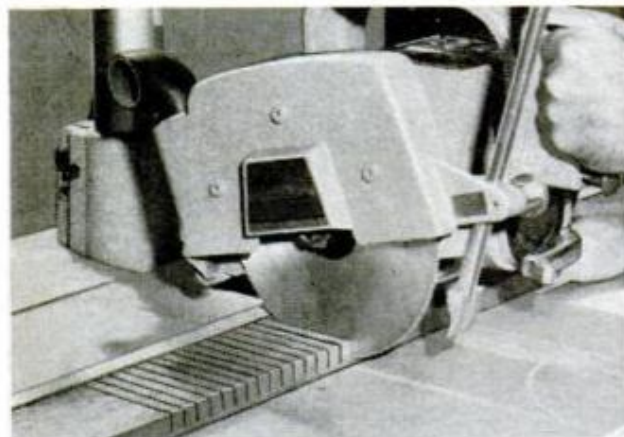
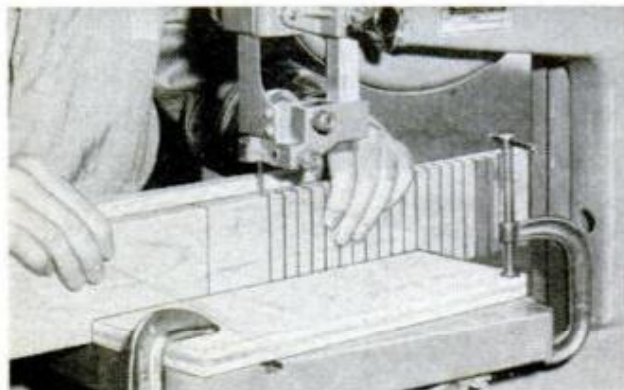


5 KERF BENDING



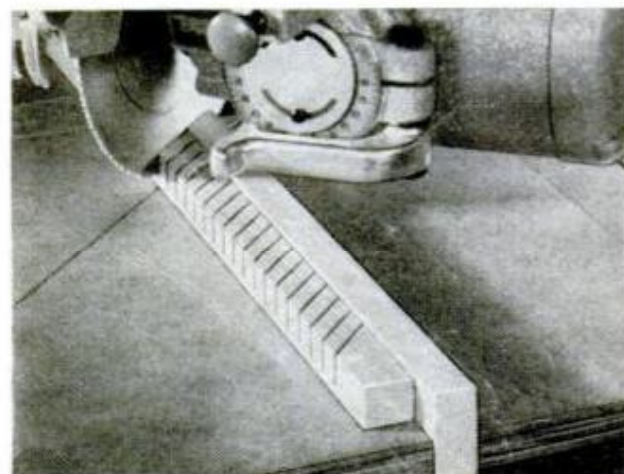
6. METHOD OF MEASURING spacing of kerfs. Raise stock until kerf at left closes. Then measure as shown

7. KERFING is easily done with a bandsaw. Note guide is set at slight angle so stock will clear frame



8. KERFING also is easily and quickly done with a radial saw. Here spaced kerfs are cut square across

9. KERFING STOCK at an angle results in an advancing spiral bend like in center of photo, Fig. 2



Kerfing at an angle with the center line of the work, Fig. 9, will give you an advancing spiral form of the type shown at the center of the photo, Fig. 2. In making a right-angle bend, or when making a fairly sharp bend past a right angle, you may have trouble with split-outs on the convex face, Fig. 5, detail D. This usually can be overcome by strapping with a strip of galvanized steel as in Fig. 5 detail E, also detail B, Fig. 18. The metal strap must extend the full length of the work and be clamped at the ends before the bend is made. As the work shortens in bending, the strap will be drawn very tight. This will prevent any split-outs by forcing the surface fibers to take the bend. After the work has thoroughly dried and the fibers have taken a set, split-outs are unlikely.

Plywood, $\frac{1}{4}$ in. and less in thickness, can be made to take a bend quite easily by alternately sponging and ironing a small area as in Fig. 1. The material is nailed or screwed in place as you go. Apply pressure and keep the iron moving so that its heat is distributed as uniformly as possible over the sponged area.

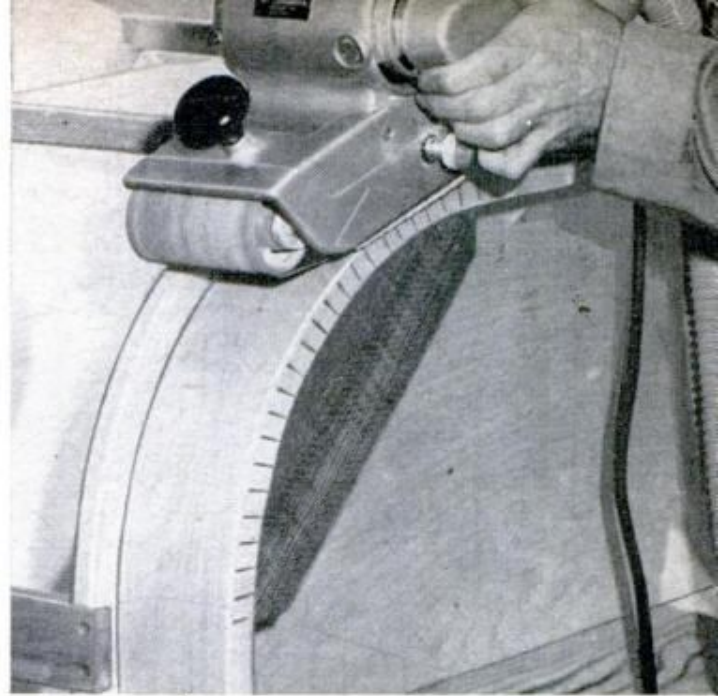
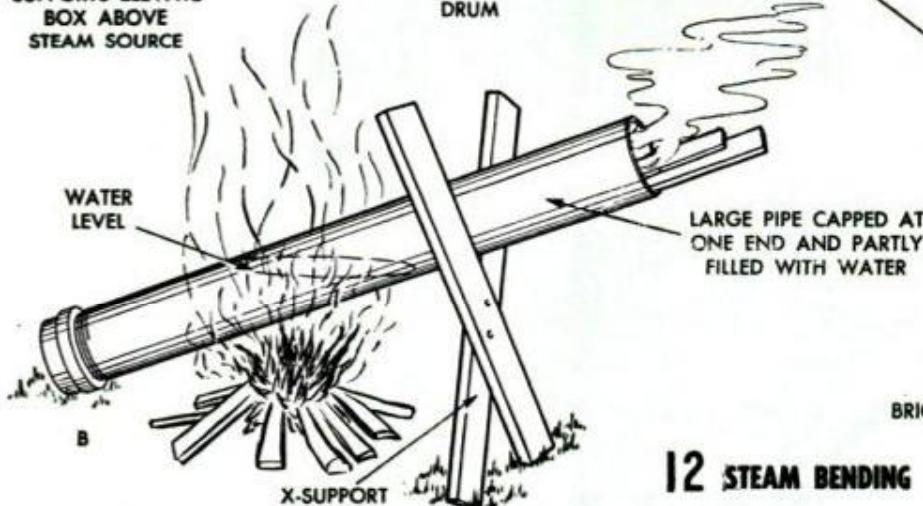
Short strips of any of the bendable woods, also sections of long strips such as boat chines, can be bent by steaming as in Fig. 11 and in Fig. 12, details A and B. Anything you can devise from materials at hand which will partially confine the steam will serve the purpose. Fig. 11 and detail A, Fig. 12 suggest methods of steaming small pieces. Although necessarily rather crude, both methods are, nevertheless, effective. Note that in both units steam is generated in a separate container, or "boiler," and piped to the steam box. A length of box gutter or a length of square downspout is excellent for steaming long pieces. If a gutter is used it should be covered with a straight board or sheet metal and the ends closed with slip-type fittings. A long wooden box, detail A, Fig. 12, is quite as effective as it can be made any practical length. These units should never be made steam-tight as this will serve no useful purpose.

Another simpler method of steaming small strips is shown in detail B, Fig. 12. Anything that will hold water, or that can be made to hold water, will do—a length of pipe capped at one end as shown, tubing closed at one end, or even a three or four inch vent pipe sealed at the joints and capped. Still another method is detailed at C in Fig. 12. Here the stock is subjected to boiling water for twenty minutes to a half hour. Use a 55-gal. drum for long pieces, an ordinary wash boiler for short strips.

While boiling or steaming, especially in a wash boiler, the process should be closely watched. Don't permit the container to boil

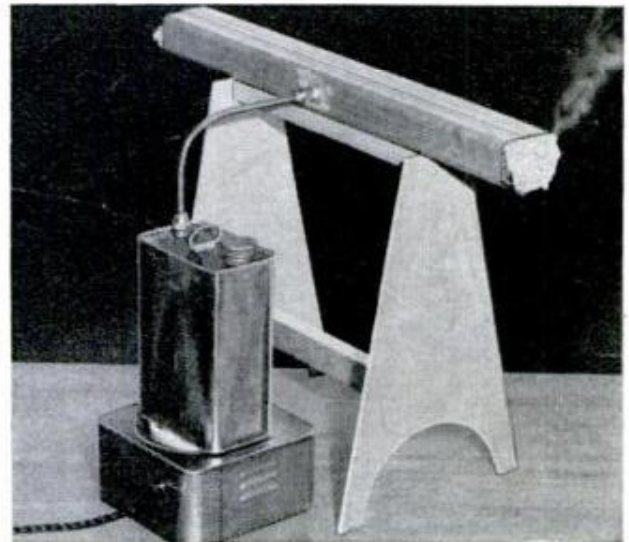
dry as the work may be ruined. Softer woods will be ready to bend after about thirty minutes of steaming or boiling. Harder woods may require up to an hour or more. Steaming affects the natural color of most bendable woods very little but boiling tends to darken some woods more or less permanently. Small pieces of most of the bendable woods can be bent satisfactorily if merely soaked overnight in a wash boiler or any watertight container. In any case once the soaked, boiled or steamed wood is removed from the steam box or other container it should be bent to the desired shape immediately. That means that the cauls, patterns, clamps, metal straps and any other equipment to be used must be at hand so there will be no loss of time getting the prepared pieces bent and clamped in position. Once in place give the bent pieces plenty of time to dry thoroughly as otherwise there will be excessive spring-back, or straightening of the bend when you remove the clamps. Remember that there always will be a certain amount of spring-back even though the work is thoroughly dry. Any cauls or bending forms should always be made with this allowance, about three to five degrees.

Caul bending, Figs. 15 through 18, provides a means of bending either thin solid stock, the toboggan slats in Fig. 17 being one example, and the bending of panels or strips laminated from several thicknesses

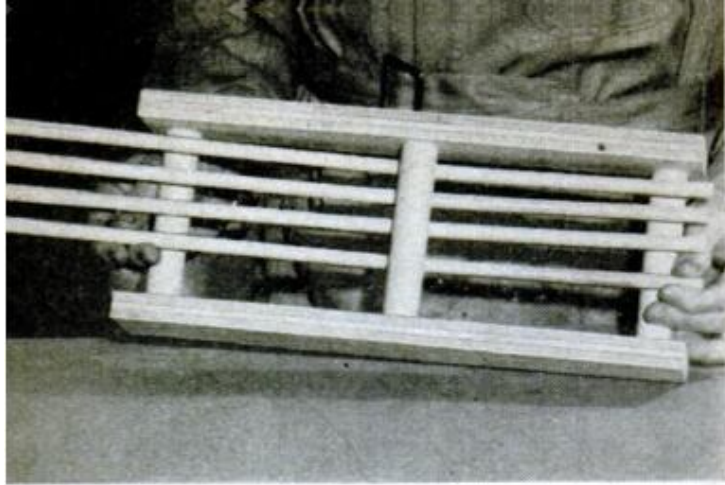


10. AFTER BENDING tension, or face, side of stock is finished by sanding. Be careful not to cut through

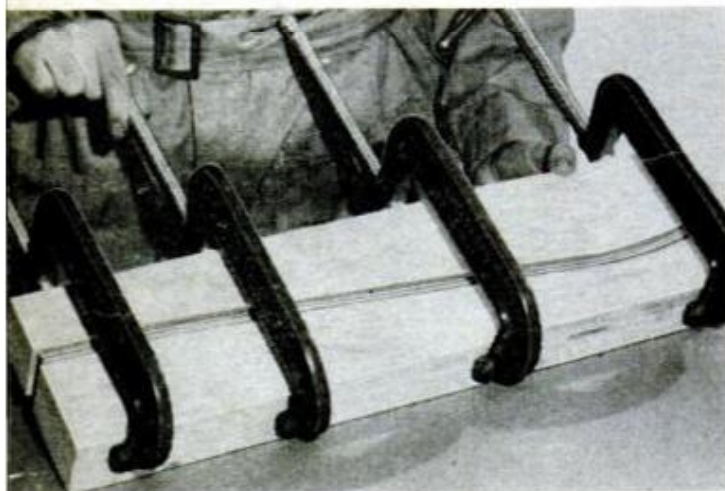
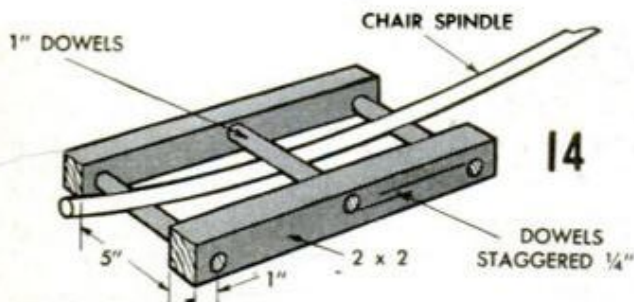
11. SIMPLE SETUP for steaming short strips of solid stock. Steam source is 1-gal. can serving as "boiler"



12 STEAM BENDING

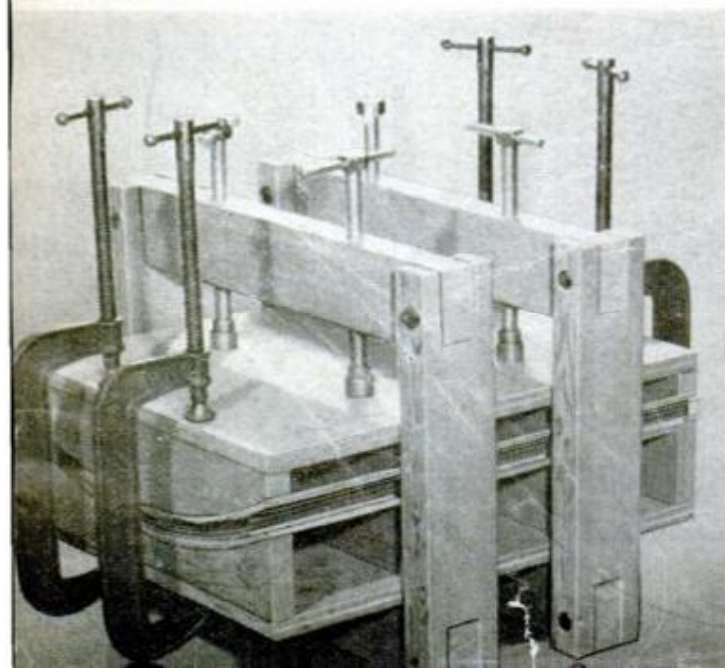


13. OLD METHOD of bending chair slats (or splats) and rounds. Stock to be bent is steamed or soaked



15. BENDING LAMINATED stock is best done with cauls built up from several thicknesses of plywood

16. CAUL BENDING of a panel, the laminations being joined with glue. When dry, panel will hold bend



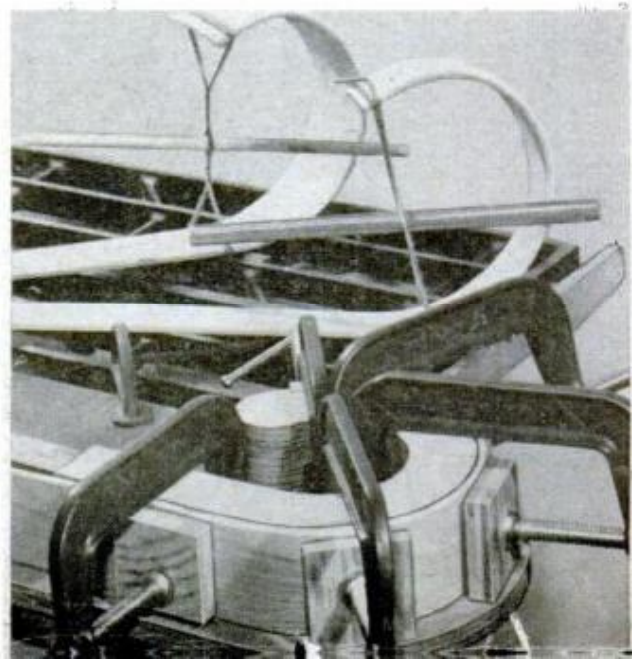
of thin material, Figs. 15, 16 and 18. Detail A, Fig. 18 is a common, workable method of bending a laminate, which consists of several thicknesses of thin stock (veneers in regular thicknesses can be used) glued together and clamped to the form as indicated. Detail B, Fig. 18 shows the method of making toboggan slats and similar bent parts, also pictured in Fig. 17. A reverse-curve bend can be cauled as in Fig. 18.

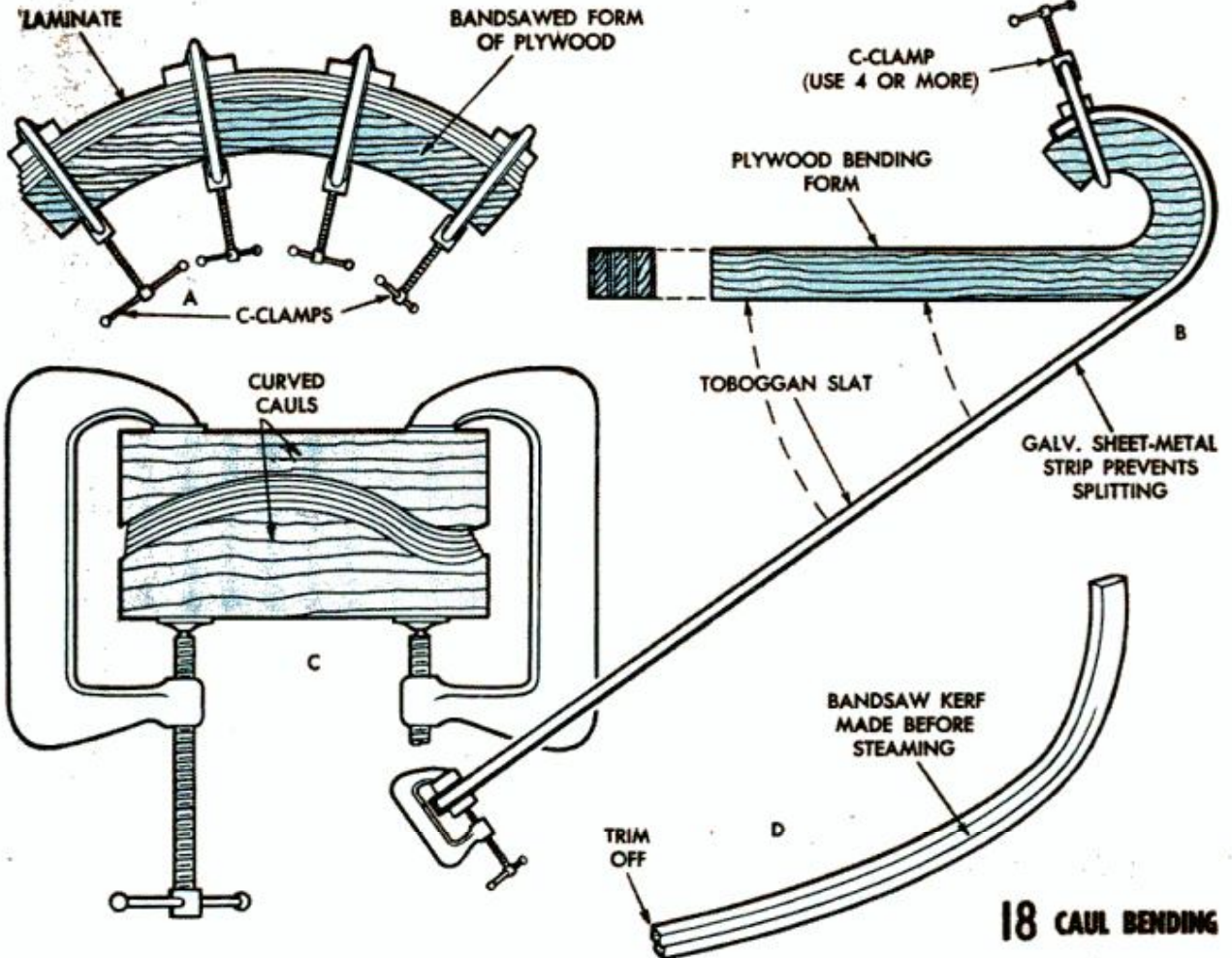
Material can be made to take an edgewise bend by first bandsawing a kerf on the center line as in Fig. 18, detail D, and then steaming and bending around a form. After the piece has dried on the form, the kerf can be opened and glue applied and the work clamped until dry. Details E and G show built-up cauls for laminating small panels, both convex and concave forms. When laminating stock in this manner, apply glue to the laminations and then drive a brad near each end as in detail F. This will prevent the laminations from shifting when the cauls are clamped together.

An old method of setting a bend in chair rounds (an example is the bend in the back rounds of the Boston rocker) is pictured in Fig. 13 and detailed in Fig. 14. Thin, flat stock also can be bent in this form, Fig. 14. When flat stock is bent in such a form, or bending jig, 1 x 2s with one face slightly rounded are usually substituted for the round dowels. Pieces so shaped give a more uniform bend in flat stock.

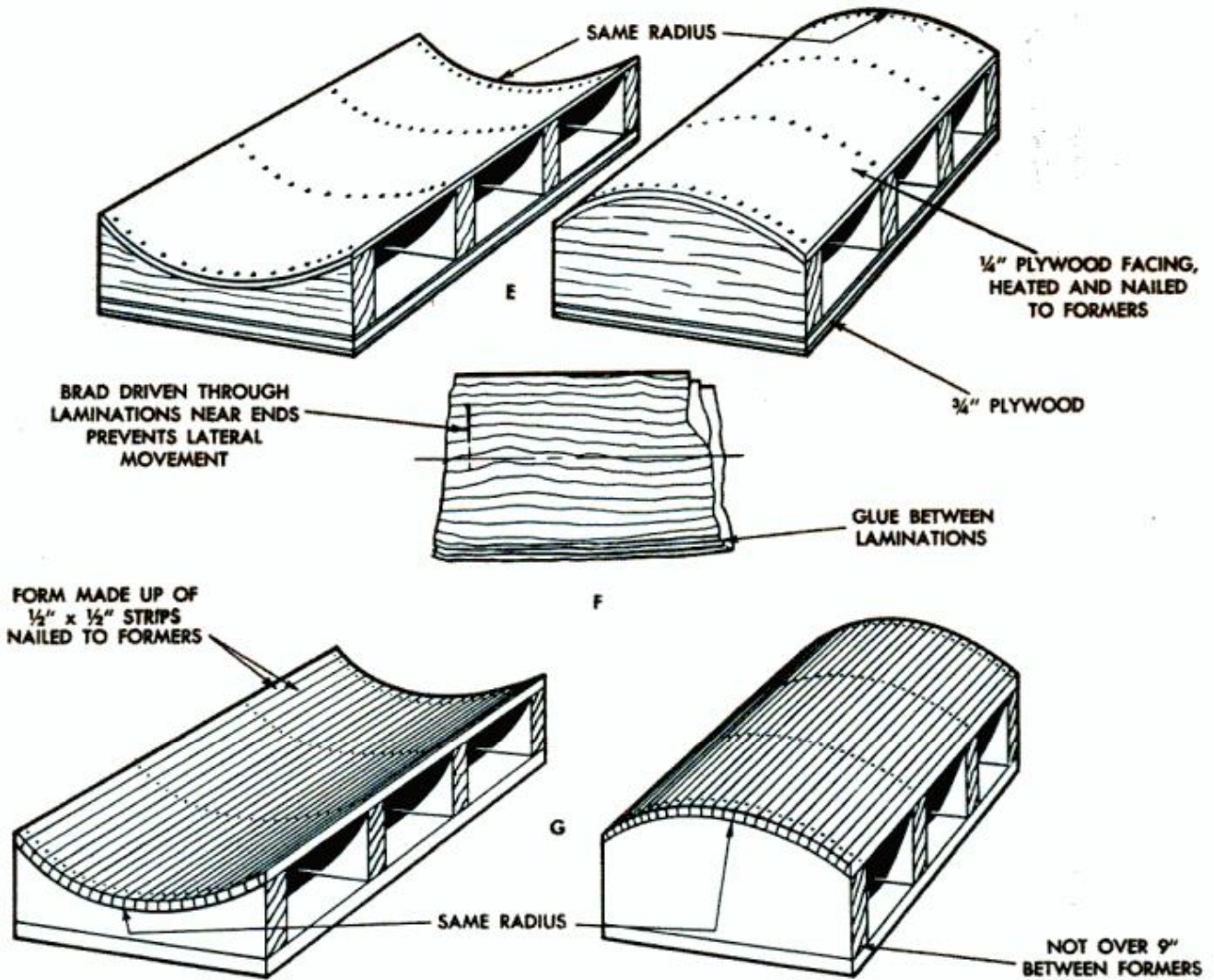
Domestic woods which can be made to take a bend quite easily by the methods outlined include ash, hickory, elm, birch, maple, red gum, oak and beech. Of these only ash, hickory and elm will take the more extreme bends. Only straight-grained stock in any of these woods is suitable for bending. Only the fir plywoods can be bent moderately by use of heat. ★ ★ ★

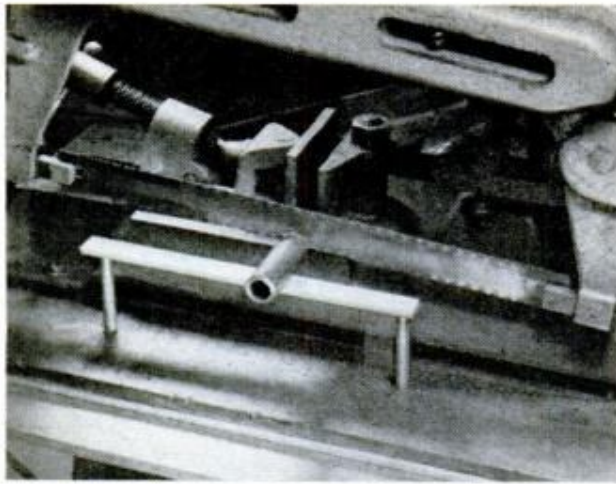
17. FORM BENDING, a method commonly used to produce toboggan slats requiring extreme bends





18 CAUL BENDING

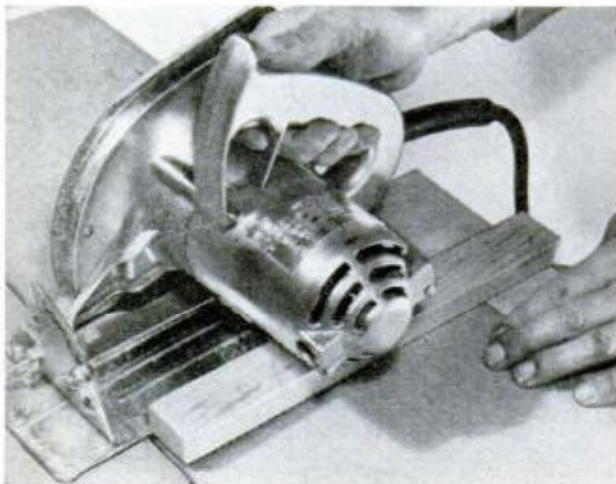




SHOP SHORT CUTS

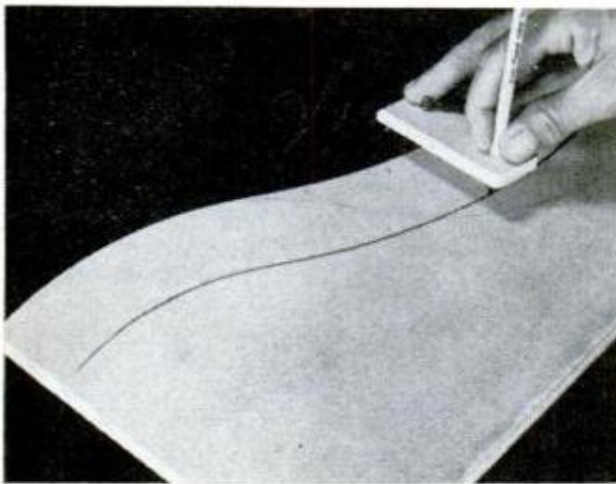
Hacksaw Work Support

When a short length of rod, tube or bar being cut off on a power hacksaw tilts down without separating, you can prevent cutting into the upturned end with a simple work support. It consists of a steel bar, supported at its ends by two pieces of tubing so the top of the bar will come level with the work-supporting surface of the saw. Long nails pass through holes in the ends of the bar, through the tubes and into the wooden saw table—*Walter E. Burton*



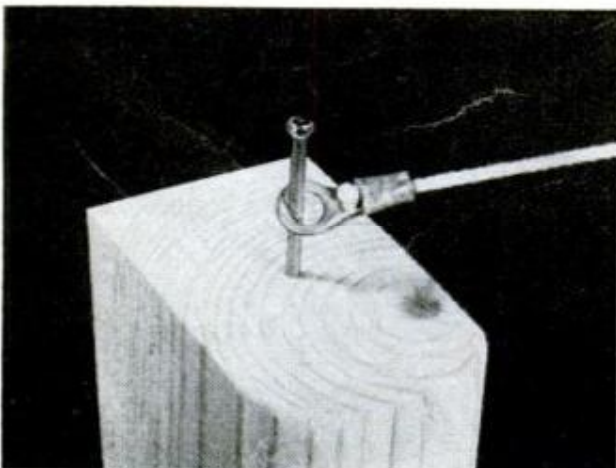
T-Square Saw Guide

When you are making duplicate angle cuts with a portable electric saw, such as on stair stringers, or when cutting off duplicate pieces, the guide shown assures accuracy. It consists of two wooden strips nailed together firmly at the desired angle. The one shown is a T-square for making right-angle cuts. The bed of the saw is run along the edge of the guide while holding the head firmly against the edge of the stock being cut. Part of the head on saw side projects only the distance from edge of the bed to blade.—*Jackson Hand*



Parallel Curves

This marking gauge enables you to duplicate accurately either regular or irregular curved edges. It's just a short piece of wood with a pencil hole drilled at one end and a nail driven through the other end. The nail rides against the edge of the stock being marked. The pencil should fit the hole snugly and should be pointed on a pencil sharpener. An advantage of this arrangement is that the nail, unlike a regular marking gauge, gets into tight corners and radii—*R. J. DeCristoforo*



Chalk-Line Terminal

Cords that are used for measuring or for laying out flagstone terraces, sidewalk forms, and similar purposes, can be improved both in their utility and in their appearance by providing the ends with wire terminals. The best kind for this purpose are those that grip small insulated wires firmly, and therefore can be clinched on chalk lines and cords of similar thickness. They will keep the ends of the cords from fraying. The eyes of the terminals should be large enough so that they can be slipped over the heads of 8d. nails.



CARRIED WITH EASE, this little vacuum cleaner quickly removes all traces of sawdust from woodworking tools

Shoulder-Hung SHOP VACUUM

By Harold P. Strand

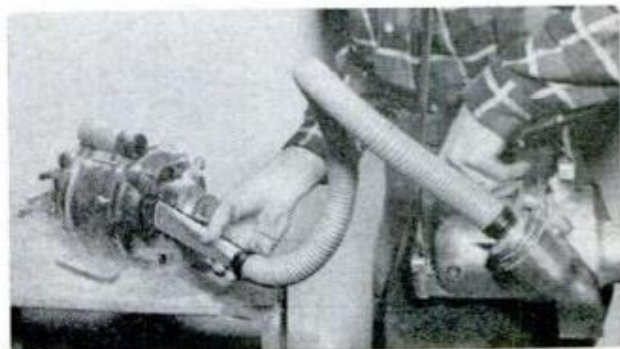
SHOP SAWDUST, shavings and dirt are disposed of quickly with this handy, shoulder-hung vacuum cleaner, which has considerably more power than the average small, portable cleaner and also serves as a blower to dislodge dirt that you can't pick up with the vacuum. Although a number of old vacuum cleaners can be converted to serve this purpose, one make that is particularly easy to convert is an upright Universal which was very popular a few years ago. Information that follows pertains to this make.

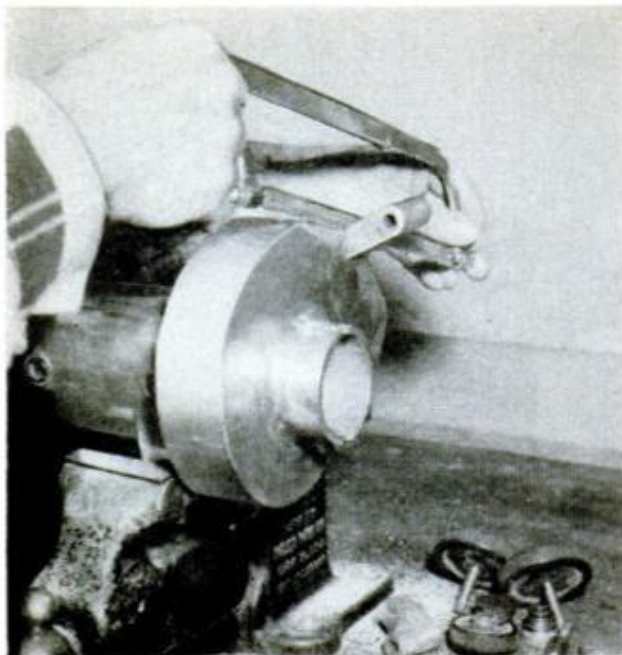
Examine the accompanying illustrations carefully so that you'll recognize the make and model easily when shopping around.



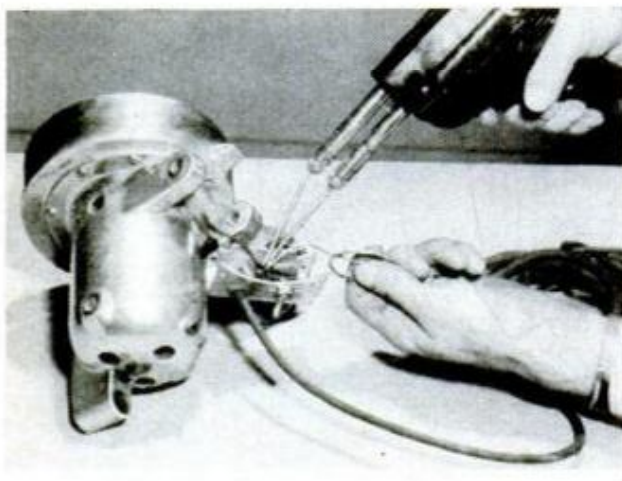
QUICK CONNECTION of the hose to outlet port of the unit before using it as blower to clean out crevices

BLOWING AWAY dust and chips from motor with blast where the dirt cannot be dislodged by suction

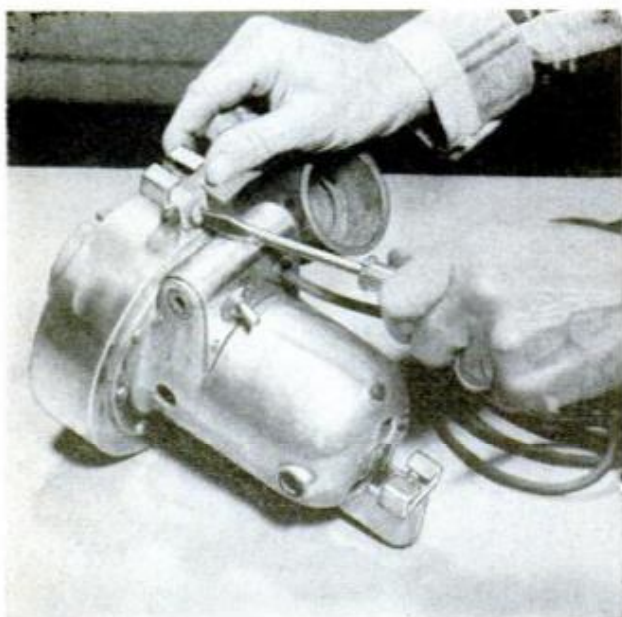




WHEEL SUPPORTS are first cut off with a hacksaw after which stubs are filed flush with housing surface



ELECTRICAL CONNECTIONS between motor leads, cord and switch are soldered before closing the box



STRAP-SUPPORT BRACKETS with straps riveted to them are attached with screws. Unit is ready for use

It has two wheels on the fan housing, a caster at the rear, and two supports on top to which the handle is attached. The adapter fittings on the bag and on the front or intake hood fit either intake or outlet port, permitting a quick change from suction to blower.

The following minor changes are to be made: (1) Remove the wheels and the caster; also the wheel supports but not the caster support. (2) Make a terminal and switch box to fit over the handle supports. (3) Make a smaller dust bag as shown in upper drawing details. (4) Provide a strap held by two brackets. (5) Fit a length of plastic-covered, vacuum-cleaner hose to the old dust-bag adapter ring and to a nozzle that you make of sheet metal.

After removing the handle, wheels and caster, saw off the front-wheel supports and file down the stubs smooth while the housing is held securely between brass or copper pads in a vise. Form the terminal and switch box from a piece of sheet aluminum to fit snugly over the handle supports and against the housing. Drill two holes in the box, one for a toggle switch and one for a rubber grommet to protect the electric cord. The box is attached to the supports with machine screws driven into tapped holes.

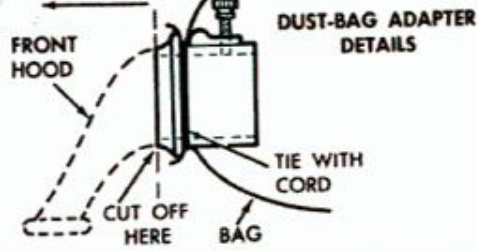
Making the Dust Bag

An old dust bag in good condition can be cut off to shorter length or you can make a new bag by sewing together two pieces of closely-woven black drill cloth or cotton gabardine. Hem a cord in at the large opening to hold the spring clip in place. The small opening should fit snugly over the adapter end of the front hood after cutting off the unwanted portion. Slip the retained portion through the hole when the bag is turned inside out. Then wrap a few turns of cord tightly over the cloth just behind the shoulder of the adapter, tying the ends, and then reverse the bag.

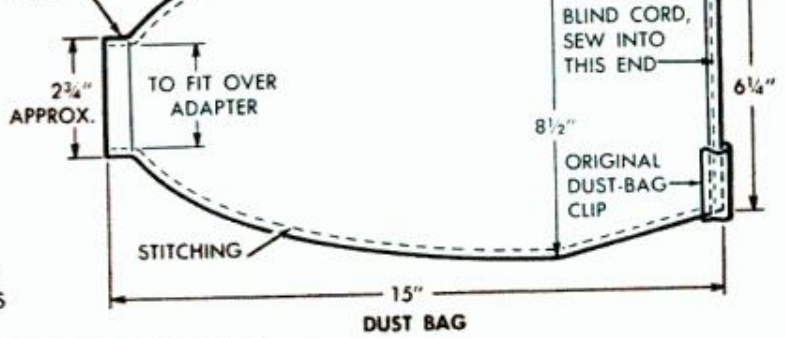
One of the two strap-support brackets is attached to the original handle stop, and the other is held by a bolt passed through the original caster support. The strap can be a man's leather belt cut to convenient length. The ends are slipped through the brackets and riveted.

The hose may be a portion of a discarded one. Drawing details show how it is provided with fittings for attachment to the old bag adapter. Some black plastic tape can be wrapped over the end to help hold it and make a neat joint. The nozzle should fit snugly inside the other end of the hose. In addition to the nozzle you can make other fitting as shown in the lower right detail of the drawing.

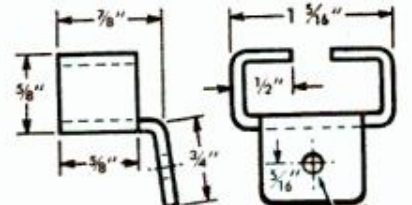
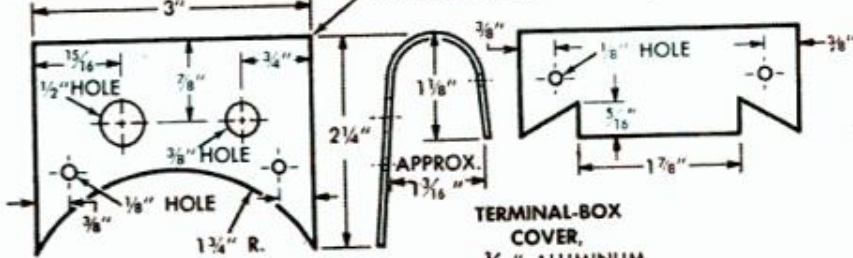
AFTER TYING, PULL BAG OVER ADAPTER IN THIS DIRECTION



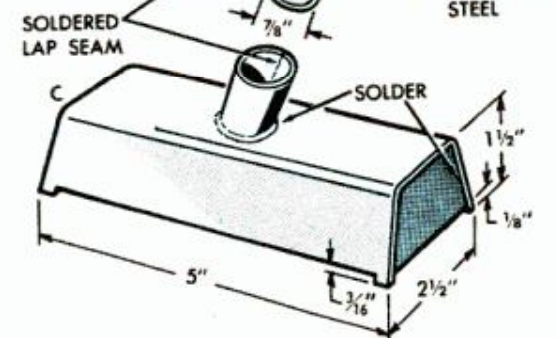
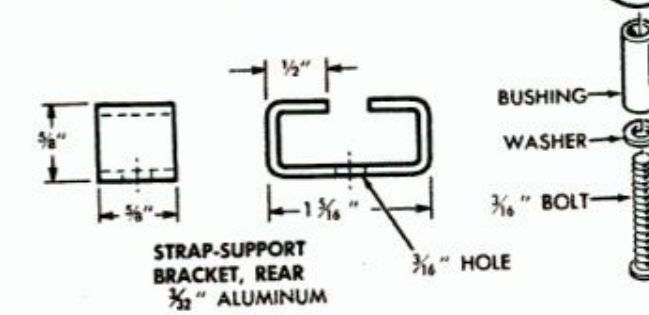
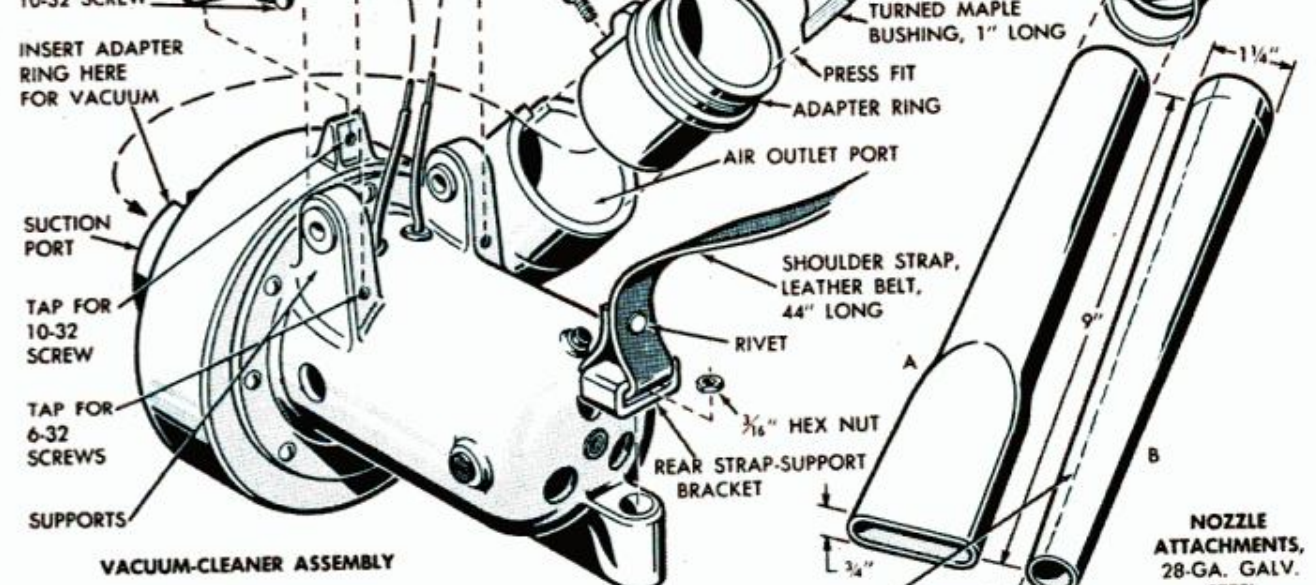
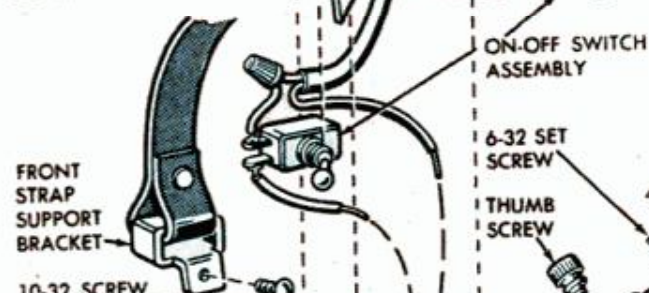
TIE OVER NECK OF ADAPTER HERE

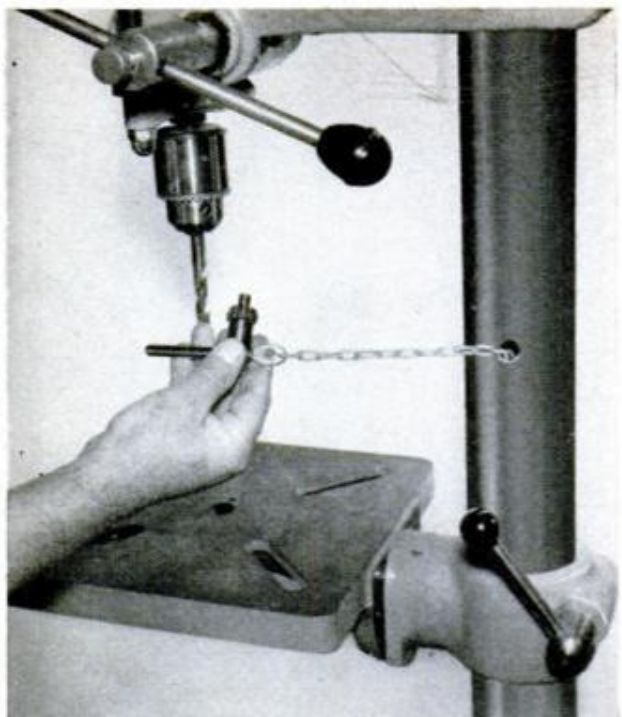


CUT AND SHAPE TO FIT SUPPORTS



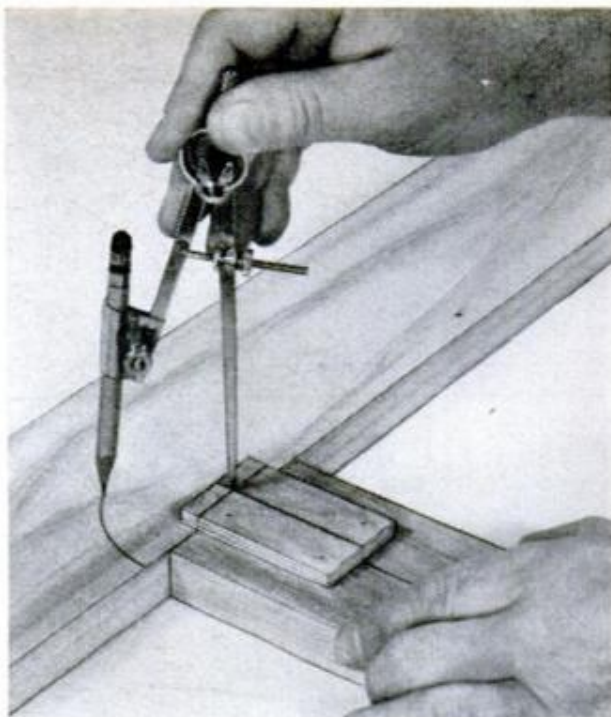
STRAP-SUPPORT BRACKET, FRONT
3/32" ALUMINUM
NO. 11 DRILL





Wrench Tether

Put that chuck wrench on a ball and chain and you'll always have it within easy reach. What you do is drill a hole through the drill-press column large enough to take a small link chain. Drill this hole at a point about 2 in. below the lower end of the chuck when it's in the retracted, or up, position. This will permit raising the machine table as high as necessary to reach any small part to be drilled without interference from the chain. Attach one end of the chain to a 10 or 12-oz. weight, drop the free end of the chain into the column and fish it through the hole. Then drill a small hole through the flat on the end of the wrench handle and attach the end link to the wrench. From that point on your chuck wrench is always at hand.—*Floyd L. Fisher*



Compass Point

Scribing a 180-degree arc from the edge of the stock just isn't done without this jig, which enables you to set the point of the scriber precisely on the edge of the material. It comes in handy when you're laying off a scalloped edge or any similar job requiring the scribing of 180-degree arcs from the edge. Just cut a short length of stock of the same thickness as the material on which the arc is to be scribed. Then tack a short piece of 1/4-in. plywood near one end, the end of the plywood piece overhanging 1/4 to 3/8 in. Scribe a center line on the plywood piece and another line perpendicular to it and flush with the edge of the thicker piece. Then just butt the jig against the stock, set the compass point on the intersection of the lines.—*William B. Eagan*

COMING UP NEXT . . .

CHRISTMAS TOYS AND GIFTS. It's that time again. Santa has allotted PM 14 pages of nifty toys and gifts which he had a hand in designing but no time to build in his workshop. The selection—especially good this year—is presented in November so you'll have plenty of time to make one or all.

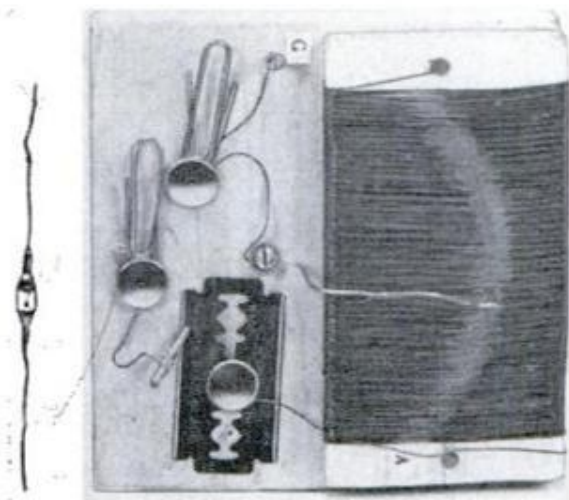
TEACHING MACHINE. Teachers and instructors who have examined this unit have called it the most practical teacher's aid they have ever seen. It's simple in construction and can be built by the dozen in the school shop. Look for it in the November PM.

INDOOR SHOOTING. All about setting up for indoor shooting with BB guns, CO₂ and air guns, .22s, and even big-bore weapons. How to set up an indoor range, build bullet stops and a special bullet trap. A PM sports feature for November.

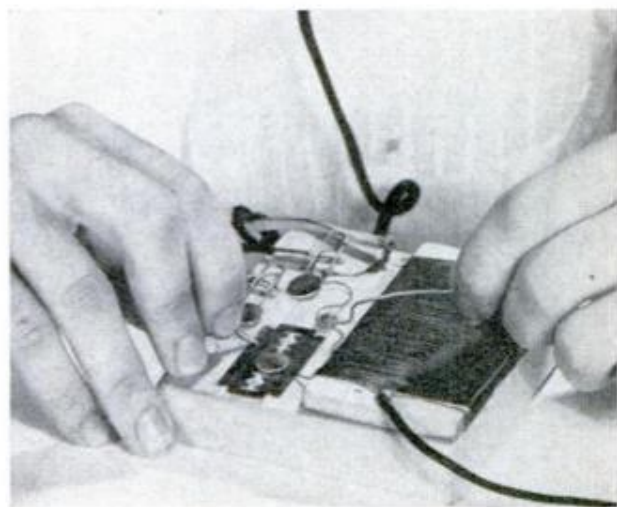
LATHE-DRIVEN BELT SANDER. Why not stop wishing for a belt sander and build one that mounts on your wood lathe? PM's shop feature for November details just such a unit. All you need are a 4-in. sanding belt, two hardwood rollers, a few pieces of plywood, eyebolts and corner irons.

RADIO TV HI-FI

ELECTRONICS



GERMANIUM DIODE, such as 1N34, shown at left, can substitute for razor blade to increase range



PROBE WITH PENCIL LEAD then adjust tuning arm for maximum volume. Result? Free radio—no batteries

RAZOR-BLADE RADIO

DURING WORLD WAR II, entertainment-hungry soldiers found that discarded razor blades could help them get around the shortage of personal radios.

Once they discovered that the quenched type of blade made a good detector, the rest of the construction was easy.

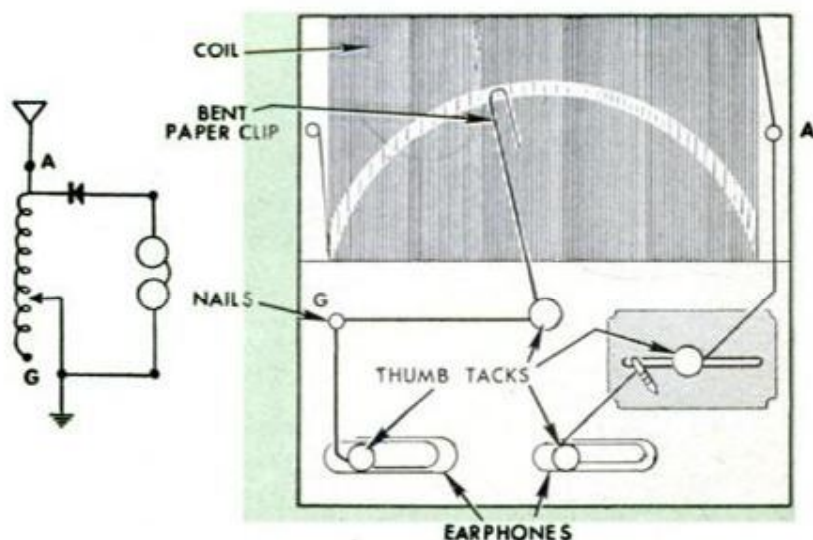
You can duplicate this bit of war-time ingenuity very easily. The result is a radio receiver that requires no electricity, and will pull in the local stations.

Use No. 26 or 30 magnet wire, wind a coil on a block of wood four inches long and two inches wide by a quarter-inch thick. Wind the turns as closely as possible. Scrape the

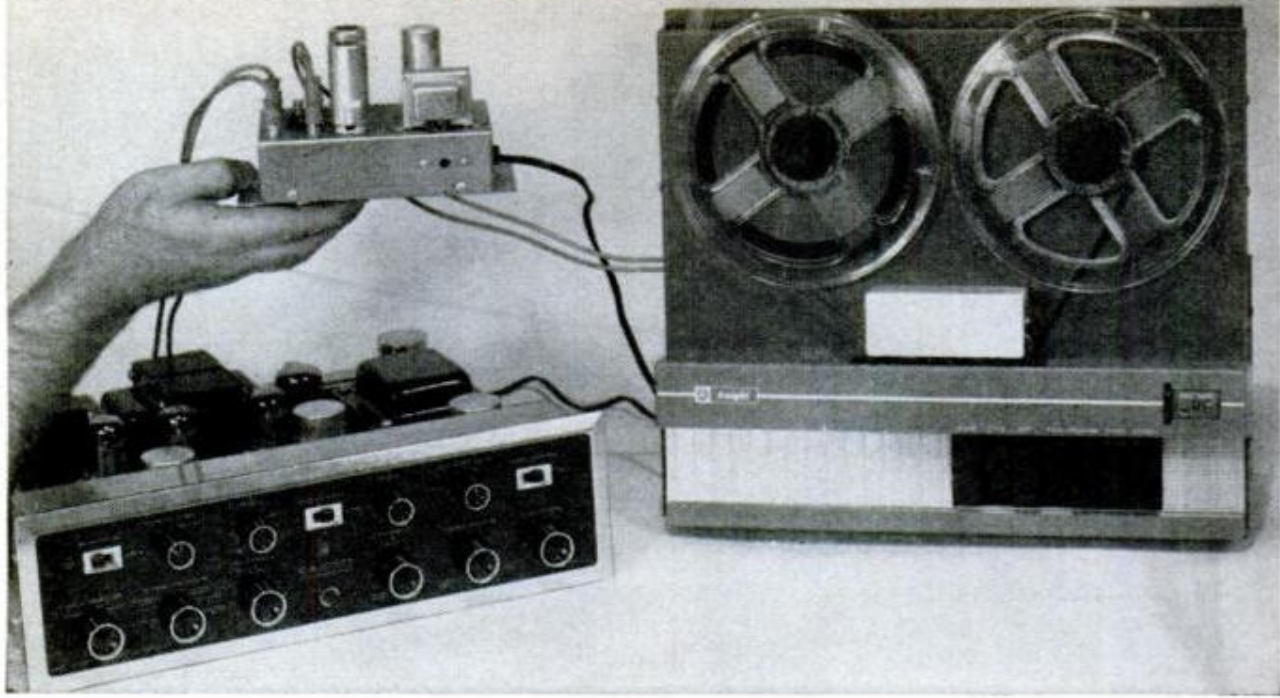
enamel from the ends of the coil and attach to the nails on the wood base. Scrape the enamel to form an arc as shown below. The probe is graphite from a lead pencil, and the antenna should be at least 50 feet long.

Move pencil lead around until a station is heard and then move the wiper arm across the coil till it is loudest. Use high impedance magnetic earphones. While reception will vary greatly with location, our set pulled in two stations from a distance of about six miles with the razor blade. Substituting the diode resulted in two additional stations and increased range to the extent of three more miles.—Joe Tartas

MOUNT THE COIL on four-inch square board; use nails for contacts. No soldering required. Razor-blade radio is a one-evening project. During World War II, the GIs used bayonets buried to the hilt in moist earth for a ground connection. You can use a water pipe for a connection



X256 M



Stereo Preamp for Magnetic Pickups

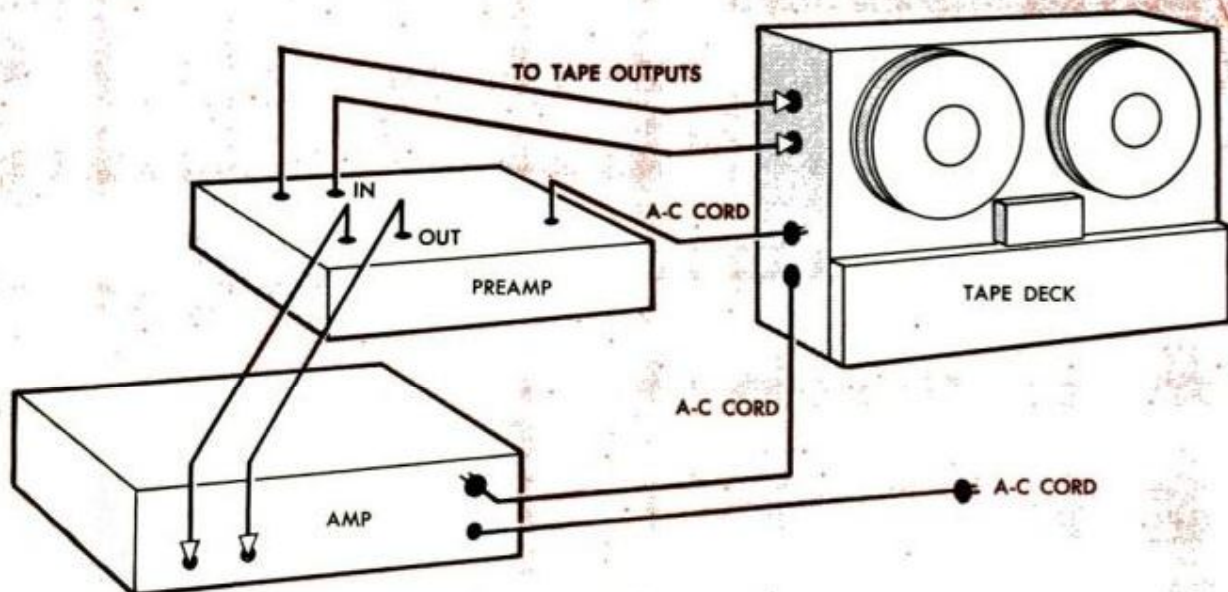
IF YOUR phonograph provides you with almost as much scratchiness as it does music, it could very well be that you have a crystal or a ceramic pickup. The pickup translates the information in the record grooves to electrical impulses, and crystal or ceramic pickups provide an output of about three to five volts. On the other hand, a magnetic pickup will provide an output measured in millivolts, so less surface noise of the record is picked up.

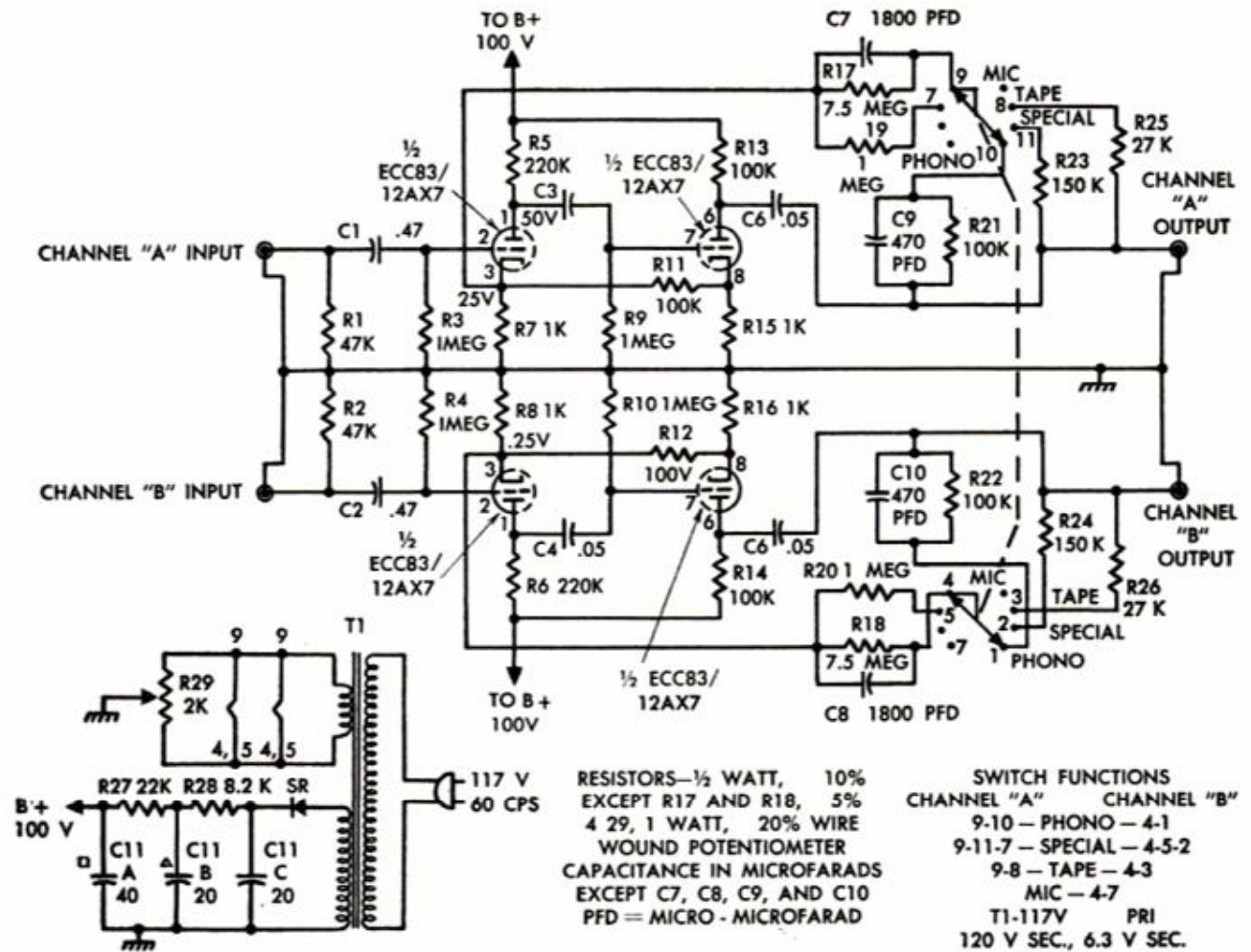
While using a magnetic pickup thus results in less scratch, the voltage must be preamplified before you feed it to the amp-

lifier. The unit described here will give that extra boost to various magnetic playback devices, such as phonos, tape or microphones.

In constructing the unit, lay out the chassis and punch all holes. Mount the major components and proceed with the wiring. Use terminal strips where required to avoid crowding at lugs. When the unit is completely wired, insert the tubes and add decals to identify the various switch positions and sockets. We are now ready to test.

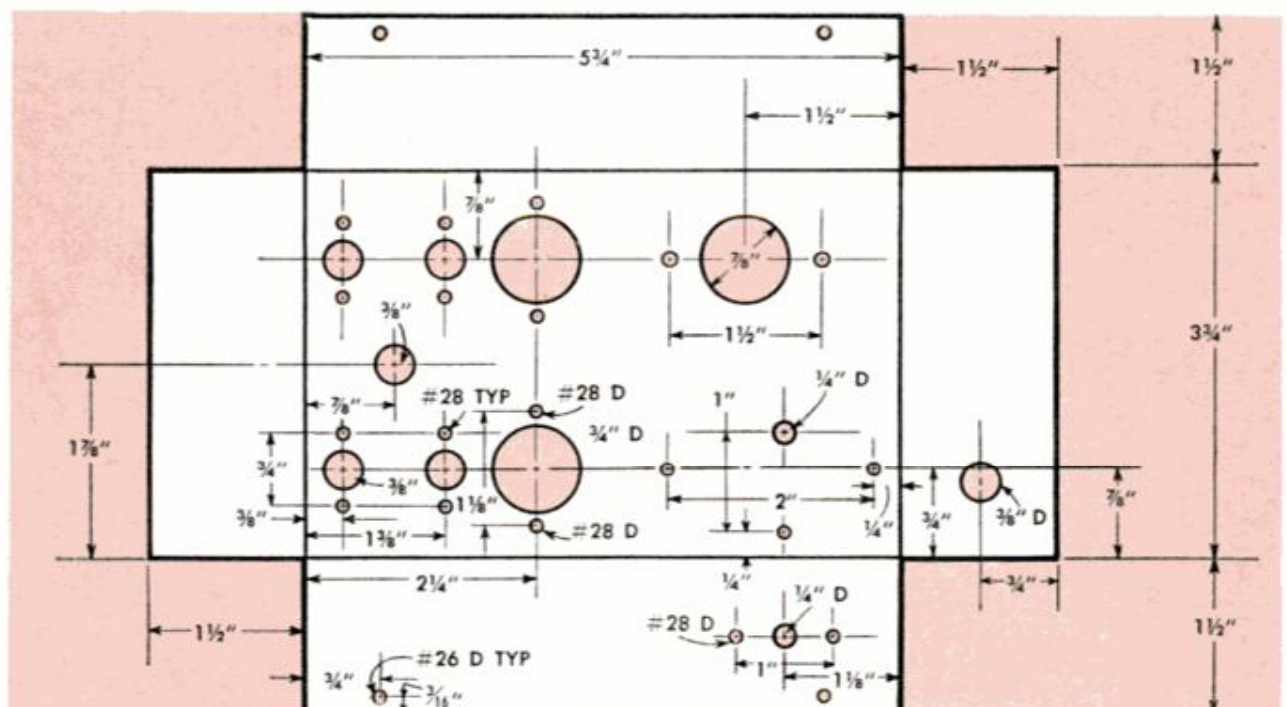
To test the setup, plug the magnetic sound source (we used a tape deck) into



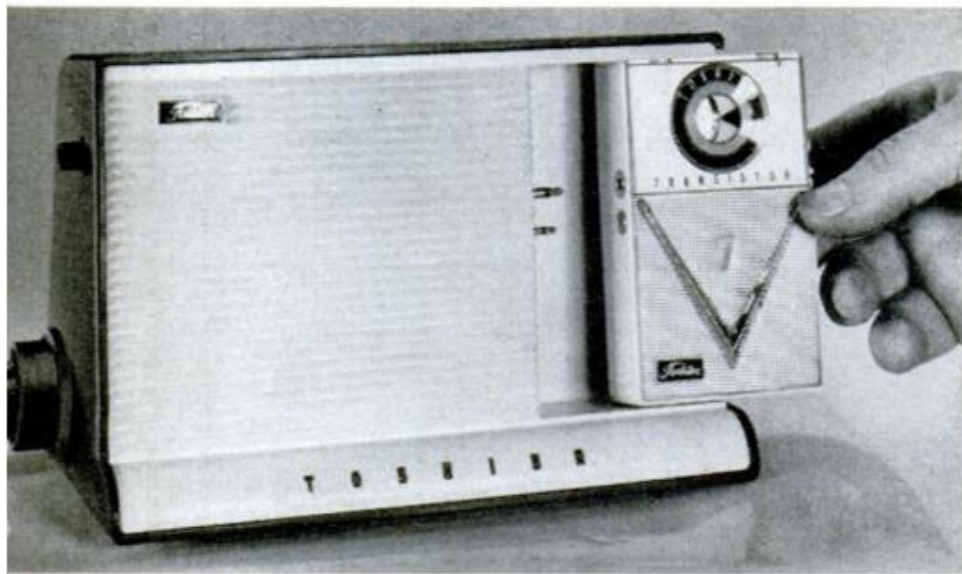


the input jacks on the preamp. Connect the output jacks to a basic amplifier. Connect the a.c. line from the preamp to a switched outlet on the tape deck. In this way, the preamp will be on only when the tape deck is on. The a.c. line from the tape deck can be plugged into a switched outlet on the basic amplifier.

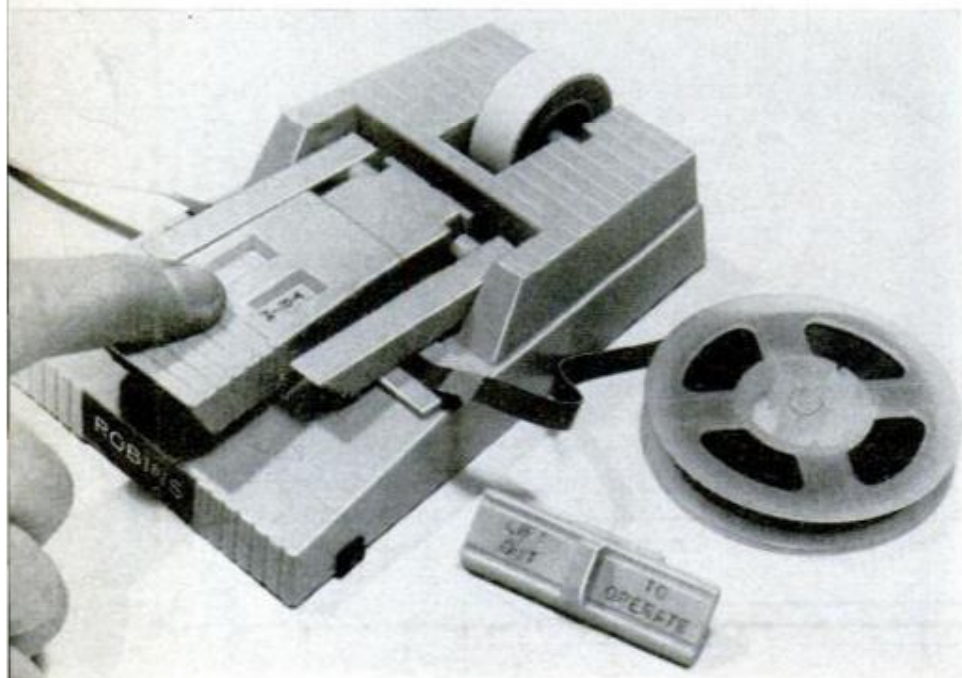
Start the sound source working. If you use a tape deck, put a tape on. If you use a phono, put a record on. Turn on the amplifier and the sound source. This will automatically turn on the preamp. The result should be nearly scratch-free, high fidelity sound. The small preamp can easily be mounted behind a panel.—*Otto Fried*



Electronically New...

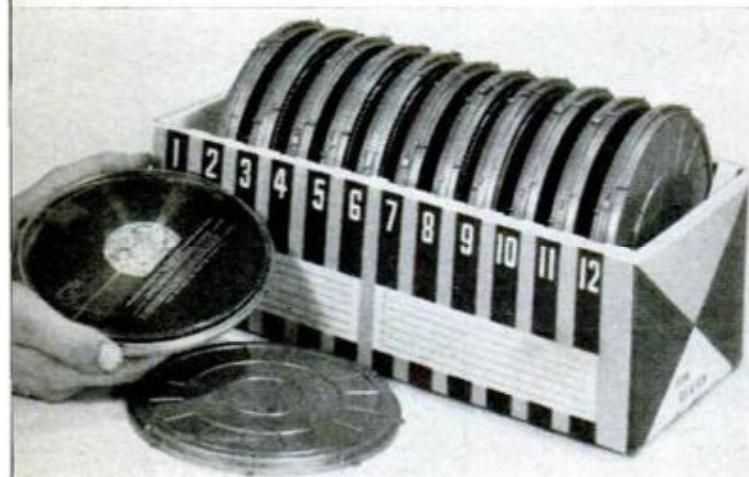


TWO-WAY RADIO doubles service. Shirt pocket model plays by itself, or can be plugged into a table adaptor which improves sound with larger speaker, saves batteries. A.C. battery saver is also available. \$34.95 for radio \$19.95, speaker cabinet. Transistor World, 52 Broadway, N.Y.

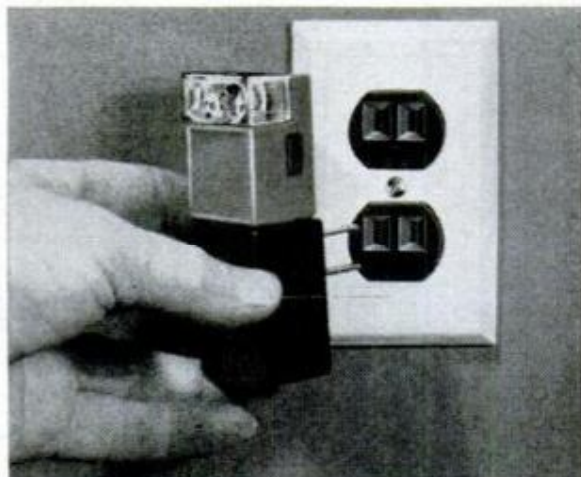


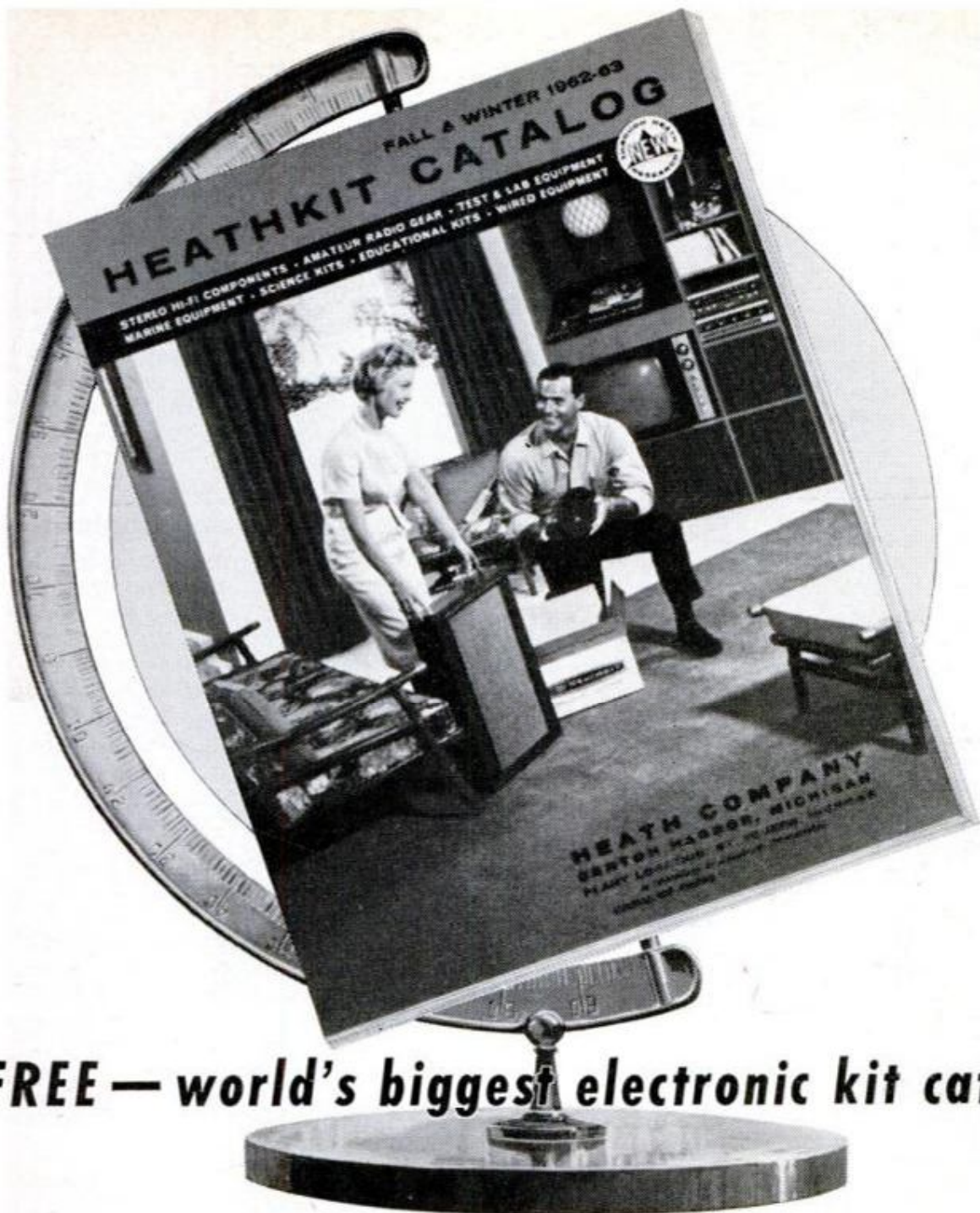
AUDIO TAPE SPLICER has many new features. Permits one holding arm to be raised while a tape is cut, windows indicate cut and trim positions. After cutting tape, unit trims slight waist to prevent cement ooze. Model Stereo 4 Deluxe, \$11.50, Robins Industries, Flushing, N.Y.

TAPE STORAGE CHEST keeps reels in order. Heavy cardboard case holds 12 plastic cans. Index on front permits easy selection. \$4.95 Lafayette Radio, Syosset, N.Y.



TWIN-BULB FLASHLIGHT has rechargeable battery, lasts up to five hours per charge. Dynatron, \$4.95, charger \$1.95. Polks, 314 Fifth Ave. N. Y. 1.





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CLINIC FOR HOMEOWNERS

Hiding Basement Columns

Q—I'm planning to finish our basement this winter and want to do a good job since the project will involve quite a bit of money. My problem is the round metal columns which support the center beam. No matter how much money we spend on paneling, floor tile, etc., the room will still look like a basement with those columns running down the middle. I am considering replacing them with wooden columns and staining these to match the paneling. Would this be practical?

—B.T., Conn.

A—A much simpler solution would be boxing in the metal posts. Make a nailing base by cutting two short lengths of 2 x 4 stock to the inside measurement of the proposed wooden column, add a semi-circular cut in the edge of each to fit around the post, and bolt these two pieces around the column.

Does Glass Insulate?

Q—A friend of mine from work told me that there is a big difference between the insulating properties of single and double-strength glass. He says that double-strength glass is far more efficient in stopping heat loss. I find this hard to believe, since we have double-strength glass in all our windows and they seem to admit a lot of cold during the winter. Is he right?—J.F., Mich.

A—The resistance of a pane of glass to the passage of heat is due not so much to the glass itself as to the air film on both sides. There is almost no difference in heat transmission between single and double-strength glass. Scientists have measured the surface temperature on each side of a pane of glass while raising the air temperature on one side 100 deg. above that of the other. With this 100-deg. variation, there was only a 2-deg. difference between the actual temperature of the two surfaces. Because of its sectional density, glass is not generally regarded as an insulating material.

Bugs in Wet Paint

Q—I painted our house this fall and ran into some trouble with insects getting stuck in the fresh paint. Is there any way to avoid this problem?—S.M., Ill.

A—Some painters mix a little insect repellent into the paint, and we under-

stand that this works quite well. However, we have some reservations about this procedure since it's possible that ingredients in some repellents might affect the durability drying time or color of the paint.

Try to schedule your painting during periods of settled weather. The drying conditions are usually ideal then and insects aren't as likely to be a problem, especially during the morning hours. With the right drying conditions, the paint should set enough so that it won't trap insects after an hour or so.

Ice Dams and Leaky Roofs

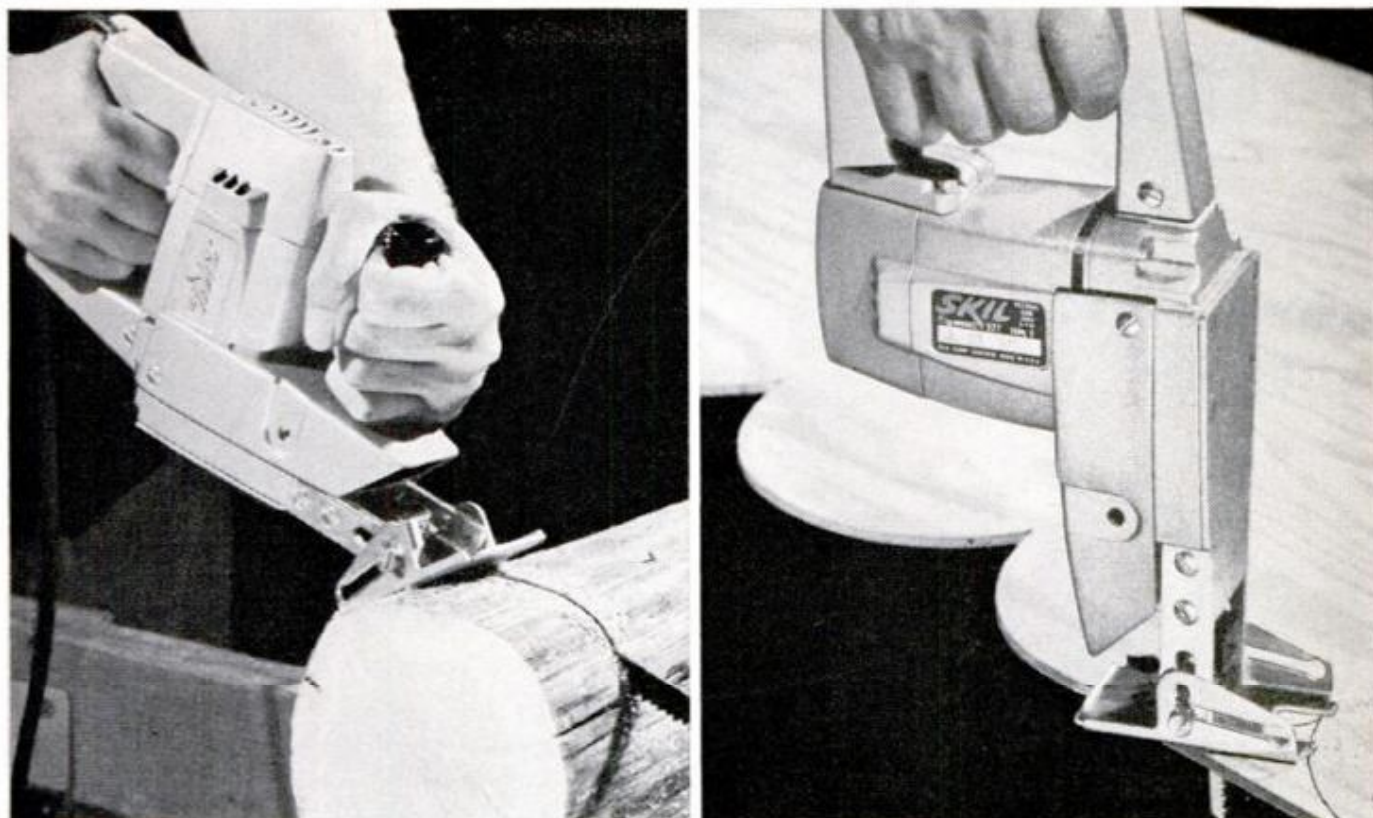
Q—Our one-year-old ranch-type home has a low-pitched roof, and last winter the ceiling plaster was severely damaged by water which apparently leaked through the roof just above the eaves. Upon checking the attic, I found that water was dripping from the roof boards near the lower ends of the rafters. Since the roof is new, I'm at a loss to figure out where the water comes from. Can you help me?—A.C., N.Y.

A—There is an outside chance that this is a condensation problem, but judging from your description, we think it more likely that an ice dam forms on the roof just above the eaves. On clear days, snow on the roof is melted by the sun and heat loss through the attic. However, snow on that portion of the roof which projects beyond the walls of the house is less likely to melt since it isn't subjected to heat escaping from the interior of the house. This causes the formation of an ice dam which traps water running down from the melting snow higher up the roof. As you have observed, water trapped in this way seeps under the shingles and through the roof boards, often causing extensive damage.

Probably the simplest solution to your problem is to install electric heating cables along the eaves. Heat from these lead-covered cables (which are designed for just this purpose) will melt the snow that normally collects here and prevent the formation of a dam.

As a service to Popular Mechanics readers in solving the hundreds of problems pertaining to a home—inside or out—you are invited to present your problems to The Clinic Editor for his helpful advice. Address your questions to The Clinic Editor, Popular Mechanics Magazine, 575 Lexington Ave., New York 22, N.Y.

NEW KIND OF POWER SAW



Skil Recipro Saw makes any cut from 6" fence posts to fancy patterns!

The Skil Model 577 Recipro Saw is the *first* portable power saw with almost unlimited cutting capacity! It'll cut thin sheeting or thick wooden posts . . . or steel pipe, sheet metal, aluminum, plaster, wall board, plastic laminates, you name it!

It's a coping saw, hacksaw, scroll saw, jig saw, crosscut saw and rip saw that'll make you twice the craftsman you ever thought you were! You can buy it at better hardware and lumber dealers everywhere. Priced under \$50 (slightly higher in Canada).



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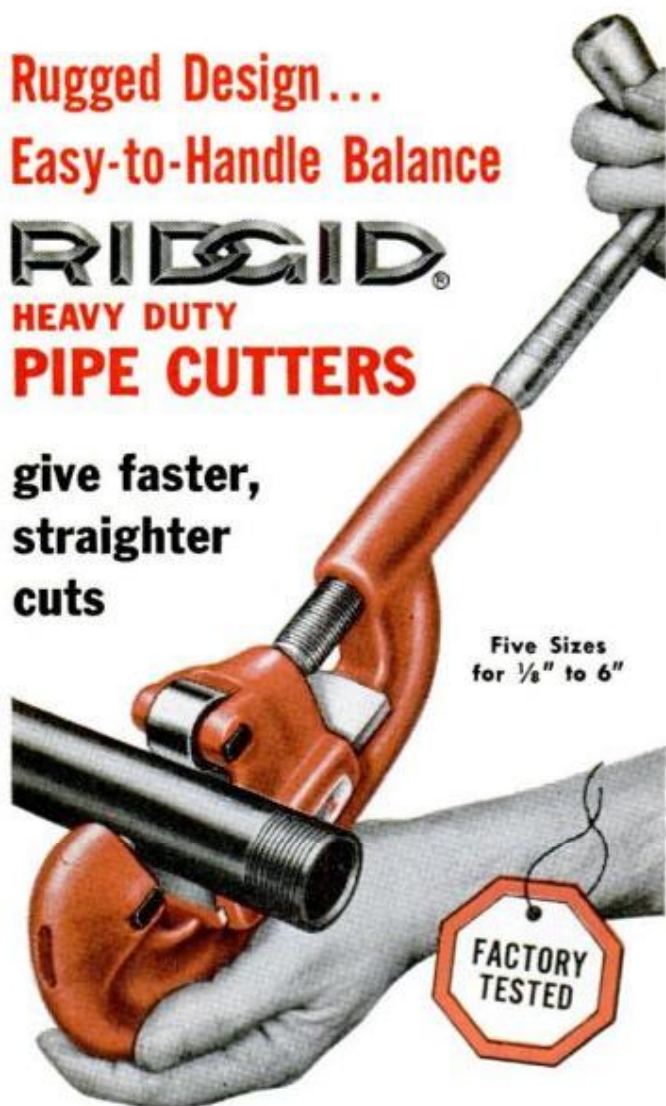
211

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Prepare Your Outboard NOW

(Continued from page 188)

tan deposits, they can be cleaned and re-gapped. Seriously pitted or burned plugs should be replaced. While you have the spark plugs out, squirt several drops of #10 oil into each cylinder and also into the carburetor through the air silencer. Then rotate the flywheel to distribute this oil evenly over internal surfaces.

If your motor performed poorly toward the end of the season, and both plugs and carburetor adjustment check out A-OK, this would be a good time to take it in to your dealer for a thorough examination. With the special equipment in his shop, he is better able to diagnose internal wear or damage.

To complete servicing the powerhead, remove and clean the sediment bowl and filter element. When replacing the assembly on the carburetor, make sure that the gasket is properly seated. Before replacing the shroud, spray the powerhead and cover gasket with silicone spray lubricant.

Servicing Lower Unit

Moving down to the lower unit, remove the propeller and dress down any small nicks or burrs with a metal file. If the blades are even slightly bent, better take it to a professional for repair since a special prop block is required for this job. Clean off any hardened grease from the shaft to prevent the propeller from freezing to it and apply new waterproof grease. When remounting the propeller, check the shear pin for wear and replace it if necessary. Finally, drain the lower unit and refill with fresh gear lubricant.

Even though it's no longer perched atop the powerhead, the fuel tank is still an important part of your motor. At the end of the season, drain out old fuel and rinse the tank thoroughly with alcohol or lacquer thinner. Either of these is highly inflammable, so be sure to remember the fire precautions mentioned above. Check for worn fittings. Examine the gasket in the cap, and if you find that it's compacted, replace it.

If your motor has an electric starter, check the battery, clean the terminals and put it on trickle charge for the winter. Most people don't have chargers, however, and if you belong in this group, ask your dealer about storing your battery for you.

Scratches in the finish of your motor or fuel tank make the equipment look old before its time and encourage rust. Feather out deep scratches with fine sandpaper, then mask nearby emblems, etc., and touch up with matching paint.

Store your motor in an upright position in a dry well-ventilated room. ★ ★ ★



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ANOTHER QUALITY PRODUCT OF MASONITE® RESEARCH

When Your Car Quits . . .

(Continued from page 180)

a dilemma. Here's what he finally did: In the wagon's tool kit he'd always carried an adjustable wrench—some call them monkey wrenches—and after a search he located tape left over from package wrappings. The wrench was tightened on the battery post and the end of that part of the ground strap still hooked to ground was forced through the hang-up hole in the wrench handle. Then the free end of the strap was taped tightly to the wrench handle as in one of the illustrations on page 171. This improvisation, crude as it necessarily was, held for the trip out.

But a family searching for a more secluded picnic spot had their car conk out just before they arrived. This not only spoiled the picnic; it posed a real problem, for something had, of all things! broken the fuel filter bowl. Probably a stone thrown by a tire, but this is such a rare occurrence that the driver discovered it only after he had checked out all the other more logical possibilities. And, believe it or not, he found the repair part in the picnic lunch! The emptied baby-food jar didn't fit very well (see detail on page 171) but the picnic went off, belatedly, and the improvised filter bowl served the purpose until it could be replaced with a standard part. In another similar instance, with an upside-down filter bowl, a small glass tumbler was made to serve in an emergency. The tumbler was lashed in place with light cord. Some small marmalade jars might also be used for the same purpose in an emergency.

When the upper radiator hose let go one ranchman figured that was it. He'd been repairing a pump on one of the remote sections of the ranch and he'd started walking out when he remembered the tool kit in the pickup. Among the tools he had used was a hacksaw. It was then he recalled that he had just installed a new tail pipe on the pickup truck. Putting these two thoughts together he hurried back to the stalled pickup, grabbed the hacksaw and cut a short section from the end of the new tail pipe. Then he removed the hose, severed it completely at the break and pressed the cut ends over the section of tail pipe, using the pipe-joint compound he had in the tool kit to form a seal. The cut ends were then taped over the section of tail pipe and the whole thing replaced. Then the radiator was topped out with water from the well and the rancher made it home and also to town the next morning for a new hose.

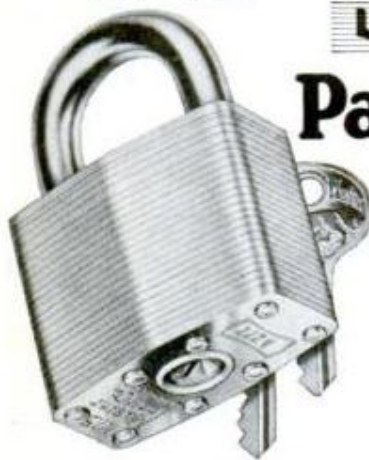
(Continued to page 216)



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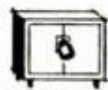
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HARLEY-DAVIDSON MOTOR CO.
Milwaukee 1, Wisconsin

Another motorist coasted to a stop on a back road. Checking, he found that the coil lead to the distributor tower was hanging loose. He tried to push the lead back in place but something seemed to be wrong. Removing the tower he found that the carbon-brush assembly had popped out. He bent the rotor spring contact up and again pushed the lead in place. But still the coil wouldn't put out sufficient voltage for a spark to jump the gap between the coil lead and the rotor. That stopped him—for a moment. There seemed nothing at hand, in the car or in his pockets, with which to make an emergency repair. Then the driver thought of the spring in his ball-point pen. Quickly he removed the spring, inserted it into the cap tower, pushed the coil lead back in place and taped it. It worked.

Then there's the fellow who discovered that a fuse had failed, apparently from fatigue—it does happen—with no replacement at hand. His solution was to wrap the dead fuse with foil from a cigarette pack, taking the chance there was no short in the electrical system. In this case he was right, and was on his way in minutes.

None of these instances is intended to outline a recommended procedure or practice. They are simply emergency roadside repairs, utilizing whatever happened to be

at hand which would serve the purpose until a standard replacement could be obtained. Some drivers carry a repair kit of standard parts for emergency repairs. One driver a long way between stations was stopped by a hole chafed in the fuel line. He bent the line away from the point of contact, cut a 4-in. section from it and installed the in-the-line filter he'd been carrying in his kit, intending to install it at the first opportunity. The emergency provided him with the opportunity. ★ ★ ★

QUOTE: Dirty Headache

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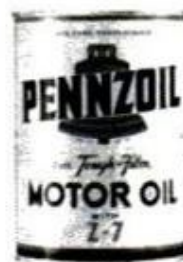


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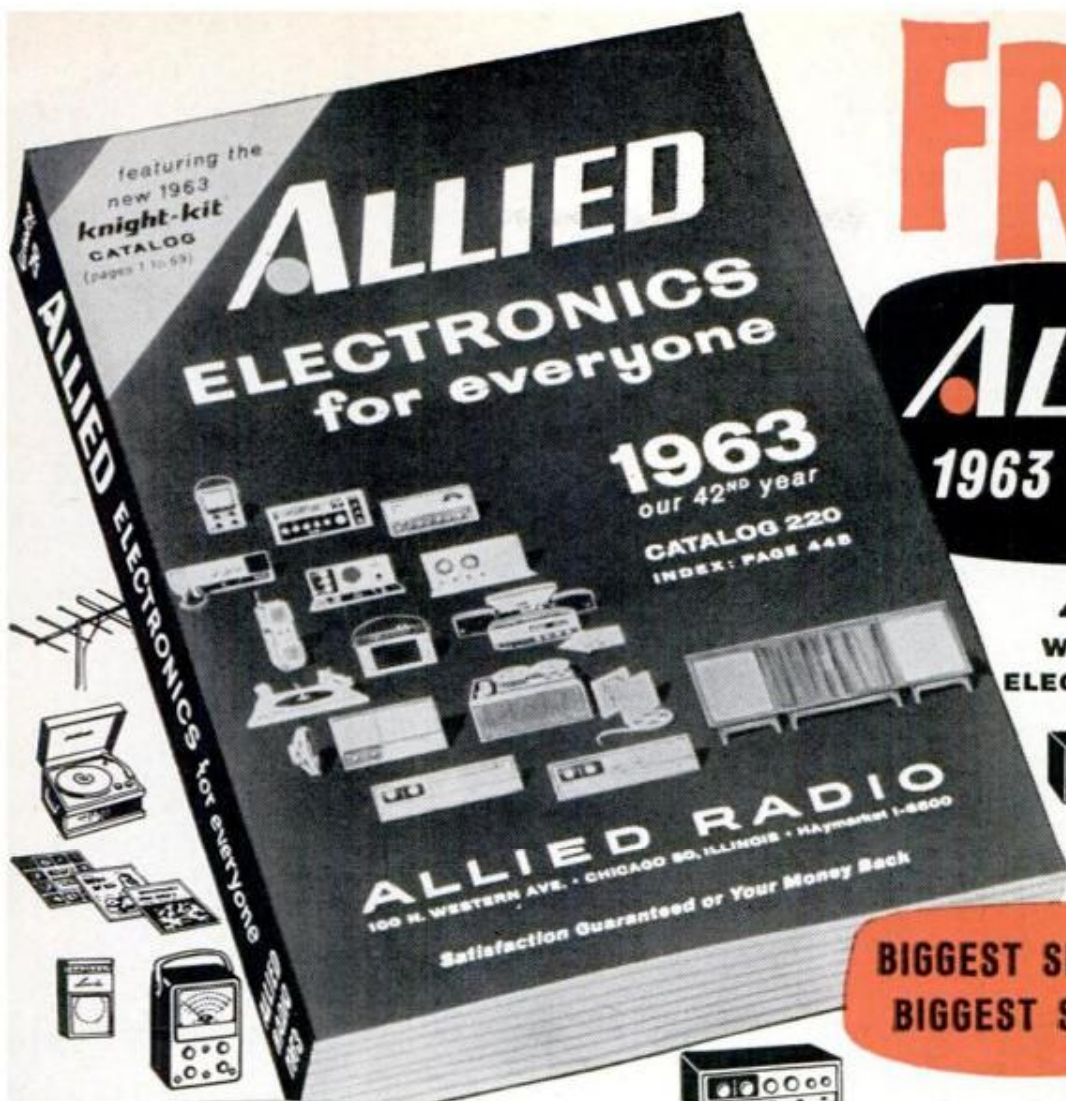
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Fun With a Zoetrope

(Continued from page 151)

gether, if necessary, to achieve the desired length. The grain of the cardboard should run crosswise so that it will curve naturally. Slots of $\frac{1}{4} \times 1\frac{1}{2}$ in. are then cut into this cardboard strip as shown, starting them $\frac{3}{8}$ in. in from the top border and spacing them $1\frac{1}{2}$ in. apart. To avoid having a slot come at the very edge where the ends of the strip butt-join, the first slot should be made $\frac{3}{4}$ in. in from the leading end.

When finished, this slotted strip is curved around the plywood circle and attached with either gummed tape or small tacks. Add the handle by fastening it loosely with a round headed screw so the drum will spin freely without wobbling. Finish by painting the outside of the drum a dull black to kill light reflections when viewing through the slots.

An ideal way to make animation strips for this zoetrope is to shoot them with a 16-mm. movie camera turned sideways to produce a vertical instead of the usual horizontal picture. Since only short bits of action will be photographed, you can use short lengths of inexpensive, surplus black and white negative film and in the dark-room, cut off the short exposed portions and develop them by hand in a tray or tank.

Here a simple method of holding the film is to wrap it around a 4x5 cut-film hanger. A wire frame also can be used for this purpose.

Requires Positive Prints

The resultant 16-mm. negative strip is then placed in the enlarger and blown up to produce positive prints in strip form which contain frames that measure $1\frac{1}{2}$ in. across their narrow widths. A little over 6 frames can be enlarged on a $2\frac{1}{2} \times 10$ -in. strip of bromide paper. Use semimatte paper, preferably, but if glossy is used, do not ferrotype it because ferrotyping tends to stretch the paper to a slightly larger size and this will seriously affect the fit of the movie strip.

After enlarging the first six frames, advance the film in the enlarger and blow up the next six frames. Repeat this procedure a third time to complete the required sequence. The three resultant strip blow-ups are then developed and printed and finally joined together, end to end, to produce a continuous strip which is subsequently formed into a circle and joined again with cellophane tape to form the completed animation band. This band should fit snugly into the drum of the zoetrope. If necessary, it can be anchored in place with a corrugat-

(Continued to page 220)

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ed cardboard disk cut to fit snugly into the drum and clamp the picture band in place around its bottom edge. A 1½-in. hole, cut in the center of this pressure disk will let it clear the pivot crew and provide a finger grip for its removal.

To view the movie strip in action, hold the zoetrope under a light, look through the slots and give the drum a spin. The picture frames seen through the slots will miraculously come to life. Viewing can be done by several people at the same time, each viewing from different positions around the drum. If desired, the handle of the zoetrope can be eliminated and by means of a larger hole drilled through the plywood disk, the drum can be set on the turntable of a record player for continuous, automatic spinning.

The best type of activities to film for zoetrope viewing are short, snappy actions that repeat themselves by coming back to their original starting points as in calisthenics, rope jumping, lollipop and ice-cream licking, swinging, tree chopping, etc. It is best to set the camera on a firm tripod and avoid actions that require panning, though this is by no means a firm rule. One interesting stunt is to focus on a low diving board and have your subject run into the frame and dive off the board. On the zoetrope, you will see an endless procession of divers running out and leaping into the water—all the same person. Try this same stunt with a person simply running in and out of the frame. The results will be that of a long line of runners running around the inside of the drum. With a little imaginative experimenting, many novel and amusing effects can be achieved. ★ ★ ★

U. S. May Import Insects

Ever vigilant against the invasion of harmful foreign insects, the U. S. government, however, is seriously pondering admitting the flea beetle, a native of Argentina.

Something is needed to control the growth of alligatorweed, a choking pest of southern waterways. The flea beetle has an excellent record as a weed controller in Argentina; also, it is not known to feed on any plant other than alligatorweed and its one close relative, which is not found in this country.

Agriculture Department entomologist George Vogt investigated the record of the beetle's performance. It was good in South America. But, things being what they are, Vogt says, at least two years of work will be needed before any weed-destroying insects can be introduced into the U. S.

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Reg. \$54.95

\$44.95

Special
Introductory Price

SPECIFICATIONS

(Model 300 Bayonet Saw)

Blade Stroke	.....	9/16"
Cutting Capacity Wood	.....	2 1/2"
	Aluminum	5/8"
	Steel	3/16"
Motor	.....	2.5 amps
Speed	.....	4000 spm
Net Weight	.....	5 lbs.
Length	.....	7 1/4"

*Here's a new PORTER-CABLE saw that's unequalled in sawing flexibility . . . actually the fastest cutting saw of its type. It has preferred orbital blade action and is powered by a failure-proof motor guaranteed for two years! And it cuts almost anything—ferrous and non-ferrous metals, all woods, compositions and plastics. You'll do everything from inside curve cutting *without a starting hole* to big capacity straight line cutting jobs. All in all, a honey of a value.*

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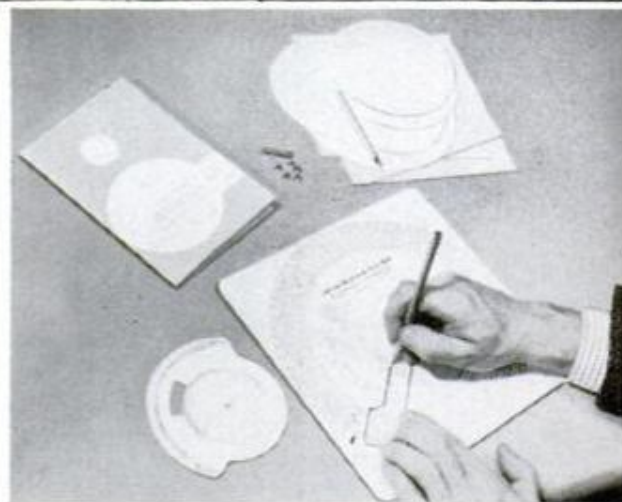


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Motor	10 amps
Idle Speed	4500 rpm
Net Weight	9¾ lbs.
Length	11½"

This PORTER-CABLE saw is the fastest-cutting 7" saw made . . . and it's yours now at a big \$10.00 savings. It whizzes through stock a full 2½" thick. You'll find it powerful, superbly balanced, safe and convenient for all types of cutting. And you'll like these Porter-Cable quality features: Kick-Proof Clutch, Built-in Blade Lock, Trigger Switch with Lock Button, Telescoping Guard, Single Line of Cut and Wide Wrap-around Base. Why wait?

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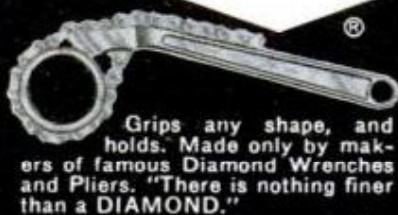
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\$79⁹⁹

Includes built-in motor

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SPECIFICATIONS

(Model 34-200 COMPACTOOL
Circular Saw)

Blade diameter 7¹/₄"
Diameter of Arbor 1¹/₂"
Depth of Cut, 90° 1¹¹/₁₆"
Depth of Cut, 45° 1³/₄"
Speed 3450 rpm
Rip capacity with extension
wings . center of 20¹/₂" board

Overall dimensions: Depth 17"
Width 13" Height 17¹/₂"

The COMPACTOOL saw gives you "big tool" accuracy, versatility—goes anywhere. If you're itching to do projects your portable can't handle—but feel you can't afford to step up to a heavier, stationary saw—this is for you! Lightweight, easy to take to the job—easy to store away. And you'll like the smooth, quiet power the revolutionary, built-in motor delivers. A demonstration can be mighty convincing. (There's also a COMPACTOOL Joints and Drill Press.)

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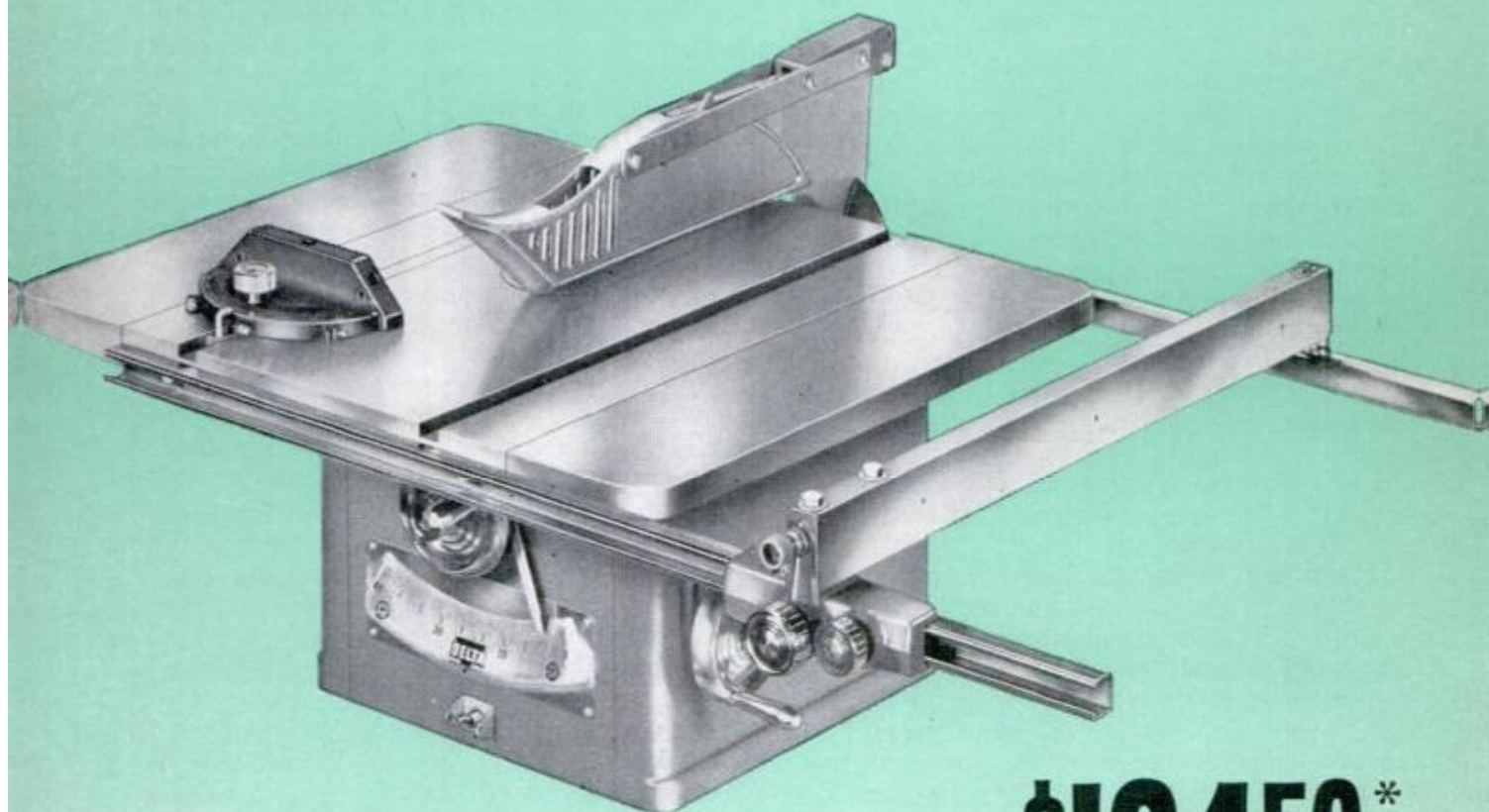
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\$10450*

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SPECIFICATIONS

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Depth of Cut, 45° 2"
Speed with 3450 rpm
motor 3800 rpm
Rip capacity with extension
wings . . . center of 48" panel
Overall dimensions: Depth 36"
Width 37 1/2" Height 17 1/2"

Buy the famous DELTA 9" Tilting Arbor Saw—get the stand FREE. If you act now, you'll get a sturdy steel stand (a \$22.00 value) as a bonus for choosing a tool that's really "loaded." It has the power, precision and capacity to satisfy the most exacting users. It's the saw with truly industrial quality and performance at a home workshop price. The offer is limited—take advantage of it!

Own it today. See your DELTA dealer.

*Slightly higher in the West.

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Convert Your Accordion

(Continued from page 145)

and top, you can make the end frames and cut the plywood for the case. However, before assembling the case you complete the front and bottom panels.

Front-Panel Details

The bass assembly of the accordion is to be mounted at the left end of the front panel to wood frame A, which is attached to the outside of the panel. The treble assembly is mounted at the right on frame B which is attached to the inside of the panel. For measurements to make the frames, which may vary from those given, remove the bellows of the accordion by pulling out the holding pins. After making frame A, screw it temporarily to the front panel so its left edge is $1\frac{5}{8}$ in. from the left end of the panel, and its lower edge $\frac{3}{4}$ in. from the bottom. Then mark and cut an opening that will accommodate the reed blocks of the bass assembly with sufficient clearance; a 4 x 14-in opening was ample in the original. After preparing the accordion parts as will be explained later, you screw the bass assembly temporarily to frame A.

Holes for screws to hold accordion assemblies to the frames are drilled so the screws will fit the holes snugly. In the final assembly you use metal washers faced with felt or leather under the heads of the screws to prevent air leakage. If you cannot find suitable places for screws, you can use small metal angles attached to the outside of the frames. The angles can be concealed later with strips of wood. The accordion parts should fit snugly on sponge-rubber strips glued to the frames. When making the final assembly fill holes that were occasioned by the removal of parts, with non-drying putty which does not shrink and is easy to remove.

Next, you determine the approximate location of the treble assembly so that the left end of its valve-and-reed housing will not be closer than $1\frac{3}{4}$ in. to the bass assembly, which provides clearance for the side extension of the treble keyboard. Also locate the assembly so that the treble keys will line up with the bass keys. Then cut an opening in the panel through which the reed blocks will pass; a $7\frac{1}{4}$ x $18\frac{1}{2}$ -in. opening was ample in the original.

Now place the treble assembly flat on the panel with the reed blocks projecting through the opening and the keys in alignment with the bass keys. Mark the outline of the housing on the panel and enlarge the hole to this size. After screwing frame B to the back of the front panel to line up with the opening, without letting any of the screws project through the panel, screw the

treble assembly in place temporarily. As frames A and B have only been screwed on, you still can alter their positions for good alignment. When locations have been established, remove the accordion parts and then glue and screw frames A and B in place permanently.

Assembling the Case

You now proceed to assemble all parts of the case except the bottom, which is done last. Wood strips are used at all joints for strength and airtightness. The strips are coated with glue and flat-head screws are driven through the panels into the strips. The bottom is prepared by boring the required holes, attaching the cleats that serve to reinforce the legs, installing the blower, switch and wiring, adding the volume controls, and the leg-mounting plates as shown on page 142. Seal all cracks, even those around the electric cord and switch, using putty or caulking compound. Use a silent electric blower such as No. XP-700 made by the Magnus Organ Co., 100 Naylor Ave., Livingston, N. J.

As you will see from the underside view of the bottom panel, page 142, there are two knee-operated volume controls. Volume is reduced by letting air escape. This does not result in an instantaneous reduction of sound, but involves a slight time lag, and the sound reduction is gradual. The levers connect to hinged blocks faced with felt or leather to tightly close the air-escape holes for increased volume. Cabinet-door catches are used to keep the levers in the loud position when variations of volume are not desired. After the case has been assembled, you can cement on the $\frac{1}{8}$ -in. covering material and then install the accordion parts permanently.

Preparing Accordion Parts for Organ Use

To dismantle an accordion, remove the straps, grille, and all external metal fittings. Remove the reed blocks after marking them with pencil lightly so they can be returned to their places. Each note of an accordion has two reeds, one that sounds when the bellows is being inflated, and another that sounds when it is being deflated. A leather flap for each reed (except those of high notes) prevents air leakage through the reed when its companion reed is in use. When an accordion is used in its normal way, the flaps fall on their seats as soon as air pressure is applied. However, in the accordio-organ half of the flaps hang downward and will eventually fail to function, thus causing air leakage. To prevent this failure use narrow strips of adhesive tape to hold the lower flaps over their

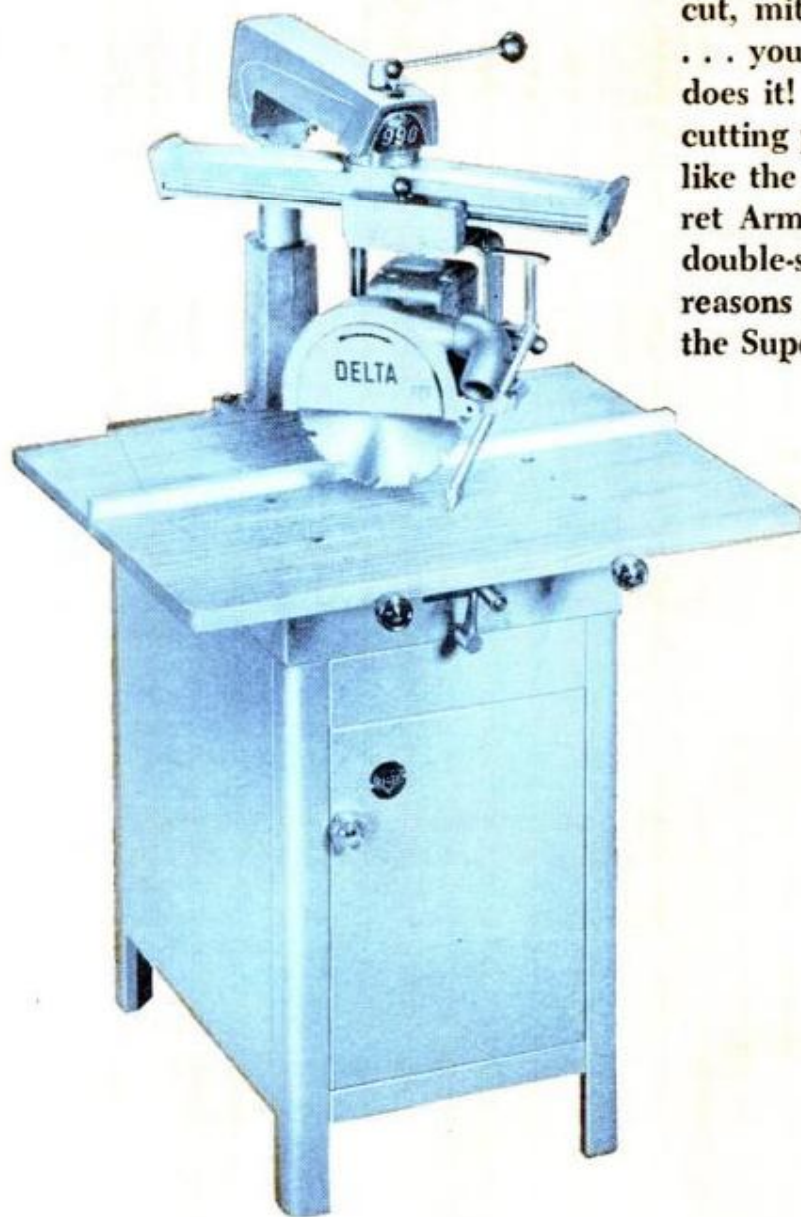
(Continued to page 230)

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SPECIFICATIONS

(Super 990 Radial Saw)

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Diameter of arbor 5/8"
(rear shaft) 3/8"

Depth of Cut, 90° 2 1/2"

Depth of Cut, 45° 1 7/8"

Speed (full load) 3450 rpm

Rip Capacity
center of 48" panel

Overall dimensions: Depth 27"
Width 32" Height 55"

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openings. If your blower draws air out of the case instead of compressing air into it, you fasten the tape over the exposed upper reeds to prevent escape of air.

Test the reeds by sucking at each hole in the reed block, or by blowing if the blower is the decompression type. Foreign matter on reeds may prevent them from vibrating, but this often can be cured by cleaning them carefully with benzine. If a reed is mutilated or is out of tune, invert the metal frame so that the companion reed is brought into use.

Adding the Legs and Grilles

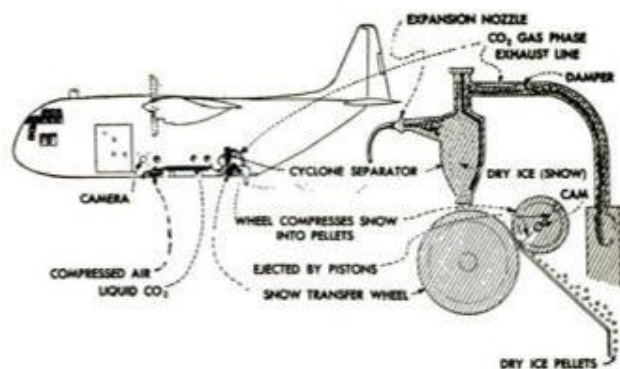
Keyboard height should be from 27 to 28 in. above floor level. You can purchase tapered brass or wood legs 22 in. long that screw into steel plates which are attached to the underside of the case. Two grilles, page 145, which are made to fit over the exposed parts of the accordion assemblies, will greatly improve the appearance of your accordio-organ. These can be made from prefinished hardboard to match the case. Small, flat-head screws and glue are used to hold the parts together. ★ ★ ★

QUOTE: Universal Revolution?

"To our descendants, our era will appear above all as the era when man's life expectation . . . has increased two or three times in the span of a few generations, an era when the amount of energy available for the average individual to satisfy his wants and his desires has grown tenfold if not a hundredfold. In this era, man has penetrated the atom, and released the awesome energies of its nucleus; he has first left his planet to surge into space. This revolution in human existence unfolds before our eyes, not as a part of the conflict between the two camps into which the Western world is divided, but, in essence, through their common efforts. Our era may appear, to a myopic mind aware only of the bitter conflict raging between the ideas extrapolated from mankind's obsolescent experience, as an era of alienation in which mankind has become separated as never before into two irreconcilable camps; but to the future generations it will appear as an era of the beginning worldwide cooperation of mankind. Never before have so many outstanding men of all nations devoted themselves to parallel or concerted activities based on commonly acknowledged truths, and dedicated to the common aim of better understanding and more effective mastery of nature."

DR. EUGENE RABINOWITCH, Editor,
Bulletin of the Atomic Scientists

POPULAR MECHANICS



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Holes more than three miles wide have been created in clouds by Air Force scientists in tests using a new machine that makes dry-ice pellets as needed.

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Know What IQ Means?

(Continued from page 119)

here are some examples of how good the quick IQ tests are at screening new applicants for jobs.

One company tested all applicants for sales jobs, then went back five years later to see how many had been promoted. All who had made the top score had; 77 percent of those who ranked second had; 70 percent of the third rank; 58 percent of the fourth; and so on. Only 13 percent of the third, lowest ranks, and none of the second lowest had been promoted.

Another company similarly checked back on its division managers. A hundred percent of the top rankers had been promoted; only 15 percent of the seventh rankers were; and those in between were promoted proportionally.

Another study, of managers of a chain of small retail stores, showed that both sales ability and sales volume (in dollars and cents) correlated highly with IQ scores.

Still another test found that higher scoring bank tellers worked with greater accuracy and efficiency, even under pressure.

How to Improve Your IQ

Job seekers traveling from personnel office to personnel office take so many IQ tests that they soon become proficient at them. That's one way, says SRA's Dr. Weinfeld, that IQ scores can be made to vary. The same applies to school children. In areas such as New York suburbs, where pupils are apt to be "over-tested," IQ scores generally are higher than in, say, Nebraska, where children may be "under-tested," he says.

There are other ways IQ scores can be raised. You can "cram" for them. The best thing to study, say the experts, are words. The core of any intelligence test is its vocabulary unit. In fact, as stated earlier, short-cut IQ tests rely heavily on word sense. That's because psychologists feel that, since words represent ideas, how adept you are with them indicates how well you grasp ideas.

Intelligence test designers make no bones about telling parents how they can work to improve their children's—or their own—IQs. Of course, we are all born with an upper limit to our potential intelligence which is, unfortunately, determined by heredity. There's nothing we can do about changing our genetic makeup. But we can, says Dr. Buel, make the most of what we have. "No one is at the upper limit of his

(Continued to page 234)

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intelligence," he says, "we can all extend and push ourselves upward."

How? Well, if you're an adult, you can leave that television set alone and spend evenings with challenging, mind-stretching mental work; study, read, take advanced courses; don't always do what comes easiest; rather, grasp for what is difficult.

"It's a poor analogy, I know, but you should think of exercising your brain like a muscle with informative and conceptual pushups," Dr. Buel says.

As for your children, says Dr. Thelma Thurstone, answer their questions; use good English when you do, not baby talk; listen to their stories; teach them nursery rhymes; help them to solve problems, word games, and riddles; take them to see new places and things; give them tasks and responsibilities around the house; and provide them with challenging toys and playthings they can work with, not just wind up.

Home Atmosphere Important

By giving them a proper home atmosphere, says Dr. Buel, you can raise your child's IQ by 15 to 20 points. This could mean the difference between going or not going to college later, between getting or not getting that job 20 years from now.

In England, psychologist P. E. Vernon showed that he could raise grade school pupils' IQs an average of 11 points with just a few hours' coaching.

In Iowa, 652 preschool children from middle income homes, where the fathers were high-school graduates or better, had an average IQ of 117. Sent to a nursery school which emphasized the intellectual, many raised their IQs seven points the first year, four the second, and two the third—for a grand total of 13 points.

A Midwestern parent coached her child with vocabulary and arithmetic material and raised his IQ score by 19 points.

We mentioned earlier that children in New York are liable to score higher on IQ tests than children in Nebraska. There are other differences between people in general. In 1956 a Columbia University psychologist, Dr. John B. Moner, surveyed intelligence in the U.S. by giving tests to a random sample of 1500 people in 228 cities, towns, and counties.

Briefly, he found that those with the highest intelligence were better educated, higher skilled, white (see additional information below) middle class, urban adults. Age, he found, also makes a difference: Intelligence rises until about 25 years of age; it stays at this plateau until about 55 years; then it creeps down.

(Continued to page 236)

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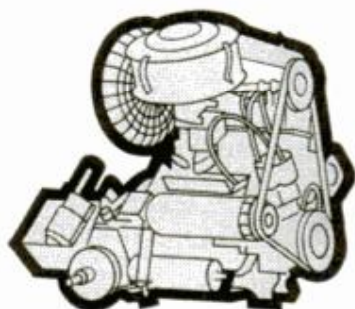
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IQs in general, says Dr. Weinfeld, seem to be increasing slowly over the years. There are also seasonal shifts, easily explained: IQs of schoolchildren are higher in the spring than they are in the fall. This is because children who take IQ tests in the spring have a semester and a half of mental limbering up behind them; fall test takers are still rusty after the summer vacation.

There is also, SRA finds, a difference between sexes. Girls do better than boys on Verbal Meaning, Word Fluency, and (sometimes) Reasoning. Boys do better on Space and Numbers.

Because environment has a tremendous influence on IQ, psychologists have been perfecting what they call "nonverbal" tests. SRA's "nonverbal" test was used dramatically in a New York public school attended by Negro and Puerto Rican pupils. Most of these culturally deprived slum children had never been exposed to many good books, much stimulating conversation, or interesting toys. Their average IQ had been measured at 82. The new tests showed that about half the pupils actually were college material!

This New York experience was the springboard for a "Higher Horizon" program launched across the country in big-city schools to discover hidden "brains."

The "nonverbal" tests use geometric forms and pictures to test reasoning, mental alertness, and perception. All the test taker has to do is find the one of a series of four somewhat similar pictures that, for some reason, is different.

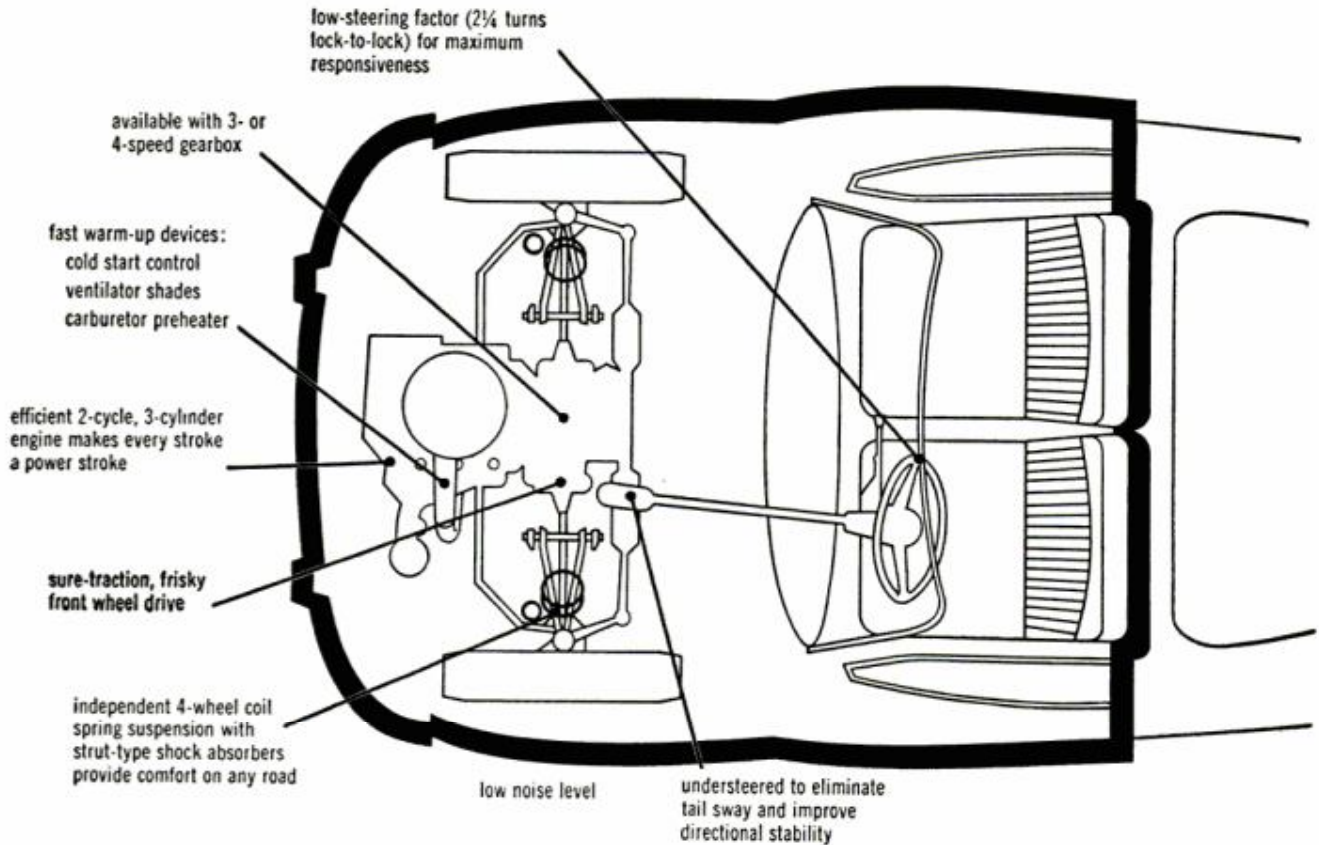
"Nonverbal" tests are still new and have a lot of "bugs" that have to be ironed out. But the same is still true of the older IQ tests. While they are constantly altered and changed to make them better, they still have their shortcomings. And the people who use them—teachers, personnel managers, etc.—have to learn to use them properly. But despite all the obvious drawbacks, IQ tests are still the quickest, surest way to get a general idea of how smart anyone is. ★★★

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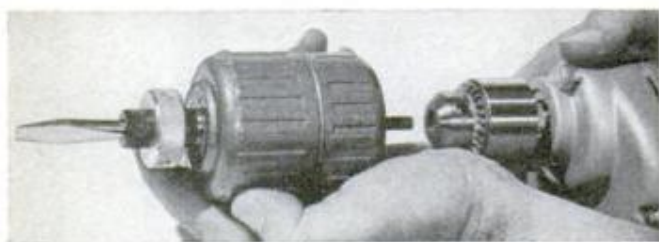


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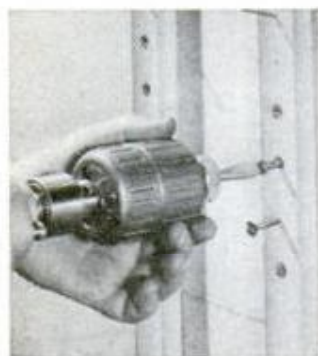
OCTOBER 1962

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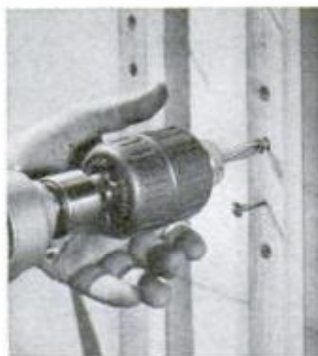
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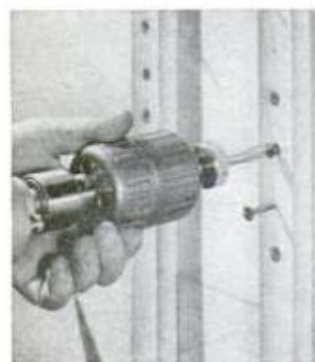


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The Longer, Livelier '63s

(Continued from page 102)

Although there was no wheelbase increase on Plymouth, it gained three inches in overall length.

Mechanically, the biggest single change in this group is Chevrolet's all new six-cylinder engine, which displaces 230 cubic inches and develops 140 horsepower at 4400 rpm. Although only six cubic inches smaller in displacement and rated at only five-horsepower less, the new Six is two inches lower and 2.6 inches shorter. It weighs approximately 500 pounds, about 150 pounds less than the engine it replaces.

A short stroke (3.25 inches) and crankshaft with seven main bearings make the new engine smoother and quieter, we found after a test run. Performance is slightly improved due to the reduced weight.

Chevrolet's basic 283-cubic-inch V8 has been increased from 170 to 195 horsepower by raising the compression ratio to 9.25 to 1 and changing the valve timing. This means that owners will have to pay for their power boost in the form of premium gasoline, which the increase in ratio demands. Premium V8s for Chevy are the 327-cubic-inch job at 250 or 300 horsepower and the whole hog job, a 409-cubic-incher with 400 and 425-horsepower ratings for single and dual four-barrel carburetor set-ups, respectively.

Although Chevrolet's external sheet metal and trim are new for '63, the functional change that will be noticed by driver or passengers is a welcome redesign of the windshield and its corner posts. These have been straightened to improve vision and remove the dogleg in the door opening.

Ford Galaxie's external changes are below the window line, which results in a "different sameness" in appearance and no alteration of the passenger compartment. Most notable change is the increase in size of the tail lamps — they're big as wash basins.

Ford's basic 292-cubic-inch Galaxie V8 has been replaced by the new, lighter 260-cubic-inch V8 introduced as a premium engine of 164 horsepower on the Fairlane during the '62 model year. Other Ford V8s are 352, 390 and 406-cubic-inch jobs of 220, 300 and up to 405 horsepower on the performance specials.

On all engines but the 406, standard transmission is Ford's new all-synchromesh job of three forward speeds. This is a first for U.S. built cars and putting it on at no visible extra cost was an admission by a

(Continued on page 240)



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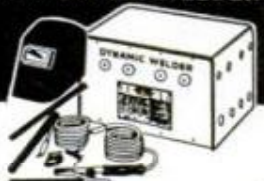
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major manufacturer that stickshifts are here to stay.

Galaxie has incorporated a crank mounting on the lower control arm of the front suspension which permits the wheel to give slightly. It provides compliance (rearward as well as upward wheel travel) in reaction to bump shock. The same effect is achieved at the rear wheels by a squeezable rubber bushing at the front eyes of the rear springs.

The swivel steering post, introduced on the '62 T-Bird as an option will appear as an option on '63 Ford Galaxies. This is the jointed steering column that swings horizontally to the right for about seven inches.

Pontiac, Olds, Buick, Mercury Monterey and Chrysler. Among these five medium-priced cars, size increases are measured in fractions of inches for '63. Few owners complained in recent years that these cars were too small, so there has been no need for a stretchout.

All three GM medium-priced cars have been restyled with flat side panels giving an almost unbroken sweep of convex curved paneling from headlamp to tail lamp. This does make the cars look longer.

Concave Backlights

All three GM mediums have new windshields with straightline corner posts. Pontiac's Grand Prix and Oldsmobile's Starfire sports coupes share a common two-door hardtop roof with a unique backlight glass running flat from side to side yet concave in profile from top to bottom.

The small quarter window that formerly filled the space between the rear door frame and the backlight glass has disappeared to be replaced by a "blind" metal panel on both sedans and hardtops alike among all cars in this group except the Buick Electra, which still offers a "six-window" sedan.

The blind quarter may be stylish, but it does block some of the driver's backup parking vision.

Chrysler has reduced the size of its front compartment floor tunnels by eliminating the driveshaft parking brake. By moving the engine forward, Oldsmobile has cut the front tunnel in half and reduced the base width of the rear seat tunnel by four inches.

Adjustable Steering Wheel

As an option available with power steering only, Olds has a Tilt-Away steering wheel. It is mounted on a universal joint at the hub so it may be moved vertically through a seven-position arc by the release of a lever. By permitting a change in driving position, this might reduce fatigue on long trips. The tilting wheel option is also available on Pontiac, Buick and Buick

(Continued on page 242)

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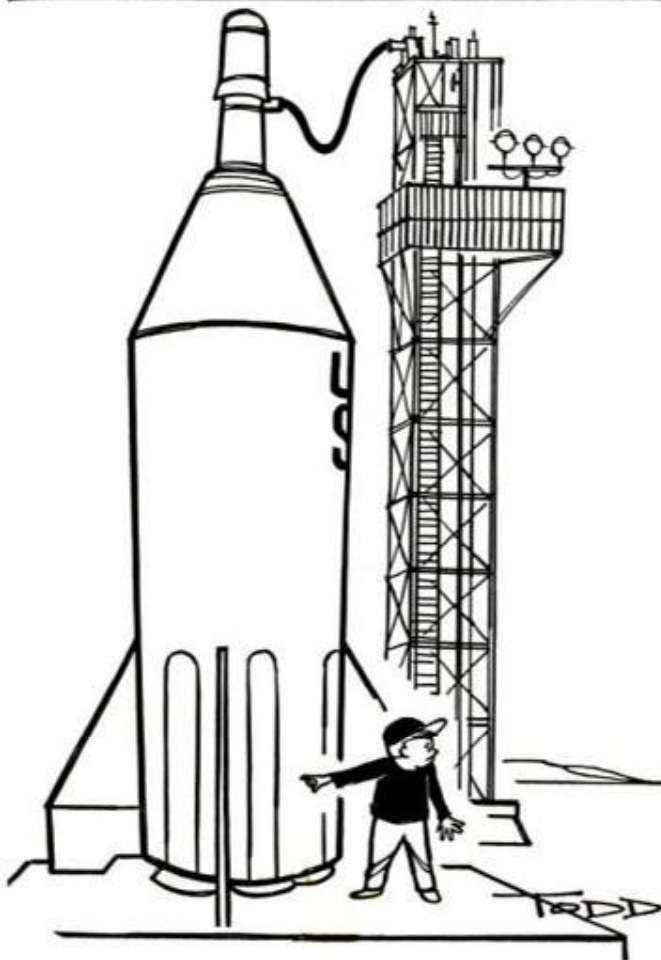
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Riviera. Add in the Mercury Monterey swing-away wheel and it looks as if there will never be a dull moment in the driver's seat next year.

Pontiac engineers have improved foundry techniques on the 389-cubic-inch V8 that's standard on all models. As a result, both cylinder heads and block casting are lighter. Heads have been redesigned to increase power output.

Pontiac's much-heralded wide track has been made 1.5 inches wider at the rear and rear suspension control arms have been changed and given new rubber bushings for a softer ride. Up front the steel control arm bushing has been replaced with rubber; this softens the action and eliminates lubrication points. Brakes are self-adjusting and Delcotron alternators are standard.

Pontiac retains a two-barrel, low-compression ratio (8.6 to 1) version of its engine teamed with either manual or Hydra-Matic transmissions for those who appreciate the economy of regular grade fuels. It puts out over 200 horsepower (the exact rating will be announced later) which is plenty for family style touring, even in 3900-pound Pontiacs.

More Trouble-Free Speedometers

Olds has come up with an innovation that may spread throughout the industry. The speedometer is driven by direct cable connection with the left front wheel via a hollow spindle. Coupling between drive cable and wheel is made at a nylon block embedded in the bearing dust cap. The advantage is a smooth kink-free cable route and elimination of various sets of speedometer drive gears needed to match different rear axle ratios. With the new system, only two gearsets in the head (behind the panel) are required, one for each tire size.

Changes in the three regular series of Buicks are minor—a switch to Delcotron alternator, lifetime greasing of front suspension upper arm pivots, lighter weight rear axle and positive (vacuum valve controlled) crankcase ventilation system.

Chrysler's big story is in the transformation in styling made by the new exterior sheet metal and new roofs.

All traces of the old Forward Look are gone, including the rear fenders that looked amputated in 1962 when the fins were "left off." The only external item on the car that's unchanged is the windshield glass and its corner posts.

A new instrument panel with a full set of round-dial, readable gauges has made a big improvement. With the move from transmission-mounted parking brake to

(Continued on page 244)

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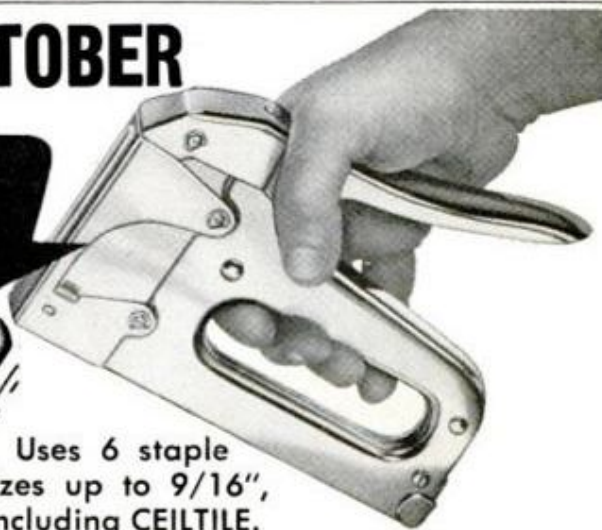
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cable operation of rear brake shoes, Chrysler has added a parking lock to the automatic transmission controls.

Standard transmission on Newport is a three-speed floor shift. Chrysler claims that their new body structures are more rigid and durable. After a short road test PM is inclined to agree that almost all traces of body shake on rough roads are gone.

Among the Bucket Seat Specials, Studebaker's Hawk and Avanti, Thunderbird, Buick Riviera and Corvette, the last two are the big news items (PM tested the Avanti in the August 1962 issue, p. 74).

Underneath its sleek and exciting body shell the Riviera carries pretty much standard Buick hardware. True, overall length is seven inches shorter and the frame is six inches shorter in wheelbase than the LeSabre and Invicta, but the frame is still a wasp-waisted X-member structure that's typically Buick. The front and rear tread are two inches narrower than on the conventional Buicks.

The Riviera—How Sporty?

Weight is distributed 53 percent front and 47 percent rear. This balance gives rather good handling considering that the car is neither intended for nor billed as a sports racing machine. Steering is available only with power assist, but the 3.5 turns lock to lock makes the Riviera exceptionally responsive.

After a short road test, we decided that with much firmer shock absorbers and perhaps a stiffer front anti-roll bar, it would make a very creditable sports touring car. Sporty types will be very comfortable but not happy in the Riviera in that there is no four-speed (or even three-speed) manual transmission to play games with.

Stick shift or no, the Riviera has straight-away performance aplenty with a 425-cubic-inch engine rated at 340 horsepower. An informal check showed acceleration to 60 from standstill in the area of 7.5 seconds. That's for a loaded car with air conditioning.

Underslung Corvette

Real sports will rejoice when they take their first spin behind the wheel of the '63 Corvette, literally all-new with the exception of the engine and transmission. And even the engine has a redesigned fuel injection system.

An entirely new box section frame gets all weight as near to the road as possible; this includes the passengers, as the car sits only 49 inches high. Yet the modified buckets are comfortable and there's headroom

(Continued on page 246)

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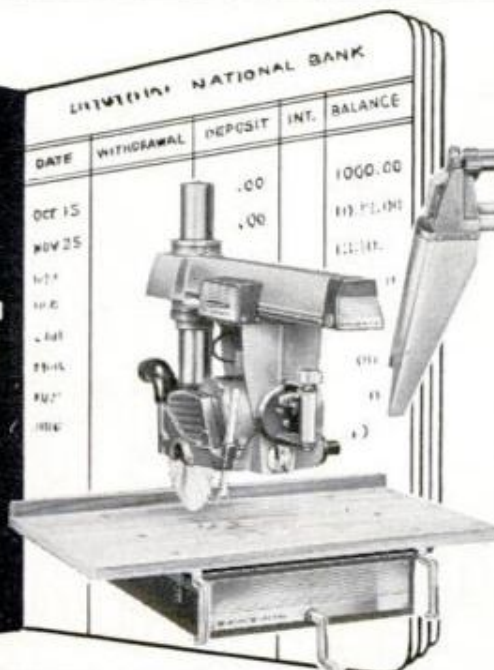
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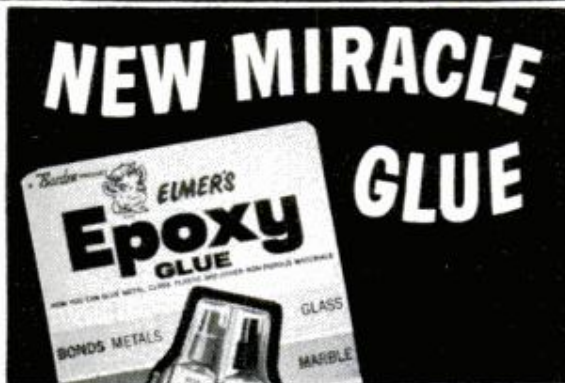
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in the coupe for over six-footers.

The car is so low that the driveshaft actually passes *above* two of the frame members on its way back to the chassis mounted differential. Drive is by double U-jointed swing axles to independently suspended rear wheels which are linked to the chassis by fore-and-aft torque arms. The wheels are also positioned laterally by the axles in combination with pivoted cross links acting together as a parallelogram, with unequal length arms which hold the wheels at a constant angle relative to the body. This suspension controls “rear axle steering” effects to the driver's advantage.

Corvette Test Run

Rear springing is by a single transverse leaf spring linked to the torque arms. We found out in a brief but memorable test run that if the '63 Corvette tends to drift out when cornering at really high speeds you need only downshift and dump more power to the rear wheels and the car will bore its way tighter in the direction that you want it to go. Also contributing to the car's ease of control is a weight distribution with rear bias. Corvette's front suspension is adapted from 1962-3 Chevrolet parts so located as to complement the unique rear suspension.

An interesting steering system involves dual mounting points on pitman arm and idler arm for the relay and tie rod assembly, so that you can “quicken” the stock steering from an overall ratio of 19.6 to 1 down to 17.0 to 1 by moving two bolts. The steering also has another first for modern U.S. production cars — a steering damper or shock absorber between the frame and tie rods. The steering wheel, incidentally, is adjustable on a splined shaft through a three-inch travel in or out to suit driver size and preference.

Lincoln Continental, the only one of the three luxury cars to be dealt with in this issue of PM, has incurred a number of changes for '63. The grille pattern is new, and the rear deck lid has been redesigned to add 1.3 cubic feet of space. Under the hood a new four-barrel carburetor mounts the primary barrels directly over the intake manifold so that 90 percent of the time the carburetor acts as if it were a simple two-barrel model. The booster barrels don't cut in until you top 75 miles per hour. A 40-amp alternator has replaced the generator and aluminum front brake drums have been added to increase fade resistance. ★★★

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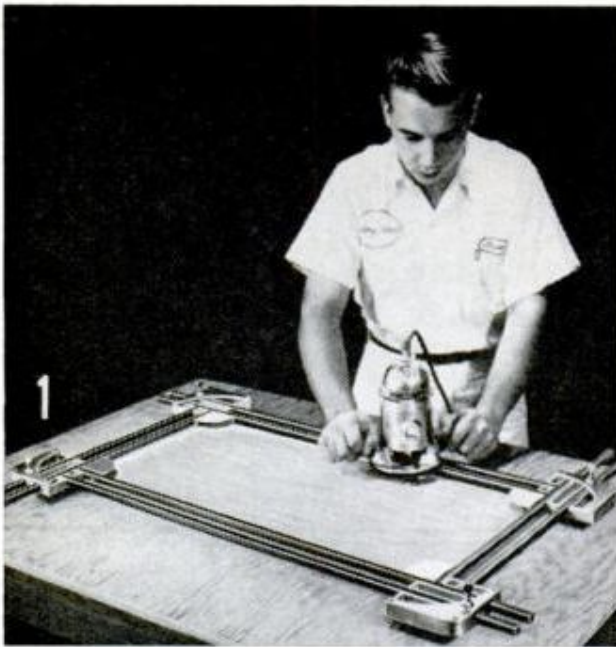
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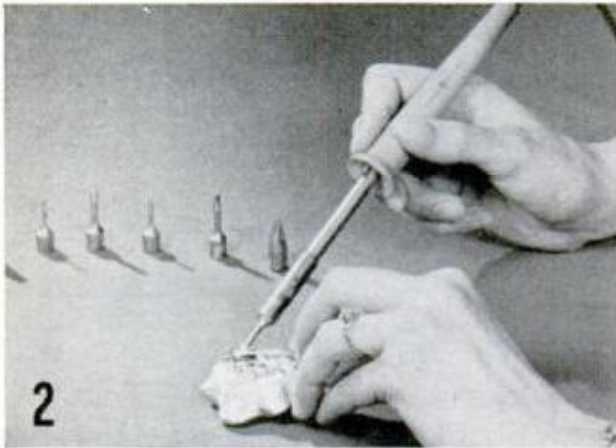
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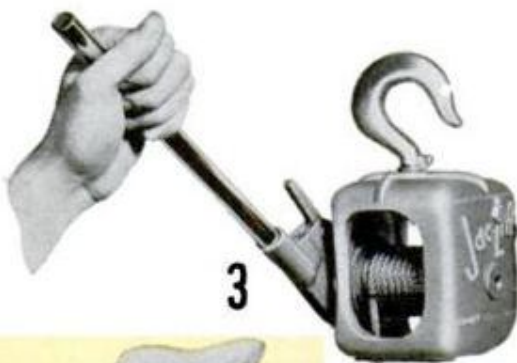
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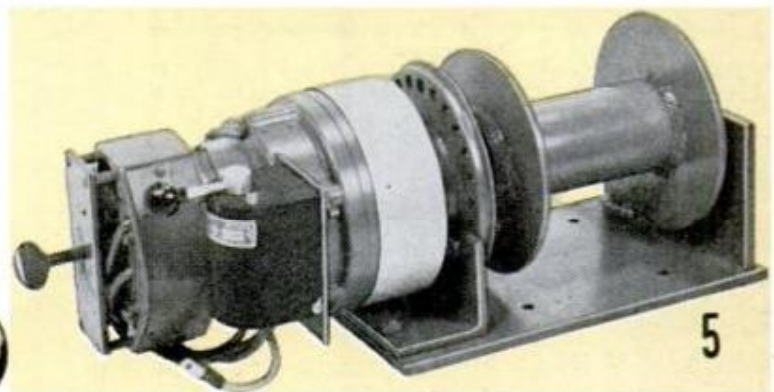
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Explosion Creates Diamonds

Synthetic diamond particles have been created by subjecting artificially produced graphite to explosive shock at the Poulter Labs of Stanford Research Institute.

Graphite is composed of sheets of atoms arranged in one of two patterns. The less common form is similar in structure to the diamond, except that in the diamond the sheets are puckered and closer together. The explosive force puckers and compresses the graphite to form diamond.

The experiment was performed by placing an explosive charge atop an unrestrained graphite specimen over a container of water. Following the explosion, small diamonds were recovered from the water.

Current methods of diamond synthesis require high capital investment, but the explosion method is limited only by the noise which can be muffled. Commercial value of the explosion method is not presently apparent, technicians say.



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H271



H37

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BASIC ROUTER BIT KIT

H248



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Cellulose, an organic compound constituting the structural stuff of wood and grasses, has been put into edible form which can be readily digested by man. In its natural state, cellulose is fibrous and resists man's earnest efforts to digest it. Termites have been eating and digesting it for years, since they are equipped with special bacteria in their intestines which help decompose it. Man, however, not equipped with similarly talented bacteria, gets only a small amount of cellulose in vegetables which is not digested, but acts as roughage. Cellulose is noncaloric and provides no nourishment. Inside the body, it takes up space, but since it is not digested, it cannot add weight to the eater.

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Two forms of digestible, nonfibrous cellulose have been developed as a result of applied research in the fields of high polymer chemistry by American Viscose scientists. Avicel, a highly purified form of cellulose, is dependent upon colloidal phenomenon for its unique properties.

In its dry form, Avicel is a snow-white, free-flowing edible flour that resembles sawdust. In this form, it is capable of absorbing fats and oils which means that such syrupy and oil-based foods as cheese, peanut butter, molasses and honey can be converted into free-flowing forms. For example, Avicel can be used to make a dry free-flowing peanut butter that can be sprinkled on bread. The white powder can also be used in the preparation of such calorie-controlled baked goods as pastries, cookies, and breads; it can be added to meat products; or it can be used in making candy and confections. This same absorptive property permits Avicel to be used as a carrier for active constituents in the pharmaceutical and cosmetic fields.

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Never before and perhaps never again—this offer of brand new genuine Clinton and Briggs & Stratton engines including 1 yr. factory warranty at less than cost. Perfect power for go-carts, scooters, tractors, mowers, generators, pumps, sprayers, etc. We bailed out 3 big factories who needed cash and the savings are yours while quantities last. Act fast.



Clinton 2 1/2 hp, MdI. A-400—Re-coil starter Std. 3/8 shaft w. keyway—ready to go. Reg. price \$49.50 Special (item 1002)

\$29.95

2 for \$57.50
6 for \$150.00



Briggs & Stratton 2 hp, MdI. 60101 Rope start, std. 3/8 shaft w. keyway. Sturdy 4 cycle power. Regular price \$49.80 Special (item 106a)

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6 for \$149.50

\$67.50

5 3/4 hp.

Briggs & Stratton



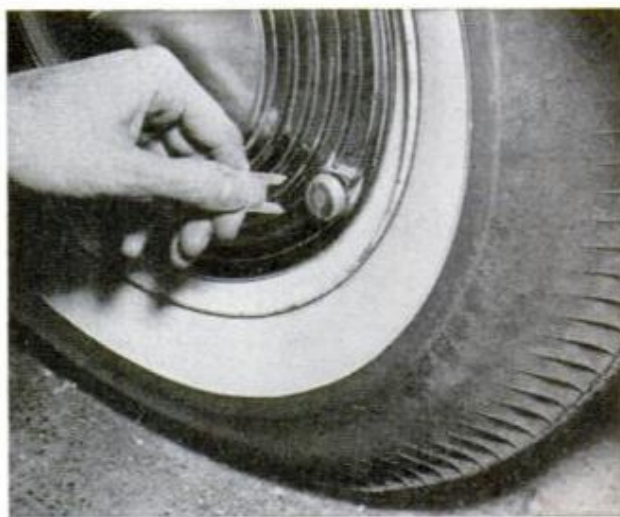
Briggs & Stratton 5 3/4 hp, MdI. 143302. Re-coil start. Std. 1" shaft w. keyway, aut. choke & throttle control—a rugged big engine ready to tackle any job. Regular price . . . \$92.60 Special (item 1059) . . . **\$67.50**

2 for \$130.00 6 for \$350.00



Insects Are Studied by X Ray

Dr. Ronald Stark is getting the goods on insects that destroy wood. The University of California entomologist studies pieces of Ponderosa pine and other wood with an X-ray machine to learn insect habits. Above, right, is a borer at work in a chunk of pine. He plans to develop a portable machine for use in forests.



Hub Cap Lock-Up

Have you ever had your car's wheel covers stolen, then seen a similar set turn up as a "custom" touch on a car of another make? Safety hub-cap locks are designed to put a stop to that and keep wheel covers on the cars they belong to.

The lightweight, polished, rustproof locks screw on to tire valve stems, then lock with a special key to prevent theft or tampering with tire valves. A set of four locks and two keys can be had for \$1.49 from Safety Plug Lock Corp., 1270 Broadway, New York 1, N. Y.

Better Your Home On Your Own!

and SAVE



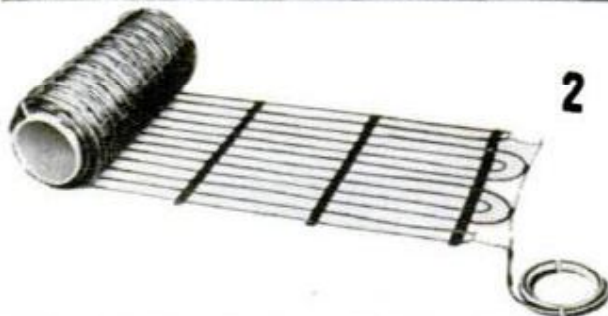
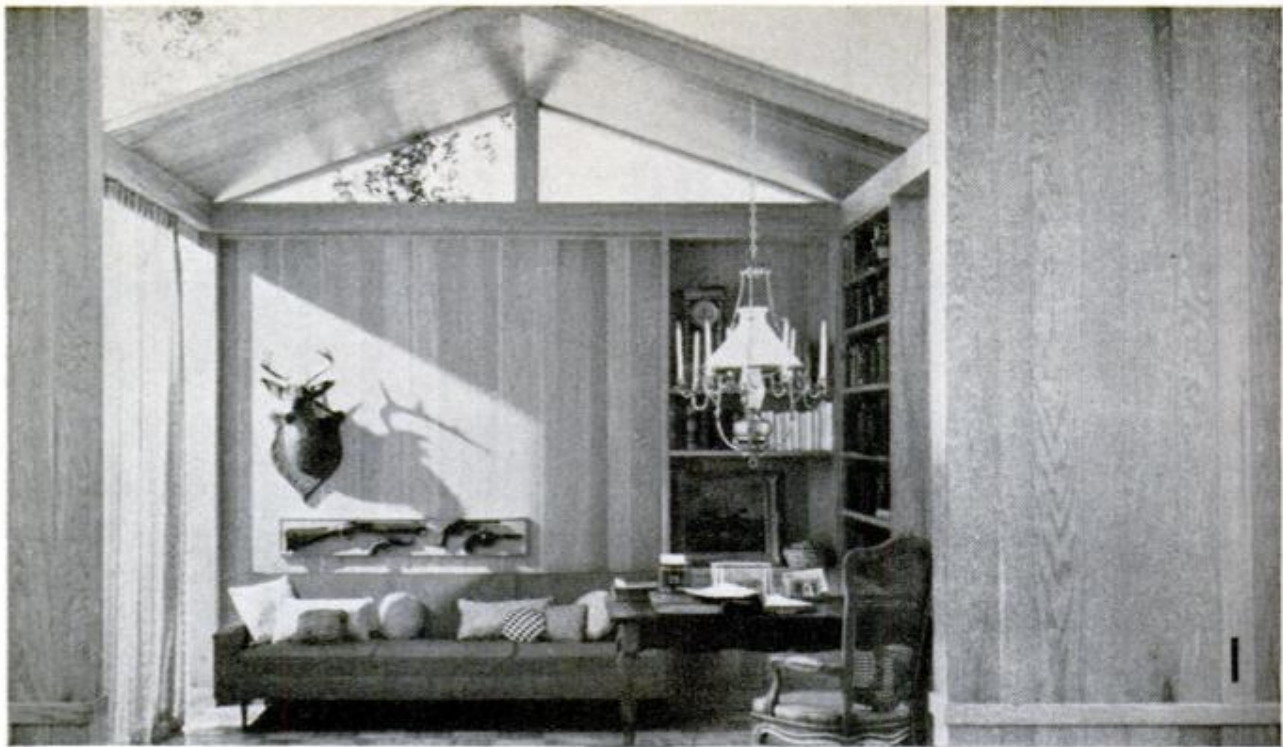
STANLEY FALL FAVORITES

Here are quality tools to help you breeze through those Fall fix-up jobs. See your nearby Stanley retailer. NOW, while he is offering many of these tools at special prices. And send for our free booklet #T2 that lists books and plans available and the tools you'll want to make short work of your Fall projects. Stanley Tools, Division of The Stanley Works, 6210 Elm Street, New Britain, Connecticut.

1. New "Steelmaster" Hammer with FREE Self-Centering Nail Set. OST1½, Special \$5.25.
2. Set of 4 Chemical Spray Tools with FREE handy spray handle. CT4, Special \$4.49.
3. "Life Guard Yellow" 10-Ft. Pocket Rule, ¼" Blade. MYT10, \$1.29.
4. "Yankee-Handyman" Push Drill. 46Y, \$4.25.
5. Set of 5 "Stanley-Handyman" Screw Drivers with FREE metal rack. 3005, Special \$2.99.
6. "Surform" File with Metal Cutting Blade and FREE Wood Cutting Blade. S295, Special \$2.79.
7. "Life Guard Yellow" 6 Ft. Folding Rule. 6LG, Special \$1.79.
8. New "Stanley-Handyman" Trimming Plane. H101, 99¢.
9. New "Stanley-Handyman" Block Plane. H102, \$1.69.
10. New "Stanley-Handyman" Bench Plane with FREE extra cutter. H104, \$4.49.
11. "Stanley-Handyman" Mitre Box. H114, \$6.00.

STANLEY

THE TOOL BOX OF THE WORLD



2

On the market



3



4



5

1. PREFINISHED HARDWOOD PANELING 7/16 in. thick eliminates need for backing or furring strips which saves cost of labor and materials. Called Craft-wall, it is sold in walnut, elm, oak, cherry, mahogany, birch, maple and four additional color tones. Weyerhaeuser Co., Wood Products Div., Tacoma, Wash.

2. ELECTRIC SNOW MATS embedded in blacktop driveways, parking areas, walks, etc., keep them free of snow and ice. They are 18 in. wide and operate on 230-240 volts, a.c. Priced at \$17.75 for 5-ft. length, \$21.75 for 10-ft., \$39.95 for 20-ft. and \$59.95 for 40-ft. Made by Smith-Gates Corp., Farmington, Conn.

3. MOLDED FOAM-PLASTIC CEILING TILES have attractive diamond-patterned squares and a lap edge. Easy to handle, they can be cut with standard tools and stapled, nailed or glued in place. Available in two-foot squares, in thicknesses ranging from one to eight inches. United Progress Co., Albany, N. Y.

4. LOUVERED PINE-DOOR CABINET is something new in home fixtures. Designed for bathrooms with large vanity mirrors, it is equally appealing in kitchens and recreation rooms. Enameled steel body has adjustable glass shelves and magnetic door catch. The F. H. Lawson Co., Dept. VPW, Cincinnati 4, Ohio

5. BOTTLED PRESSURE sprays liquids and chemicals such as insecticides, germicides, foams, paint and a variety of petroleum and water base chemicals. Pressurized aerosol can is refillable. Safety valves protect against excess pressure. Sells for \$19.95. Made by Aero-Dyne Corp., Box 247, Emmetsburg, Ia.

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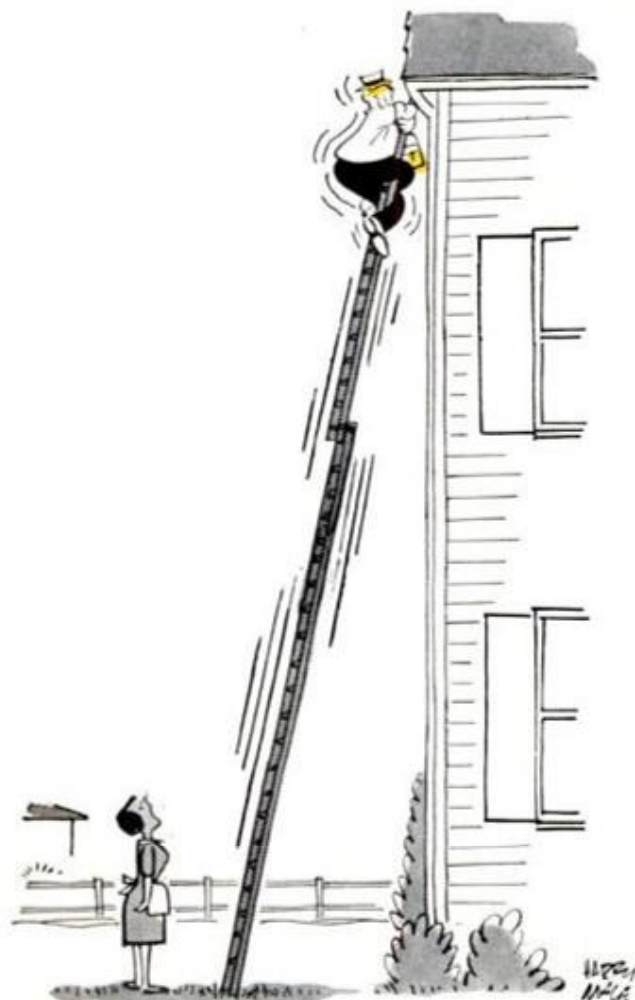
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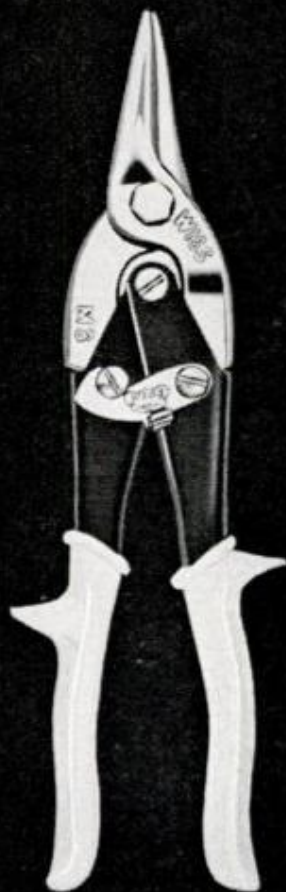
REGULAR—OIL SPRAY—ELECTRIC MOTOR



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OCTOBER 1962

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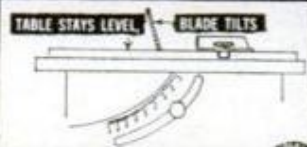
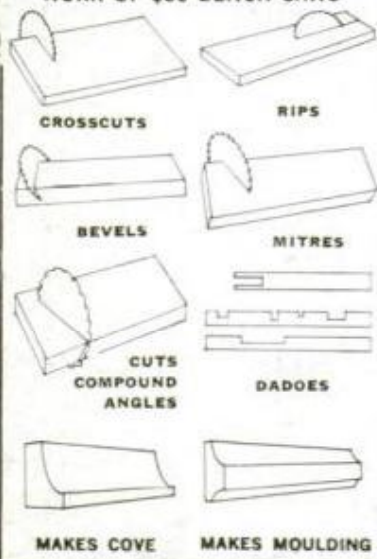
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