

Owners Reports: Chevy II and Rambler

# POPULAR MECHANICS

MAR. 1962  
35 CENTS

**WHOOSH!**  
There Goes the  
**PM JET** →

*Be First to Build  
This Go-Anywhere Boat*

**LOST:** Those  
enticing "extras"  
on old-time cars

**"Guest Room"  
In a Table**

**Boaters vs. Anglers—**  
*Here's Your Chance  
To Come Out Fighting!*

**Power Tower  
for Toting Tools**



# WIN YOUR OWN SHOWBOAT!

MADE BY KAYOT, INC.,  
MANKATO, MINN.  
world's leading builders of pontoon boats



## VISIT YOUR EVINRUDE DEALER'S FUN AFLOAT SHOW

**1,023 PRIZES!**

**3 SHOWBOATS**  
(as illustrated)

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40 hp Lark motors.

**PLUS**

**1,020 OTHER PRIZES**

to be given away in  
Evinrude's national  
SHOWBOAT CONTEST!

**2,100 ADDITIONAL PRIZES**

to be given away by  
Evinrude dealers across  
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during their

**FUN AFLOAT SHOWS**  
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Win this EVINRUDE SHOWBOAT — featured at the New York boat show. It's a practical pontoon boat by Kayot, Inc. — powered by a 40 hp Evinrude Lark IV with PUSH-BUTTON electric gearshift . . . as easy to operate as your own car. There's a built-in grill big enough to cook steaks for a boatload of guests. The paddlewheels turn as you move. It's a gay sight to see and practical for day cruising and partying. Three Showboats, plus 1,020 other prizes will be given away in Evinrude's Showboat Contest!

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Get your Official Contest Entry Form and FREE Evinrude FUN GUIDE at your nearest Evinrude dealer now. Look for his name in the Yellow Pages under Outboard Motors. Evinrude Motors, Milwaukee 16, Wisconsin, *A Division of Outboard Marine Corp.*

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Giant "Pop-Tents"

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Movie Cameras



100 Westinghouse 3-band  
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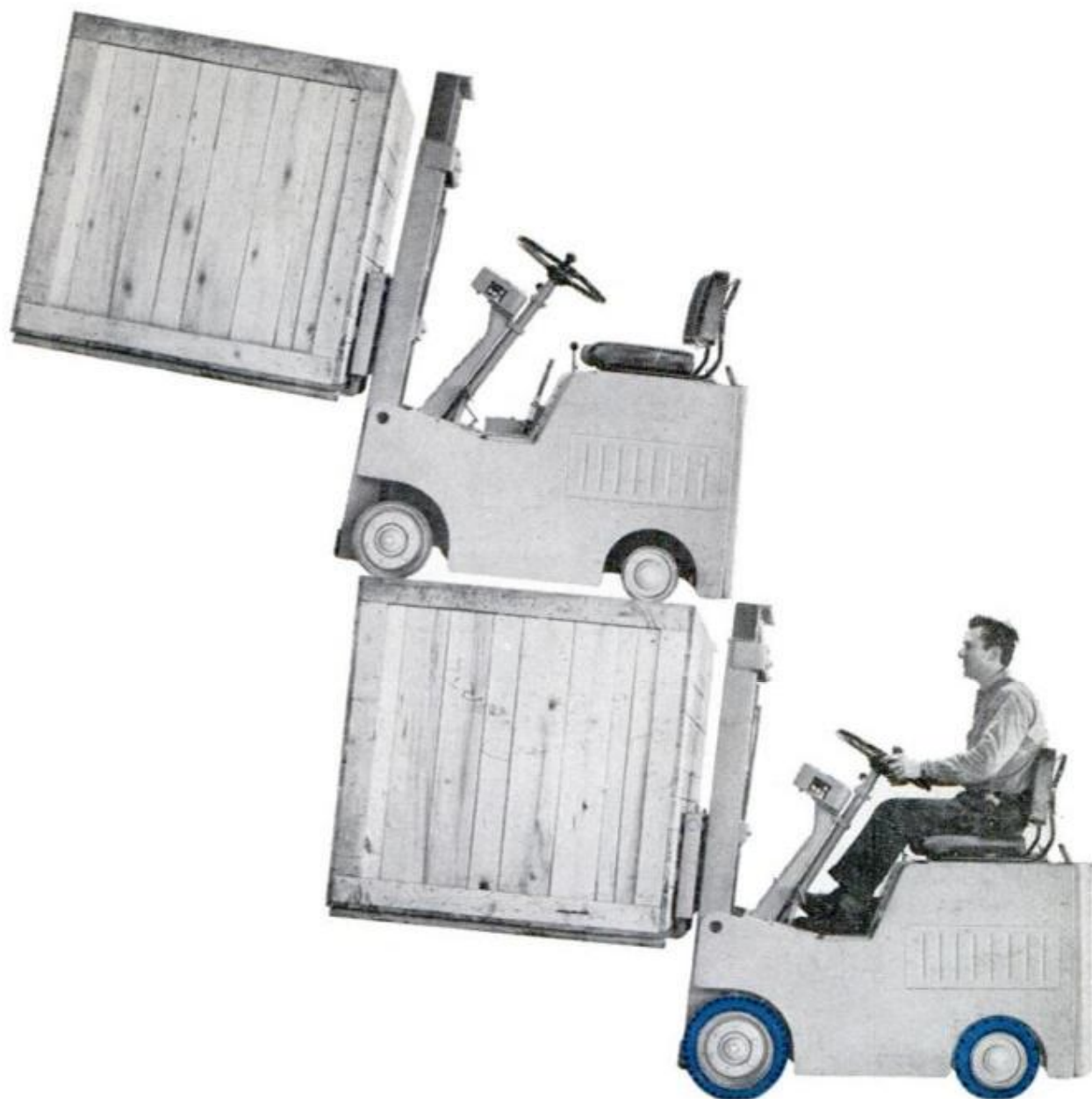
250 AMF-Voit  
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250 Turner  
Camping  
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250 South Bend  
Fishing Outfits



## Blue tire wears even better under twice the load!

We made these tires blue because they're so different from other industrial tires!

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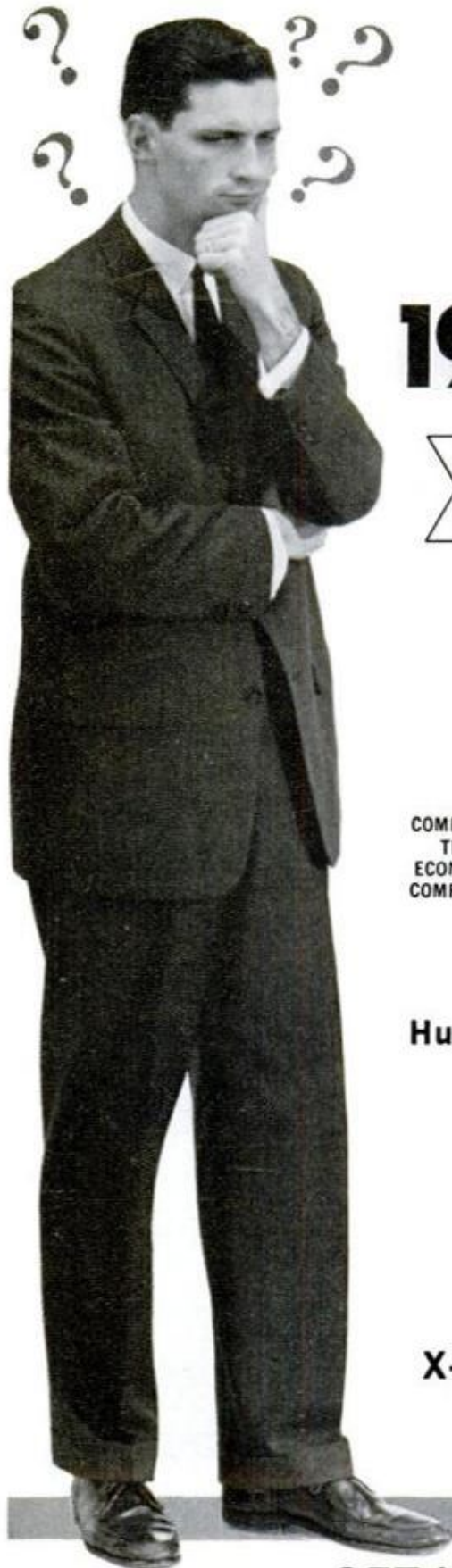
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**GOODYEAR**

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# POPULAR MECHANICS®

MARCH 1962  
VOL. 117 NO. 3

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## Next Month . . .

The finest fishing spot in North America—can you guess where it is? The new Falcon and Pontiac—do you know what their owners think of them? Important tips for tent buyers—any idea what they would be? You'll find these questions answered in the April PM, the same issue that will introduce you to a new armload of power and a "classic" sidewalk car that runs—safely—on one battery.

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## Superfast Polaroid Film

Carrying a speed rating of 10,000 ASA, an extra-fast film has been marketed by the Polaroid Corp. for specialized scientific applications.

Not recommended for general-purpose photography because of its high contrast and grainy structure, the new Type 410 film will be used primarily for recording extremely short-duration oscilloscope traces, photomicrographs, metallographs, etc.

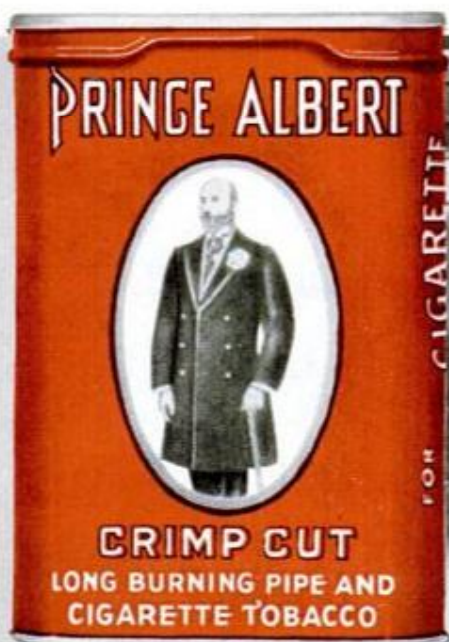
Packaged in 12-roll cartons, each carton will retail at \$27.12. Polaroid's previous highest-speed film was rated at 3000 ASA.

## Machine Takes Voice Commands

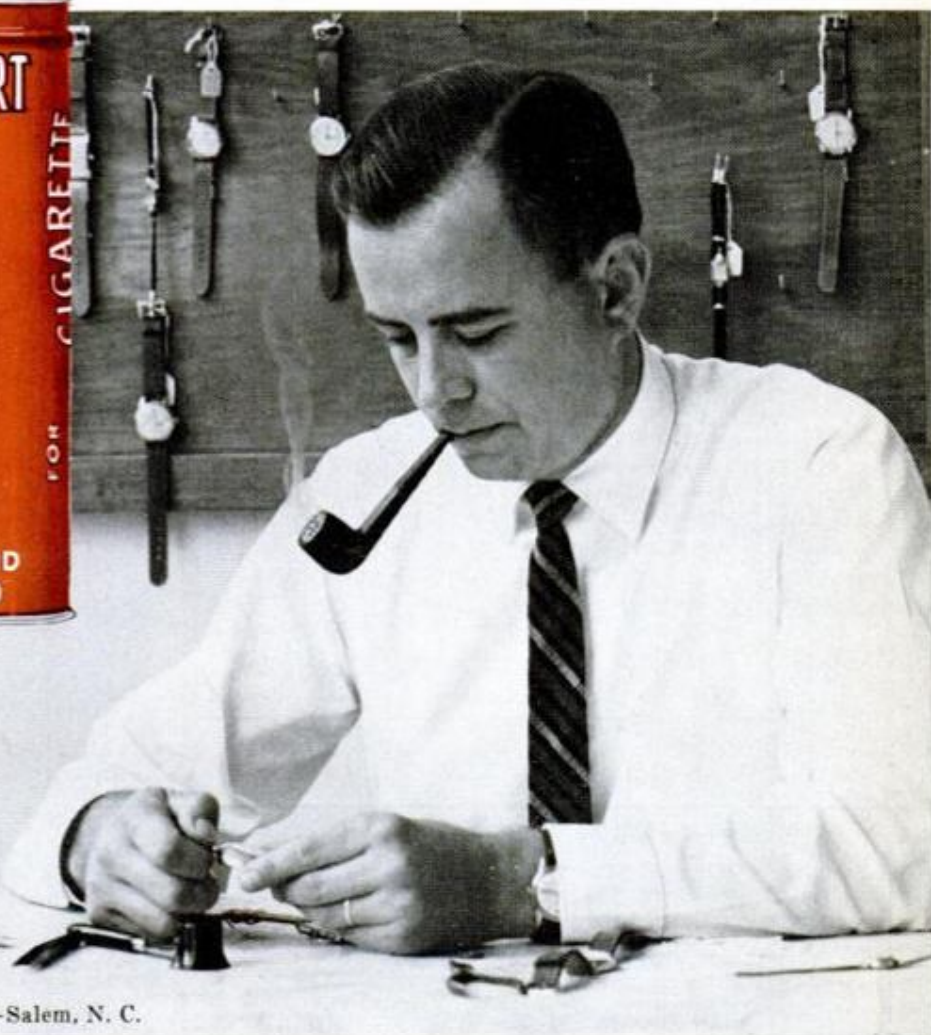
Arithmetic problems can be solved by a machine under command of a person's voice. Named Shoebox, the tiny experimental device recognizes 16 words spoken into a microphone, including 10 digits. When words such as "plus," "minus" and "total" are spoken, it instructs an adding machine to calculate and print out correct answers to simple arithmetic problems.

In operating Shoebox, a person first speaks into a microphone which converts his voice sounds to electrical impulses. A 31-transistor measuring circuit classifies these impulses by various types of sounds.

# PRINCE ALBERT has the flavor most favored in the U.S.A.



- Tastes fresh
- Smokes cool
- Burns steady



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*The proof is in the puffing... try*

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POPULAR MECHANICS



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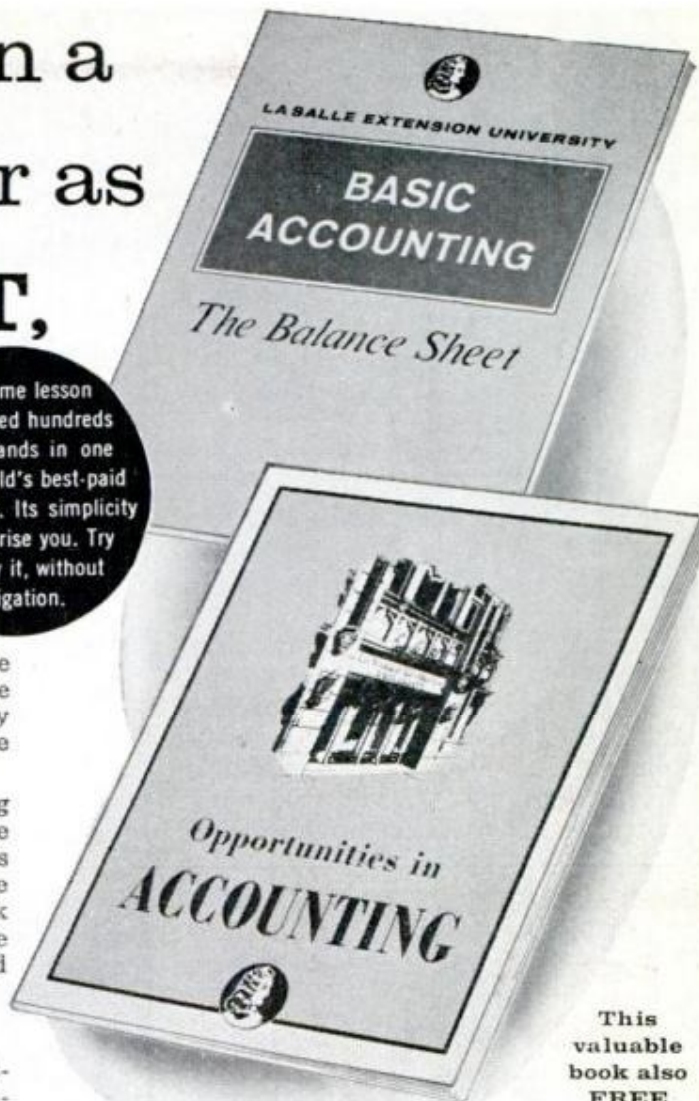
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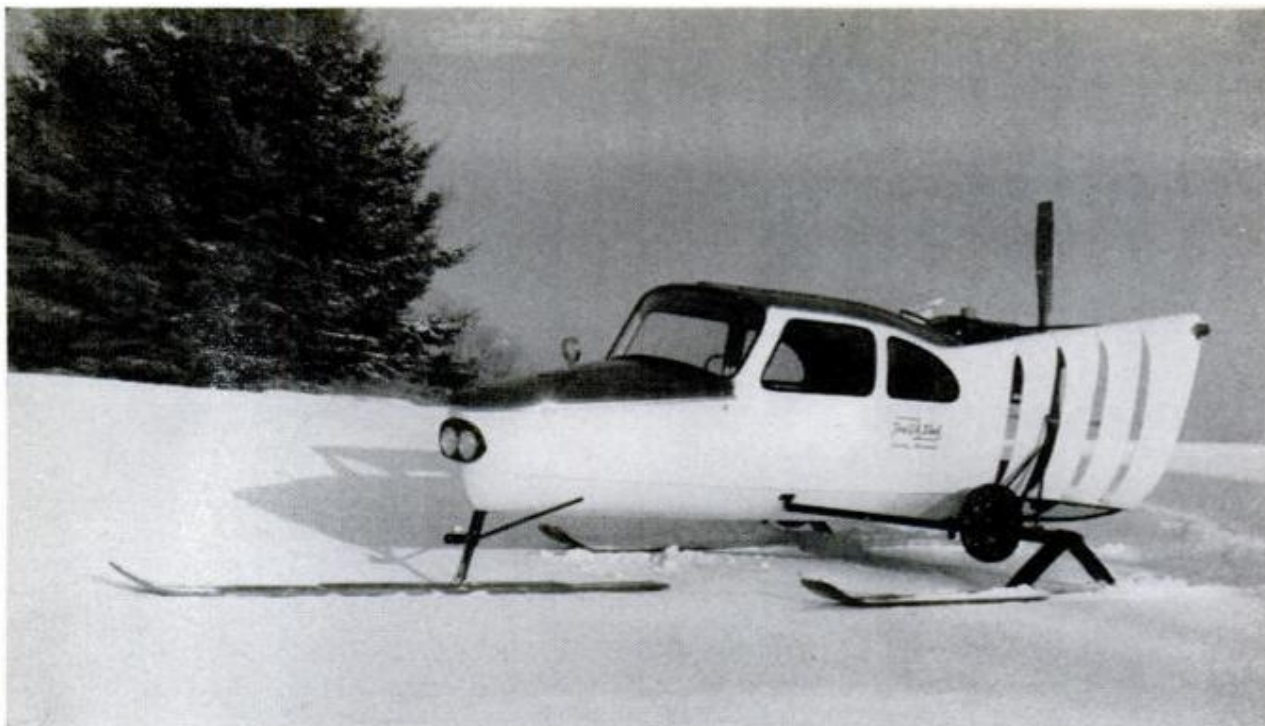
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## Power Sled Has Retractable Wheels for Towing

Retractable high-speed trailer wheels that resemble the landing gear of an airplane are a feature of new model propeller-driven snow sled. The craft also has a built-in trailer hitch and removable front ski for

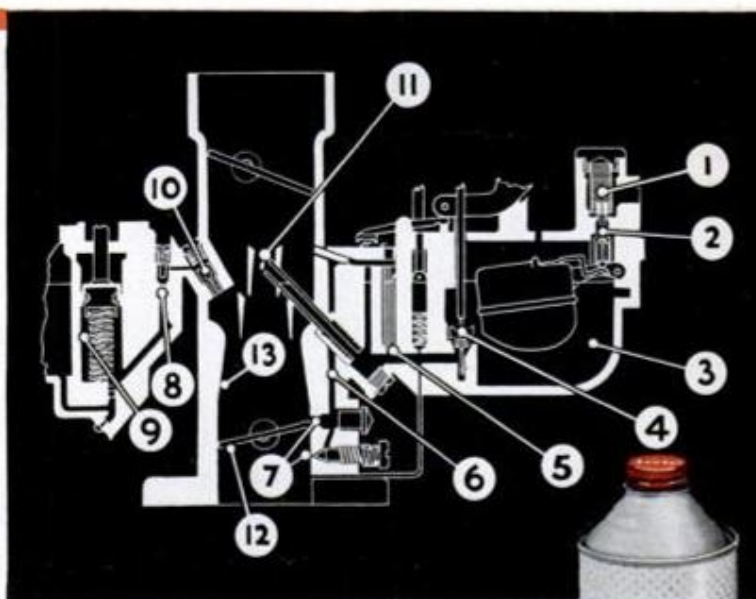
towing over the highway to a suitable area.

The sled, which will travel up to 100 miles an hour, is built by Trail-A-Sled, Inc., Crosby, Minn. Prices range from \$1395 (without engine) to \$2395 (four-place).

# GUMOUT CLEANS CARBURETORS 13 WAYS!

There are at least 13 potential trouble areas in your carburetor—areas where even the tiniest speck of dirt or gum will impair engine economy and performance. You can clean a dirty carburetor quickly, thoroughly and economically with GUMOUT. Just add GUMOUT to your gas tank. It cleans your carburetor while you drive. Get GUMOUT at your favorite service station or auto supply store. You'll get improved engine performance and better gas mileage.

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CLEVELAND 4, OHIO



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**SUNSHINE PARADISE OF THE BOOMING SOUTHWEST**

**NOW! OWN A 1/2-ACRE ESTATE IN THIS  
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 FOR ONLY \$795**

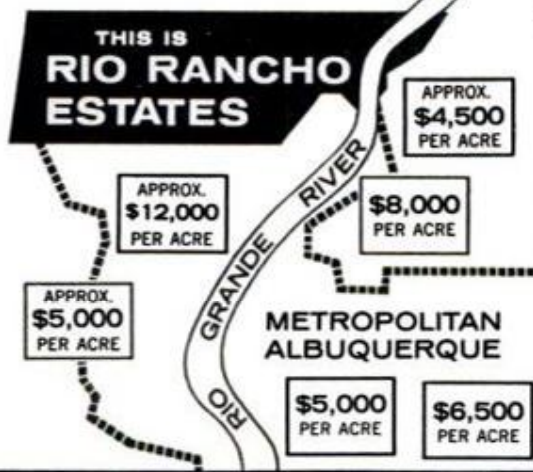
RIO RANCHO ESTATES AT ALBUQUERQUE, NEW MEXICO

**LOOK**

what they're getting for land today at sunny Albuquerque!

**COMPARE**

prices of homesite land—up to \$12,000 an acre right to the very doors of RIO RANCHO ESTATES. Prove to yourself that only at RIO RANCHO ESTATES can you obtain choice homesites, right in the path of big-city growth and soaring land values, for a fraction of current market prices!



**FOR INVESTMENT!  
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 YOUR OWN SUBURBAN ESTATE**  
 for only  
**\$10 MONTHLY**

**CHECK THESE MAGNIFICENT FEATURES AT RIO RANCHO ESTATES:**

- A completely planned development! 21 miles of streets and roads already cut through—new houses going up—centrally-piped water supply available to each home in residential area now under construction—power, phone lines on property—community club house, swimming pool facilities now on the way!
- LOCATION:** Directly adjoining metropolitan Albuquerque.
- LAND:** Guaranteed rich, fertile. On gently rolling ground, easy to build on. No mountains, bogs, muckland, barren desert—no flooding.
- CLIMATE:** Albuquerque acclaimed for "best year-round climate in U.S.A."
- STREETS:** All streets give quick access to neighboring Albuquerque; will be maintained by County. State highway 258 and County Road 46 run through property.
- WATER:** Abundant domestic well water available on every site. Piped water available in residential area now under construction.
- RIO GRANDE RIVER:** Three miles of frontage on the romantic Rio Grande River.
- ELECTRIC, PHONES, GAS:** Available to all residential areas at Rio Rancho Estates.
- POLICE, FIRE PROTECTION; FREE SCHOOL BUS AT PROPERTY.**
- TITLE:** Master Title Policy. No cost to you.

**HEALTHIEST SPOT IN U.S.—WHERE THE SUN SHINES 360 DAYS A YEAR**

With 274,000 people now and streaking toward a million, fast-growing Albuquerque, New Mexico, now offers you the opportunity of a lifetime to own choice big-city homesite land for pennies on the dollar—far below current market prices. Learn how you can actually be a big landowner here for only \$10 monthly and get in on the fortune-building potential of big-city land in this booming sunshine resort area, famed for best climate in U.S.

**LET ALBUQUERQUE'S LAND BOOM MAKE MONEY FOR YOU!**

A look at the map above will show you that in most cases you must pay \$4,500 to \$12,000 an acre for remaining land at Albuquerque—indeed pay that much or more for land right up to our very doors. The map clearly shows the last section at Albuquerque where choice homesite land can still be bought at far below current market prices... RIO RANCHO ESTATES, where you pay pennies instead of dollars in comparison with every other choice piece of land in sight. Only \$795 for a half-acre site! You get a big piece of property equal to 10 1/2 standard 20' x 100' city lots at a low, low price that figures out to less than \$74 a lot. Nowhere else in the Southwest can you buy a choice 1/2-acre site so low in price—so close to a major city—and for only \$10 monthly!

**A WONDERFUL NEW WAY OF LIFE**

Picture you and your family living on a rambling, king-size estate of your own, in this friendly Southwestern community where you'll be able to fish, swim, golf to your heart's content—enjoy a lifetime of vacation pleasures

and recreational facilities only minutes away from your door. A sun-drenched beauty-spot where wonders of Nature surround you in all directions—where the sun bathes your body 360 days a year—where winters seem like spring, and summer is so comfortable you never need an air-conditioner.

RIO RANCHO ESTATES slopes along one of the greenest, most fertile valleys in the world, the Valley of the Rio Grande. The gently rolling land is so fertile it awaits only your touch to produce luscious fruits and vegetables—exotic floral gardens ablaze with beauty. And all around you, you'll thrill to "picture window" views of majestic mountains that soar in the distance—the silvery Rio Grande that winds by your door—the gleaming skyline of Albuquerque that lights up at night like a fairyland of color!

RIO RANCHO ESTATES is located directly on the banks of the romantic Rio Grande River, only five minutes from metropolitan Albuquerque, and right next to a \$12,000-an-acre golf course development. Schools, churches, theatres, big-city shopping all just a few minutes downtown from property. Guaranteed ideal land for building, with roads, power, phones, water system already available to those desiring to build homes now or later.

**FREE! LAND INVESTOR'S KIT**

Remember—this is big-city land, with adjacent property already priced at \$4,500 to \$12,000 per acre. Act now! Land prices are starting to skyrocket in this "Sunshine Paradise". Rush coupon for FREE fact book, land maps, photos, details, and comparison prices of land in the Albuquerque area!

**RIO RANCHO ESTATES, Dept. RR-10**  
 A Division of American Realty & Petroleum Corp.  
 1429 Central Avenue, N.W.  
 Albuquerque, New Mexico

Please rush FREE fact book, land maps, photos, and details on the big-city land opportunity you offer at far-below market prices at ALBUQUERQUE, New Mexico.

NAME.....  
 ADDRESS.....  
 CITY.....ZONE.....STATE.....  
 © 1962 Rio Rancho Estates, Inc.

# Over the editor's desk

## Forecaster Krick Replies

I am enclosing verifications our staff prepared for the October forecasts published in *Popular Mechanics*. When forecasts are prepared several years in advance as these were, we must allow some latitude—sometimes as much as 12-18 hours in depicting events of a particular day over a wide area such as North America. We have been able to verify pressure patterns and related weather features over most of the country with acceptable tolerances. An exception is the Oct. 3-4 situation which we regard as the poorest match and considerably below our usual performance level as exemplified in the other charts. . . .

Krick Associates, Inc. IRVING P. KRICK

For the information of latecomers, Mr. Krick's forecasts of certain October 1961 weather periods in the U.S. were sent to PM on June 5, 1961. His charts matching his forecasts against the actual weather—in terms of the percent of U.S. area verified—show 60 percent for the Oct. 3-4 forecast and 80 percent for each of the Oct. 11-14, 18-19 and 20-22 forecasts.

## Finnish SAH-oo-nah

You mention that among forthcoming articles may be one on the Finnish "suana or steam bath." The word is "sauna" and Finns pronounce it "SAH-oo-nah," not "sawna." To Finns the sauna is almost a religion; the sauna may get built before the house does. Finns tend to deny that it is quite a "steam bath." Though water is thrown on the heated rocks while the sauna is going on, apparently the air is so hot that little steam forms.

Greeley, Colo. TOM BURNAM

But there must have been enough steam to fog up our proofreader's glasses, Tom. Incidentally, we didn't promise an article on a sauna—that will depend on how many PM readers ask for it.

## Family Gym

I was pleased and interested to read the article concerning the building of a family gym (Jan. '62 PM). It is heartening to learn that you are as deeply concerned as we are about the vital need for physical fitness. Your success in combining an effort to fulfill this need with an article of such obvious interest to your readers is to be congratulated.

As the Council continues its program, we trust that we will find further opportunity to rely on your support.

The White House BUD WILKINSON  
Washington, D.C. Consultant to the President on Physical Fitness

## Wrong Place, Right Time

When I saw the picture of the near collision of two planes (p. 138, Sept. '61 PM), it brought back instant memories. I was at that air show and took the same picture at a different angle. My photo (top, below) is not as dramatic which probably proves I was in the wrong place at the right time.



The other picture of the girl who was on top of the biplane was taken as the plane taxied to a stop. Her first words were, "anybody have a cold soft drink?"  
Los Angeles, Calif. FRANK H. UNDERWOOD

A proper reply from an already cool chick.

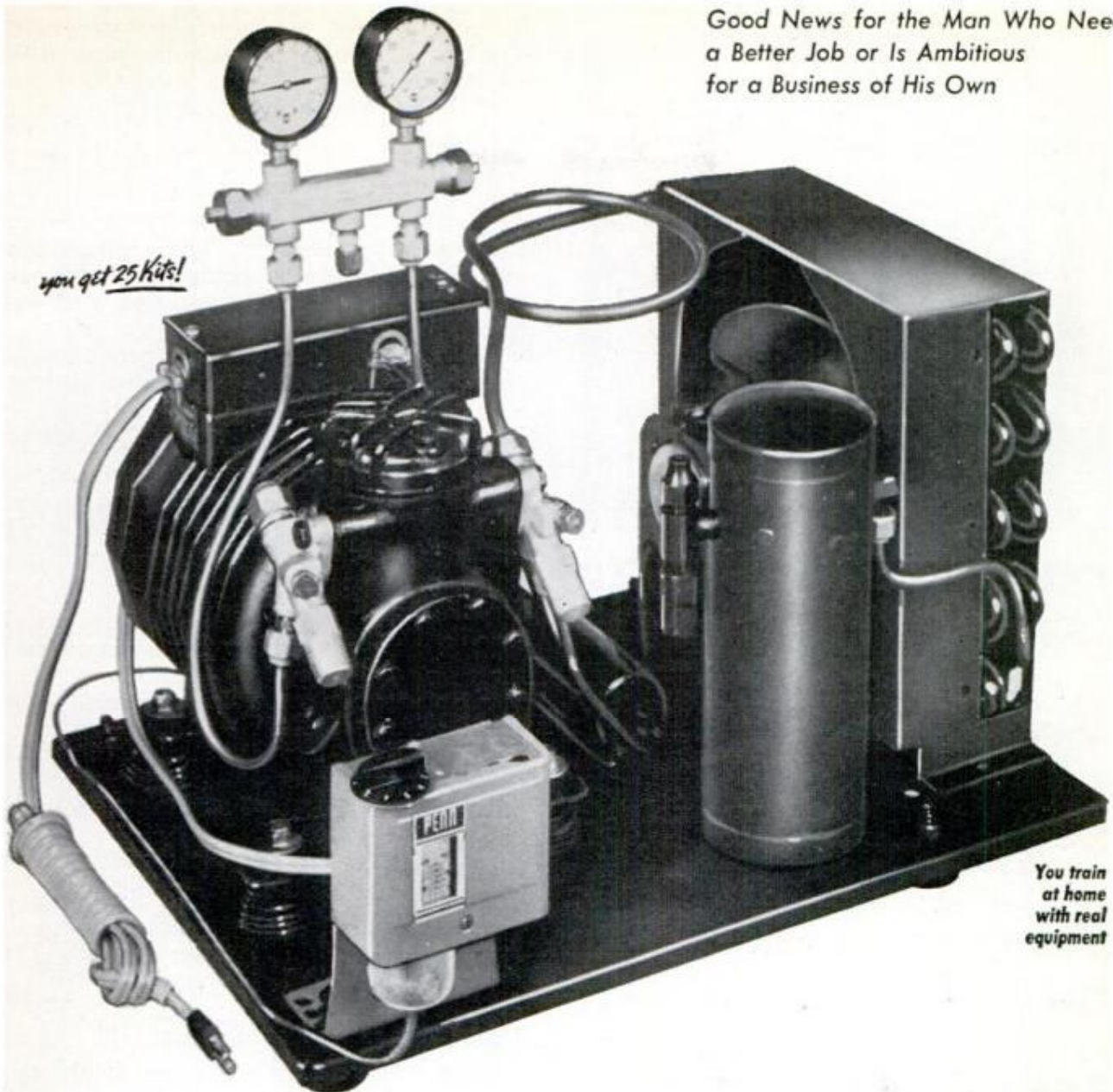
## Where Do They Fit?

I do not understand why you are printing stories like *This Way, Please* or *Football's Fabulous Foremen* (both Nov. '61 PM). Just where do they fit in a publication called POPULAR MECHANICS? I buy the magazine for just what its name implies.  
Bokeelia, Fla. ERNEST J. PERG

We felt that the way Andy Frain engineers the handling of crowds (*This Way, Please*), and the quarterbacking techniques described by Norm Van Brocklin (*Football's Fabulous Foremen*), both involved

(Continued to page 12)

Good News for the Man Who Needs  
a Better Job or Is Ambitious  
for a Business of His Own



You train  
at home  
with real  
equipment

## Learn REFRIGERATION and AIR CONDITIONING

Thousands of men have found a short-cut to a good job, big money and security—even a business of their own—in the Air Conditioning and Refrigeration field.

This short-cut method is available to you as well. The only investment you make is a few hours of your time each evening and a few dollars of your income each month. And when you're ready for your big-pay job in Air Conditioning and Refrigeration—as a technician or mechanic—you switch over.

You'll find the key to a better future in the condensing unit above. It's the heart of the exclusive CTI Home Training Method. CTI sends you illustrated lessons which supply the knowledge and know-how. However, during your training, CTI also sends you 25 kits of parts and tools to build the condensing unit. With it you work on 20 practical projects. You develop your skill in trouble-shooting, using tools, making repairs and servicing. You learn by practicing!

Many CTI students earn money in spare time as they train. This extra income helps meet tuition payments, buys extra equipment.

Yes, CTI Home training has many parts. We'd like to tell you all about it—and the marvelous opportunities that are waiting. (Did you know that each year the Air Conditioning and Refrigeration industry needs 20,000 more newly-trained men?)

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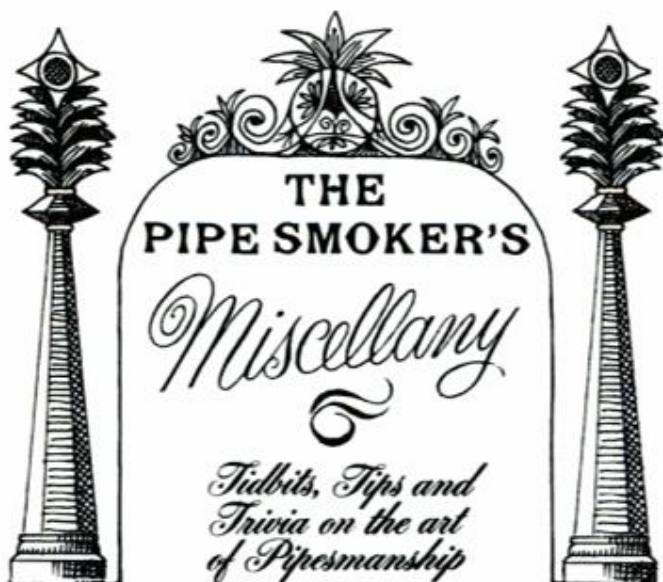
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But let's face it, a half dozen pipes is a better and more realistic number. (Of course, the more the merrier!)

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some interesting mechanics of today's living. Perhaps other PM readers have ideas on the suitability of such subjects? If so, we'd like to hear your frank expression of them.

## Silk-Screen Fan

Learned a lot from your November article on silk screening. I'm a photo bug anyhow but this working with process films gave me a new education and expanded my photo interest.

Have you published tips on process-type cameras? I have been trying—without luck—to build a small one.

Little Falls, Minn. ROBERT D. POMEROY

We've run tips on using, but not on building, copy cameras. Maybe this is a project other readers would like to have PM work up for a future issue?

## Fun-Table Costs

Your fine December issue contained more interesting articles than I have ever read in any one magazine, especially the two dealing with hobbies: *Table-Top Racing* and *Triple-Top Fun Table*. I would like to know the cost of constructing the three-in-one table and outfitting the pool table.

Annapolis, Md. ROBERT M. ARNOLD

Materials for the fun table, plus playing equipment and HO-gauge track layout, will cost about \$130-\$150, depending on the equipment selected.

## Caution and Invention

Reader Pat Mebus of Ogden, Utah contributes a helpful note of caution concerning a spray painting booth set up in the home. If you're planning to build one, be sure that you equip it with lamps and motors designed to prevent explosion and fire, as outlined in the rigid requirements of the National Electrical Code.

Reader Reinelda Speight, who teaches fifth graders at the Lincoln School in St. Charles, Ill., sends us her youngsters' descriptions of things they would like to see invented. And what are tomorrow's grown-ups dreaming about today? Here are some samples: A desk with built-in drinking fountain or another with an electric book selector; a flying bicycle or a pair of flying shoes; a profit machine for salesmen; an air-kart for kids; and a quiet-room desk enclosure complete with loudspeaker for talking to the teacher.

Wonder what *your* youngsters think of these ideas?

*The Editors*

POPULAR MECHANICS

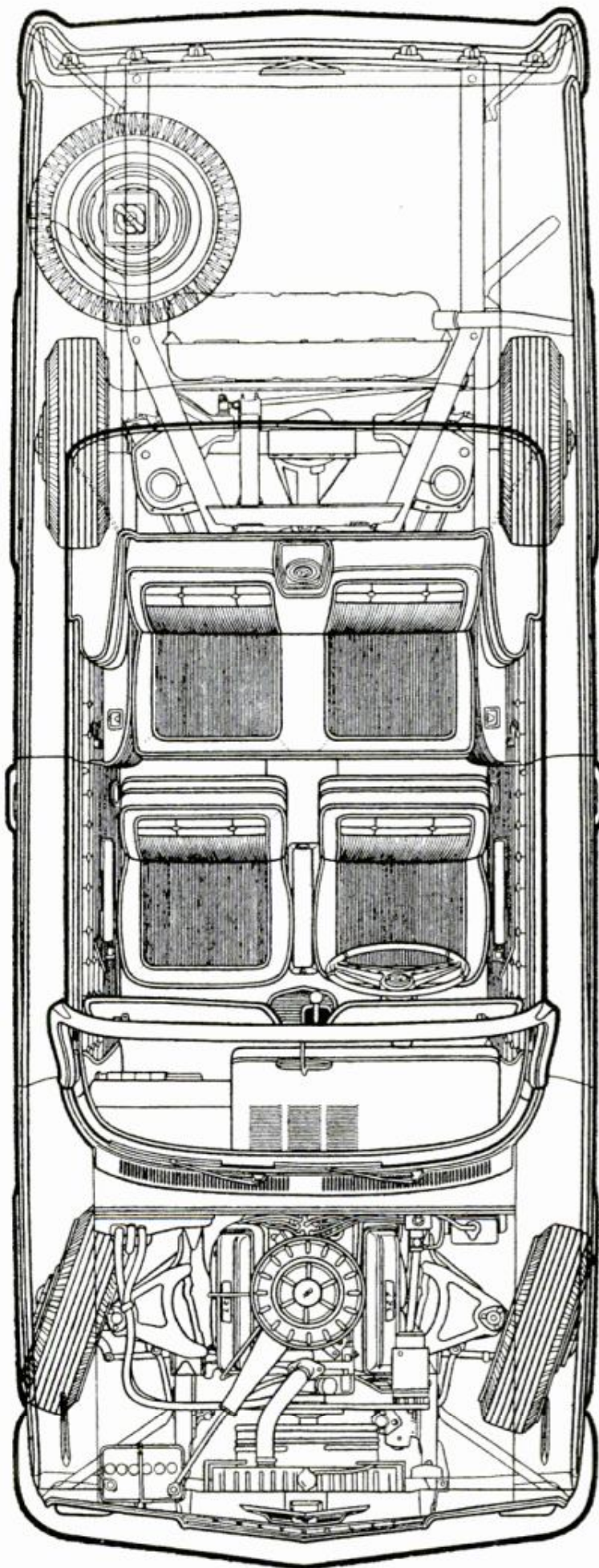
## NOBODY KNOWS ENTHUSIASTS AS WELL AS CHEVROLET

After all, who introduced the four-speed all-synchro transmission (one of the world's best) in American cars? Chevy. Who started the recent trend to bucket seats? Chevy did. Who built a real honest-to-goodness sports car back when hardly anybody else on this side of the Atlantic even knew what they were? Chevy again. Who pioneered Fuel-Injection for American cars? You guessed it.

Right now, Chevrolet builds a wider variety of models for discerning drivers than anybody, except perhaps a couple of European one-of-a-kind custom builders. Everything from frolicsome two-seaters to full-size family sedans, all available with a fantastic array of equipment designed to suit the more demanding driver.

Imagine a car like the Impala Sport Coupe with such optional-at-extra-cost equipment as bucket seats, four-speed box, 409-cubic-inch engine, Positraction, heavy-duty shocks and springs, and sintered-iron brakes. It'll out-handle and out-run quite a gang of good automobiles, and it'll carry you, your wife, your mother-in-law, two kids, a bird cage and a springer spaniel in the process.

If you're a one-car man with a ten- or twelve-car appetite, try a combination like that—it's not bad, and it'll sure leave a trail of disillusioned sports cars in your wake. Chevrolet Division of General Motors, Detroit 2, Michigan.



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## Sidelights on aviation

Can you "hack it" in the space age? Are you "AOK" and "sitting fat," or are your "eyeballs in"? Is your vocabulary up to date enough to know that "blowoff," "T-time" and "sunseeker" don't refer to loudmouths, crumpets and bikinis?

"Hack it" is the military equivalent of "cutting the mustard." Either you can hack it or you can't.

"AOK," made popular during Comdr. Alan Shepard's suborbital flight, means all systems working perfectly.

"Sitting fat" is about the same as sitting in the "catbird seat"—it means up in orbit and doing fine.

"Eyeballs in" refers to the pressure of G-forces during blastoff.

"Blowoff" is the explosive separation of the payload from the booster rocket.

"T-time" is the blastoff in "10, 9, 8, 7, 6, 5, 4, 3, 2, 1, BLASTOFF! . . ."

And "sunseeker" is not a Miami Beach doll, but a Cape Canaveral gadget that keeps instruments aimed at the sun.

Now, can you hack all that?

**Raising your right hand** is the standard procedure for taking an oath, but how high?

An Air Force sergeant set some sort of a record recently, but it was shattered immediately by a Navy air technician.

The sergeant, assigned to a communications squadron, climbed 1200 feet to the top of the Air Force's tallest transmitting-antenna tower, raised his right hand and was sworn in for another six-year hitch.

The technician climbed into the back of a supersonic McDonnell F-4H Phantom jet, was taken to 38,000 feet, and, while cruising along at 1500 m.p.h., the pilot—his commanding officer—administered the reenlistment oath over the intercom.

An air-car crash boat, capable of 80 m.p.h. over land or water, might be developed by the Navy for rescue service. This new GEM (ground-effect machine) model has been tested "with impressive results," suggesting a prototype 29 feet long, weighing 10,000 pounds and carrying a crew of six. It would be powered by a turbine engine that would drive a fixed-pitch cushion fan and a controllable-pitch propulsion fan.

*Kevin V. Brown*

POPULAR MECHANICS





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## Spotlight on the Rolls-Royce

By Jim Whipple

**WHAT'S IT LIKE** to drive a legend? Is Rolls-Royce really "The Best Car in the World" as its modest maker claims? And if so, how much better is it than the best Detroit has to offer? To find out some of the answers we borrowed a standard Silver Cloud four-door sedan from the firm's U. S. distributor, Rolls-Royce, Inc. in New York.

At \$15,655, there's precious little that's "standard" about this basic-model Rolls. It comes equipped with automatic transmission, heating and ventilation systems, power brakes and steering, matched-grain walnut folding picnic tables hinged to the back of the front seats, and a rear window defrosted by hundreds of invisible electric wires, sandwiched between the plies of glass.

The outward appearance of the Silver Cloud, sleek with its 14 coats of preservatives, primers and paint, has an air of stately elegance that makes you think of silver-haired bishops, United States senators and the Queen Mother. So strong is the attitude generated by the car's dignified image that we found ourselves at first driving the car like an elderly chauffeur hauling some haughty dowager to a Park Avenue church.

We were genuinely surprised when we got out into the hilly back country of Connecticut and, summoning our courage, mashed down on the accelerator pedal. Whammo! the world's most elegant motor car moved out right now, for all the world like a full-house Pontiac at the drags.

Frankly shook up, we dug out our stopwatch and tried it again, this time from a

standstill. The traditional 0-60 run was ticked off in just 11.3 seconds. Not bad for a portable London club weighing 4700 pounds.

Motive power for the Rolls' well-bred zoom (no exhaust roar, no tire squeal) is an all-aluminum V8 of 380-cubic-inch displacement.

This relatively understressed engine, with 8-to-1 compression ratio, is of modern, short-stroke design (4.1-in. bore, 3.6-in. stroke). In accord with longtime Rolls-Royce policy, no horsepower rating is given, but interpolating from American cars of this weight and performance potential, we'd be willing to bet that the Rolls V8 would ring up something like 270 on the dynamometer.

Transmission is of Rolls-Royce's own manufacture based on GM's Hydra-Matic patents. (Imitation by Rolls-Royce is indeed sincere flattery.) At any rate their version works very well indeed. The steering column control lever permits you to downshift from 4th to 3rd ratio at part throttle for smooth hill climbing or additional engine braking. With control either in 3rd or 4th, the automatic upshifts to top ratio at about 70 m.p.h. Top speed is comfortably in excess of 100.

The engine is obviously beautifully balanced as there is no vibration at speed. On the test car there was a slight trace of uneven power impulses at idle.

Cruising speeds are pretty much what you make them in the Rolls. With windows buttoned up there's not much audible difference between 50 and 80 m.p.h. At this higher speed we could distinctly hear a fly

(Continued to page 18)

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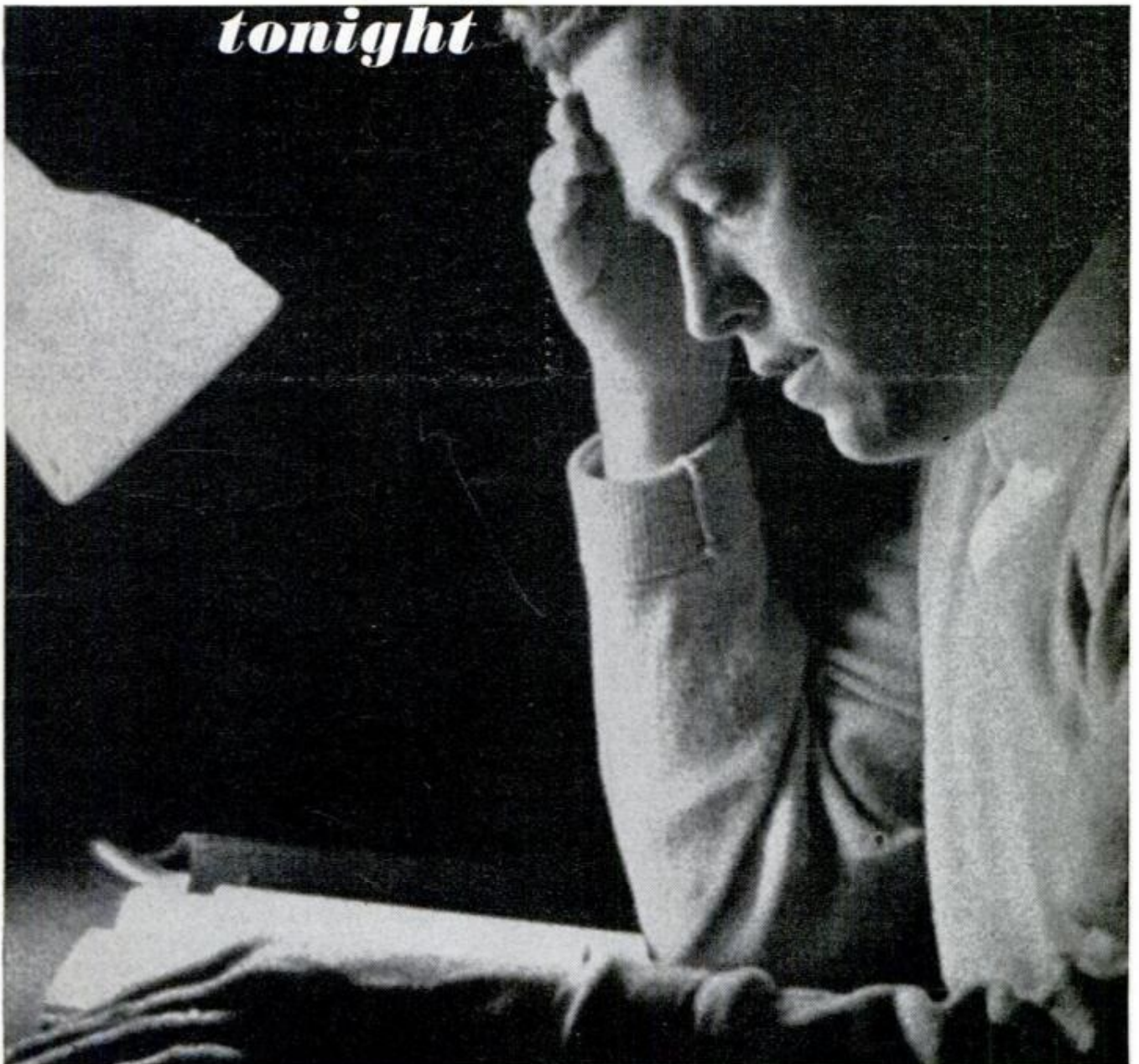
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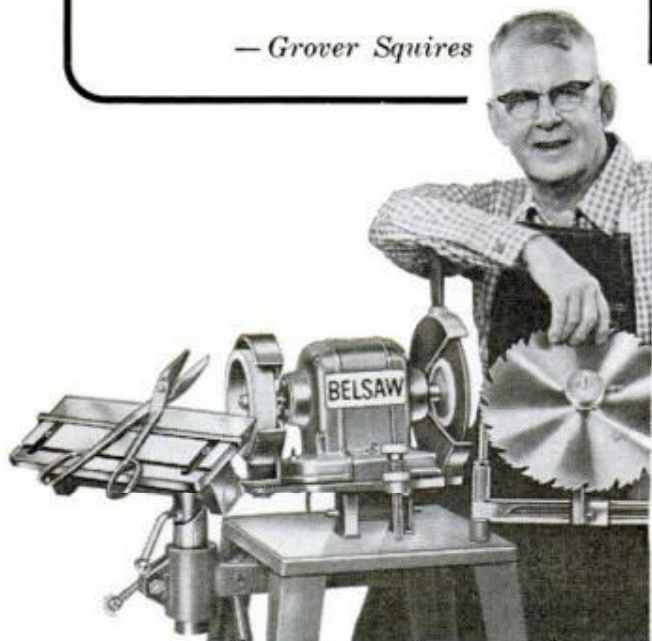
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(Continued from page 16)



**ASH TRAY** is combined with the sliding walnut picnic table beneath panel with its full set of instruments

buzzing in the back seat. When urged, the engine gives out with a deep power hum many decibels below the vulgar va-va-voom of a big-bore Detroit flat out.

But, even more impressive than the Rolls' vitamin-packed power curve, is the car's handling, roadability and ride.

Once again the car's appearance is misleading. Nine or ten inches higher than the average '62 U. S. product (it's 64 inches high) 212 inches long, with a 123-inch wheelbase, thus you might think that the Rolls would be clumsy or sluggish in response. Nothing could be further from the fact. We took the car over a one-and-a-half-lane, high-crowned lumpy, country road at 55 m.p.h. around curves that make the best U. S. cars heel over and yaw wildly.

The big Rolls took it light and tight—it might have been a Corvair Monza holding the line through the meanest of S bends. At one point we topped a sharp rise, were almost airborne, then came down hard enough to have pounded the rubber bumpers off many cars. But the Rolls never bottomed, thanks in part to its dual-range shock absorbers that can be set for firmer control at the flick of a steering column switch.

This feature gives you the "soft" control to permit the springs (long leaf semielliptic at rear, coils up front) to do a superb job of cushioning rough surfaces. When set on "H," though, the suspension hardens up when you need maximum stability.

At no time during our ride was there a squeak or creak from the body which sits isolated from the frame on 13 rubber insulators, the only metal-to-metal contact

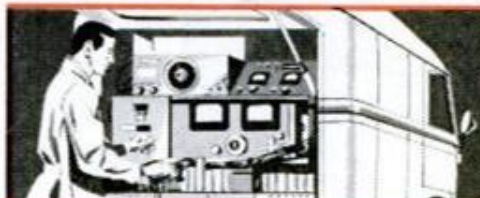
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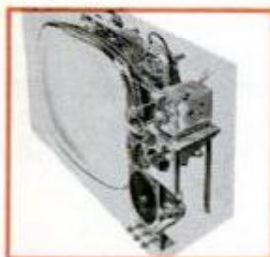
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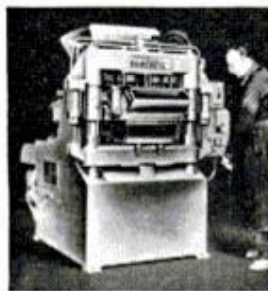
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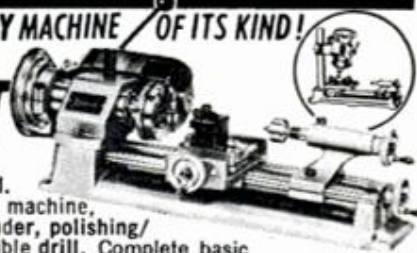
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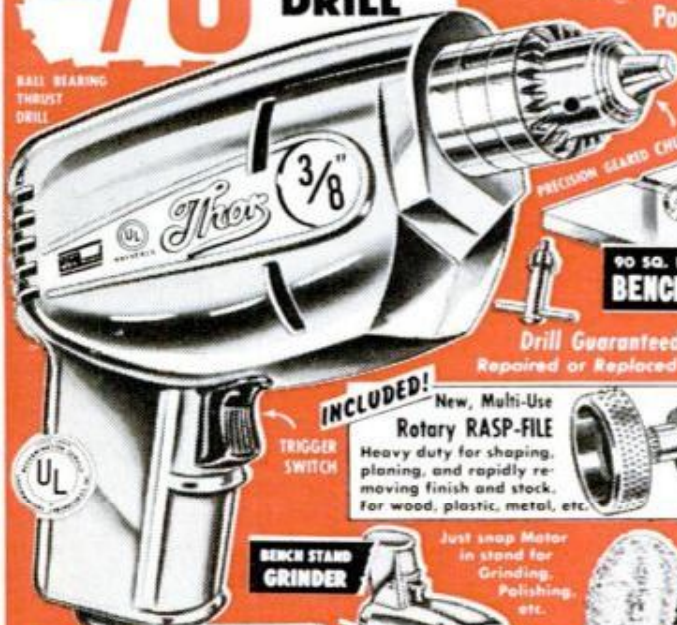
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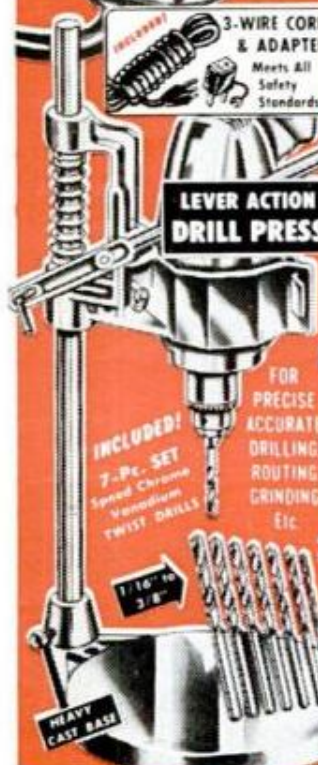
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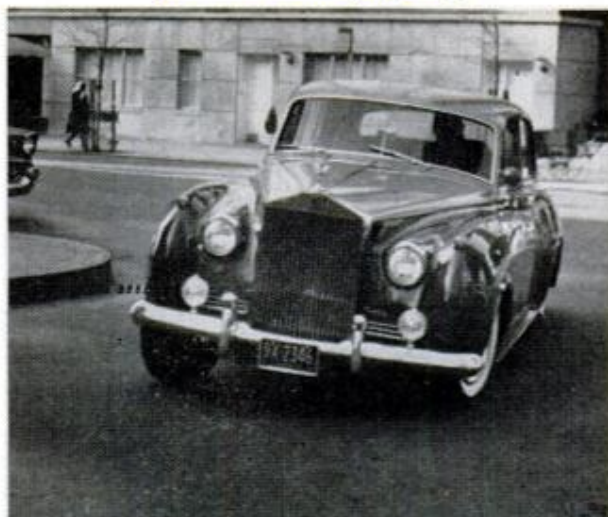
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(Continued from page 18)



**DIGNITY ON THE MOVE**, the tall, 4700-lb. Silver Cloud handles easily and has good roadability

between body and frame being the speedometer cable.

For those who accept power steering grudgingly as a necessity on a heavy car, the Rolls' assisted wheel is a revelation. Itself a joy with three sturdy spokes of black plastic, the wheel never feels dead, gives just the power aid you need but never overdoes it. It's as nice and precise a setup as we've ever tried.

The brakes are worth a mention, too. They have a dual master cylinder setup, plus backstopping mechanical linkage to rear wheels and the world's greatest power booster. When you press down on the pedal a clutch-like device engages a disk on the drive shaft and transmits torque to the master cylinder via a mechanical linkage. Thus, the faster you're rolling the more pressure you can harness to the generous 240 square inches of lining.

The Rolls' quality is as flawless as any manufactured product we've seen, the result of infinite care that even insists upon matching the cowhides (top grain of course) for evenness of texture of the soft leather upholstery.

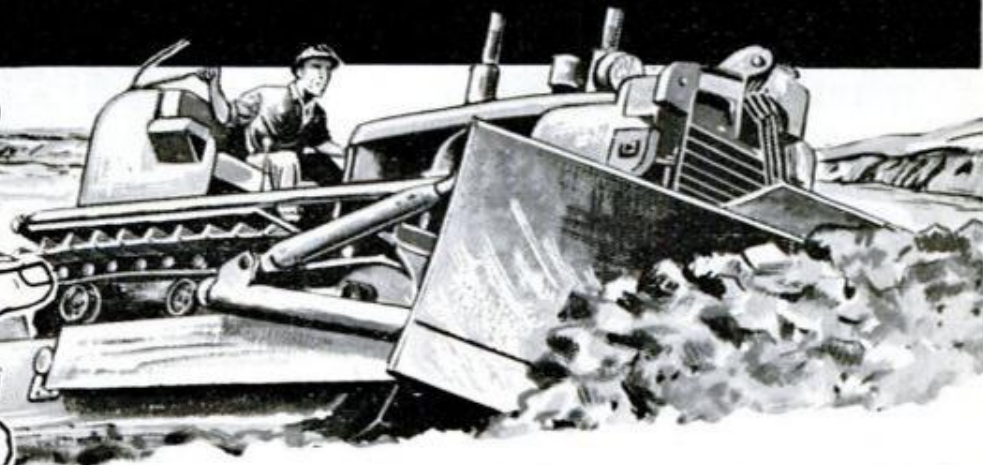
Because of its perfection we looked all the harder for faults and found just one. When the individually contoured front seats are moved fully rearward, their raw, metal tracks are exposed on the front floor. These could possibly snag milady's evening gown. And, oh yes, she's a bit thirsty. We logged 11.6 miles per gallon.

To sum it up, Rolls-Royce is a near-perfect motor car, restful, elegant unobtrusive, yet agile and powerful. It is obviously sturdy as a rock, nimble as the best touring sports car and downright fun to drive.

In fact, we can think of no nicer way to spend \$16,000. ★ ★ ★



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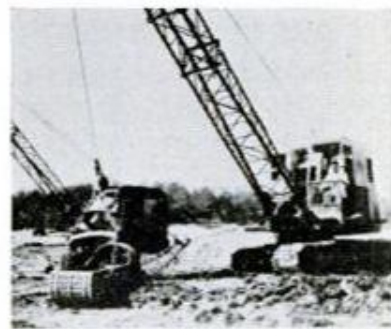
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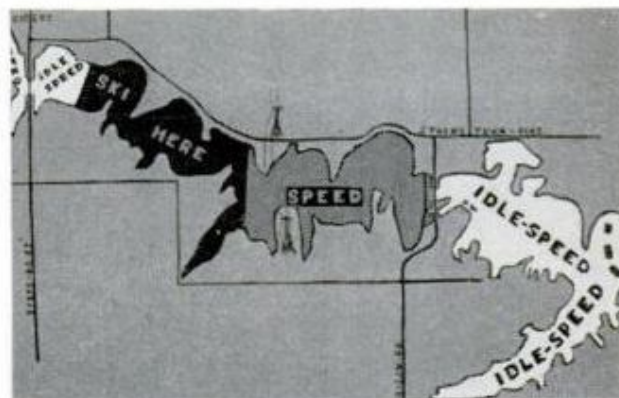
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**Items from  
all outdoors**

Not all our waterways, fortunately, are as troubled as the one described in Joe Bell's article on page 140 of this issue. A lot of local authorities have had the good sense and initiative to work out plans for sharing the waters peacefully. One excellent example is at Morse Reservoir in Indiana, not far north of Indianapolis.

Dividing the five-mile-long reservoir into four sections, the local authorities set aside the better fishing waters at the head and tail for fishing and closed-throttle boating only. The middle third of the lake, less popular with anglers, is open for boatmen for fast running and skiing. (Fishermen use that water at their own risk, and are required to keep their craft out of the way.) The boatmen's water is also divided into a water skiing area and a no-skiing speed area, for safety's sake.

To preclude any arguments or misunderstandings, the Morse authorities established easily-recognized boundaries—bridges, and a power line across the lake. Then they posted all the access ramps with the big signs shown here. We're told it runs so



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smoothly that the Indiana conservation people are thinking of using a similar system on other large bodies of water.

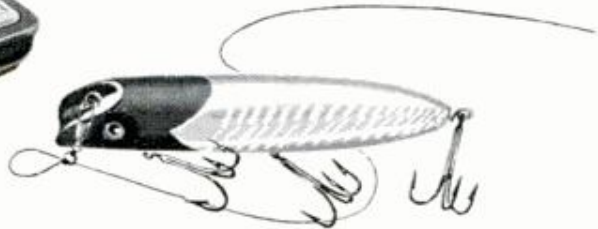
Score another triumph for science in athletics. The champion Green Bay Packers professional football team used Polaroid photographs during their games to study formations and their opponent's defenses. The photos were made by a scout posted high in the stadium, but he reverted to an older tactic for delivery. He threw the prints down to the bench in a weighted sock. That's real progress.

*Dick Kirkpatrick*

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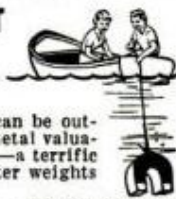


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# Science overseas

By William Kreh

Atomic energy soon may throw the switch for railroad crossing signals in Japan. Engineers, experimentally, are attaching radioactive substances under one coach on a train. When it rolls over a certain section of track some distance from the signal, a Geiger counter picks up the radiation, amplifies the energy, tripping the crossing switch.



Clean-shaven men or men with bushy mustaches make the best Army officers, according to a study made by British psychiatrist Geoffrey Peberdy. He says men with close-cropped "toothbrush type" mustaches turn out poorly.



A large solar furnace nearing completion in Sydney, Australia, will focus sun rays into a beam as small as a man's thumb, producing a 4000 degree C. torch capable of melting steel in seconds. The University of New South Wales also will use the furnace for research in purification of substances.



A satellite-relay ground station, capable of handling up to 600 phone calls simultaneously, will be built by the West German Post Office for operation early in 1964. To be built near Munich, it will consist of four automatic tracking antennas, designed for operation with Telestar and Relay-type satellites.



A potato detector has been developed by Scotland's Department of Agriculture and Fisheries. Using a beam of light, the electronic sensing device can be fitted on commercial potato harvesters, and will automatically tell the difference between potatoes, stones and clods of mud.



Broken bones pinned together with pine-wood rods have been found in the remains of Aztec Indians. According to Dr. Guillermo Polo, consultant to Mexico's National Institute of Anthropology and History, the



wooden rods were inserted through the marrow channel of the bones.

Medical books credit discovery of this technique—known as intramedullary fixations—to German surgeons in World War II. The Germans used stainless steel rods.



**A Japanese atomic scientist** is using himself as a guinea pig to test the rate of elimination and effects of dangerous strontium 85 when taken by human beings.

Teshio Aoki of the Atomic Energy Research Institute swallowed a dose of the radioactive element by mixing it with his coffee. The amount—about one-tenth the level considered dangerous to human bodies—lodged in the bones of his shoulder, hip and spine, according to radiation readings.

It'll be a year before results of the experiment will be known.



**Videophone service** has been started between the Soviet cities of Moscow, Leningrad and Kiev. Calls have to be placed eight hours in advance and appointments arranged. The callers see each other on television sets standing near each microphone. The charge is 75 kopeks (83 cents) a minute, with a minimum of three minutes.



**Electricity in teeth** may be causing some forms of neuralgia and keeping mouth sores from healing.

Researchers at the Clinic of Oral Surgery, Budapest, Hungary, say that teeth cavities filled with metal may develop differences in electrical potential and the resulting voltage, minute as it is, can cause discomfort and keep mouth sores from healing. The researchers replaced metal fillings in patients suffering from various mouth disorders with nonconductive materials and said 80 percent showed improvement. They measured electrical potentials with an electron tube voltmeter equipped with platinum electrodes.



**For the first time in history**, two underwater cables have been laid simultaneously. It was done by the French cable-laying ship, *Ampere*, when she laid France's share of two cables to connect the French and British electricity systems in the English channel.

For just over 16 miles, about half-way across, the *Ampere* uncoiled simultaneously two long cables of copper and steel weighing a total of 900 tons.

The British put the cables down the rest of the way—one at a time. ★ ★ ★

MARCH 1962

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# Pentagon sidelights

By William R. Kreh

Warships have been sunk by microscopic plankton. That's because some of these tiny swarming sea creatures give out phosphorescence when disturbed — by a passing ship, for example. Thus the vessel's position was given away to enemy aircraft.

Scientists under Navy contract are trying to learn when and where phosphorescence will happen, and avoid it if necessary. They will try to invent some antiluminescence measures, too.

Meanwhile, they find other plankton are getting in the way of antisubmarine warfare. Masses of them distort and disrupt the sound of detection systems. They even create false targets. The scientists hope to find a way to overcome this problem, too.

A hip-pocket charcoal grill that a GI in the field can use to boil water has been developed for the Army. It consists of a square aluminum-foil package containing charcoal. Above the charcoal is a flexible metal grid. The device is about a foot square and weighs only a few ounces. It can boil six quarts of water in about 18 minutes.

A rocket radio system for broadcasting information on radiation from 100,000 miles in space has been developed for the Air Force. It requires less power to operate than a flashlight bulb.

An explosive gas that hugs the ground has been developed by the Army, according to several reliable sources. When released over an enemy, even a spark ignites it.

Sixty muscle-sore soldiers are resting up at the Army's Picatinny Arsenal in New Jersey. They recently finished toting 100-pound boxes of ammunition through a series of strenuous tests. Purpose was to try new plastic handles for the ammo boxes that will replace the conventional jute rope.

In the tests, 30 two-man teams carried the four-foot-long boxes around a 70-foot course, lugged them up and down sets of stairs and hoisted them on and off landing platforms. They circuited the course 1450 times, climbed more than 4700 steps and loaded about 1500 boxes. The new plastic rope is strong, light, resists deterioration

and is easily obtained, whereas jute sometimes freezes and breaks, has rough texture and its supply may be cut off in a national emergency.

For the best car care don't mix different brands of greases in it. That's the gist of a report just issued by an Army research team on "the compatibility of greases." The study showed that mixing two types of greases, even though they each meet the same specifications, causes a drop in lubrication ability in 25 percent of the cases and could cause bearing failure.

Top-secret high-powered radar equipment may uncover new information about bird flights.

Throughout months of peak bird movement over New Jersey, a photograph is taken every 12 seconds for four hours each morning of a radar screen in the New York sector of the Air Force's Air Defense Command. The photos are given to Dr. Jeff Swinebroad, an ornithologist with Douglas College, who studies them with a device that flashes them on a screen. A computer helps analyze data.

From his work, Dr. Swinebroad hopes to get new data on the volume and pattern of bird migration and find out if conventional means of studying migration are accurate. The radar not only gives the speed and direction of flocks of birds but also pinpoints individual birds of the larger species.

Collecting ashes around the Naval Supply Center in Norfolk, Va., can be a profitable chore. A Philadelphia firm recently paid the Navy more than \$39,000 for 13,700 pounds of ashes from silver-cell batteries.

These batteries help drive conventional submarines. Every year thousands of them pass through the salvage yard where their plastic coverings are burned off. What's left contains a high amount of pure silver which can be salvaged by the firm.

Skunk scent can put a man into orbit, but not a missile.

Basic research is usually a lonely job, but when the staff at the Army's Redstone Arsenal chemistry lab decided to test mercaptans, they found themselves even more alone than usual. Mercaptans are the chemicals that put the skunk into skunks. Just one of the many chemicals tested in the never-ending search for missile fuel, the pungent liquid was analyzed to determine its possible uses in high-energy rocket fuel. Final conclusion: Although it produces a violent reaction from humans, it can't be used in missiles. ★ ★ ★



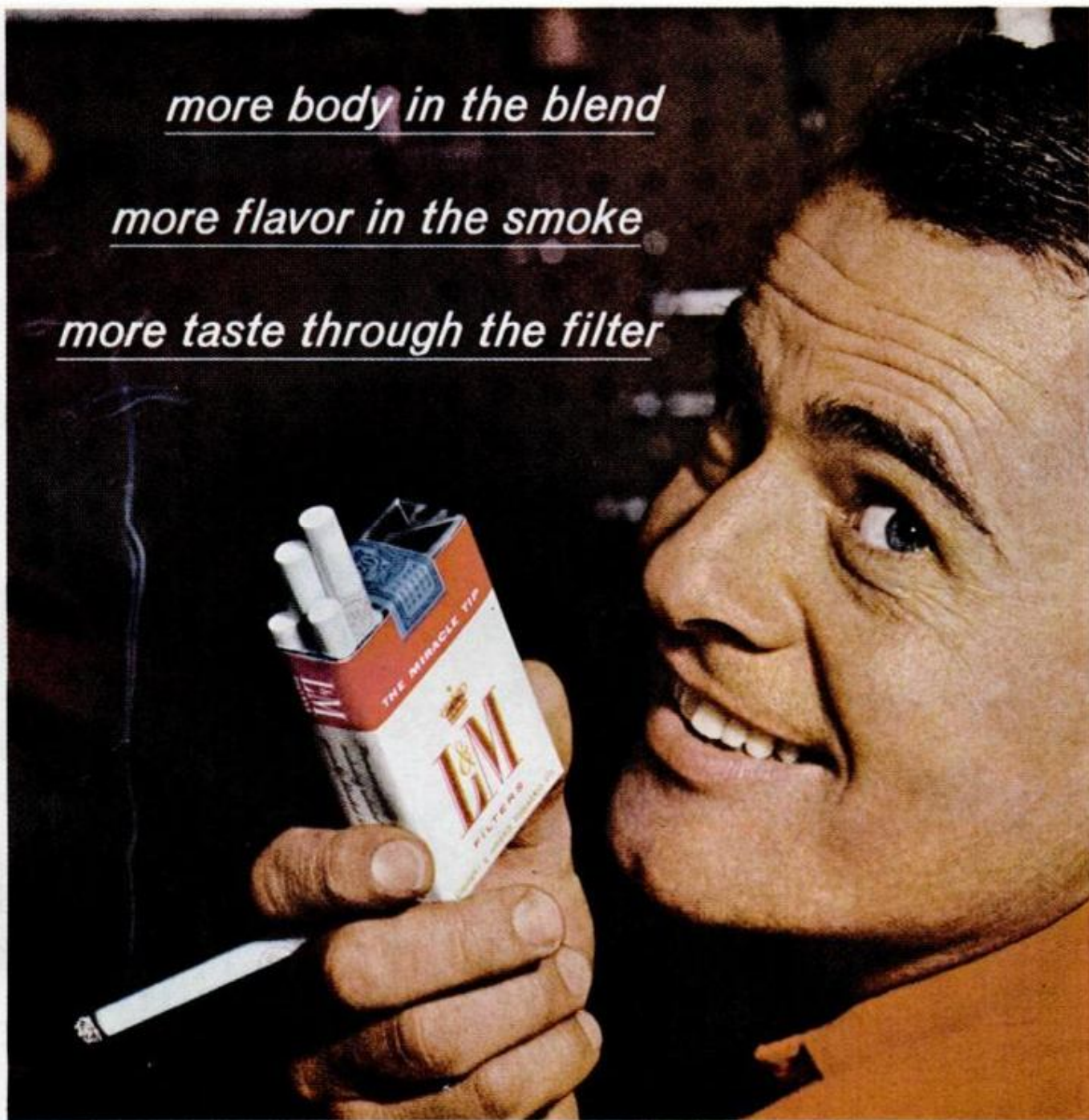
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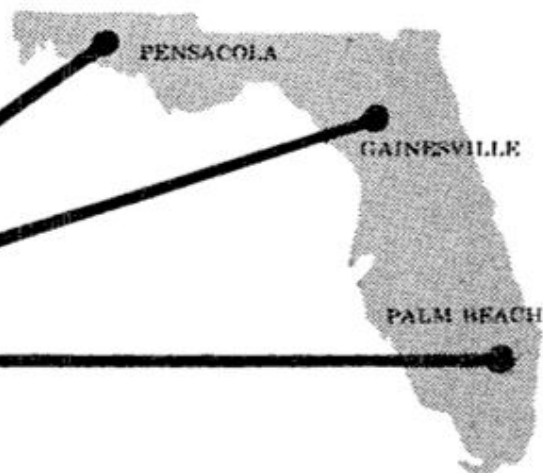
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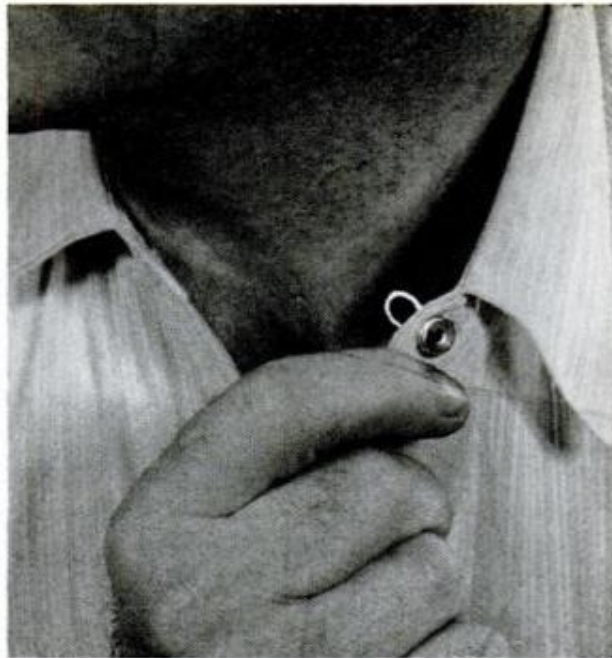
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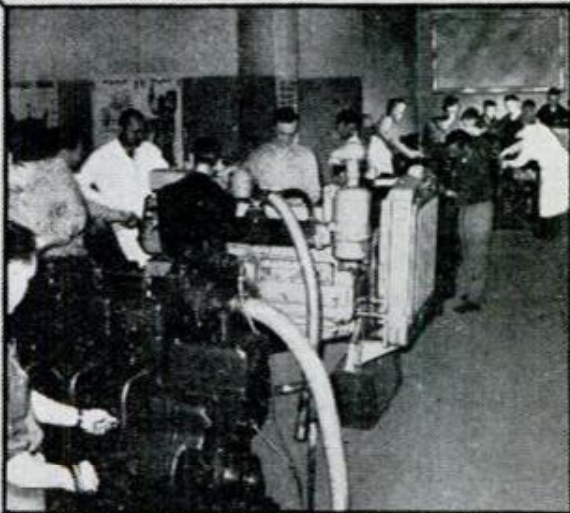
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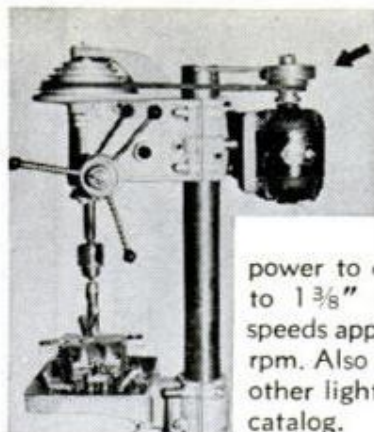
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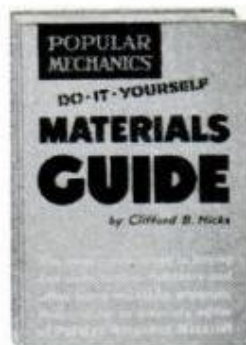
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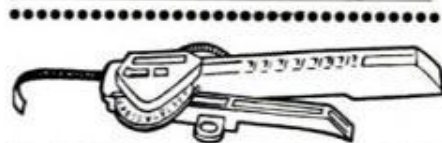
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## Revolving Radar Room Sickens Electricians

There's a group of dizzy, staggering men at White Sands, N. M., who get sick and tired helping in the development of a giant acquisition radar for use with the Nike-Zeus antimissile.

They are technicians charged with keeping the experimental set in operation at the proving grounds, and they get sick when they have to hop on the continuously whirling equipment room that hangs below—and contains the electronic marvels for—the continuously revolving radar dome.

The whirling room is the size of a small house and spins around at 10 revolutions per minute, setting up a high-stress environment. Because a technician can't see himself spinning while inside this windowless room, his eyes naturally tell him he's not moving. But his nervous sensors—the labyrinths of the inner ear—know he's whirling. Over-stimulation of the labyrinths versus no stimulation of the eyes produces a conflict of data—called canal sickness—and the brain doesn't know what to believe.

Spinning along, the men become dizzy, drowsy, depressed, indifferent; they experience muscular fatigue, reduced visual acuity, sweating, pallor; they have false impressions of position and trouble walking straight.

And there's more: A force called coriolis comes into play as they spin; it accelerates them away from intended straight paths. When a man extends his arm to operate a control, the hand can miss the target by several inches. Making repairs in the room is like trying to install a light bulb in a jumping socket.

As might be expected, this maintenance job is not for every man. Those performing it work from 5 to 30 minutes and have been weeded out from others as best adapted to work while they spin.

## Seek That Last Drop of Oil

Squeezing the last drop of oil from underground deposits is the aim of a program under way at the University of California. As much as 80 percent of the reserves remain in the ground after wells are closed.

The studies will seek to find new ways to get the remaining oil out of the ground. One method is to flush out the oil by forcing another liquid into the ground. In certain porous areas of earth, however, the pushing process becomes unstable and the pushing liquid mixes with the oil. The studies will seek to discover under what conditions such instabilities develop.



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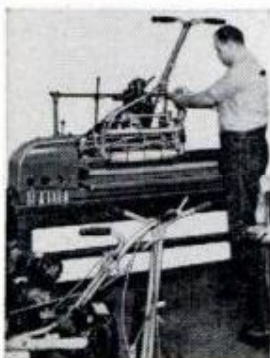
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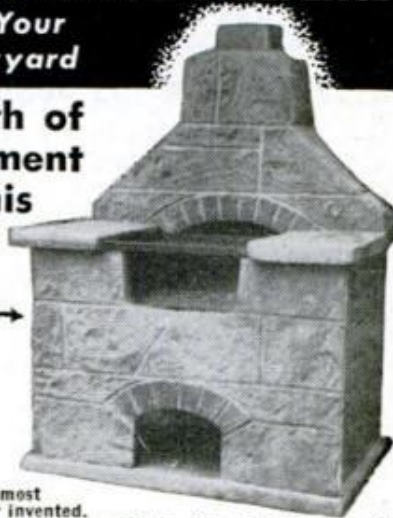
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# Tune in on the inventors

Five thousand dollars is the prize being offered in a second inventors' competition for the design of a stair-climbing wheelchair, the Department of Commerce has announced. The prize, offered by an anonymous donor, will go to anyone who can develop the chair to their specifications. Last year's competition turned up three improvements to existing chairs, but failed to turn up a really successful design.

Briefly, the wheelchair must operate effectively as a conventional chair, but must be able to climb and descend curbs and stairs of average size and height—with no damage to the stairs and with a minimum of time lost in adjustments, if any. The chair may be motor or occupant-propelled, though an attendant is permissible.

Design specifications are: Weight, not more than 75 pounds; width, 25 inches or less; turning area, three by three feet; climbing balance, not more than 15 to 25 pounds transferred to attendant; cost, not more than \$500. The chair must be collapsible for storing in cars, and cannot require special ramps, devices or modifications to existing facilities for their use. A booklet listing the specifications in detail and describing the contest is available on request from the National Inventors Council, U. S. Department of Commerce, Washington 25, D. C. The contest will be open until December 31, 1962.

Two of the best inventions across the desk this month are based on the same basic idea; they're attachments for existing electric shavers. First is the invention of Ralph Miller, of Charlotte, N. C., and is a rotary toothbrush attachment which fits onto the power-head of a Norelco rotary shaver. The cleaning head looks and works much like the familiar dentists' brush, driving through a flexible shaft. Mr. Miller has been awarded patent No. 3,012,263 for his invention.

The other, invented by Jacob Waggoner, of Charles City, Iowa, is a hair-trimming attachment for the type of shaver with reciprocating toothed blades. It guides the hair into the shaving head slots, which do the cutting. He won patent No. 3,008,233.

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

## Flip-Top Flitewing

Flitewing, a \$125,000 Dodge dream car, incorporates roof canopies that flip up as doors open.

Inside, a unique speedometer replaces the conventional dial with 13 small windows. Nondriving controls have been moved to the driver's door panel and the full-length console that separates four bucket seats heavily upholstered in top-grain leather.

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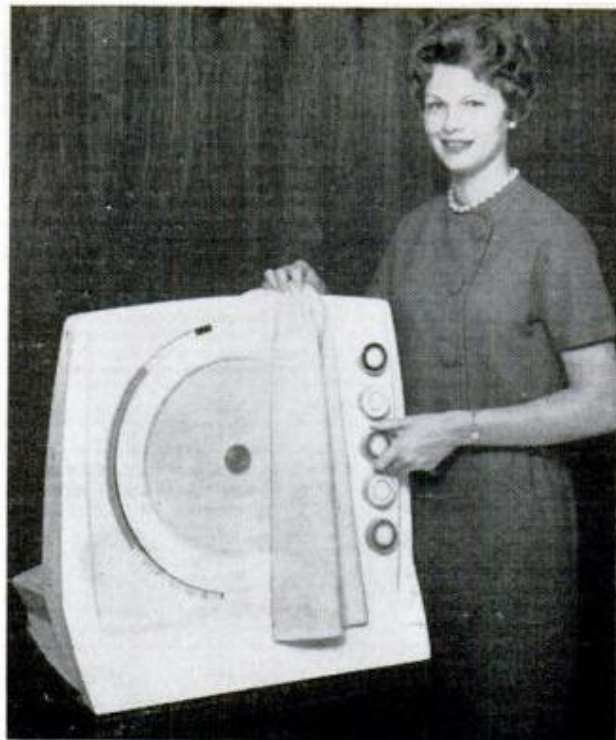
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**\$20.00 HOUR.** Learn engraving. Engrave glass steel head of pin. Engrave for us. Send 25¢. Engraver, 751 Market, Victoria, B.C., Canada.

**\$100 WEEKLY.** Sparetime home mail order business. Beginners plan. L&D, 109 W 42nd, New York City 36.

**MAKE** Big money. Easy complete instructions "Automotive Fiberglass Repair Manual" \$2.50. RPS Publications 30, P.O. Box 222, Beverly Hills, California.

**SAWDUST** 112 Uses. Tin-cans 63. Newspapers 27. Rubber 67. Glass 20. Rags 35. Instructions \$1.00 each. All six \$3.00. Charles Company, 42-GWGD, Norwood, Ohio.

**HANDSOME** Profits. Instructions on how to make and sell this hot item in your spare time. \$3 to Pritchard, Box 10274, Fort Worth, Texas.

**AUTO** Glass tinting offers excellent profits. Exclusive new process. Investment as low as \$100.00. Tinton Products Co., Rogers, Arkansas.

**MAKE** Money selling spices, paper and janitorial supplies. Complete information \$1.00. Box 413, Gary, Indiana.

**VENDING** Machine catalog. Rakes, 609P Spring Garden, Philadelphia 23, Penna.

**BECOME** Private investigator! Complete booklet \$4.50! Also bargain catalog \$1.00! Both \$5.00 Milmar, (Dept. PM-BO), Box 1932, Oklahoma City 1, Oklahoma.

**PACKAGE** At home for profit! We supply everything. No selling. Free home business details. HPC, 2212BH Jesse Street, Los Angeles 23.

## MONEYMAKING OPPORTUNITIES

**LEARN** Showcard writing in sparetime. Fascinating profitable business of your own. Complete information free. Arcadia, 19-D Corwin St., Dorchester 22, Mass.

**MAKE** Big easy profits making costume jewelry at home in spare time! Quick, easy to make, easier to sell! Details free! Don-Bar, 2934 W. Fullerton, Dept. C-202, Chicago 47, Illinois.

**MAKE** Plastic novelties for extra income. Low cost home training now available. Write for free booklet. Interstate Training Service, Dept. D-3, Portland 12, Oregon.

**\$25.00 WEEKLY** Making jewelry, flowers. Catalog 10¢. Flocraft, Farrell, Penna.

**SECRET** Investigation opportunities. Experience unnecessary. Investigators particulars free. Wagner, M-125 West 86th, New York City 24.

**NEW** Stamping machine. Stamps tags, door name plates, social security plates. Maurer Metal Specialties, Box 934, Springfield, Illinois.

**WANTED—Cartoonists.** Amateurs, professionals. Over 200 markets. Information free. Cartoon Markets-M-3PM, 11620 Lansdowne, Detroit 24, Michigan.

**NATIONALLY** Advertised games. Sales kit \$1.00. "Games," Box 12614, Tucson, Arizona.

**MAILORDER** Money-makers! Cash commissions! No canvassing! Hirsch's, 1301 Hoe, New York City 59.

**"HOME** Businesses" (U.S. Government reprint) 25¢. Dittofax, 5815-PM Compass, Los Angeles 45.

**\$30-\$50 WEEK** Spare time possible with herbs. Grow inside-outside or gather wild. Details free. Whitlow, Dept. A-3, 403 No. Westmoreland, Dallas 11, Texas.

**NEW:** Build waterfalls, fountains. Parts supplied. Priplata Fountains, Pasadena 3, Calif.

**\$35-\$65 WEEKLY** Assembling artificial lures at home for stores. Materials supplied free. Write: Lures, Box 1280, Fort Walton Beach, Fla.

**BAKE** New greaseless doughnuts in kitchen. Sell stores. Free recipes. Melvin, 3605 South 15th, Minneapolis 7, Minn.

**FABULOUS** Profits raising earthworms. Picture folder free. Excello, Kosciusko 6, Mississippi.

**ATTENTION—Aluminum** concrete yard ornament molds—donkey cart planters, beautiful bird baths, urns, etc. Prices slashed. Write for information. Knapp's, 4257 Josephine Street, Denver 16, Colorado.

**WIN** Contest money. General Contest Bulletin gives hundreds of tips. Lists current contests, rules. Sample magazine 25¢. General Contests, 1609½ East 5th, Duluth 12, Minnesota.

**MEN, Women—get in on the huge profit** plastic bonanza. Work home. No direct selling. Send \$1.25 or for free literature. Specialty Sales, Box 365, Haysville, Kan.

**HOW** To win prize sweepstakes, drawings, contests. Lesson 25¢. Winner, Box 304, Columbia City, Indiana.

**CIGARETTES—Make** 20 plain or filter-tip for 9¢. Facts free. Moberly, Box 4012, Owensboro, Kentucky.

**MINK** Raising information free. Complete. Lake Superior Mink Farm, Superior, EE1, Wisconsin.

**EARN** Money evenings copying and duplicating comic cartoons for advertisers. Adservice, Argyle 1, Wisconsin.

**VENDING** Machines. No selling. Operate a route of coin machines and earn amazing profits. 32-page catalogue free. Parkway Machine Corporation, Dept. #26, 715 Ensor Street, Baltimore 2, Maryland.

**EARN** Money raising fishworms for us! Write: Oakhaven—59, Cedar Hill, Texas.

**YOUR** Own, easy-to-start, home mail-order business, sparetime. Fascinating; profitable! Information free. Alfano, 19-PM Pine, Closter, N. J.

**BIG** Money raising fishworms and crickets. Free literature. Carter Hatchery, Plains, Georgia.

**READ** "Progressive Mailtrade," the magazine that tells how to make money by mail. Quarter brings sample and special offer. Progressive Mailtrade, Box 357, Sheboygan, Wisconsin.

**AMAZING** Successes through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, MP-528, 333 North Michigan, Chicago 1.

**LEARN** The secrets of repairing junk batteries, generators, starters, profitable, easy, at home. Free particulars. Batteryman, 3465 Forrest, Santa Clara, Calif.

**\$25-\$50 WEEKLY** Possible, re-writing news items, jokes, poems, recipes, for publishers. Some worth \$10 each. Details free. Service, 81-D, Knickerbocker Station, N.Y.C.

**MAILORDER** Business learned easily. Write: Easco, Box 323, Grand Rapids 1, Michigan.

**EARN** \$240.00 A month at home, spare time, doing only two \$5.00 invisible mending jobs a day. Big money paid for service that makes cuts, tears disappear from fabrics. Steady demand. Details free. Fabricon, 6251 Broadway, Chicago 40, Ill.

**EASY** To start rubber stamp business at home in spare time. Make up to \$9.80 an hour without experience. Facts free. Write Roberts, 1512 Jarvis, Room CR-2-A, Chicago 26.

**MEN—Women!** Start money-making plastic laminating business at home in spare time. Material that costs 11¢ brings back \$2.58. No canvassing or selling but mail orders brings in \$20 a day. Write for full particulars free. Rush name on postcard to Warner, Room CL-2-A, 1512 Jarvis, Chicago 26, Ill.

**MAKE** Money writing short paragraphs! No tedious study. I tell you what to write, where and how to sell; and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell, right away. Send for free facts. Benson Barrett, Dept. C-27A-N, 7464 Clark, Chicago 26.

**BIG** Mail, money making offers, samples, for you. Act now. Details. Write: Del Vecchio, Box 74, Newton 95, Mass.

**BIG** Profits selling rubber stamps. No investment needed. Martin, Box 218, Tustin 12, California.

**MAKE** Money ghost-writing for others. Opportunities everywhere! Free details. Career Aids, (PM), Southampton, New York.

**"LUCKY** Day Adpak" is loaded with money making opportunities. Order yours today. 25¢. Arcane, Box 117, Plant City, Florida.

**ALERT** Yourself to America's greatest opportunities for operation of individual businesses. Franchising expansion creates openings for profitable exploitation. Alert yourself to franchise opportunity by requesting free information today from National Franchise Reports, GB-528, 333 N. Michigan, Chicago 1.

**MONEY** Making manuals. Free list. Jackson, Box 66, Takapau, New Zealand.

**AMAZINGLY** Profitable. Start portrait painting service. F. Brassard, 137 Heward, Toronto 8, Canada.

**PRACTICAL** Mail order. Start small. Money-maker, 722-P East Silver Spring, Milwaukee 17, Wisconsin.

**FREE** Details! "211 Lucrative Business Ventures." Work home! Dilley, Box 3854, Milwaukee 5, Wis.

**MAKE** Up to \$8,500 a year sparetime. Complete data \$1, refundable. Janeeck, 373 East 155th Street, New York 55, N. Y.

**EARN** Big money! Be a film wholesaler. Free instructions, price sheets. Perma-color Labs, 1007 6th Ave., New York 18.

**BECOME** Private investigator! Complete booklet \$4.50! Also bargain catalog \$1.00! Both \$5.00 Milmar, (Dept. PM-MO), Box 1932, Oklahoma City 1, Oklahoma.

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**WATCHES!** Airmailed from Switzerland. 152-page catalog 35¢. K-P Imports, 511 Glenwood, Buffalo 8, N. Y.

**LARGE List imports \$1.00.** K & M Enterprises, Box 971, Great Falls, Mont.

**IMPORT Export.** List of oversea sources and products they sell or buy. \$1.00. R. W. Cantrell, 3642 S. Main St., Winston-Salem, N. C.

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**"IMPORT Journal" magazine, 10¢.** Zastrow's, 1236 Rose Vista, St. Paul 13, Minn.

**NEWEST Products, fabulous bargains in direct importing.** 475 worldwide firms, classified—\$1.00. Henderson, 2620 Rio Vista, Tampa 3, Florida.

**JAPAN: Direct mail-order 26 page catalogue: dolls, novelties, business information, manufacturers' names, addresses, \$1.00; Japan's Trade Directory, 3000 companies, \$3.00.** Send cash. Clarence Yamagata, 814 Toginbiru, Marunouchi, Tokyo.

**YOUR Own import mail order business.** Deal with over 400 manufacturers exporters of the world. Complete import procedures, international dropship methods. Capitol unnecessary. Details 10¢ refundable. Associated, Box 108-EI, Lincoln 1, Nebraska.

**WORLDWIDE Dropship and import directory \$1.** Janeczek, 373 East 155th Street, New York 55, N. Y.

**"FOREIGN Bargains Directory." \$1.00.** L. J. Finn Company, 140 Virginia Park, Detroit 2, Michigan.

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**UNUSUAL Chemistry books, courses, kits! Rare chemicals, cheap! Catalog 25¢.** NSC, Box 11133, Palo Alto, Calif.

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**AUTO Engine overhaul compound formula \$1.** Other auto service formulas included free. Janeczek, 373 East 155th Street, New York 55, N. Y.

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**ANTI-FREEZE, Waterless handsoap, resilvering mirrors, all \$1.00.** Neiko, Box 3462, Merchandise Mart, Chicago 54.

**LATE, Modern manufacturing formulas.** List free. Moon Chemical, Martville, New York.

**FORMULAS For latest money-making discoveries. New! Good! Valuable literature free!** Miller, Chemist, 1517-D, Tampa, Florida.

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**BOXES, Plastic. 200 sizes. Free list.** Althor, 170 Bay 23 Street, Brooklyn, N. Y.

**NEW Liquid casting plastic, clear, colors. Embed real flowers, butterflies, photos, coins.** Send 25¢ for two handbooks "How to Cast Liquid Plastics" and "How to Make Extra Money at Home." Castolite, Dept. C-101, Woodstock, Illinois.

**NOW! Low priced plastic laminating machine.** Details. Burr, 330 East Center, Kalamazoo, Mich.

**CELLULOID Scrap. Sheets, state thickness, colors.** Box 333, Kearny, N. J.

**PROFITS! Vacuum form plastic! Easy!** Box 1971, San Diego 12, Calif.

**NEW Instruction manual tells how to do plastic embedding and molding.** Manual \$1.00, catalog 25¢. Castacraft Corp., Dept. M-362, P.O. Box 555, Palo Alto, Calif.

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**BIG Profit selling chamois to service stations, car lots. Steady repeat business.** Free details. Inka Industries, 717-H Fairview, Houston 6, Texas.

**MAKE \$55 A day clear profit! Sell nationally advertised Royaltone Auto Glaze to car owners, dealers, jobbers. Exclusive territories. Rush name for free sample, details.** Royaltone, Brooklyn 30, N. Y.

**RUN A spare-time greeting card and gift shop at home.** Show friends samples of our wonderful new 1962 all-occasion greeting cards and gifts. Take their orders and earn up to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. Regal Greetings, Dept. 67, Ferndale, Michigan.

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

**FREE Sample. Beautiful curios! Sell on sight!** Apartado 9036, Mexico City.

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

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

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

**BIG Profits. Stamp social security plates, key protectors. Sample 50¢.** Catalog free. General Products, 11 No. Pearl St., Albany 7, N. Y.

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

**EXOTIC Earrings! Details free. Pair, \$1.00.** Ohga, PH-330, Sigakenkusatu, Japan.

**WAGON Jobbers, route men, \$100.00 extra per week. Guaranteed sales.** Revolutionary new tool holder sells on sight for \$1.98. Makes hooks, peg board obsolete. Information Drawer J, Blue Bell, Penna.

**MAKE Most extra cash with world's biggest line everyday greeting card assortments, gifts. Introduce friends, neighbors, to over 150 assortments, 500 big money-makers. Pocket up to 100% profit plus big cash bonus. Free giant color catalog; samples on approval.** Write Arrow Greetings, 513 Fourth Ave., S., Dept. 83-L, Minneapolis, Minn.

**BUSINESS Kit free! Postcard puts you in business! Complete line 230 shoe styles, jackets. New discoveries pay big commissions. No investment. Send for free kit.** Mason, Chippewa Falls, K-404, Wisconsin.

**WILL You test new items in your home? Surprisingly big pay. Latest conveniences for home, car. Send no money. Just your name.** Kristee 124, Akron, Ohio.

**START Your own business, selling the "World's Most Usable Bible." Sales quick, easy and profitable. Extra bonuses; free insurance; other benefits.** Write International Book Company, Department M3, Box 118, Wichita 1, Kansas.

**SELL Greeting cards. Make extra money. Guaranteed.** All occasion assortments, Easter, stationery, gifts, wrappings, toys, jewelry. Experience unnecessary. Salable samples on approval. Free catalog, free gift offer. Details. Write—Hedenkamp, 361 Broadway, Dept. PM-72, New York.

**SHOW Your free sample. I give you amazing Leth'r-test footwear.** Show on your feet to 10 people and 5 will buy on sight because of beauty, quality. You'll see! Only \$1.99 to \$4.99, none higher. Guaranteed for one whole year. Highest commissions. Rush your size, state if man's, woman's. Perfect-World Co., Dept. 96, Cincinnati 12, Ohio.

**AGENTS Wanted. Miracle silver cleaner works like magic. Granulated form, light, compact. Customer puts in dish pan water. Repeats. \$1.00 retail, you keep 75¢. 300% profit yours. Free particulars.** Davis Co., Box 489, Edmonds, Washington.

**NEW Car thief signal. Lightning seller.** Samples sent on trial. Northwest Electric, Ave. 13, Mitchell, S. Dak.

**\$20.00 FIRST Day introducing distinctive personalized doorplate assortment.** Complete sales kit free. Reeves, Attleboro 7, Mass.

**MAKE Money selling ties, tiekerchief sets, readyknobs. Free catalog.** Philips Neckwear, 22 West 22nd, New York.

**EARN \$50 Weekly in sparetime. New unusual way to earn extra money in your spare-time. No investment necessary! No sales experience needed. Get merchandise on credit. Work your own hours! If you'd like complete details on how to earn money this interesting way, write Greetings Unlimited, Park Square, Room 2-680, St. Paul, Minnesota.**

**HI-DRY Magnetic soap hanger sells on sight. Send one dollar for sample kit.** Hi-Dry, 1175 Dan, Ogden, Utah.

**SPARETIME Profit (men or women) taking orders for small Hoot Gibson California Ranchos. Literature on request.** Tracy Wiley, 440 So. Atlantic, Monterey Park, California.

**EARN Big money selling amazing new Cleaf skin cleanser leaves in a beautiful home dispenser! No woman can resist buying this new discovery that is better than soap. A multi-million market that is yours alone! Free samples and complete details rushed to you by return mail.** Cleaf, Inc., 2 Park Ave., New York City.

**GUARANTEED Easy sales. Beautiful items. Samples, details \$1.00.** Traders, Box 74, Fruitland, Maryland.

**AMAZING. New moneymaking plan. Exciting. Investigate. Gifts, Box 330-K.** Ft. Dodge, Iowa.

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

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100,000 PRODUCTS Wholesale! Terrific bargains! United Wholesalers, 1265-M Broadway, New York 1, N. Y.

EVERYDAY Necessities. Everything guaranteed. Amazing illustrated free catalog packed with exciting bargains. Southland Enterprises, Box 3062, Forest City, Florida.

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FREE! Name brands catalog! Your own high profit business. Sell name brands, full or part time. No inventory, no investment. More than 2,000 name brand items; lowest wholesale prices. Watches, jewelry, cameras, hi-fi, stereo radios-phonos, appliances, housewares, hardware, power tools, luggage, musical instruments, garden equipment, sporting goods, toys, many others. 8 floors of name brands. Million dollar inventory. Orders shipped complete in 24 hours! Send for free, beautifully illustrated catalog now! Separate wholesale price list. H. B. Davis Corp., Dept. PM, 145 W. 15 St., New York 11, N. Y.

BUY Below wholesale! Thousands of nationally advertised products. Drugs, clothing, housewares, cameras, jewelry, hardware, sporting goods, etc. Postcard brings price list showing actual factory cost. Buy-Rite, 310 Main, Bennington 2, Vermont.

NEW Deluxe multicolor below wholesale catalog, automobile catalog, and others. Housewares, appliances, refrigerators, freezers, washers, dryers, television, radios, furniture, clothing, luggage, binoculars, phonographs, recorders, cameras, projectors, tools, typewriters, watches, jewelry. Name brands. Huge discounts to 70%. Postcard: Selbyco, Decatur 15, Ill.

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USED And new watches \$2 up. Free list. Southern Watches, 5-PM So. Wabash, Chicago 3.

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WHOLESALE Specials. Closeouts. Catalog \$1 deposit. Loeber, 224-A Wvatt, Lincoln, Ill.

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GENUINE Wholesale prices. Catalog 25¢. Watonga Company, Box 6792-B, Portland 66, Oregon.

ELECTRIC Guitars, amplifiers, wholesale. Free catalog. Carvin PMW, Covina, Calif.

BARGAINS! Buy retail at wholesale prices. Catalog free. C. Ayres, 1427-A Pickens, Columbia, S. C.

NATIONALLY Advertised products wholesale. Send products name-model for quotation. Coats, Box 1247-A, Ontario, California.

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BIG Bargains. Wholesale. Hundreds practical items. Large illustrated catalog. 10¢. Gifts, Box 330-A3, Fort Dodge, Iowa.

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EXPERIENCED Magazine men, no turn in. Cars, crews furnished. Apply Mark Steele (Magazine King), Steele, Missouri.

MAKE Big money taking orders Campbell's Gro-Green Liquid and 100% soluble crystal fertilizer concentrates. Saves time, money, labor. Feeds foliage, soil. Field proven over 10 years. Increases protein, mineral content grains, forage. Free sample. Selling outfit. Credit given. Ideal for corn and feed men. Campbell Co. (Est. 1928), Rochelle 52, Illinois.

BIBLE Profit 130% — why make less? Literature free. Bible, 4813A Hurford, Chester, Penna.

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

IF You're interested in making money in selling, see the hundreds of exceptional opportunities in Salesmen's Opportunity Magazine. Send name for your copy, absolutely free. Tell us what you're selling now. Opportunity, 848 N. Dearborn, Dept. 17, Chicago 10, Illinois.

CALENDARS, Novelties. Full or part time. Liberal commissions. Fleming, 6535-A Cottage Grove, Chicago 37.

MAKE Extra money—Big cash commissions plus premium for you and your customers. Sell advertising book matches. Sensational new tenorrama glamour girls, hillbillies; dozens others. All sizes. Quick daily sale; big repeat business. Free master kit makes selling easy. No experience necessary. Superior Match, Dept. M362, 7530 Greenwood, Chicago 19.

I'LL Send you free stocking sample newest advancement in hosiery since nylon. Patented, full-length. Stays up over-the-knee without supporters, without girdle! Nationally advertised price \$1.95. Make money introducing to friends at \$1.00 pair. American Mills, Dept. 721, Indianapolis, Indiana.

CLEANS Windows without mess. Strange dry cleaning-cloth. Replaces liquids. Windows gleam. Samples sent on trial. Kristee 108, Akron, Ohio.

OPERATE Your own profitable franchised distributorship. Learn how by requesting free details today from National Franchise Reports, SD-528, 333 N. Michigan, Chicago 1.

ADD A money-maker to your line. Whatever you sell, your customers can use Nilodor. 10-second demonstration convinces housewives, businessmen, even government officials! Prestige House, 1509A N. Western Ave., Los Angeles 27, Calif.

LONG Needed invention. Men to contact service stations. Huge profits. Cyclo Mfg., 3816 Dahlia, Dept. 132, Denver 1, Colo.

SEAMLESS Nylons \$6.95 doz. Panty's \$4.75. Free catalog. Lizmar Hosiery, 10409 St. Clair, Cleveland 8, Ohio.

WANT To get ahead! Extra income, new car, vacations, new home, luxuries you always wanted. Salesmen make 122%, distributors 233% with Torco Carburetor Clean Out. 20 second demonstration clinches sale on sight. 78,000,000 prospects. Big year round repeat profits. Guaranteed results. Write Torco, Dept. M, Santa Fe Springs, California.

ENDS Car waxing forever! Miracle new product seeking distributors. Very high return on nominal investment secured by inventory. Write Livingston, 15 E. Reno, Oklahoma City 4, Okla.

HIGH Commission and bonus. Earn \$100 to \$300 weekly. 30 year old company has openings. List delinquent accounts for collection. Experience not necessary. Permanent. Write: Merchants Protective Agency, 1015M Walnut, Kansas City, Mo.

SENSATIONAL New longer-burning light bulb. Amazing free replacement guarantee—never again buy light bulbs. No competition. Multi-million dollar market yours alone. Make small fortune even spare time. Incredibly quick sales. Free sales kit. Merlite (Bulb Div.), 114 E. 32nd, Dept. C-74R, New York 16.

PICTURES! (Washable). Huge profits. Brochure. Rustic Art Sales, Wallace, Mich.

IMPORTED Bargains. Low prices. Wright Company, Matthews, N. C.

\$1,000.00 A Month for making dramatic 3-second demonstration of amazing lightweight Presto fire extinguisher. New chemical used by airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free kit. Merlite, 114 E. 32nd, Dept. P-66R, New York 16.

MAKE Extra money selling advertising matchbooks. Free catalog and sales outfit. Matchcorp, Dept. PM-32, Chicago 32.

LEATHER Zipper key case \$42.00 gross P.P. Sample \$1.00. Opal Susi, 2230 Light St., Bronx 66, New York.

AMAZING Opportunity. New low priced fire alarm protects homes, farms, offices, factories, etc. No wiring—hangs like picture. Pays up to \$1,100 a month. Free kit. Merlite (Alarm Div.), 114 E. 32nd St., Dept. F-66R, New York 16, N. Y.

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DIRECTORY Reports. Construction, aviation, shipping, oilfields, government, manufacturing, trucking, etc. Foreign-stateside. Helpful information plus job-getting tips on preparing application letters. Unconditional money-back guarantee of satisfaction. Act today. Only \$2.00 (\$2.25 airmail). (C.O.D.'s accepted). Research Services, Meramec Building, St. Louis 5-PM, Missouri.

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MERCHANT Marine jobs. Men and women. Top wages. Travel. Captain, Box 501-P, Reading, Massachusetts.

JOBS On ships. Age 18 to 55. Experience not required. National Seafaring, Box 71881-B, Los Angeles 1, California.

JOB-Getting resumes easily prepared. "Effective Resume Guide" shows you how, makes it simple, step by step. Sample resumes included. Send \$3.00. Richton Company, Dept. A, 1020 Broad, Newark, New Jersey.

FOREIGN Employment. Construction, other work projects. Good paying overseas jobs with extras, travel expenses. Write only: Foreign Service Bureau, Dept. PM, Bradenton Beach, Florida.

CALIFORNIA List of industries hiring in all fields, \$1.00. Hughes Enterprises, 109 East Etiwanda, Rialto, California.

JOBS On ships. Employment directory \$1. Janecek, 373 East 155th Street, New York 55, N. Y.

U.S.A. And foreign jobs, up to \$1600.00 monthly. Construction, shipping, aviation, clerical, supervisory, etc. Skilled, unskilled. Free transportation. Unusual opportunities. Complete information plus worldwide project listings. Only \$2.00 (\$2.50 airmail). Satisfaction guaranteed. International Opportunities, Dept. 66W, 109 W. 42, New York 36, N. Y. or Dept. 66X, Box 621, San Jose 6, California.

CIVIL Service jobs. How to get them, what to do. Circular. Ingills, P.O. Box 1602A, Chicago 90, Illinois.

TREMENDOUS Opportunities — U.S.A., overseas. Choose your job, your location. Bonuses. Free transportation. Free details. International Occupations, International Airport, Box 100C-4, Jamaica 30, N. Y.

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**MAIL** Forwarded. \$3.00 month. Rod, 96 Central Ave., Newark 2, N. J.

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**YUKON** Territory postcards, 4 for \$1.00. Write message and return to us for remailing. Monthly forwarding service \$3.00. Other remails, 25¢. Yarter, Box 177, Watson Lake, Yukon Territory, Canada.

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**SECRET** Mail address, \$3 month. Wolfe, 7604 Mack, Detroit 14, Mich.

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**HAWAII** Secret address. Receiving, forwarding, 25¢ or monthly rates. Coe, Box 984, Kailua, Hawaii.

**REMAIL** 25¢. Vetra Hayslett, 4148 Royer Drive, Toledo 16, Ohio.

**CONFIDENTIAL** Receiving, forwarding system, \$3.00 monthly. Free details. H. V. Zinck, Box 934, Lunenburg, Nova Scotia, Canada.

**SECRET** Address. Write: De Graff, Box 14156M, Professionals, Fabulous, San Diego, California.

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**REMAILS** 25¢. Monthly \$3.00. Pollock, Box 352, Bayamon, Puerto Rico.

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**REMAILING** And information service. Reasonable. Arcane Service Agency, P.O. Box 3922, Milwaukee 5, Wis.

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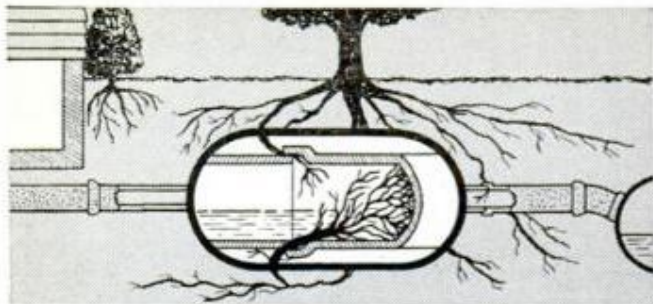
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## Science bulletins

**How big is a raindrop?** How many fall a minute?

To answer these questions the Army, aided by New York University, has built a sizer and counter that sorts drops into 13 sizes ranging from  $\frac{1}{100}$  of an inch to more than  $\frac{1}{8}$  inch in diameter and counts drops of each size at the rate of 10,000 a minute, even in a heavy rainfall.

The device does its work electronically as the drops fall through an intense beam of light. Among those who need specs of the drops, says the Army, are weathermen researching how rain is formed, and missile makers who wonder what effects rain has on performance of their products.



**Helium**, a relatively rare gas on Earth, is somewhat less than rare 600 miles above Earth's surface. A shell of helium nearly 1000 miles thick stretches up from that height. That such a shell exists has long been theorized. Information radioed back from the Explorer VII satellite has confirmed the fact, says Dr. Robert Jastrow of the National Aeronautics and Space Administration.



**Motions of stars and planets** no longer will be the yardsticks by which we measure time.

During the next ten years we will grow to rely on the measurement of the vibrations of an atom, possibly an atom of cesium, according to Dr. John M. Richardson of the National Bureau of Standards.

The reason for the change, which will be proposed at a world-wide scientific conference in 1966, is that instruments of modern science can measure the vibration of an atom more accurately than they can measure motion of stars and planets.

Modern technology, says Richardson, demands accurate time: When a satellite, for example, is orbiting, an error of a fraction of a second between tracking stations creates an error in the satellite's position.

*James Biery*

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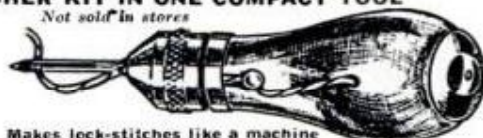
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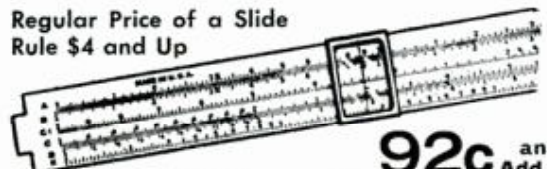
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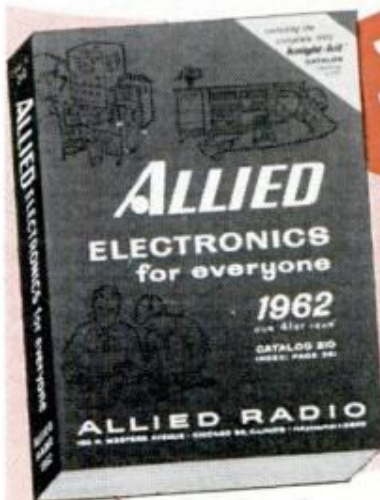
The Selectric typewriter is a product of International Business Machines Corp.



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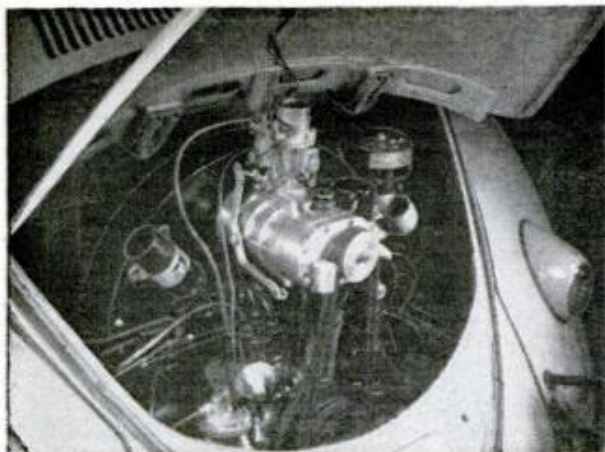
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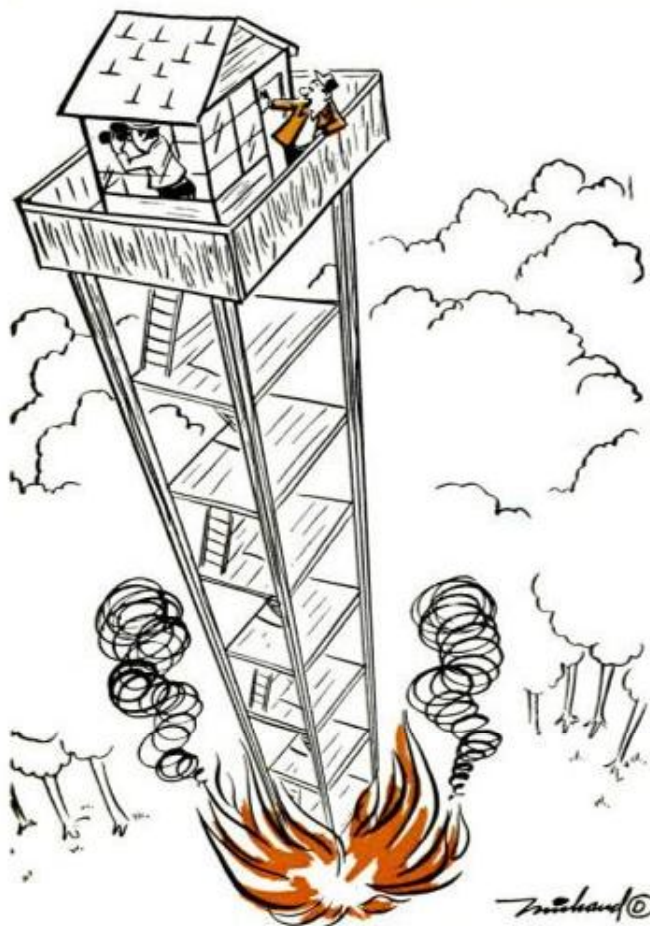


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"Hey, Charlie . . ."

MARCH 1962

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## PM SHOTS THE .460 MAGNUM

SHOOTING THE .460 Weatherby Magnum is an exciting experience. Despite its enormous power, PM's tester fired 15 rounds without damage, other than a bruised bicep from a shot fired without a secure shoulder fit with the stock. A poorly-stocked .30-06 can "kick" harder, and the .460-WM's recoil is certainly less than a lightweight 12-gauge single-shot shotgun can produce.

The secret of its comfortable shooting is partly the excellent design of the California-style mesquite stock, and partly the built-in muzzle brake provided by a pattern of drill holes in the last three inches of the barrel. They direct the gases to each side, and push the rifle against its own recoil. As a result, the recoil is minimized. The muzzle rises somewhat, as shown above, but there is no feeling of lack of control.

The .460 gives good accuracy; the best five-shot group at 100 yards measured  $\frac{7}{8}$  by  $1\frac{1}{4}$  inch. Off-hand snap-shooting produced results comparable to any good field firearm.

Looking for an impressive penetration test, we filled a five-gallon metal can with water and fired into it from about 100 feet away. The container was rent from end to end, the 60-gallon drum on which it sat was thrown to the ground, and water drizzled down on shooter, photographer and bystanders for several seconds. The test proved nothing measurable, but it was impressive.

The .460WM rifle may be the answer to the old controversy of bullet weight versus bullet velocity for killing power on really big game. The .460WM throws a 500-grain solid bullet at a muzzle velocity of 2725 feet per second for a muzzle energy of 8245 foot/pounds. That's well above the energy of the former champ, the .600 Nitro Express (900 gr at 1950 fps for 7600 ft./lb.). The high velocity gives the big bullet a trajectory just two inches high at 100 yards when zeroed in

for 200 yards; nearly identical to the .30-06 with a 180-grain bullet. And the '06 is considered a very flat-shooting rifle.

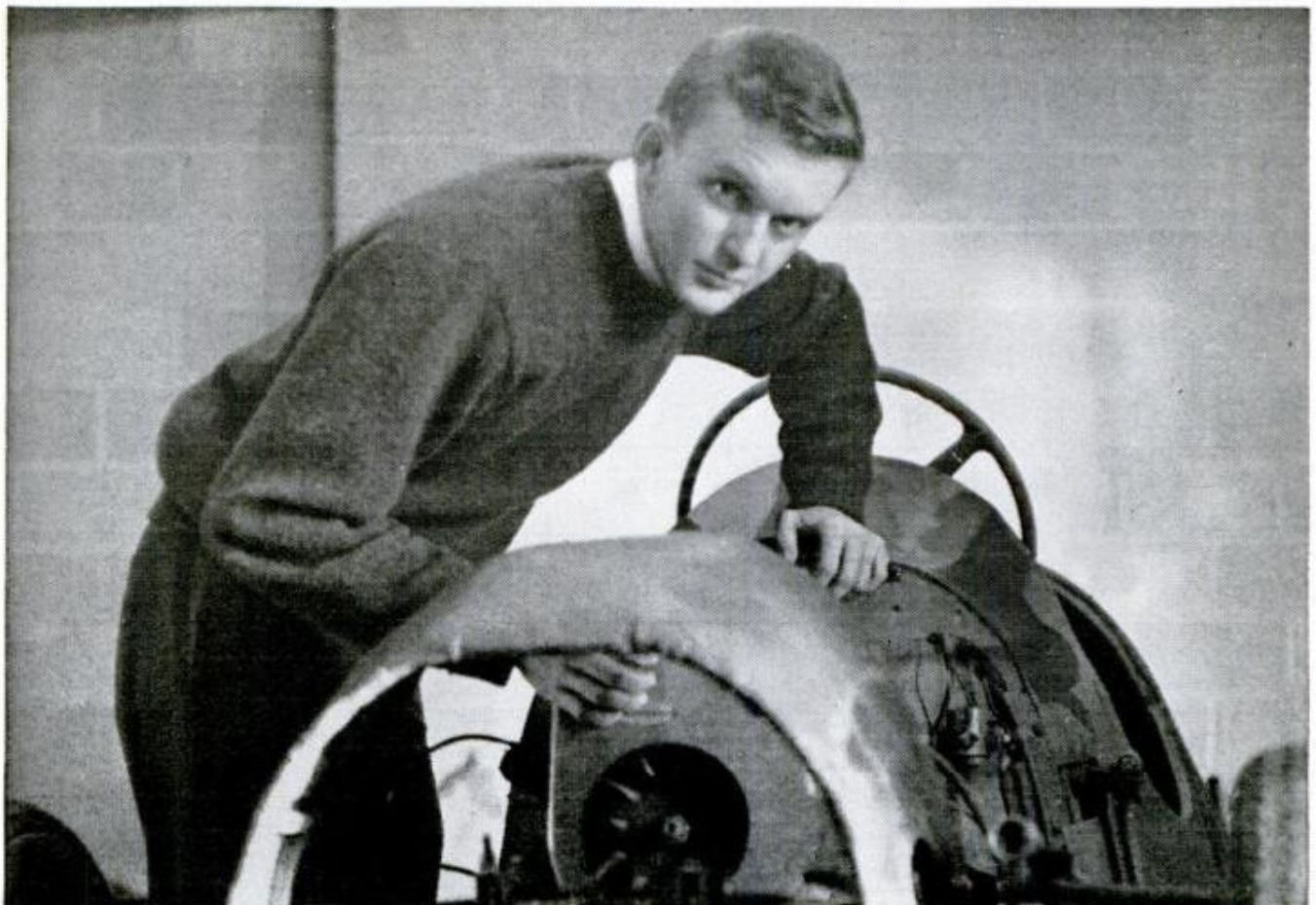
The designer's objectives were to put that tremendous power into a comfortable-shootable, bolt-action rifle (most of the big guns are double rifles) that would kill anything that walks. It will.

In conclusion, PM's tester reports that the .460WM is ideally suited to its job of killing elephants, rhino and Cape Buffalo with minimum damage to the shooter. The price is a hefty \$525, and ammunition runs about 87½ cents a shot. But for the moment of truth with big, dangerous game, it'll do the job. ★★★

FOR COMPARISON, left to right, the 30-30, .460 Weatherby Magnum, and a .30-06 round







18-year-old Ronald Satterfield of Atlanta, Georgia, asked...

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Airman 2C Satterfield whose civilian hobby was building “hot rods,” is presently enrolled in a 45-week electronic computer course at Keesler Air Force Base in Mississippi.



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5,000 MILES		X	X	X				X	X
6,000 MILES	*	X	X	X				X	X
7,000 MILES		X	X	X				X	X
8,000 MILES		X	X	X	X	X	X	X	X
9,000 MILES		X	X	X				X	X
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12,000 MILES	*	X	X	X	X	X	X	X	X

\*Note: Only Ford-made cars have all maintenance scheduled at 6000 mile intervals, twice-a-year for the average motorist.



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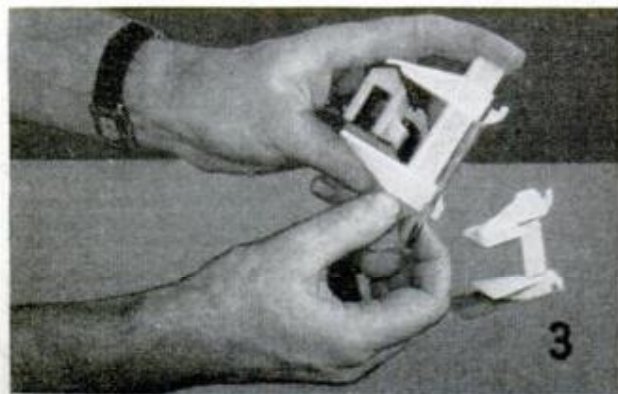
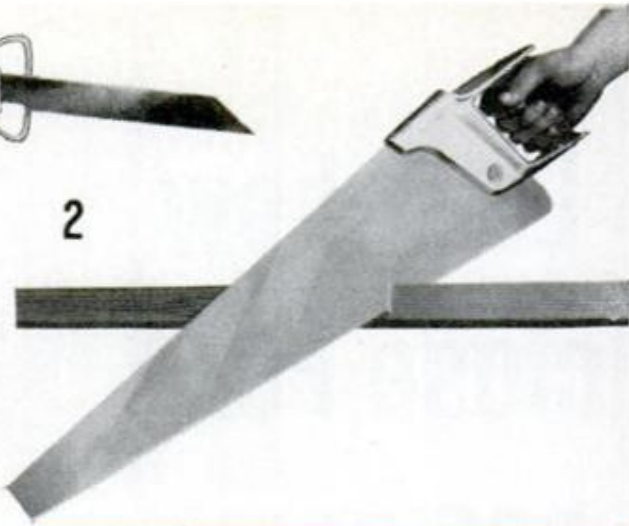
By advanced, thoughtful engineering, Ford has made car ownership more carefree—and cost-free—than ever before. This new freedom is something you ought to experience; why not get your first sample at your Ford Dealer’s this week?



Galaxie and  
**AIRLANE** by Ford



2



3

## Shopping for tools

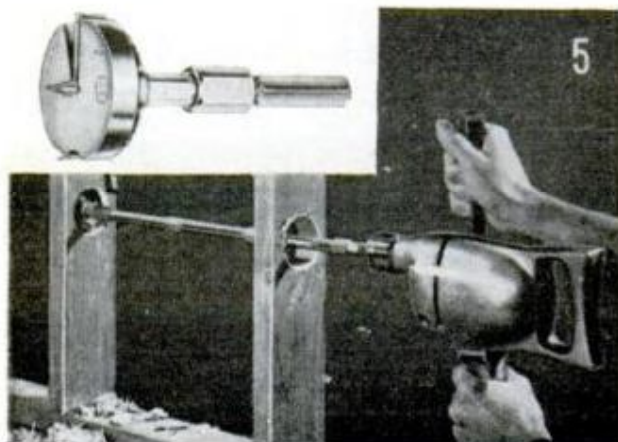
**1. HARD-TO-REACH PLACES** are no problem when using this attachment saw. It has a reversible blade for right- or left-hand use—may be operated close to walls or floors. On an electric drill or flexible shaft, saw cuts squares, circles or bevels. With six blades, lubricant and wrench, \$14.75. Grip-Torc Tools, 1780 Shelburne Way, Los Gatos, Calif.



4

**2. TOP-QUALITY HAND SAW**, designed for maximum comfort and control, has aluminum handle. The blade is made of exclusive thick-backed steel, and each tooth edge is ground to same gauge. The handle is attractively inlaid with solid walnut. Saw is priced at \$13.95 and made by Disston Div., H. K. Porter Co., Porter Building, Pittsburgh 19, Pa.

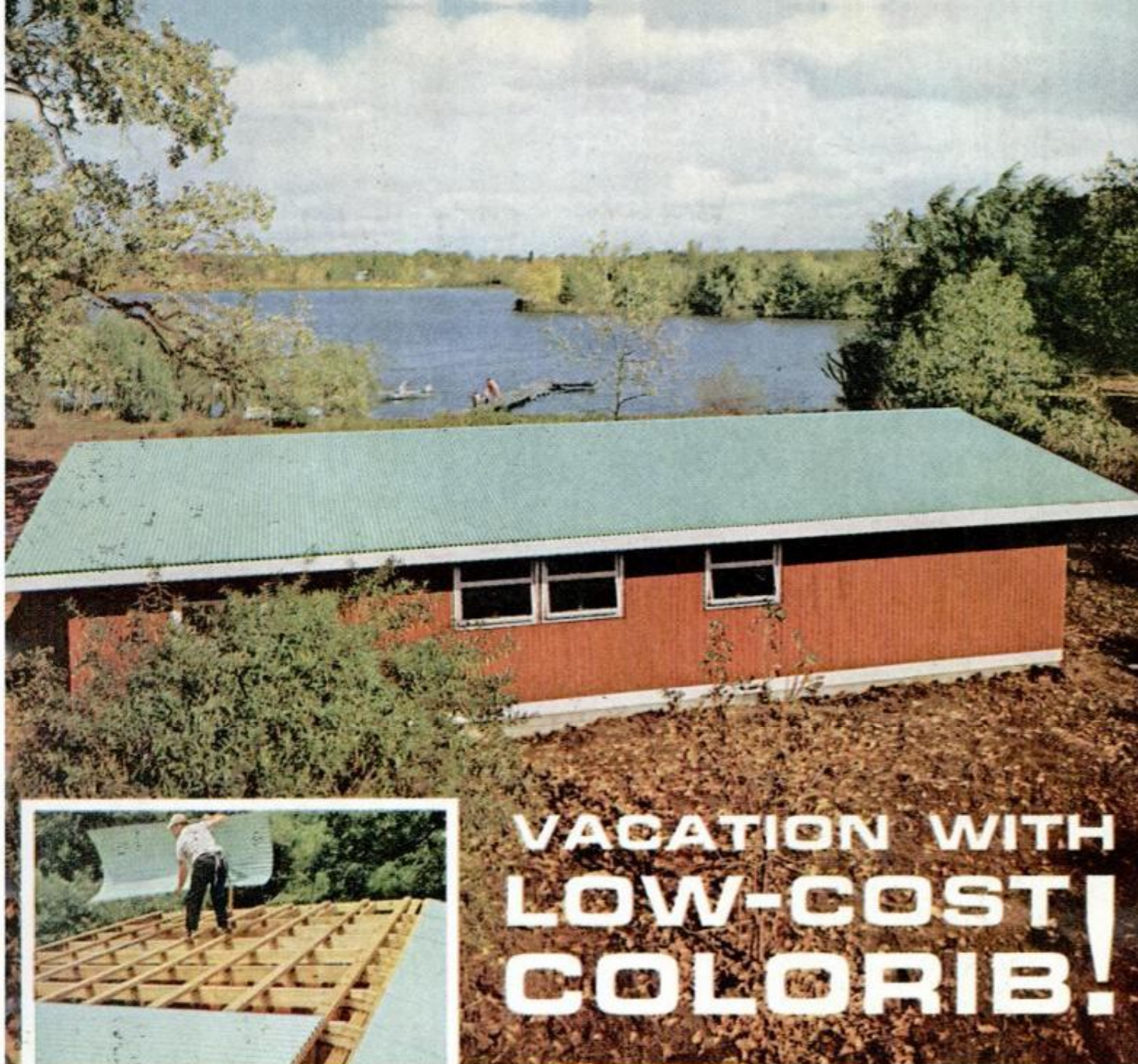
**3. CLAMPS OF DURABLE NYLON** are perfect for those small clamping jobs or for use in close quarters. Held by rubber binders, the clamps develop surprising amounts of pressure. Most glues will not stick to them. Three different small-size clamps with table platens are \$1. Two larger sizes with platens are \$1.29. Made by Miniclamp, Minneapolis 8, Minn.



5

**4. COMPACT ARC WELDER** is an all-purpose, 225-amp. unit with ample power for those bigger jobs that require electrodes up to 3/16 in. Entire unit weighs only 102 lb.—small enough for one man to lift into a truck or car. With full set of accessories and ready to weld, unit sells at \$159.50. Made by Bren/Weld Corp., 5114 Third Ave., Brooklyn 20, N. Y.

**5. LARGE-BORE BIT** includes replaceable, high-speed-steel pilot screw, spur and cutters. No sharpening is needed: Simply replace damaged parts in seconds with inexpensive new ones. Bit provides safety to user and it's easy to hold bit in correct alignment. Extensions are made from pipe. Time-Saver Tools, Inc., 27 East Park Ave., Mundelein, Ill.



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PLYMOUTH TURBO FURY cruising in Los Angeles. Pickup was smooth and swift with no tire-burning takeoff.

## Driving Chrysler's 1963 Gas Turbines

By Don Werner

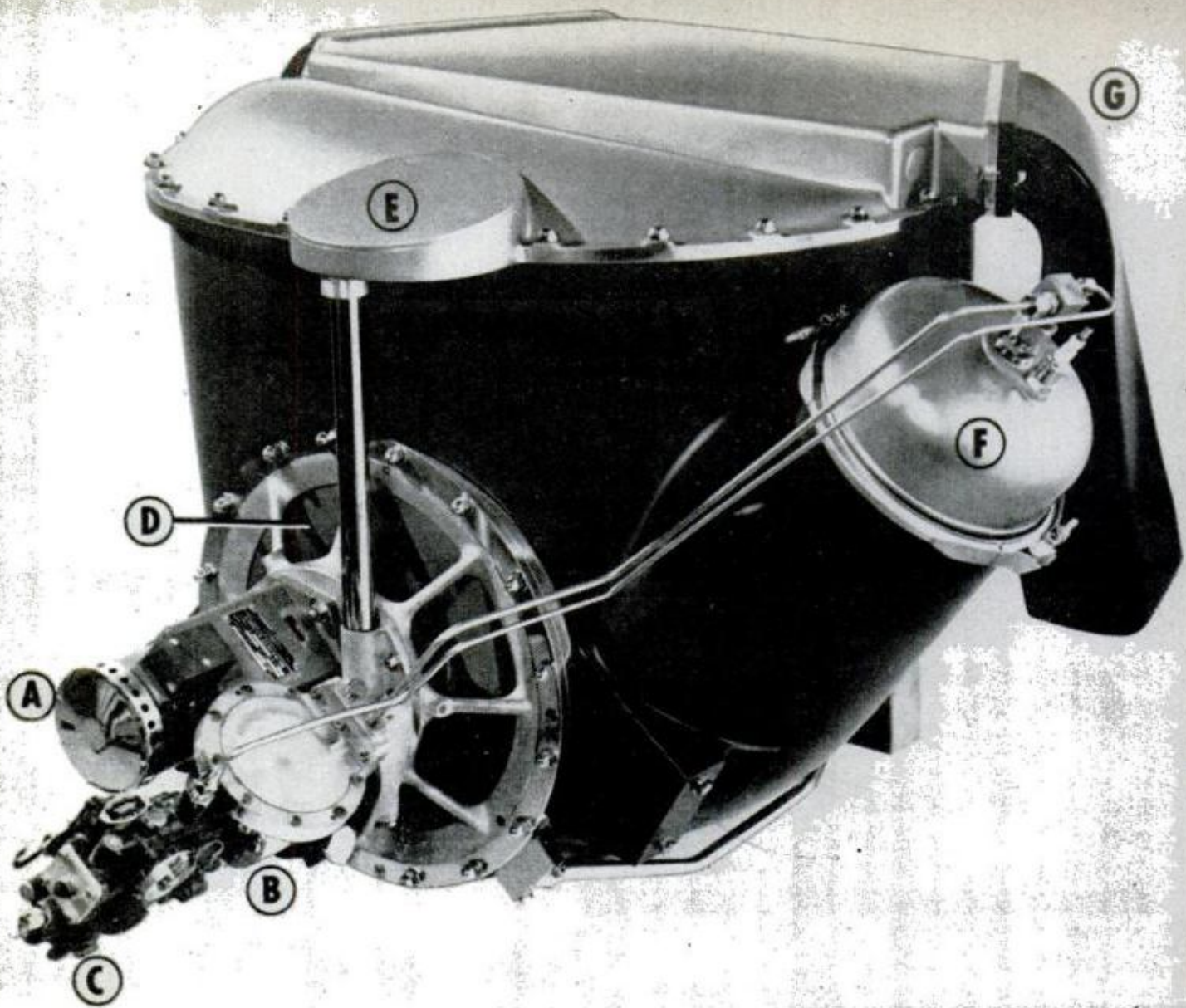
*Do they accelerate well? Are they noisy? Can they compete on fuel mileage? This report—based on 500 miles in them—has the answers*

**T**WO EXPERIMENTAL VERSIONS of 1963 cars have been touring the U.S. recently. While such advance display of new models by Detroit is rare, the cars themselves—a Dodge Turbo Dart and a Plymouth Turbo Fury—are even more unusual. They're powered by gas turbines.

Chrysler Corporation has said officially it is planning limited production

CRUISING PACIFIC COAST highway in Dodge Turbo Dart. Instruments include tachometer in center console





**TURBINE'S EXTERIOR** parts are: (A) starter-generator; (B) fuel pump; (C) fuel control system; (D) compressor air inlet; (E) regenerator gear box; (F) combustion chamber housing one spark plug and fuel nozzle; (G) one of two exhausts: Turbine installed measures 36 inches long, 35 inches wide, 27 inches high

for the public next year of totally new cars which will use these turbine engines.

By why turbines? Are they better than the familiar reciprocating engines? What are they like to drive in traffic? On the highway? Have all the problems been solved? Is Chrysler serious?

Recently, the Turbo Dart was driven 3100 miles from New York City to Los Angeles by George Huebner, the head of Chrysler turbine research, and his crew. The Fury, shipped out, promptly joined the Dart on the road.

For four days the cars roamed separately through southern California. Every day I was in one or the other, in crawling downtown traffic, on high-speed freeways, or out on open country roads. What these gas turbines do—and how they do it—is truly remarkable.

Currently, Chrysler's turbine is rated at 140 hp. Yet I clocked it from a standing start to a true 60 m.p.h. in 8.5 and 8.7 seconds. With more practice and carrying the

driver alone, the time could be cut to less than eight seconds with ease. Top speed is 115 m.p.h.

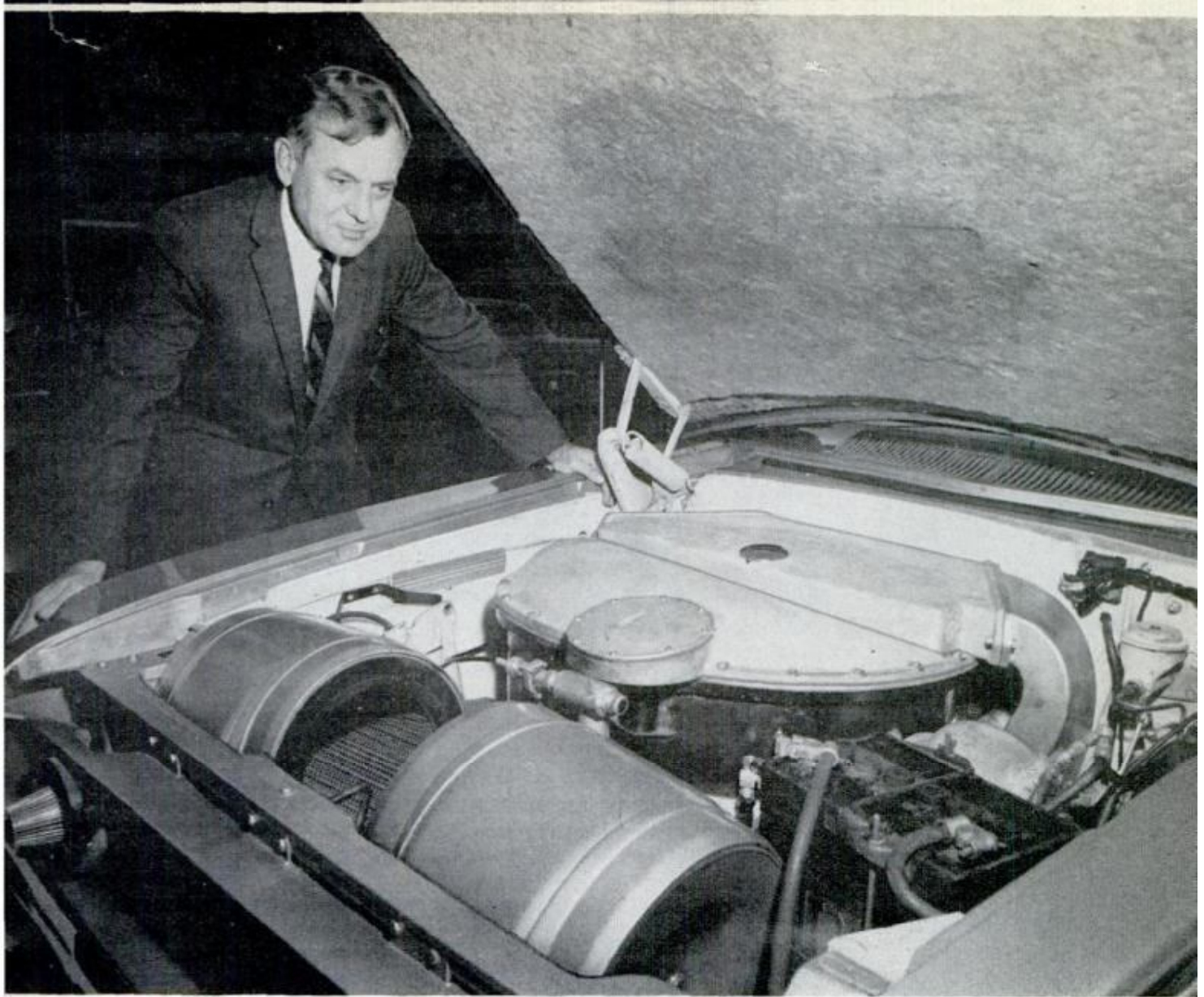
Such performance came not from a lightweight compact, but from a 4000-pound car. How is that possible with a mere 140 horses? Unlike a piston engine which doesn't peak until well under way, this gas turbine delivers its maximum torque at the start of the acceleration run.

#### **Elastic Smoothness**

The feeling of acceleration is a fresh experience. No vibrating, shaking roar. Only the high-frequency banshee whine of the turbine. During the first few seconds the car seems to move slowly. In fact, it's almost impossible to spin the wheels. Then there's a sense of sinking into the seat cushions as the forward rush increases with elastic smoothness. The speed acceleration buildup is swift, faster than a reciprocating engine's after the early seconds.

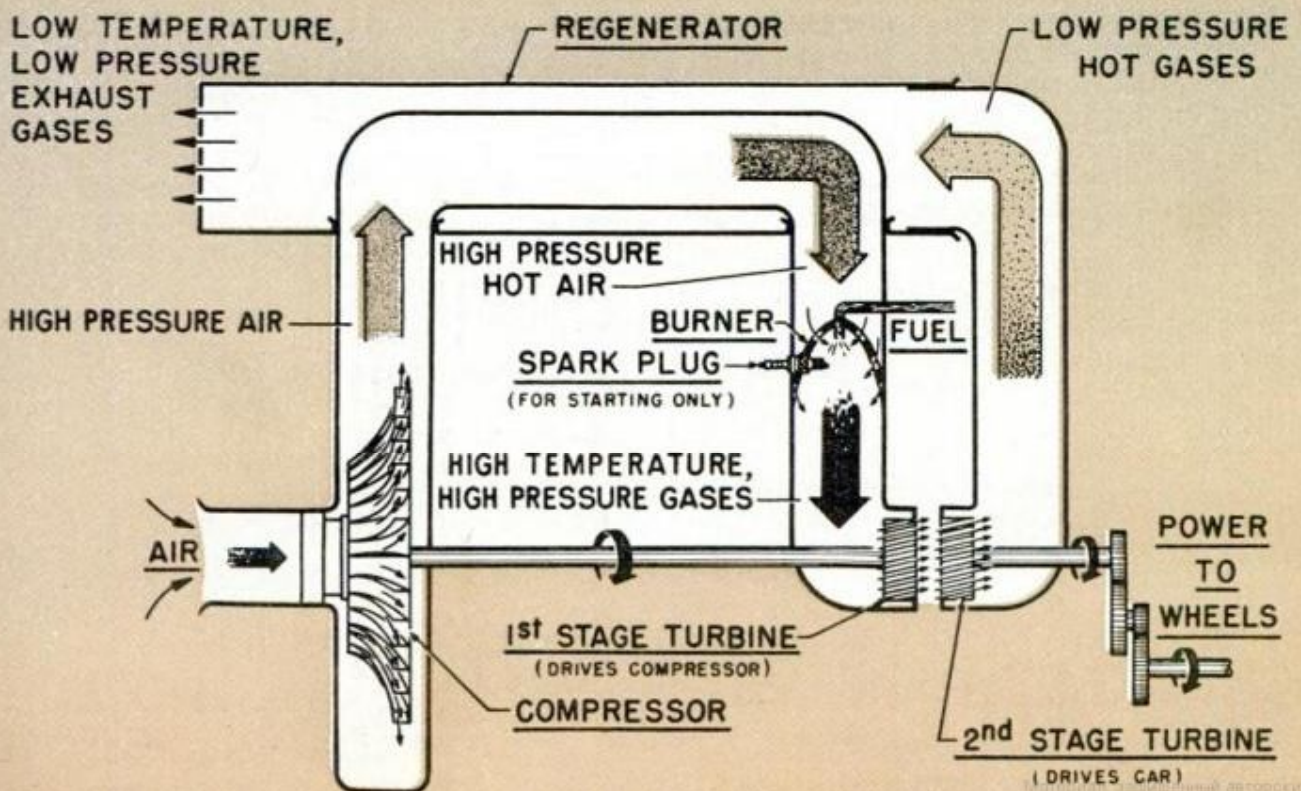
At 70 m.p.h., cruising on the Pacific Coast





**AUTHOR WERNER** inspects kettle-shaped turbine. Large "cans" in front are air intake cleaners and silencers which engineers say are not easily clogged by dust and dirt. Battery is a standard 12-volt type

**HOW CHRYSLER TURBINE WORKS.** Innovations are regenerator which uses hot exhaust to heat incoming air and variable nozzle (not shown) which directs pressurized gas at 2nd-stage to provide range of power





**FEELING 200-DEGREE-temperature exhaust, which comes out under front wheel wells on prototype models**

highway toward Newport and Balboa, over the turbine whine I could hear the breakers spilling onto the sand of the nearby beach. Under the sound of the turbine I caught the hum of tires, even the occasional creak of the torsion bars. The engine was loafing, registering barely 32,000 r.p.m. on the tachometer. Although on full power, it seemed more like coasting out of gear with the engine off.

Actually, the turbine noise—now curbed with silencers on the air intake and insulation around the regenerator—can be suppressed much further, Chrysler engineers say. At the moment, Chrysler wants these cars to sound like jets. It gets attention. Everyone looks to see if a DC-8 is taxiing down the street.

Engine decelerating or braking effects on the inclines seemed about the same as it is with a reciprocating-engine car which has an automatic transmission. And I noticed this even with the Plymouth Turbo Fury, whose turbine nozzles were set to give slightly less decelerating effect than the Dodge.

### **Fuel Economy**

Public tests with these turbines in 1960 resulted in up to 19 m.p.g. fuel economy. In discussing the Turbo Dart's cross-country run, Chrysler engineers were evasive. Severe winter storms with heavy snow and ice probably reduced fuel economy figures to an unimpressive level. But reliable sources reported the average was 17 m.p.g. And that diesel fuel gave eight to ten percent better mileage than gasoline.

The turbine, of course, runs on anything that will mix with air and burn, from good

brandy or hair oil to kerosene, premium gas or jet fuel—with no changeover procedures needed. But expensive leaded gasoline should be avoided, since it tends to leave deposits on the turbine blades. When turbo cars become common, the effect on the oil industry will be revolutionary. Refining processes can be simplified, with no need for exquisite tailoring of fuel.

The low cost of cheaper fuels is only one advantage in a long list. Lubricating oil, which is never exposed to high-heat, gases or outside air, will not need changing. One fill should last the life of the engine. No tune-ups are needed. There is no cooling system. The electrical system consists of a combination starter-generator, standard 12-volt battery, coil and one spark plug. There are 80 percent fewer moving parts than in a piston V8.

The gas turbine starts quickly and easily in any outside temperature, from 60 degrees below zero to 120 above. It needs no warmup. Fuel combustion is nearly complete, so exhaust is clean with little pollution of the air by smoke or unburned hydrocarbons.

Smoothness is an inherent characteristic of turbines. No pistons or valves jerk up and down. All action is rotary, like a windmill or water wheel. Air flows through ducts and smoothly spinning blades in a steady stream. There is very little friction.

Chrysler's gas turbine, designated as CR2A, is a classic layout. It has two sections—one generates power, the other receives it and delivers it to an output shaft that drives the car. There is no mechanical connection between the two operations.

In the first section, air is sucked in, com-

pressed and forced into a cylinder-shaped burner where a continuous spray of ignited fuel heats it. The next section receives the blast of pressurized gas on blades of two consecutive spinning turbines that turn separate shafts — one powering the compressor and one driving the car.

It is in this use of two stages that Chrysler's turbine differs in basic principle from those used on well-known jet aircraft, such as the DC-8 and 707. The second stage, which forms what in aviation is termed a "free turbine," is not involved in pure jets.

In making their turbine efficient and practical for car use, Chrysler engineers came up with two innovations: a rotating regenerator (in other turbines it is fixed) and variable nozzles on the burner end (not the compressor side).

### Rotating Drum

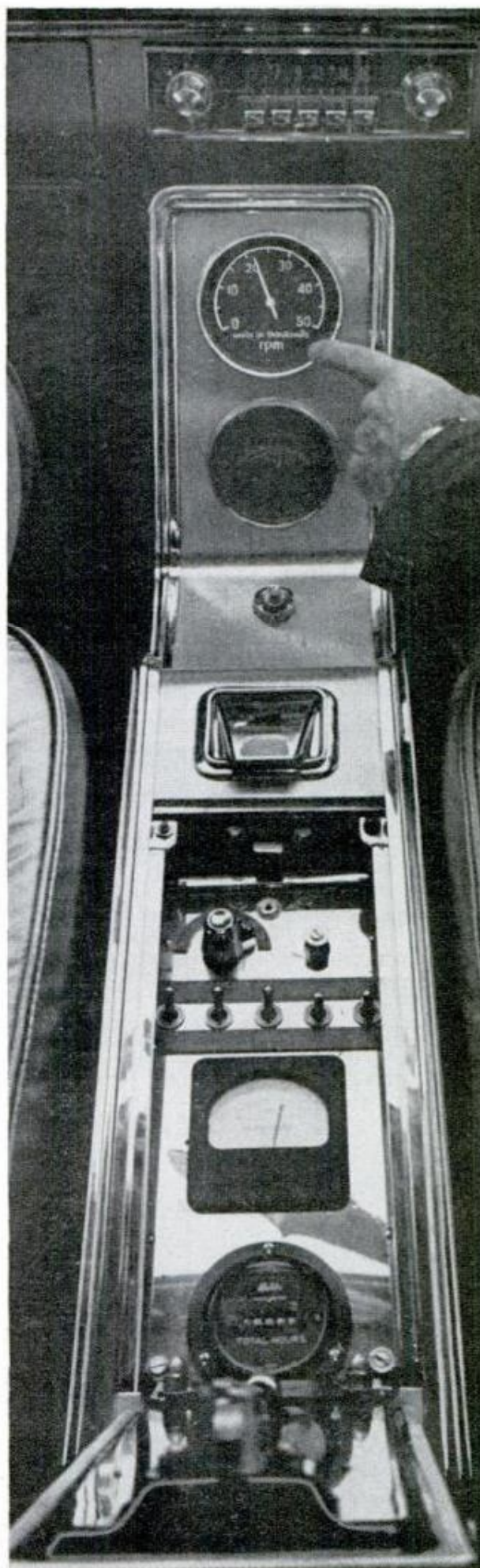
Chrysler's regenerator is an ingenious heat exchanger. It consists of a revolving drum packed with crinkled metal looking much like a giant cigarette filter. This drum is rotated constantly via reduction gearing from the compressor turbine. First it revolves in the exhaust chamber where 1700-degree gases flow through it transferring 1200 degrees of heat to the thin metal. As the drum rotates, this heated porous metal passes through the intake duct where incoming compressed air is raised from 300 to 1000 degrees as it absorbs heat from the metal. Without this continuous cycle of heat transfer the turbine would require much more fuel to raise the temperature of the gases to the point where they would expand and do equal work on the power turbine.

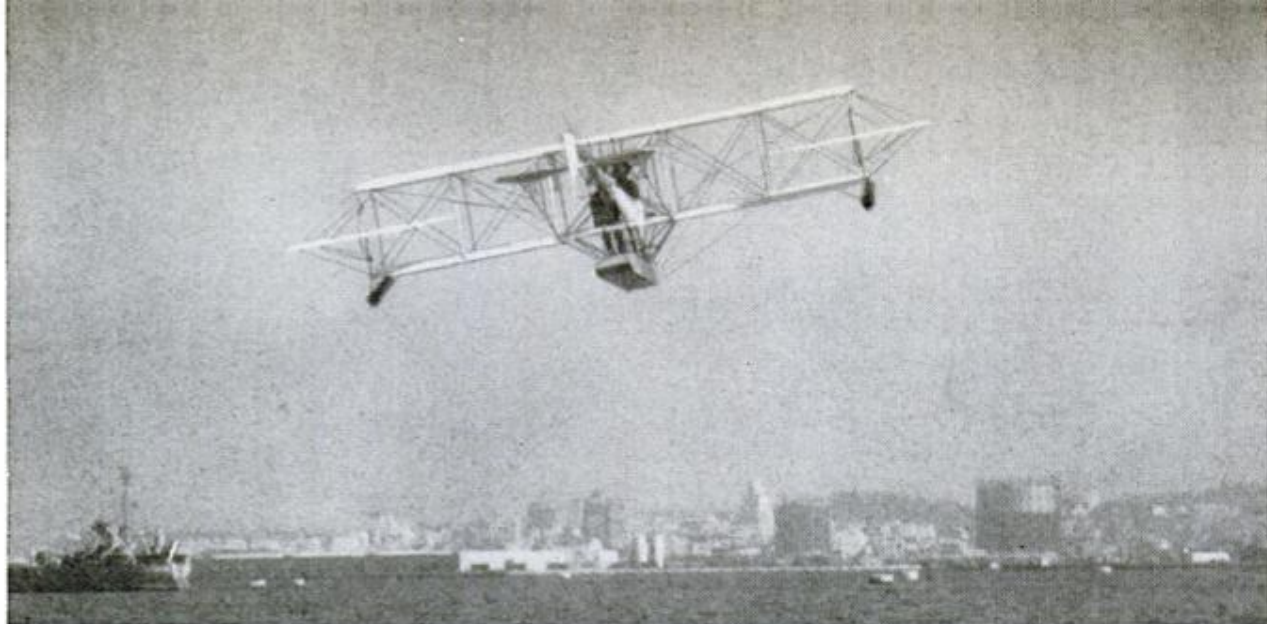
There's another vital regenerator function. Hot exhaust, giving up heat to the mechanically-rotated metal matrix, is cooled to about 500 degrees. Then aspirators blend in cool outside air. What comes out the exhaust pipe is a harmless 200 degrees.

The variable nozzles give the turbine some characteristics essential in a passenger car: Wide performance range, improved fuel economy and engine braking in deceleration. The nozzles are blades, like little airfoils, which automatically vary in adjustment in response to the accelerator pedal and car speed. Pressurized gas is aimed at the driving turbine from an angle appropriate to operating need. When the blades move to reverse position, engine braking is obtained, which turbines otherwise lack.

(Continued to page 250)

**TACHOMETER** on center console shown registering 21,000 r.p.m. at idle speed for first stage compressor





**CURTISS BIPLANE**, rebuilt from original plans, takes to the air where prototype flew some 50 years before  
**A-1 REPLICA** weighs 1500 pounds fully loaded. Powered by 1913 engine, it got up to speed of 60 m.p.h.

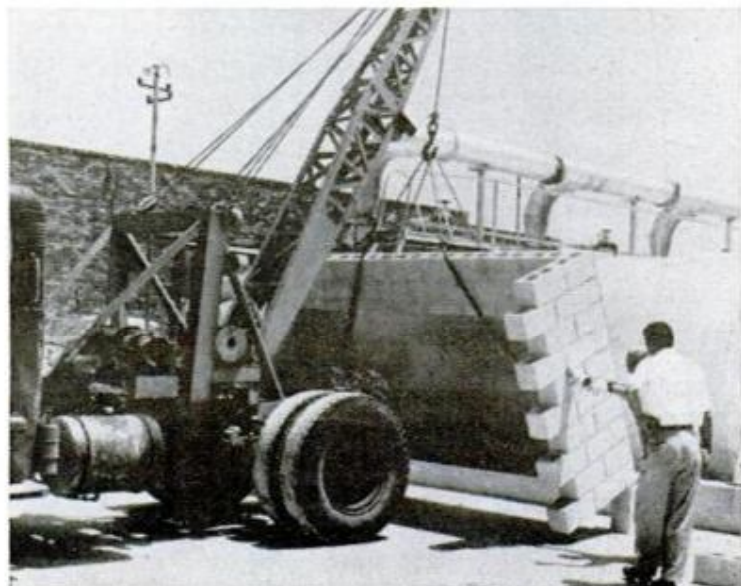


## Navy Pusher Biplane Flies Again

Marking the golden anniversary of naval aviation, a replica of the first airplane built for the U.S. Navy — a Glenn Curtiss A-1 pusher biplane — was reconstructed and flown near San Diego. More than 150 members of the Institute of the Aerospace Sci-

ences built the plane in cooperation with the Navy. The plane will be displayed in a new San Diego air museum.

The first A-1 was flown by Curtiss over San Diego Bay in 1911, and later by the Navy's first aviator, Lt. T. G. Ellyson.



## Epoxy Block House

Epoxy adhesive, shot from a caulking gun, is zippering up the concrete blocks of a mortarless house in Tampa, Fla.

The mortar substitute, batched from cement, lime accelerator and epoxy, cures in 24 hours and reaches full strength in 72 hours.

While the new adhesive costs almost twice as much as conventional mortar, speed of block laying is expected to offset the difference. The masons, for example, were able to lay the blocks end to end and apply the compound while another mason applied it to the top surface of each course.

## Seat Fits Auto Bumper

Motorists can use their autos as the legs of a camp chair by hooking to the bumper a portable seat that attaches with rubber-tipped bolts. The seat has a steel frame and ripple-finish plastic cover.

The bumper seat is available for \$3 from Enon Products Inc., Box 173, Enon, Ohio.



## Mulcher Does Much

Not only does a new multipurpose farm machine shape the seed bed, it mulches the bed with black plastic film, plants the seed and fertilizes it, then punches holes in the film for new plants!

Developed at Texas A&M College, the machine has controlled weeds, conserved moisture and increased the yield of farm crops during a three-year test at locations throughout Texas.

A single mulching with black plastic film—which helps retain water in soil—has increased both early and total yields of such vegetables as squash and peas by 20 to 300 percent.



## And After This Comes the Caldozer

There's a new critter—the cowdozer—moving into the construction field and moseying along among the bulldozers. The difference is that it pulls while the other pushes.

The cowdozer's blade is turned toward

the tractor (in the case of the LeTourneau model, an Army tank), and it pulls dirt to the tractor rather than pushing it ahead as a bulldozer does. This is helpful in moving earth where there's no footing for a tractor, as on a steep hill or muddy stream bottom.



POPULAR MECHANICS

**OWNERS  
REPORT**

A NATIONWIDE SURVEY

# Nimble Handling Pleases, Fuel Mileage Disappoints Chevy II Owners



**BASED ON 1,065, 493 OWNER-DRIVEN MILES**

**CHEVY II OWNERS LIKE . . .**

Neat handling, easy steering  
Sensible size  
Roomy interior

**DISLIKE . . .**

High fuel consumption  
Shoddy paint jobs  
Lax quality control

**GENEROUS HEADROOM**, large doorways pleased owners who were delighted to find them in a compact





A PLEASANT SURPRISE to many Chevy II owners was the maneuverability and easy handling of the new car

**Marginal and boldface comments by Jim Whipple, PM's Auto Editor**

**C**HEVY II arrived on the automotive scene as the latest, and possibly last, of the compacts. It's arrival was welcomed by long-time Chevrolet fans who were waiting for a car easier to maneuver than the big Belairs and Impalas and at the same time easier to sit in than the low-slung Corvair. According to the majority, Chevy II seems to combine the desirable nimbleness and maneuverability of the Corvair with headroom and ease of entry equal to the big Chevrolet.

The six-cylinder Chevy II engine costs \$60 more than the Four and offers 30 additional horsepower. Presumably the Four was offered as an inducement to the ultra-economy minded. But only 13.9 percent of owners reporting bought Fours while 84.6 percent chose the Six. (A few, 1.5 percent, didn't indicate how many cylinders their power plants contained).

This low percentage of four-cylinder cars may not be a true test of the ultimate popularity of this engine. Many more Sixes than Fours were available at dealers early in the season.

The Chevy II is not, at least at the outset of its first year on the market, a standout economy car. Some 41.1 percent of all owners felt that their gasoline mileage was lower than they had expected.

To backstop this report PM drove a Chevy II Nova 400 two-door hardtop with six-cylinder engine, Powerglide automatic transmission and power steering.

Constant-speed fuel consumption to corrected speedometer reading was as follows:

- 25.7 miles per gallon at 30 m.p.h.
- 24.1 miles per gallon at 40 m.p.h.
- 21.6 miles per gallon at 50 m.p.h.

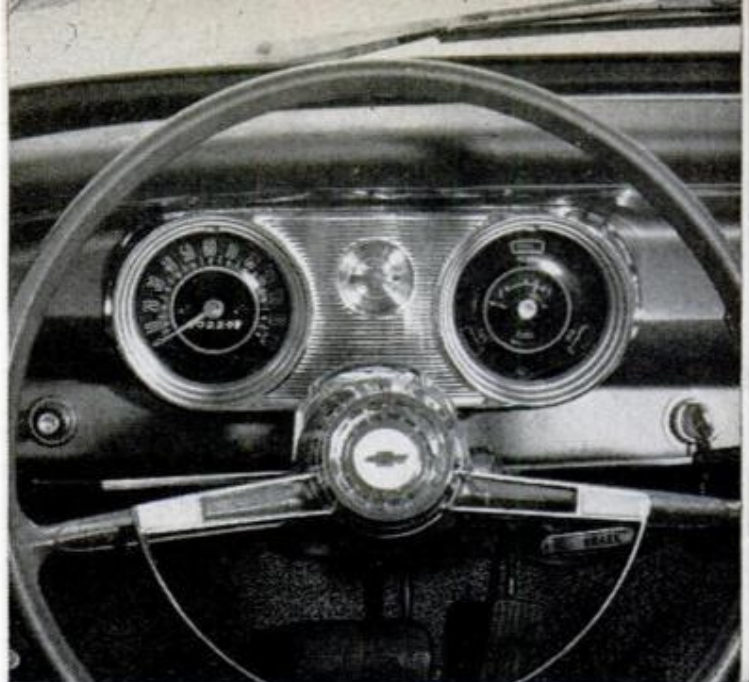
**← Chevy II is much better competition for Falcon, Rambler et al. than Corvair ever was. Now the Ford-Chevy war will be on in earnest**

**← There's a whole tribe of four-cylinder-engine lovers who'll buy Chevy IIs in search of four-banger fun**

**← Fuel economy will doubtless improve as the factory works on engine tuning. Production before perfection seems to be a Detroit custom**



**SEAT WIDTH** is adequate for compact Chevy II, but tall riders will find scant kneeroom in the rear seat



**INSTRUMENTS ARE WELL PLACED** but many drivers resent use of warning lights in place of gauges

**Chevy II is easy to maneuver, but its 39½-foot turning circle is larger than that of most other compacts** →

**Both front and rear doors offer exceptional ease of entry. However, PM's 6'3" driver needed a bit more legroom in driver's seat** →

**So it does, if you use the lower gears and let engine wind up to higher r.p.m. than you're accustomed to using** →

**Chevrolet has announced switch from 3.08 to 1 up to 3.50 to 1 rear axle ratio on stick shift Fours. This should give more power with less shifting, hence better mileage in runabout use** →

19.1 miles per gallon at 60 m.p.h.  
15.7 miles per gallon at 70 m.p.h.

Over-all mileage, including warmup, city, country and expressway driving was 18.3 miles per gallon.

*But, let's find out how the new Chevy II rates with the owners themselves. Here, in the order of frequency of mention, are the first five best-liked features.*

"It handles well on rough, choppy terrain."—Illinois refinery worker.

"Handles like a dream—easy to turn around."—North Carolina mechanic.

"It is no small car and yet it is no boxcar to push around. I just love it for city driving."—Iowa politician.

"Compact, yet room for six adults. Very nimble in traffic."—Ohio crane operator.

"It's about the size cars used to be and has plenty of power."—Tennessee service-station operator.

"I am 6 feet, 2 inches tall and had trouble getting in other compacts. But in my Chevy II, I don't get any bangs on my knees."—Michigan milkman.

"I can get in Chevy II without knocking my hat off and can sit up straight with hat on. This is the fault with most small cars."—Missouri realtor.

"This Six has plenty of power."—Ohio salesman.

"Plenty of pep (4 cylinder), very economical, surprisingly powerful, top speed 90 or more—far more power than a Corvair or Falcon."—Ohio salesman.

"Good pickup with automatic transmission for a four-cylinder car."—New Jersey inspector.

"I get about 25 m.p.g. at 55-65 m.p.h. Under this, we have gotten as high as 28.9 m.p.g. (6-cylinder)."—Wisconsin farmer.

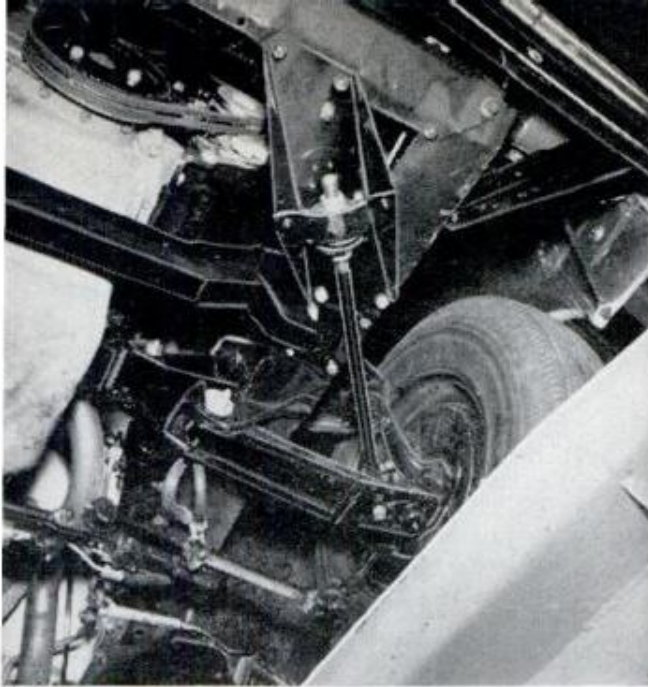
"It has the look of a big car yet the expense (of operation) is that of a compact."—Kentucky retiree.

*A shakedown on an all-new car, of course, includes complaints. Here are the first five in their order of frequency.*

"Chevrolet should drop the 4-cylinder Chevy II or put enough power or the right gear ratio for it to get good gas mileage. If they cannot, the Chevy II 4-cylinder will fail."—North Carolina accountant.

"Gas mileage isn't what they told me it would be. (His Six gets 13 m.p.g. over-all). I bought it for economy but





**DIAGONAL TRAILING LINK** connected to lower control arm is rubber insulated to absorb road harshness



**LOW RIM** makes loading of the trunk easy, but full use of the space is hampered by a flat-mounted spare

I got better mileage on the full-sized car I traded."—Tennessee secretary.

"Gas mileage should be at least 20 m.p.g. with an engine of this size (Six).—Iowa telephone worker.

"Shoddy paint job—outside and inside."—Louisiana clerk.

"The paint job was thin in three places that had to be repainted by the dealer."—New Jersey government worker.

"Very poorly assembled—snow drifts in at all four doors."—Wisconsin grocer.

"Door seals are not right and cold air blows in."—Ohio salesman.

"Quit selling them before they are put together."—Illinois coal miner.

"Interior Phillips screws not tightened. A half dozen of them have come out."—New Jersey broker.

"Joints on the body are very rough and crude. In fact, the welds at the front post and roof line are breaking."—Tennessee production planner.

"Poor workmanship on the interior metal parts. And my automatic choke was put on backwards."—Missouri highway patrolman.

"The problems are minor details that the dealer should have taken care of in, at most, two service visits. Instead, they have given it "the alley" treatment and I have had to take it back about six times."—Michigan credit manager.

(Continued to page 268)

He's right unless all your  
 ← driving is stop and go

We found this on some of  
 the Chevy IIs we've driven,  
 but not on others. So it must  
 ← be quality control, not  
 a design problem

Automakers could avoid  
 this if they put the first  
 ← 50,000 cars of a new  
 model through a special  
 "fix-up" line after assembly  
 and before delivery

Dealers who do this are  
 wrong of course, but whose  
 ← fault is it that they're  
 swamped with new cars  
 needing so many  
 "make right" repairs?

## WHAT MILEAGE DO CHEVY II OWNERS GET?

(6-CYLINDER ENGINE)

Miles per gallon:	10-12	13-14	15-16	17-18	19-20	21-22	23-24	25-26	27-28	29-30	Don't Know
<b>Manual Transmission</b>											
City Driving			26.3%	26.3	17.5	1.9	3.5	3.5	3.5		17.5
Long-Trip Driving				3.5%	21.1	19.3	3.5	10.5		3.5	38.6
<b>Automatic Transmission</b>											
City Driving	4.5%	5.7	16.2	29.4	12.8	6.4	2.3	1.5	0.4	0.4	20.4
Long-Trip Driving		1.9%	3.8	10.6	14.3	15.8	10.2	5.3	1.1	0.4	36.6

**BASED ON 1,227,553  
OWNER-DRIVEN MILES**

## Likeable Rambler Marred by Flaws, Say the Owners

*Marginal and boldface comments by  
Jim Whipple, PM's Auto Editor*



*Rambler Classic is about the same length as most compacts, yet has interior room equal to new, "family-sized" Fairlane and Meteor. How right can you get with a 1956 design?* →

*Rambler is no longer the only game in town, so its "compactness" isn't unique. But note how owners appreciate a roomy compact that's "smaller on the outside, bigger on the inside"* →

**R**AMBLER, THE HARDY PERENNIAL of the compacts, rolls along winning new friends and keeping most of the old ones. The wisdom of American Motors in first introducing this car is constantly reaffirmed, as 5000 or more buyers each week take delivery on brand new ones.

The fact that Rambler's sales have held up while a dozen or more new compacts blossomed out speaks well of the car's basic design.

What's more, they're coming back for seconds. The percentage of buyers who've traded an older Rambler in buying their new car has nearly doubled since the previous Rambler Owners Report (PM August 1960, p. 86) on the 1960 model. Some 21.4 percent traded older Rambler's in buying their '60 models, while 39 percent of '62 buyers reporting traded Rambler for Rambler.

Another interesting comparison between the '60 and '62 reports reflects public thinking in regard to the compact automobile generally. In 1960 "Compact Size" rated fourth on the list of best-liked features with a percentage of 22.3. For buyers of the '62 Rambler, "Compactness" dropped in importance to seventh on the list with a percentage of 13.5, as buyers became aware that Rambler was far from being the only compact around. But as they compared Rambler with the raft of new compacts, some of its original virtues took on new meaning. "Roominess" showed up in fourth place on the '62 best-liked features list with 17.6 percent of all owners mentioning it.

All's not hearts and flowers with this year's Rambler however, and as always, the owners are prompt to sound off



**SURPRISINGLY NIMBLE** due to redesigned front suspension and steering, Rambler handles the way owners like

**OWNERS LIKE . . .**

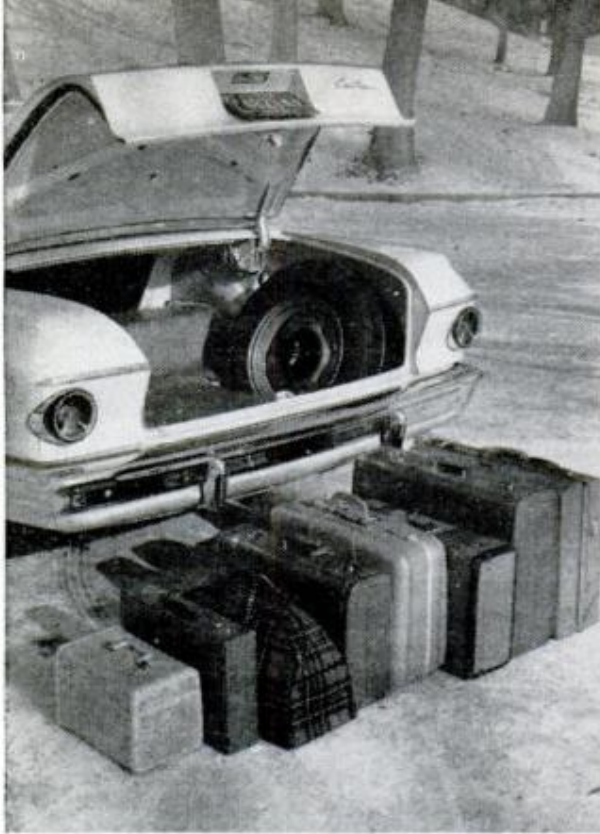
Easy handling, stability  
 Comfort, roomy ride  
 Low-cost operation

**OWNERS DISLIKE . . .**

Door maladies  
 Inadequate power  
 Poor workmanship

**HIGH BUMPERS** clear the sidewalks well and the high-rising hood headroom minimizes any mechanics' stoop





**YAWNING TRUNK** will really hold 'em. Eight bags of various sizes went in with plenty of room to spare



**SEPARATELY ADJUSTABLE** front seats, wide doors would make exit easy but for scant head clearance

**This slump in quality control may be explained, but → not necessarily excused, by the fact that these reports were from buyers of the earliest '62 models, while '60 reports were collected in midsummer after assembly-line "kinks" had been straightened out**

**Much of test mileage → was run up in foul, sub-zero weather with chains on car**

**These cost extra and have advantage over bucket → seats; you can still seat three passengers in front**

with their dislikes. A slackening off in effective quality control has increased the annoying mechanical problems and finish flaws according to the new owners, 5.1 percent of whom complained of Poor Workmanship.

A solid 39.5 percent reported some sort of mechanical trouble on their '62s, while back in 1960 only 20.3 percent reported similar troubles. However, despite gripes, the owners appreciate their Ramblers even more this year. Some 84 percent declared that they would buy another Rambler. Only 51.9 percent of those reporting made the same statement in 1960.

One of the contributing factors to Rambler's popularity is fuel economy which is still very good. PM's test Rambler was a Classic with six-cylinder engine and automatic transmission. Here are its mileage figures at constant speeds:

- 27.0 miles per gallon at 30 m.p.h.
- 25.1 miles per gallon at 40 m.p.h.
- 23.0 miles per gallon at 50 m.p.h.
- 18.8 miles per gallon at 60 m.p.h.
- 18.3 miles per gallon at 70 m.p.h.

Over-all mileage, which included warmup, idling, acceleration and city and country driving, was 20.8 miles per gallon.

*To learn what Rambler Classic owners think about their cars, let's turn to their comments on the first seven best-liked features in the order of frequency of mention.*

"I like the easy handling, especially in heavy traffic, and the comfortable relaxed feeling."—Massachusetts retiree.

"These Ramblers are comfortable; I am 6 feet-1 inch and weigh 225. My wife is 5 feet-4 inches and weighs 114. The individually adjustable front seats make it perfect for our travels."—New Mexico educator.

"It rides better than most heavier cars I have owned."—Florida mechanic.

"I think it has the best balanced ride and stability of any car I have driven."—Ohio steel worker.

"Economical to operate even at high speeds (my gas mileage is 20.8 m.p.g. over-all)."—Alabama buyer.



**SLIDING PULL-TAB** is used for PARK while other automatic transmission controls utilize push buttons



**UPPER REAR CORNER** of Rambler's back-door window frames has been rounded off from '61's sharp points

"For my money there is no other car that can compare with it for economy."—Iowa retiree.

"I like the roominess of the big station wagon, and yet it's so economical (20 m.p.g. over-all).—Pennsylvania therapist.

"Has enough room without giving the feeling of being too long or too wide to be maneuverable."—Ohio supervisor.

"Great for vacations—with all our luggage in the rack on top there's plenty of room for my two youngsters to sleep in the back."—Wisconsin machinist.

"Rambler's steering is the best of any car I have ever driven."—West Virginia chemist.

"I am 6 feet-5 inches, weigh 260 and I have plenty of room in the Rambler."—Illinois construction analyst.

"I like the seat height, headroom and road clearance. The king-size bucket seats are superb."—Florida lawyer.

"There are no rattles and squeaks such as I found in new cars I previously owned."—South Carolina minister.

"I like the marvelously-sound body construction which other makes seem to have lost through the absence of quality control and constant change."—Virginia government worker.

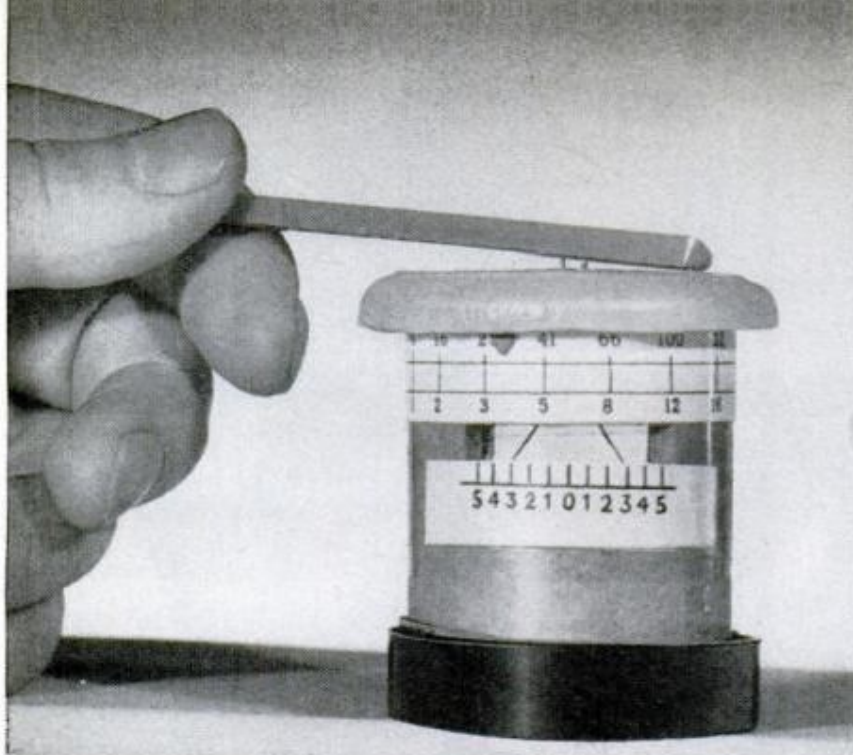
(Continued to page 241)

← **Here's the secret of Rambler's charm; big car room without big car vices**

← **Height's the reason for Rambler's roomy seating, it's 2 to 5 inches taller than other compacts**

## WHAT MILEAGE DO RAMBLER OWNERS GET?

Miles per gallon:	10-12	13-14	15-16	17-18	19-20	21-22	23-24	25-26	27-28	29-30	Don't Know
<b>Manual Transmission</b>											
City Driving	1.8%	1.2	10.6	23.5	22.9	14.1	4.7	1.2	0.6		19.4
Long-Trip Driving			0.6%	1.8	10.6	19.4	22.9	9.4	2.4	1.2	31.7
<b>Automatic Transmission</b>											
City Driving	1.0%	9.1	22.0	27.3	19.1	3.3	1.4	1.0			15.8
Long-Trip Driving		0.5%	1.0	11.0	20.1	21.5	10.5	2.4	0.5	1.4	31.1



**CHARGING DOSIMETER.** Leaves fly apart in charged position. Rate at which they come together is determined by amount of radiation in air

## Personal Radiation Monitor

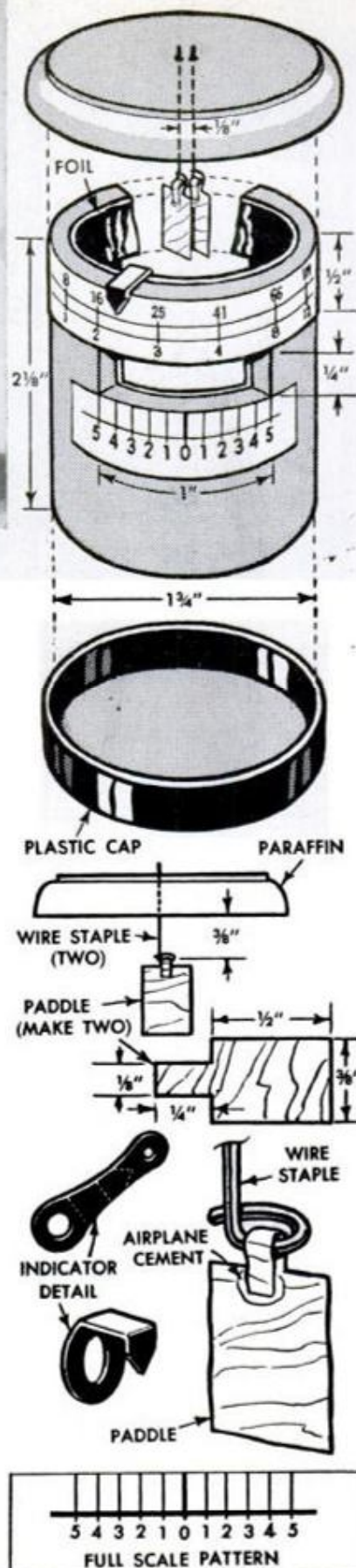
By R. L. Patrick, Ph.D.

WHETHER YOUR INTEREST is a novel project for a school Science Fair or an emergency radiation detector, you can build this simple electroscope-type dosimeter quickly from household materials. It has been checked by several testing laboratories who found it to be accurate. The maximum hours safety scale is calibrated for a safe dosage figure recommended by radiation experts.

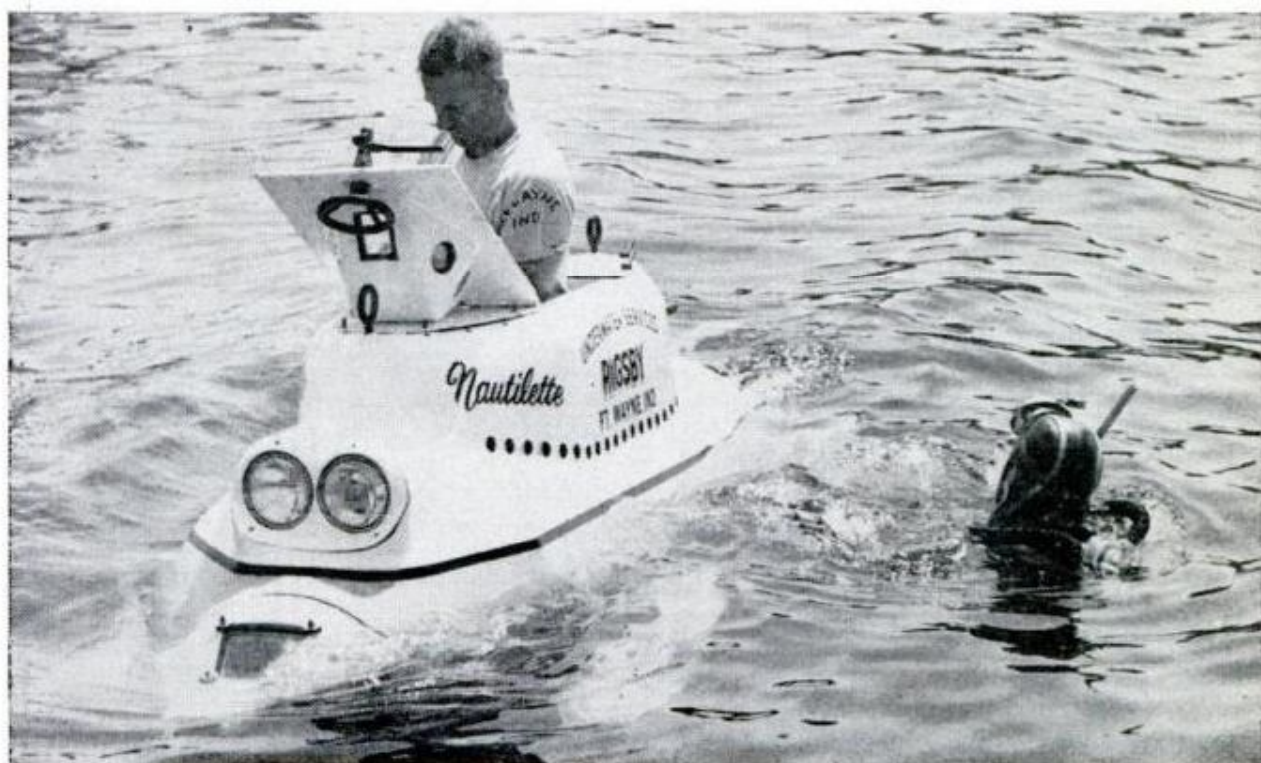
A section of mailing tube forms the housing or body of the unit. Paddles or leaves and tube lining are aluminum foil. Make the lid by pouring melted paraffin wax into a jar cover, and use a plastic jar cap for the base. Line the base with melted paraffin and seat the housing in it. Cut the pointer from a solder lug or metal scrap. Cut out the scales shown below and cellophane-tape them in place. Wrap clear plastic around the housing for protection.

Place the top so the leaves, when observed endwise, are centered over the zero reading on the scale. Charge the unit by rubbing a plastic rod with wool, or running a comb through your hair. Touch the rod or comb to the staples at the top of the wax and the leaves will fly apart to charged position. Now count the time in seconds that it takes the leaves to deflect toward each other one full scale division. The upper scale will convert this deflection rate to safe exposure time. Set the pointer here as a reminder and reference for the next reading.

A kit containing the foil-lined housing with imprinted scales and cutouts, bottom plate, leaves or paddles, formed hanger wires, paraffin top, film wrapper, charging rod and instructions is available for \$1 from Experimenters Supply Co., 1924 Columbia, Chicago 26, Ill.



Max Hours Safety	4	8	16	25	41	66	100	132	166	250	330	400	500
Minutes/ 1 Unit													
Scale Deflection	1/2	1	2	3	5	8	12	16	20	30	40	50	60



## Tiny Sub Dives to 100 Feet

Though it is big and deep, Lake Tippecanoe, near Fort Wayne, Ind., is an unlikely place in which to maneuver a submarine. Yet Woody Rigsby and his son Frank put their homemade \$5000 *Nautilette*, a two-place sub, into summer search work there.

Four years in building, the *Nautilette*—12½ feet long, 56 inches high and weighing 2600 pounds—has two-inch plexiglass windows and double hull. Underwater it's run by a three-quarter horsepower electric motor; on the surface by a one-cylinder air-cooled engine. It descends by means of diving fins and makes about two knots underwater, going as deep as 100 feet.

The Rigsbys—Woody in conning tower, Frank stretched flat below—search Tippecanoe for wrecks. Their sub carries a five-hour oxygen supply.





By Jim Whipple



## Dodge Dealers Get a "Chrysler" of Their Own. Is There a Rotary Engine in Lark's Future?

This may not be the year that breaks records for auto sales in the U.S., although many of the industry's biggest guns are talking seven million cars for 1962. But we'll bet that you'll have to go back a long way to find more different makes and models offered. Herewith, the latest additions to the line-up.

As we go to press **Dodge** offers another series, the **880**. This one will be a big brother to the **Dart** and **Polara**, having a wheelbase of 122 inches. You guessed it, the **880** is Chrysler Corporation's "C" body shell shared with **Chrysler Newport** and "300."

**Grille and other styling** details will differ, of course, but basically the **880** will be a "Chrysler" for Dodge dealers, who up to introduction of the 1962 **Dart** and **Polara** of 116-inch wheelbase, have always had a "full-sized" car to offer their customers.

According to a Dodge Division executive, the new **880** series was in response to dealer demand which in turn was sparked by a reawakening of buyer interest in large, lower-medium-priced cars. This in spite of the fact that the 122-wheelbase **Dodge Polara** offered in '61 accounted for only six percent of the Division's sales, somewhat less than 10,000 units.

The **880** required no crash program, as it was already fully tooled up as a **Chrysler**. It comes in standard array of hardtops, wagons and a convertible. Inventory will be relatively simple, with a single 361-cubic-inch engine, two-barrel carburetor and choice of manual or automatic transmissions. Price is as yet unannounced but should be slightly below the **Chrysler Newport** starting price of \$2964.

Over at **General Motors** there's activity on the import front with **Pontiac** recently announcing the projected return of England's **Vauxhall** to selected numbers of its dealers, and **Buick Division** following suit with its **Opel**, produced by GM's German subsidiary.

These cars were quietly "de-emphasized" (that's a publicity man's word, meaning dropped) about a year ago. Both these cars are attractive four-cylinder 4 to 5-passenger sedans and station wagons, with prices be-

ginning at under \$2000 (taxes not included), delivered on the East Coast fully equipped. In passenger and luggage capacity these two cars, compare closely with **Rambler's American**.

Coming after **Ford's** re-emphasis of its English lines, **Anglia** and **Consul** (PM Jan. '62, p. 16), the **Opel-Vauxhall** re-entry has the makings of a trend. One explanation for these moves is that **GM** and **Lincoln-Mercury Division** are setting up "instant competitor" ready-made for the much-heralded arrival of **Ford's Cardinal** "subcompact" at **Ford** dealers, in late '62.

The race toward a breakthrough in basic auto power-plant design has warmed up considerably with the rotary combustion (Wankel) engine and the gas turbine entering the home stretch.

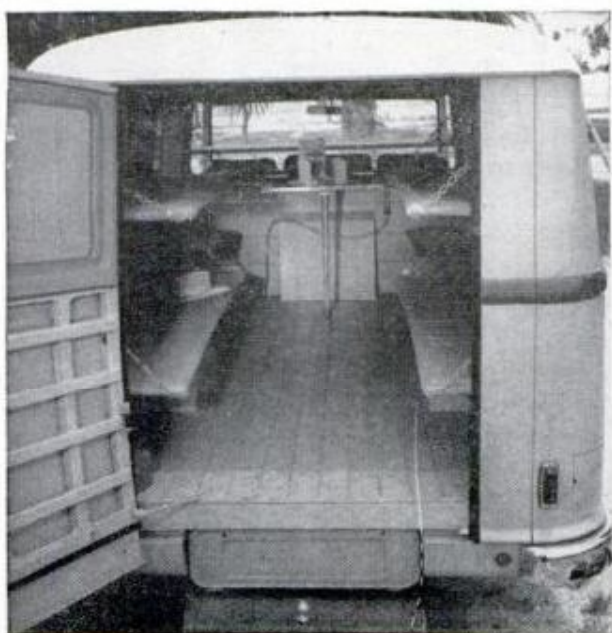
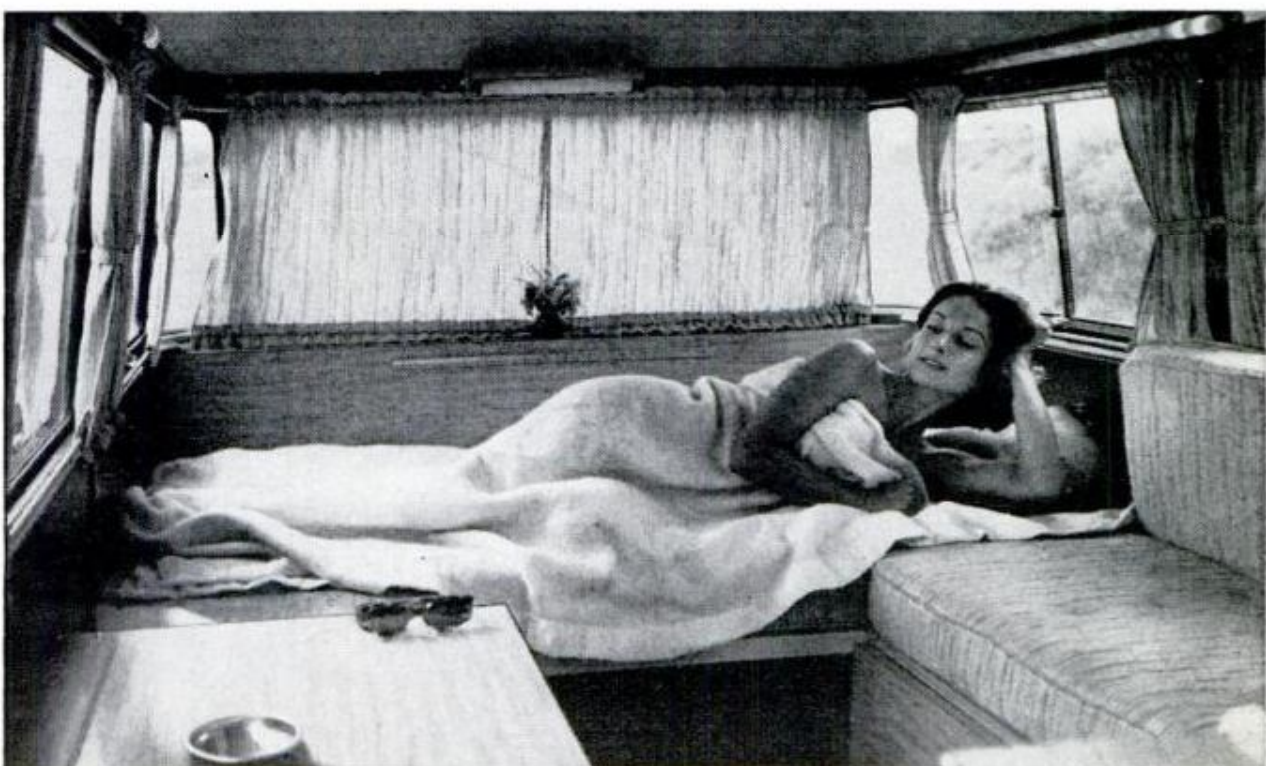
**Chrysler** claims that its turbine will be in limited production in 1963 (see page 87), while over in England **The Rover Co., Ltd.** has just unveiled its latest turbine car the **T-4**. Like **Chrysler's** turbine cars, the four-door four-passenger **Rover T-4** is powered with a front-mounted gas turbine rated at 140 hp.

The rotary combustion camp shows an equal bustle of activity. **Curtiss-Wright**, according to unconfirmed reports, has run a two-rotor Wankel-type engine for 200 hours at full throttle on the test stand. This engine is reported to develop 210 horsepower from 120 cubic inches of displacement. Its weight is 400 pounds and it is made of cast iron.

With this sort of reliability testing under its belt, **C-W** could be pretty close to production on this engine. If so it would not be impossible for it to be sold off-the-shelf to an automaker. What a shot in the arm this engine would be for **Studebaker's** 1963 **Lark**, rumored to be an all-new car.

Even as an extra-cost option to the **Lark Six**, the **C-W** rotating piston engine would create as much floor traffic as the **Lark** did itself when introduced back in 1958. **S-P's** dynamic new president, **Sherwood Egbert** (who created the new **Hawk** in 18 weeks) is just the guy to pull off a sleeper play like this. ★ ★ ★

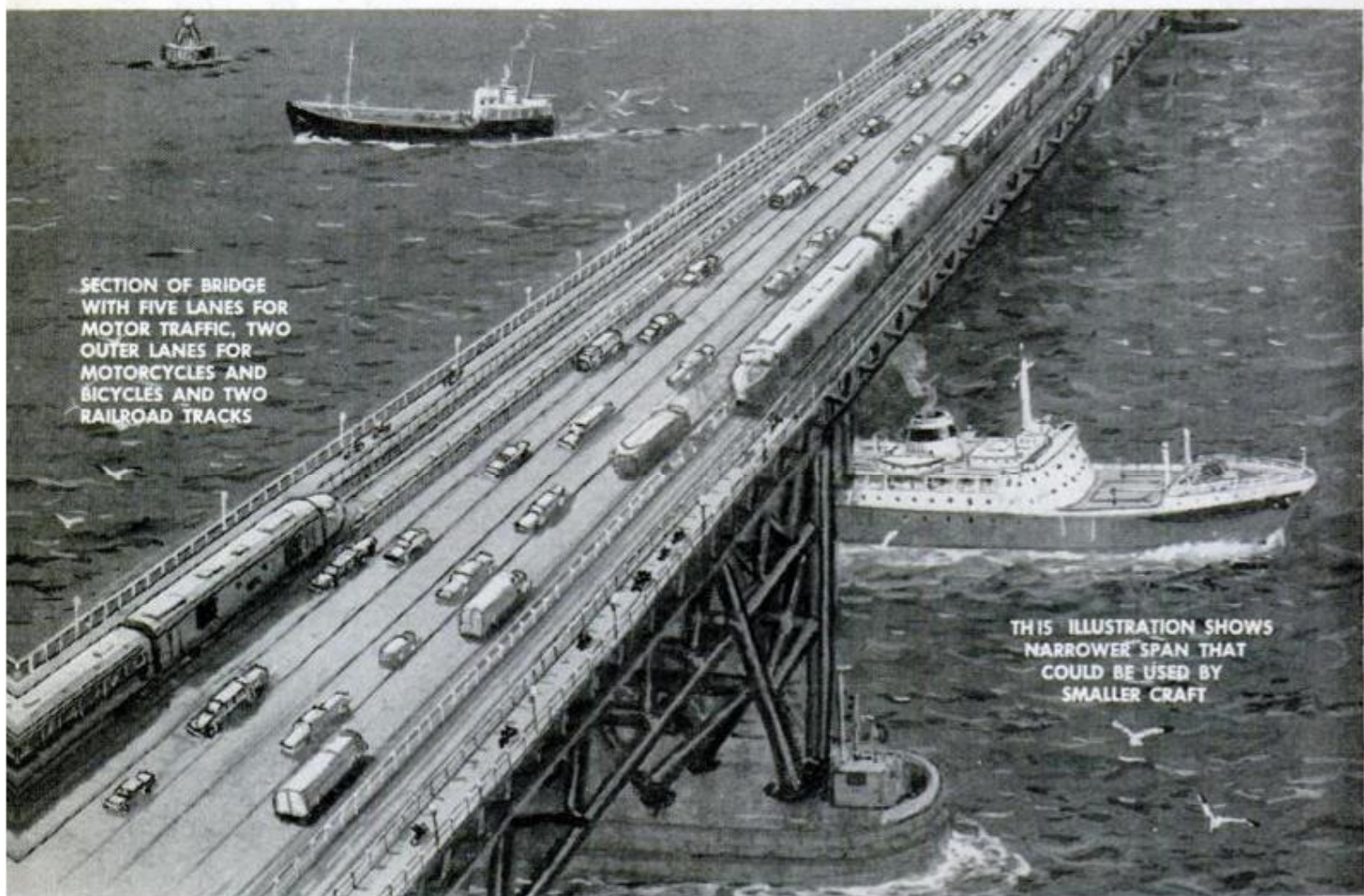
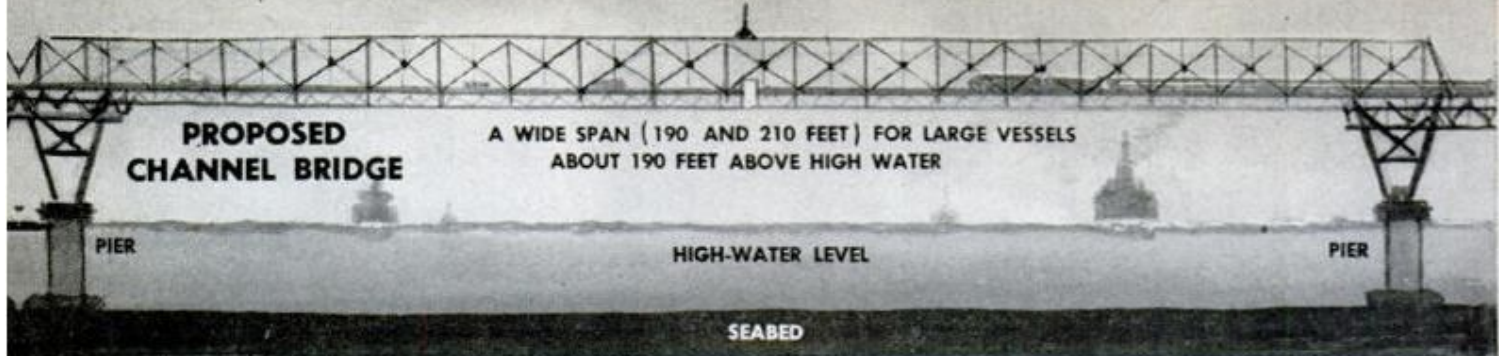




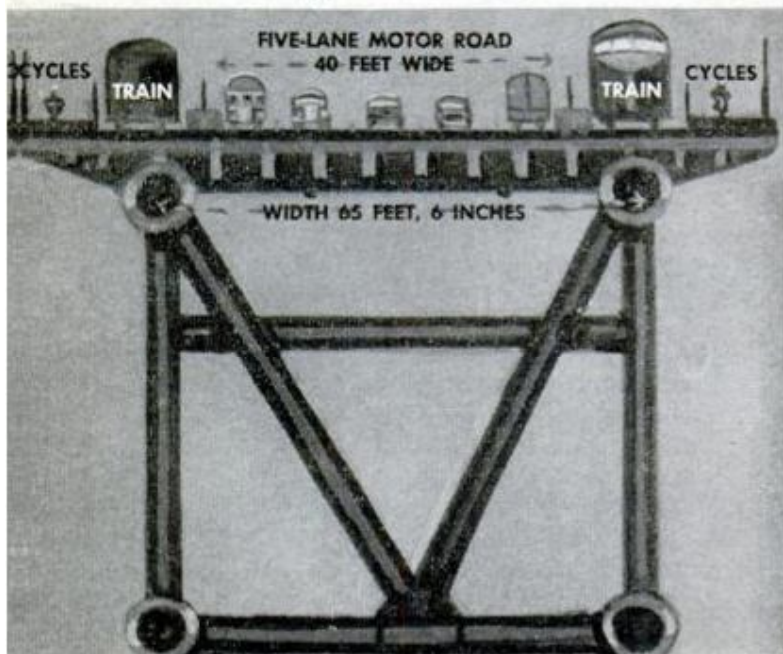
## German Camping Wagons

The booming American auto-camping field has two new entries from Germany—two camping vans by Borgward Motor Co., of Bremen. Both versions are 60-horsepower cab-over-engine vans that deliver 60 miles per hour and 20 miles per gallon; both are delivered stripped-down by the manufacturer to a distributor in West Palm Beach, Fla., for outfitting.

One, the Deluxe Camper, top photo, sleeps five and boasts a tub and shower, hot and cold running water, flush toilet, galley and air conditioning. It costs \$8800. The other, a utility model, shown at bottom, has fold-away furniture and equipment, and can be used as a delivery van. \$4995 from Borgward-Taylor Co., 1710 Okeechobee Rd., West Palm Beach, Fla.



## Bridge or Tunnel Across the Channel?

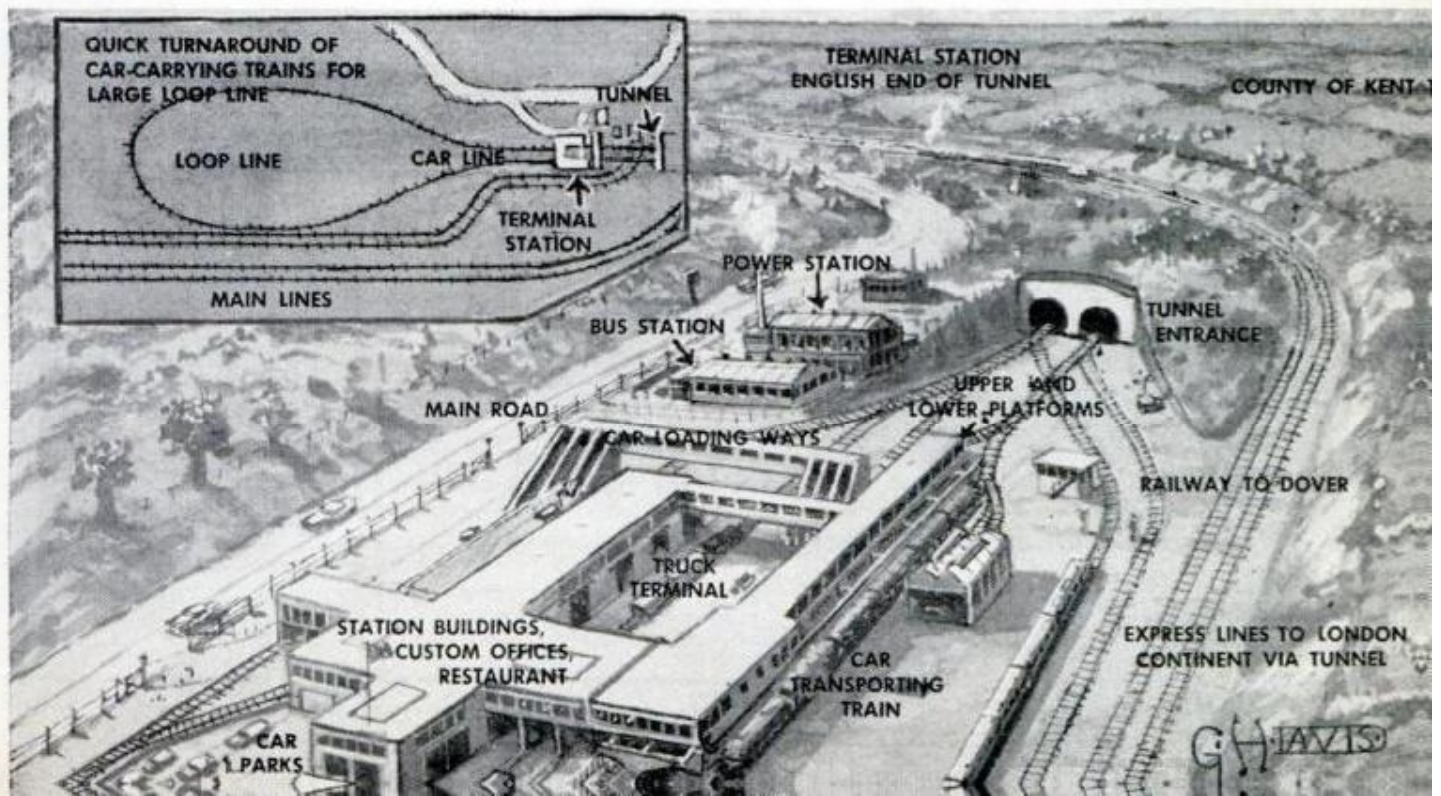
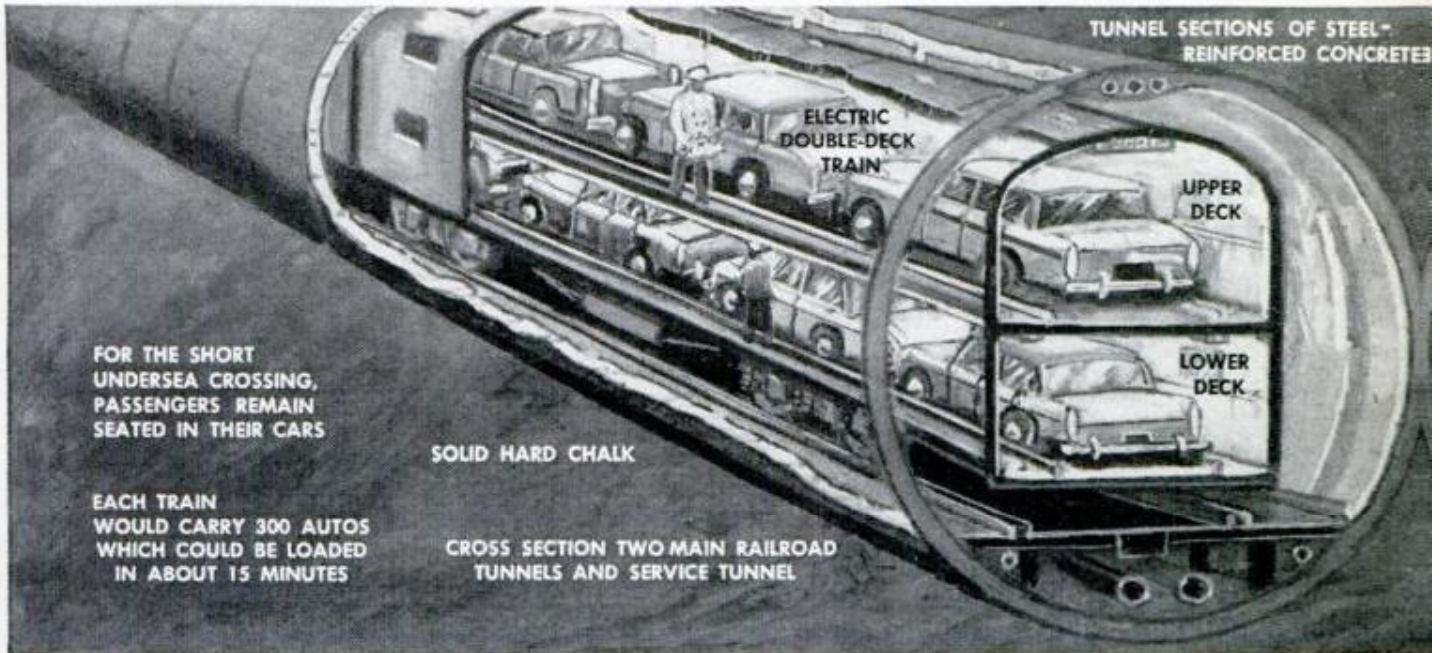
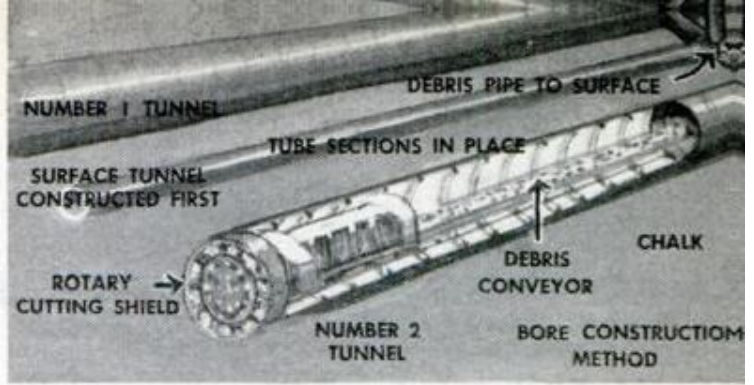
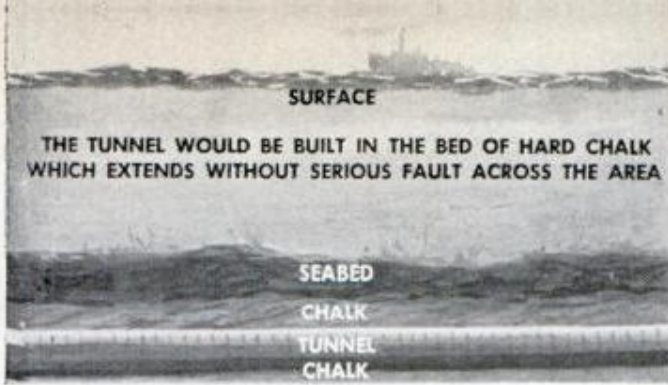


FINAL ARGUMENTS are being given in the 100-year-long debate about whether a tunnel should be drilled under the English Channel to link England and France. Yes, say many, and offer a plan. Good idea, say others, but let's make it a bridge.

Five years from now, claim tunnelers, 60-mile-an-hour electric trains could carry 300 automobiles each through two tunnels. Trains would load in 15 minutes, unload in 10. Cost: \$364,000,000.

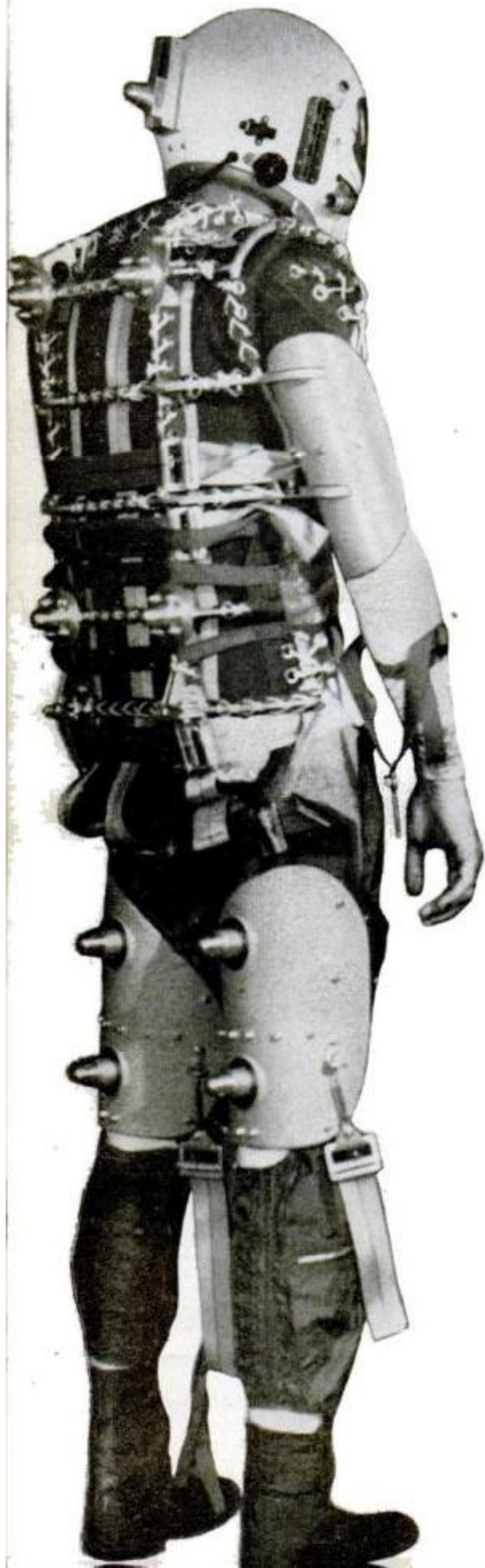
But, say bridgers, for \$560,000,000 we could build the bridge and keep in tune with the automobile age: Five lanes for cars, two for cycles, and two railroad tracks.

*Text and illustrations by G. H. Davis*



# Our First Moon Trip started at

By S. David Pursglove



**I**T BEGAN AS an Air Force bus rolled to a stop beside a concrete ramp 1500 yards inside Gate 3 of the new North Section at Cape Canaveral, Fla. Four men got out, clustered beside the bus door, and stared skyward.

Three of the coverall-clad figures showed outward signs of youth. There was a sprinkle of grey through the fourth man's close-cropped hair when he pushed back his baseball cap for a better look at the monster towering above them.

The object of their attention was a white-and-silver shaft jutting majestically 185 feet into the still-cool morning air. Four pairs of eyes followed the ever-broadening sides of the monolith downward until its base disappeared into a canvas shroud that a steel-helmeted crew was removing. As the canvas fell, four enormous funnels were revealed. Each of these nozzles could have accommodated the small group, now walking from the bus to the base of a steel skeleton that towered on equal terms with the enormous rocket.

Lt. Col. Leroy G. Cooper, Jr. (or it could be Shepard, Glenn, or any of the other current astronauts) stepped aside as the group approached a wire cage. He let the three younger men enter first. Then Cooper, now a senior instructor in the manned lunar flight program closed the cage door.

The elevator rose slowly. At 70 feet the rocket shaft tapered inward where the huge solid-propellant booster mated with the smaller second stage. A few feet farther up a coat of white frost indicated that the cage was passing the second stage's unbelievably cold tanks of liquid-hydrogen fuel and liquid-oxygen oxidizer. The frost ended 25 feet higher as the car passed a fairing connecting the

## Express to the Moon—or

Recent news reports have described a NASA plan to place several rockets into orbit, then link them into a space ship while they circle the Earth. This is the so-called "rendezvous" plan. This *Popular Mechanics* article, prepared after detailed discussions with officials responsible for our manned nonflight program, depicts a single large rocket. Why this apparent conflict?

NASA is exploring *both* techniques. *PM* discussed both plans with scientists, officials and even a member of the committee charged with making the final decision. Very likely no decision will be made before 1964. However, in almost every case where *PM* asked for a "best guess," these men gave a marked edge to direct ascent, as shown here, over orbital rendezvous.

The much-ballyhooed Advanced Saturn C-5, a larger

**4:30 the morning of July 1, 1969**

second and third stages. Shortly, more frost appeared to indicate the third stage tanks.

The car stopped alongside a catwalk leading twenty feet across open air to the monster rocket's final stage, the Apollo space capsule. The capsule looked only slightly different from the two others that the Astronauts already had flown in preparation for their voyage to the moon.

The first, more than two years earlier, had been a cone mounted on a drum. Attached behind—or “beneath,” depending on orientation of the viewer—the control capsule and its drum had been a long, cylindrical “trailer” that was home and laboratory for the three men for two weeks in orbit around the Earth.

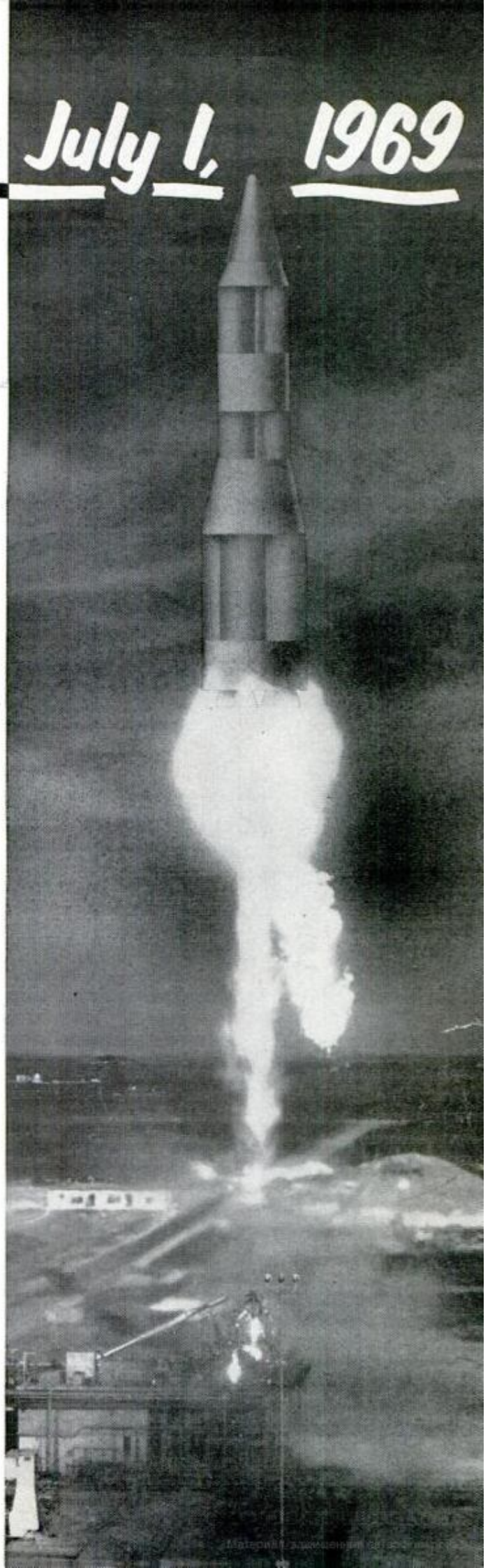
The next vehicle had been another “cone on a drum,” but the cone was flattened slightly on one side to form the cross section of an extremely thick “wing” with a small amount of aerodynamic control. Six months earlier, this capsule and the engines in the attached module, or drum, were sent around the moon and back to earth. The slight flattening of the cone—the only part of the space vehicle to return to earth—allowed pilot-navigator Henry Collins some slight guidance of the capsule as it reentered the atmosphere.

The capsule that faced Navy Lt. Comdr. Collins, his two companions, and Cooper, again was a cone that appeared very slightly flattened. Its base was 12 feet in diameter; the cone was 14 feet long. Below the cone was the familiar drum containing the two small hydrogen-lox engines that would propel the three men home from the moon. Below the propulsion module was again a trailer, but much longer this time. Here

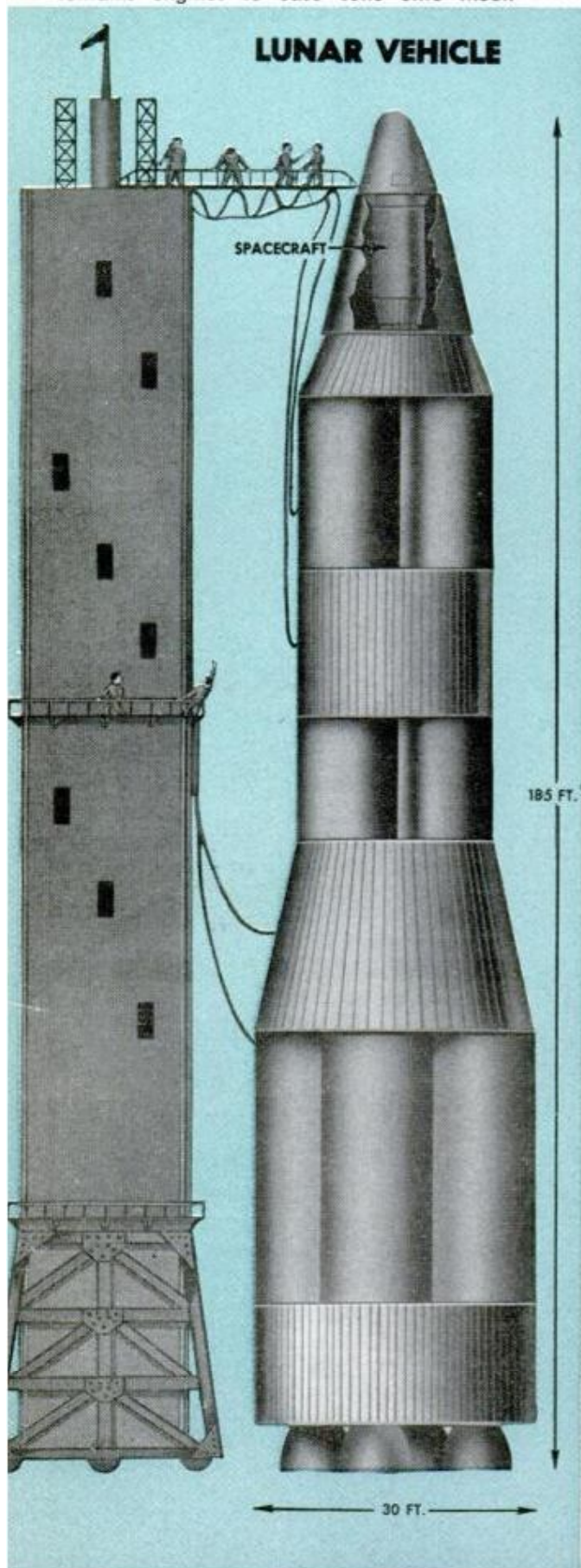
## **Rendezvous en Route?**

three-stage rocket than the design shown here, exists at this writing only in the form of a contract which has been let for design feasibility studies, and actually is intended for orbital rendezvous and perhaps circumlunar shots, but not direct moon landings. Experts estimate that any Saturn C-5 shot cannot take place until 1966.

There is no doubt that in later years, once a rendezvous technique has been perfected, it will be a cheaper and less complex way to reach the moon than direct ascent. However, this article discusses our *first* moon trip, and all evidence indicates it will be made in the rocket shown here.



**APOLLO SPACECRAFT**, which will carry three men to moon and return, rests atop three-stage lunar vehicle—185 feet in air. Base of vehicle is 30 feet across. Men ride to moon in nose cone. Cylindrical "trailer" contains engines to ease cone onto Moon



were the hydrogen-lox engines that would ease the Apollo onto the moon.

Collins strode across the narrow catwalk and grasped two small, recessed handles on the entry hatch. An effortless pull and the lid lifted out two inches and then slid downward on tracks. Collins stepped through the hatch into the control cabin, tightly packed with engine control, navigation, communication and life-support equipment. Suspended above him was his "station" for launch and reentry and for control functions during flight.

The station was a form-fitting bunk molded, in hard plastic, to Collins' body contours. It was on a three-way gimbal controlled by a motor and gyroscope to maintain a preset relative attitude as the capsule changed flight directions. Mounted on the gimbaled station were a full set of controls, which would guide the crew's destiny after the ground-controlled launching, and navigating equipment.

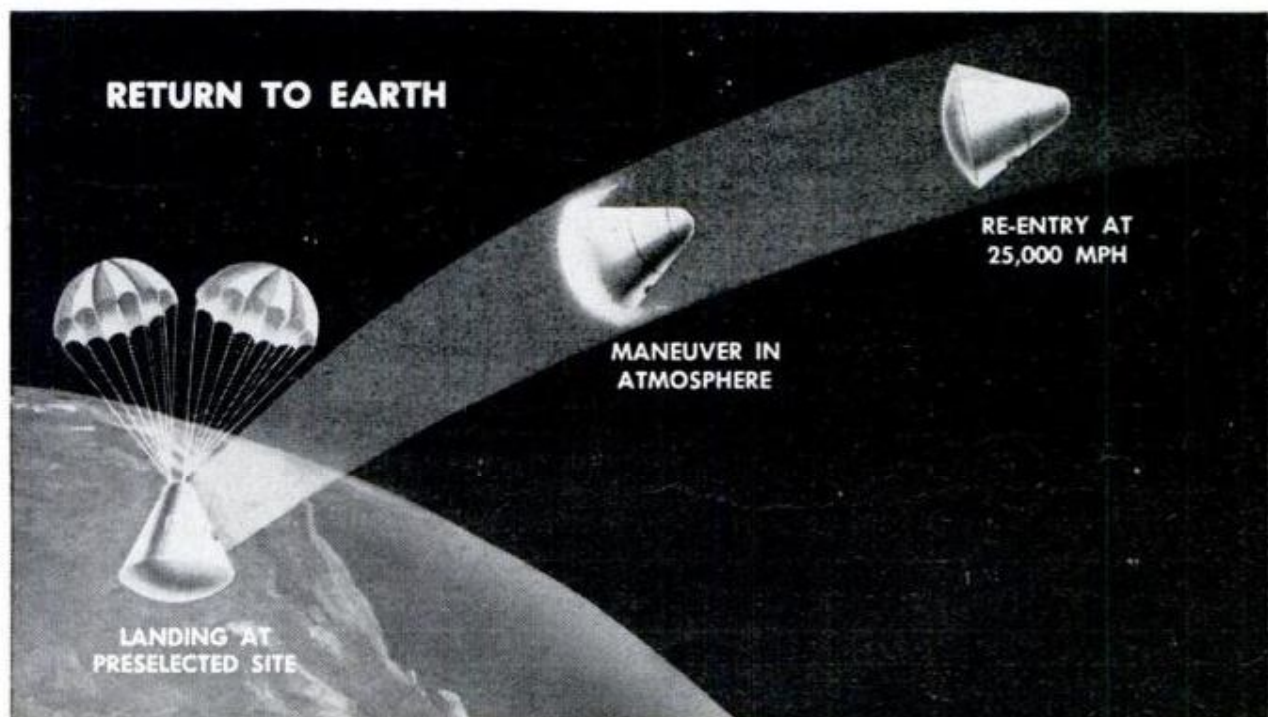
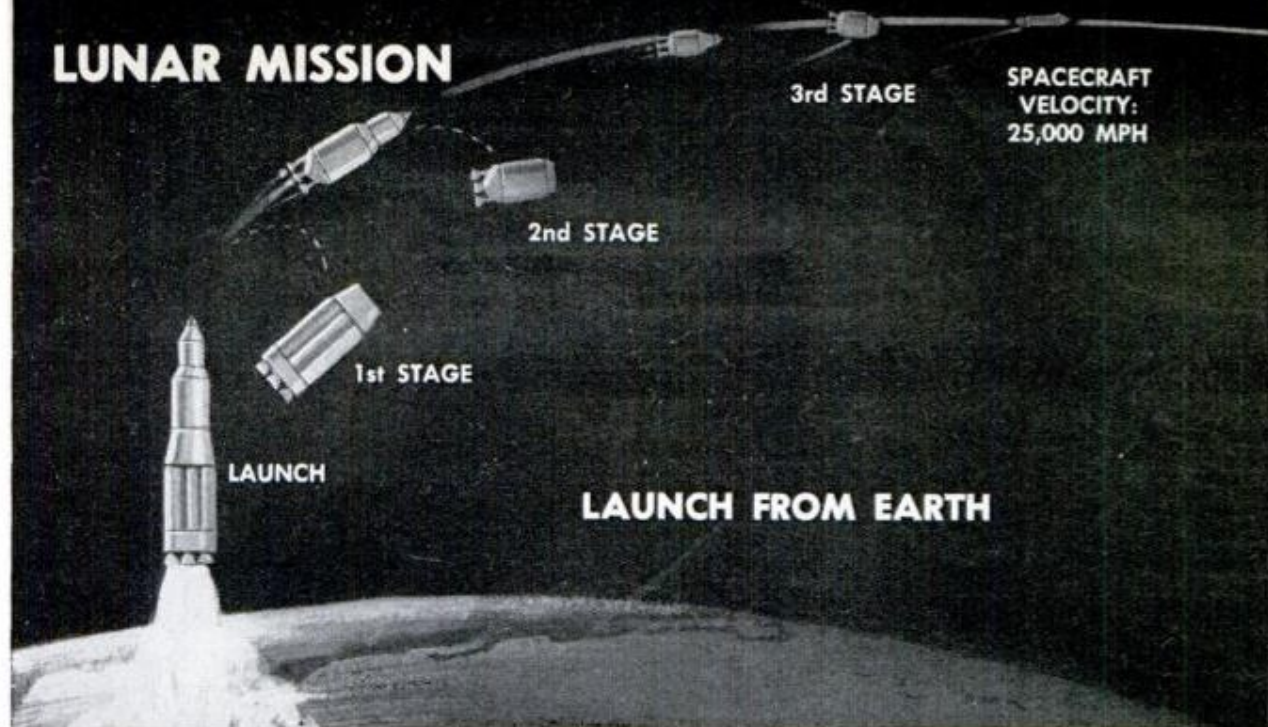
Below Collins' station were two others. Almost identical was the pilot-communicator's station assigned to Air Force Major Frank Dinswood. It featured a duplicated set of engine and emergency controls. However, only minimum emergency navigation equipment surrounded the pilot-communicator's station which featured, instead, the major equipment for communication between Apollo and Earth.

Beside Dinswood's station was another form-fitting acceleration couch, molded to the form of Air Force Captain William Hixson. As engineer-medic-scientist for the mission, Bill Hixson would be surrounded by controls for the capsule's oxygen and nitrogen breathing system, air-conditioning controls, instruments to record temperature, humidity, and every other critical factor of crew life and capsule. Hixson's station also featured the mission's tool box. Although he was the crew member most intensively trained in mid-flight repair and the use of the special space tools, Collins and Dinswood also had been checked out on the use of the tools and, of course, were on intimate terms with the rocket and capsule construction and plumbing so that they could also make emergency repairs.

It was Hixson, though, who had spent weeks learning the intricacies of space-tool use. In a weightless condition, there would be no gravity to provide one element of leverage and a major element of friction.

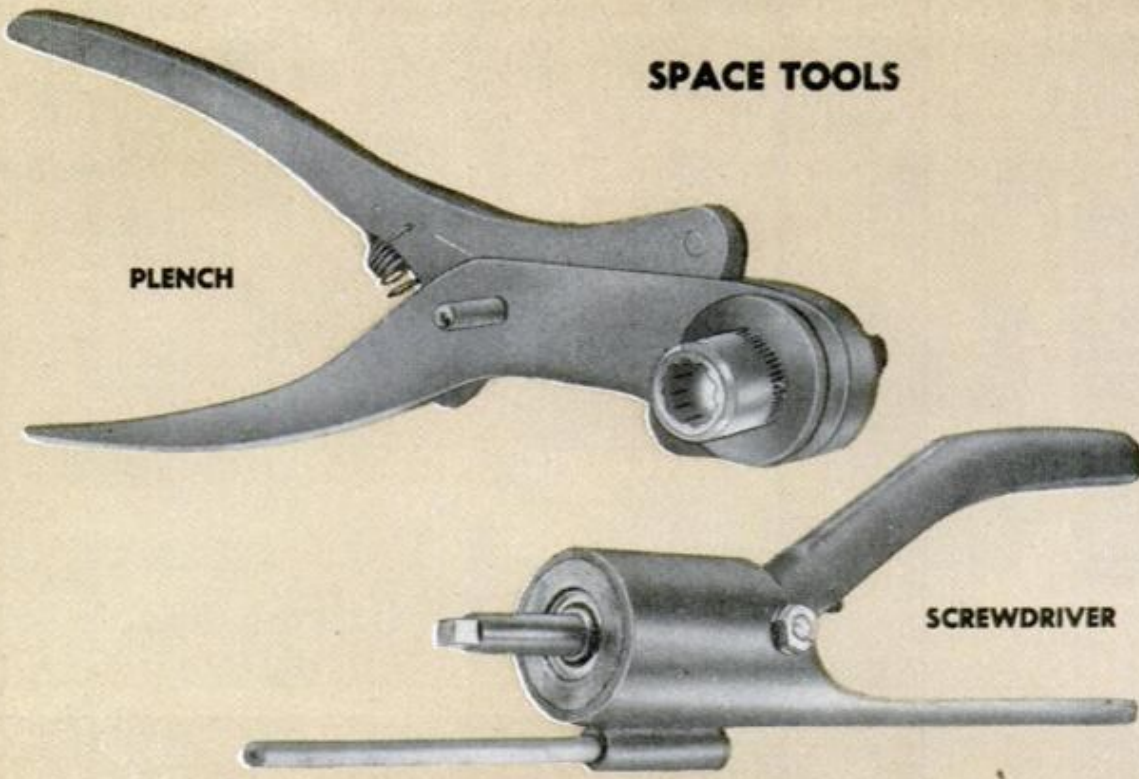
**LUNAR MISSION** includes these three phases. Launch from Earth gets spacecraft to escape velocity with three-stage booster. On lunar takeoff, "trailer" of spacecraft is left behind; only nose cone takes off. On return to Earth, cone maneuvers to land

# LUNAR MISSION



## SPACE TOOLS

PLENCH



SCREWDRIVER

**SPACE TOOLS**, designed to overcome weightlessness, are squeezed to operate, minimizing violent reaction

A sudden twisting or wrenching movement would send a repairman flying. Most tools had been redesigned to perform their traditional functions through power supplied by a pliers-handle motion. Thus, Hixson had learned to squeeze a screwdriver's handles; the squeeze motion was translated in the tool to a rotary motion that could turn a screwdriver blade. He learned to use a "plench," a ratchet socket wrench in which the working end was actuated by squeezing the plier's handles.

Many small handles were built in throughout the craft to provide handholds. Where handles would interfere with the craft's functions or would be hazardous to the crew, the designers had inset small steel plates. In the tool kit was a portable "handle" containing a battery-operated electromagnet. If Hixson needed a firm grip under a weightless condition, he could temporarily attach his "handle" to the nearest steel plate. A permanent magnet, rather than an on-off electromagnet would interfere with navigation equipment.

As he entered the hatch, Collins squeezed past Dinswood's station and stepped to a round hole in the center of the floor. Stooping, he grasped two recessed handles and raised a pair of stairwell guard rails. Gripping the rails, he lowered himself past the tanks and nozzles of Apollo's moon takeoff engines and into the forward part of the deceleration "trailer." Here were bunks, food storage and a small galley for three men during the 60-hour trip to the moon, three days on the lunar surface and the return trip.

One man always would be on duty in the control module above, and one always would be asleep in the trailer. The third would be awakening, retiring, shaving, eating or playing one of the games devised by Project Apollo psychologists.

After reassuring himself that the countdown crew had properly prepared the trailer, Collins returned to the command module. Neither Collins nor the others would be likely to spot anything needing attention, but the psychologists insisted that a personal check by the crew be a part of the countdown for mental reassurance. Likewise, their senior instructor, Cooper, was not actually needed in the gantry elevator, but his presence was reassuring. Further, it was his face on TV and his voice on radio that would continue to reassure them.

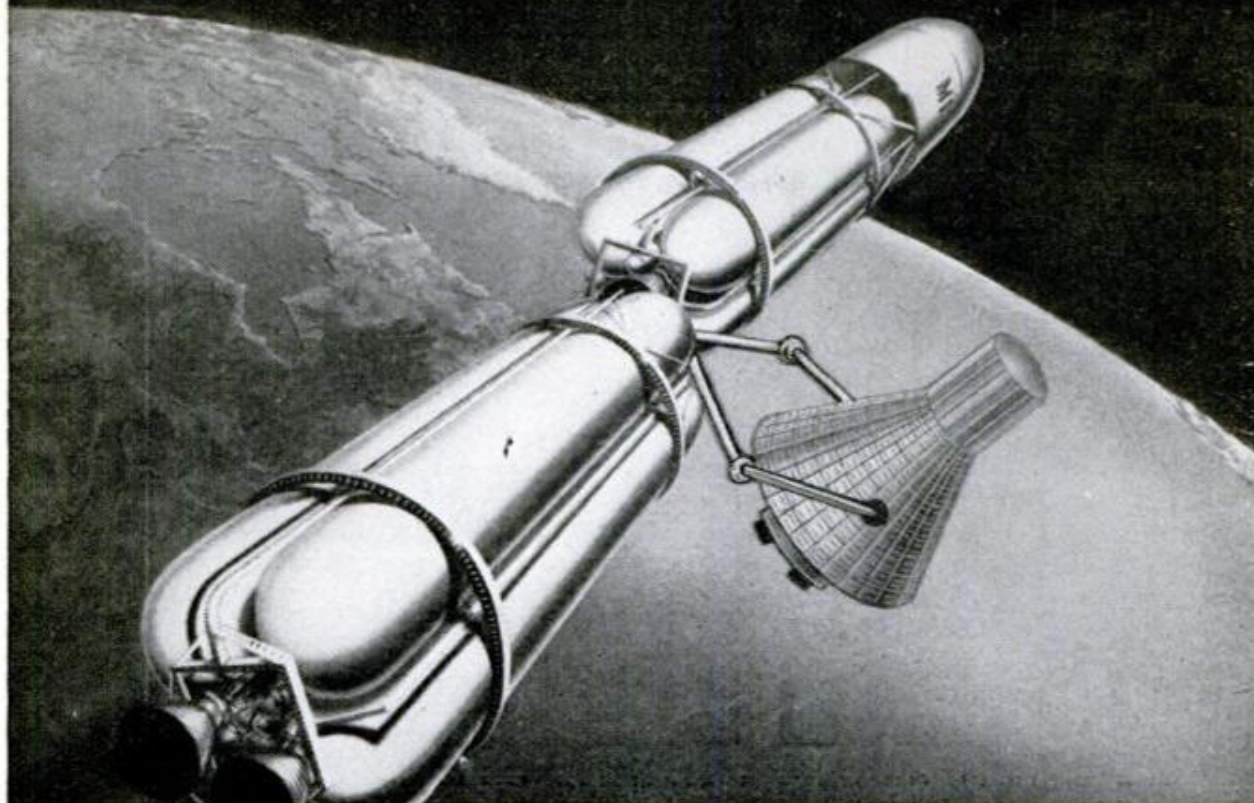
Cooper's job would be at least as hard as theirs. He would receive almost no sleep to their 8 hours of sleep and recreation out of every 24 hours. He would be responsible for decisions and Earth controls that would affect them in flight.

As he climbed back into the control module, Collins saw the pressure suits just where hundreds of practices had taught him they would be: Split into two halves, front and back, lying on the station couches. Much of the back half of the suit was made a part of the couch itself.

When Collins had finished zippering and strapping himself in—Cooper could have done the job before returning to the ground, but there would be no Cooper to do it on blast-off from the moon—he



## ALTERNATE METHOD WITH ORBITAL RENDEZVOUS



**ORBITAL RENDEZVOUS** sends separate stages into orbit, mates them in space with help of two-man spacecraft

touched a switch with the little finger of his left hand and two padded steel bands dropped over his helmet and clamped it firmly to the couch. Then he activated another switch with his thumb and spoke into his helmet microphone. He told the blockhouse that he was strapped in and there was now room for Hixson to come into the cabin and go through the same procedure. The little finger operated the helmet clamps since that function would be performed only when the craft was at rest or relative rest and no great strength was needed. The strong thumb could activate the principal radio switch even during 15 or more G's of acceleration or deceleration. The even stronger index finger was saved for the manual emergency abort switch. It was separated from the thumb—no room for error here—by nature's own spacing on the hand. No switch was assigned to the third finger as this could lead to confusion.

After Hixson and Dinswood both were strapped in, Cooper gave them an encouraging high sign and departed. Then began the solid hour of checking equipment and checking instruments against their counterparts' readings in the blockhouse.

The principal control panels—those facing Collins and Dinswood—were changed only a little from the instrument consoles of the Mercury-Redstone 4 in which Air Force Capt. Virgil Grissom hopped from Florida to the Bahamas eight years earlier. However, there were *more* panels. There were complete controls over deceleration

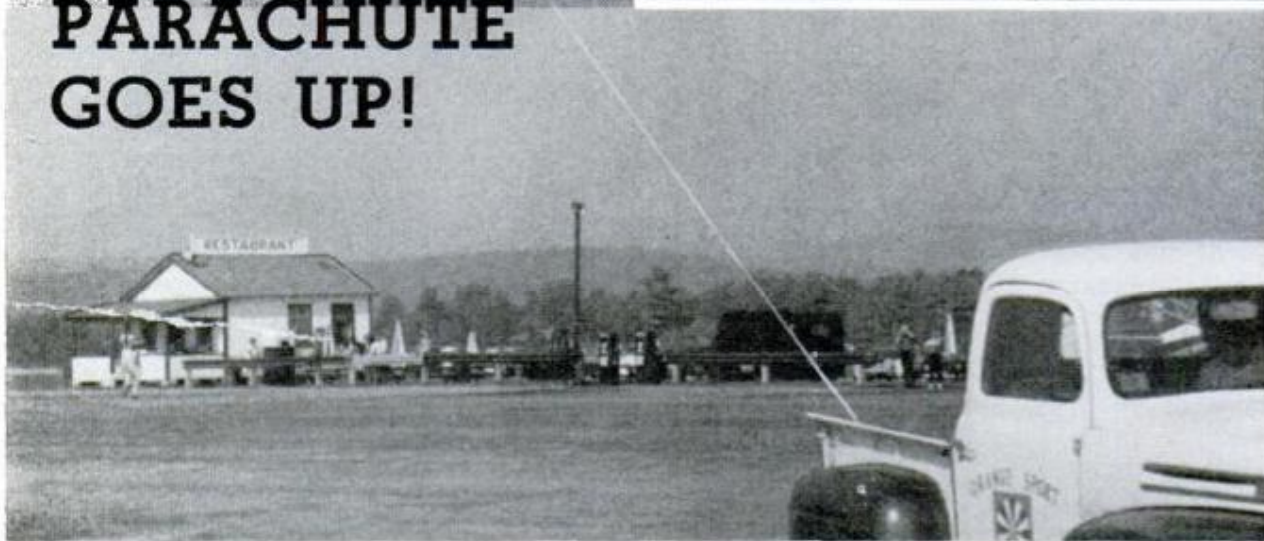
and landing on the moon, entry and exit hatch, moon blast-off and, finally, the atmosphere re-entry and landing. Almost all controls operable by the crew were also automatic or semiautomatic in the character of the spacecraft.

The pilot-communicator could relay the navigator's position readings to Earth, or the communication equipment could be commanded to do it automatically at pre-set times. The engineer could willfully control the cabin temperature or humidity in response to what he might call an emergency or a deviation, or he could allow the automatic system to take its course and make probably the same compensations.

While the spacecraft and blockhouse crews were making checks and comparing notes, other crews were checking elsewhere around the globe. At the Goddard Space Flight Center, just outside of Washington, the computers were humming with "programmed dry runs" of the flight and crews were checking each action that would be made later in following the flight so that instant communication to Lunar Program headquarters in Houston could alert a controller to make a ground-command adjustment—if possible—in a wayward flight. At Jodrell Bank, England, the huge radiotelescope was pacing and replacing the first hour's flight. Half a world away, in southwest United States, the giant tracking station at Goldstone was checking frequencies, tracking and re-tracking over the anticipated flight.

(Continued to page 228)

# THIS PARACHUTE GOES UP!



**SKYDIVER** Nate Pond takes off behind a tow truck. With right wind, chute will "fly" without tow (inset)

**COMPLETELY REVERSING** usual performance, the new French "Parachute Lemoigne" lets a skydiver go up as well as descend. Flown like a kite, behind a vehicle or on a fixed towline, the 'chute

spills air through 24 slots in the canopy, creating a low-pressure area above the canopy to produce lift. It allows skydivers to jump without a plane. American distributor is Parachutes, Inc., of Orange, Mass.

**'CHUTIST'S-EYE VIEW** down nylon rope towline. Flight lasts as long as wind or vehicle keep moving

**IN FLIGHT,** 'chute is "a little like riding a kite and a little like riding a glider, but more exciting"



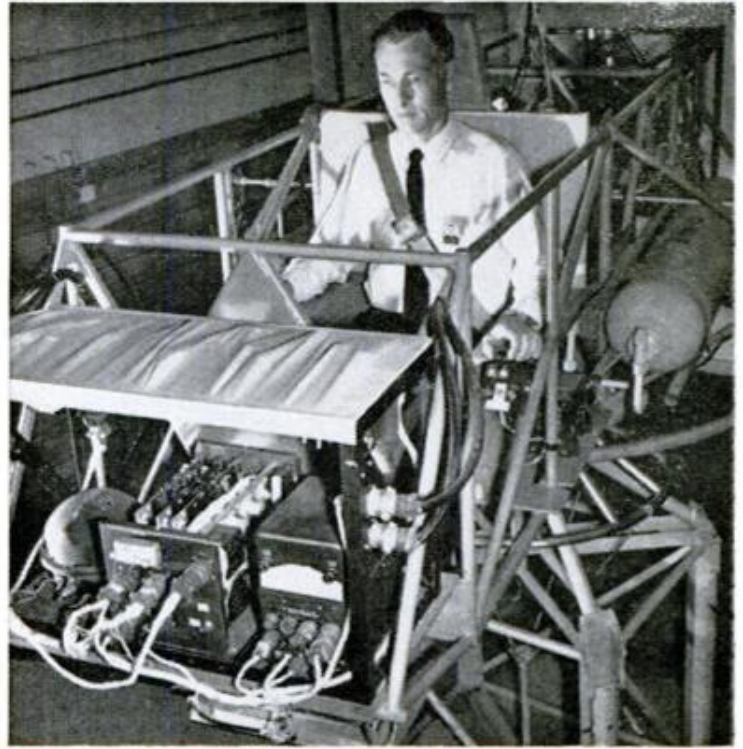
## Supersensitive Rocker

So sensitive to movement is a new test seat that the normal breathing of the occupant is enough to make it move back and forth.

Designed to help potential astronauts learn to handle controls in zero gravity, the 1500-pound "rocker" reacts to any sudden or ill-balanced movement. The student learns the careful, deliberate movements necessary under weightlessness.

Since zero gravity is impossible to duplicate on the ground, and both difficult and expensive to reproduce in the air for a few seconds, the machine is expected to prove useful for training future space travelers.

The seat was developed by Chance Vought Aircraft.



## Mail Merry-Go-Round

Neither stress nor strain nor rips nor tears stopped the mail from making its appointed rounds in recent tests of curved conveyors.

A new system developed by Goodyear eliminates the belt-wrecking edge stress usually associated with curved belts. All restraining idlers are placed along the belt's inside radius to avoid carcass strain and tearing.

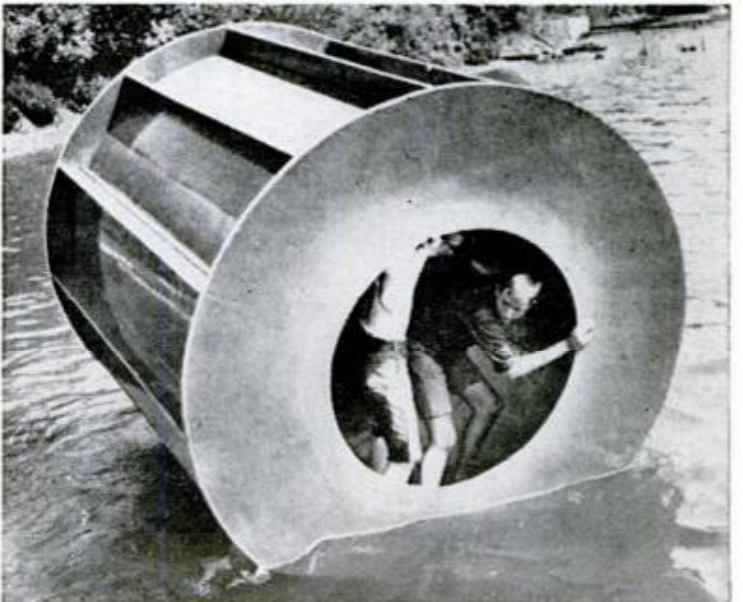
The specially-curved belt is in-laid with radial steel rods that keep it flat on the conveyor bed even at high speeds.



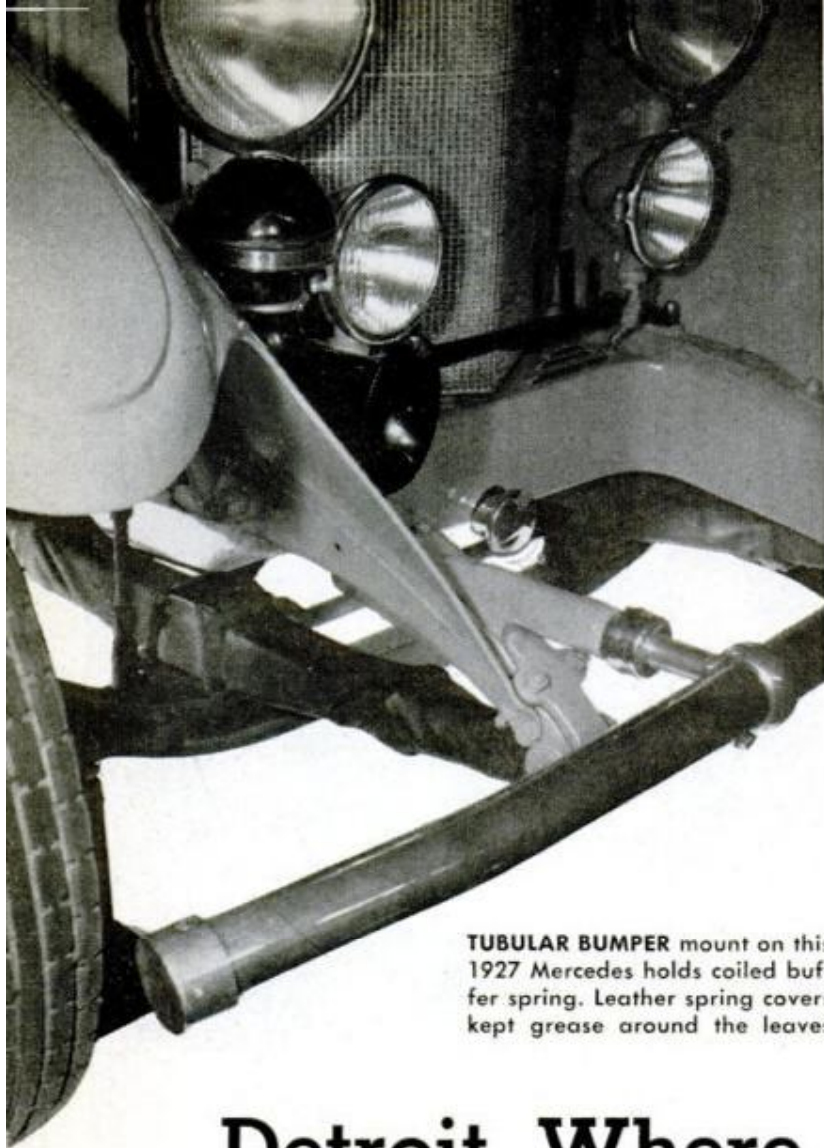
## Roll IN the Barrel

Lake Washington, near Seattle, Wash., scene of hundreds of impressive water speed contests, recently floated one of the strangest boats to appear there. It's a barrel-boat built by apprentice piano repairman Dan Grinstead, left, and friend Terry McManus.

Made to take a crew of four, the craft rolls through the water like a free waterwheel, propelled by the occupants' walking up its inside surface like squirrels in a rotating cage. It's eight feet in diameter, built of plywood and achieves a maximum speed of around three knots.



*See Grinstead S.F.  
3261-67th Ave.  
Merret Island, Wash*



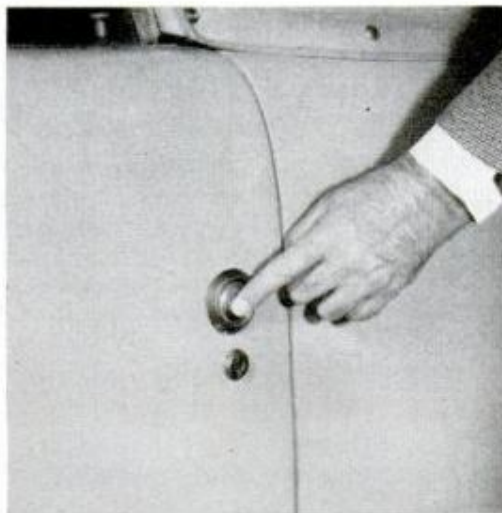
**TUBULAR BUMPER** mount on this 1927 Mercedes holds coiled buffer spring. Leather spring covers kept grease around the leaves



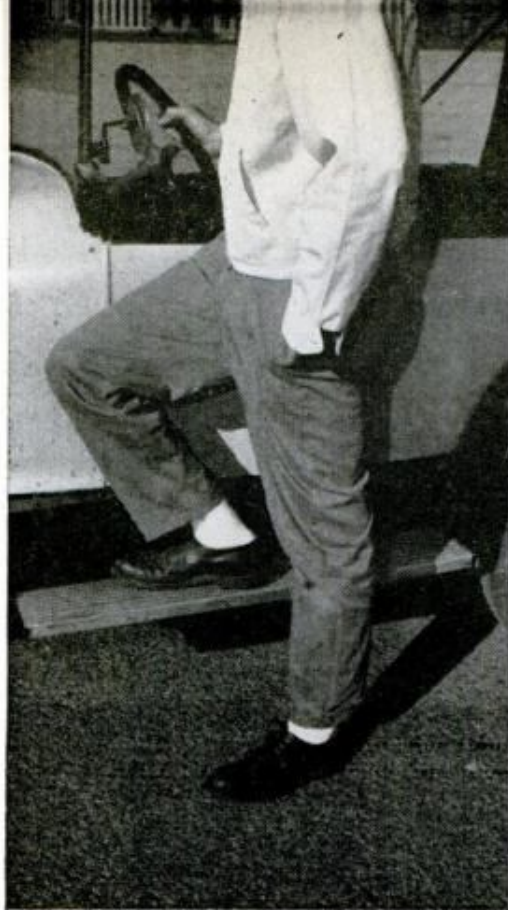
**FENDER LAMPS** like this on 1936 Horch (German) were almost universal in 1930s. They'd be great on today's cars as ultra-visible directionals as well as for parking

## Detroit, Where Are These Old-Time "Touches"?

**FOLDING STEERING WHEEL** featured on 1915 Cadillac might be dubbed The Fat Man's Friend. It pivoted forward to permit plump drivers to enter. Could it have inspired swing-away wheel of current T-Bird?



**SIMPLICITY** was the essence of this push-button latch found on 1940-48 Lincoln Continentals. The spring-loaded door popped open whenever you thumbed the button



**HIGH-WATER** runabout of '20s needed its running boards for the ascent to seats. Boards are reappearing on some bus-type station wagons in '62

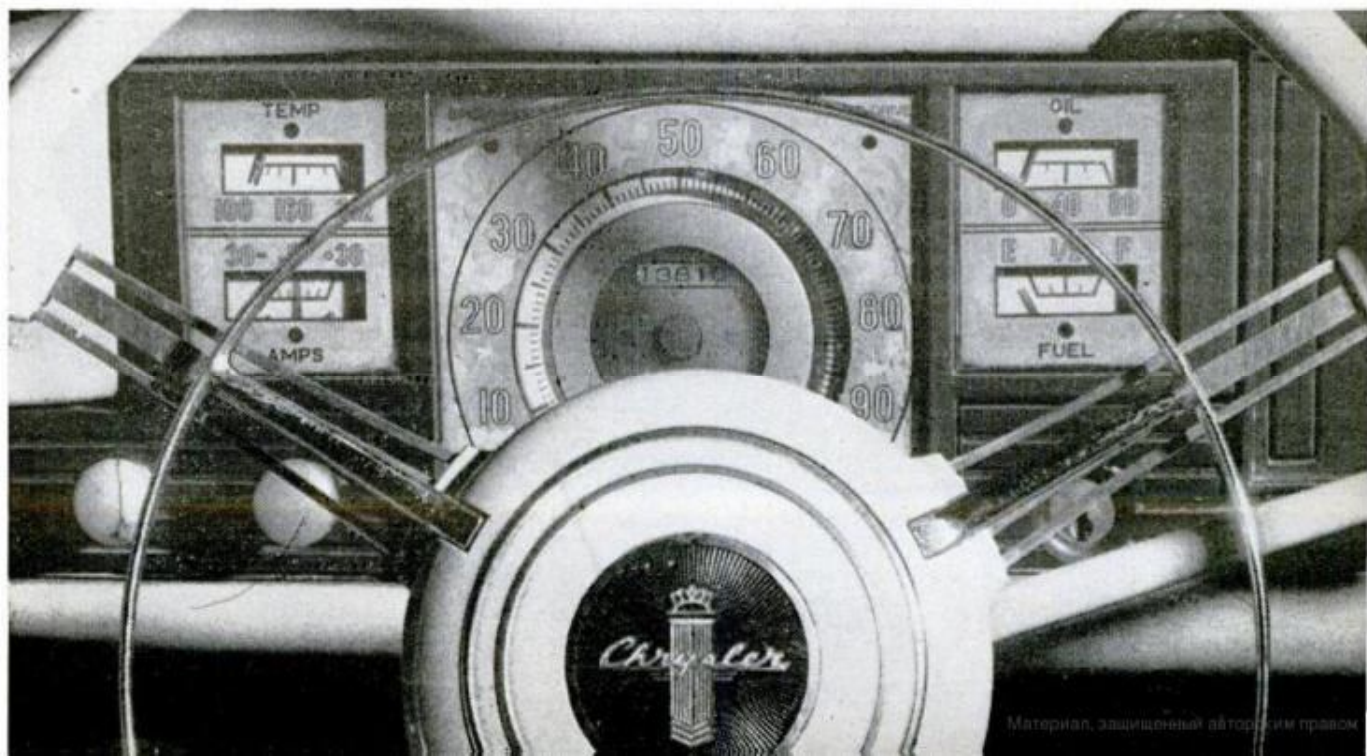
**YESTERDAY'S KIDS** had lots of fun in breezy, cozy rumble seats like this one on a 1926 Wills Sainte Clair coupe

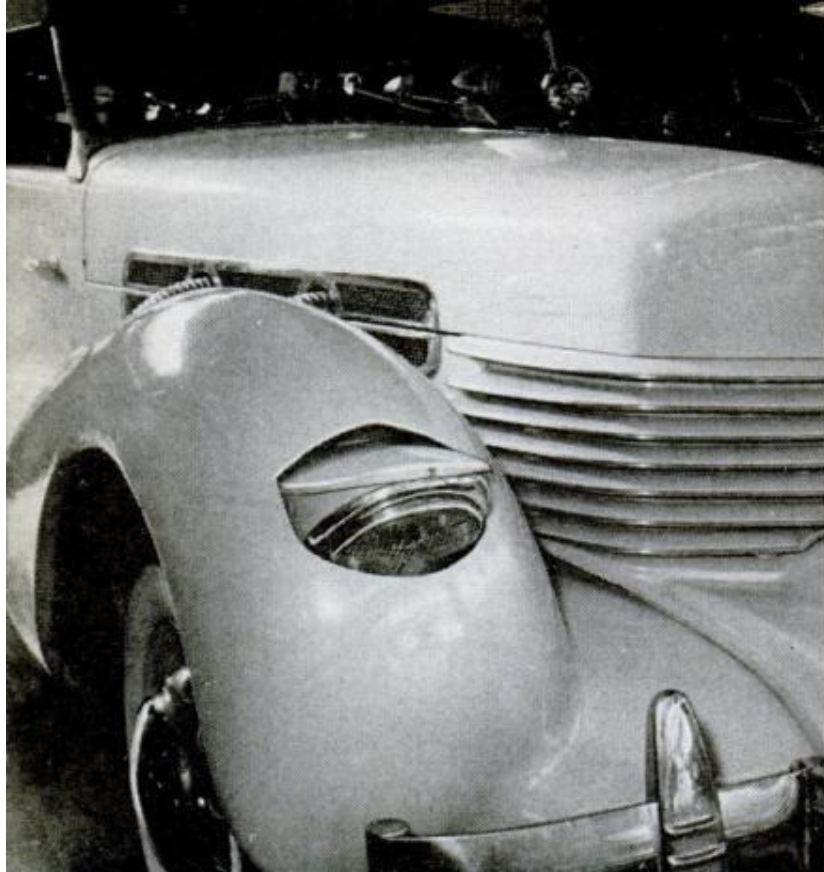


**PROGRESS IN** automotive design is all too often an illusion. Just because a feature or style is labeled 1962 or modern, doesn't always guarantee that 1) it recently burst from the inventive mind of some young engineer or 2) that it represents a superior design.

Take, for example, such a simple item as parking lamps. Back in the '30's, when they were only used to show where your car was, they stood high and

**GUESSING GAMES** were not necessary for drivers of the 1930s and '40s when almost all instrument panels, like this 1940 Chrysler's, had a full complement of gauges to give them the facts about their engines





**HEADLAMPS** on this 1937 Cord were kept free of mud and bugs when retracted into the fenders, although the real reason for hiding them behind the pivoted panels was to help cut wind resistance and improve the car's over-all styling



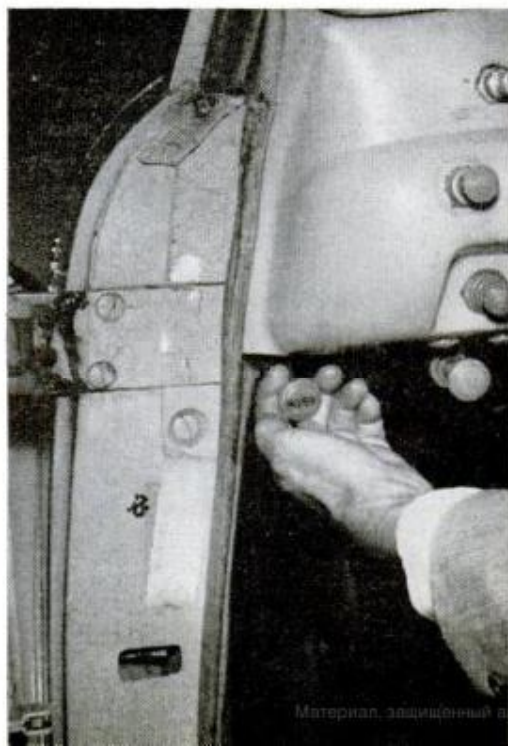
**OPERATION** of Cord's retractable headlamps was by cranks at either end of instrument panel. Flexible cables led to worm and sector gearing which rotated lamp assembly

dry and visible. Today, while these small lamps have taken on the important task of winking your turning intentions, they are all too often hidden in the glittering depths of the grille. Or they may be placed in the bumper itself where they will be first to receive flying mud or stones. Meanwhile, back on the fender top, we frequently have ornamental chrome torpedoes.

Another example of the "two-steps-backward-while-you-take-one-ahead" philosophy is the glove compartment. Today's stylists have been unable to decide where to put it (let alone make it big enough)—in the center, at right

**ONCE UPON A TIME** glove compartments, as on this 1936 Lincoln Zephyr, were big enough to hold a good deal more than gloves. On many 1962 cars they're not big enough to "take" a camera, and their cardboard bottoms are hardly theftproof

**YOU WOULDN'T** have to show every filling station attendant how to open the hood of your new car if it had a handy remote control release like this 1941 Lincoln's





**WHEN A SUN VISOR** was really a visor, as on this 1928 Franklin, it was outside the car body, and helped keep snow off in winter as well as blocking glare. Most cars of the '60s could use a similar device



**MANY MOTORISTS** today could use a real trunk rack like the one on this 1915 Belgian Minerva. The vertical cylinder at lower left of picture is a shock absorber that operated by compressing trapped air

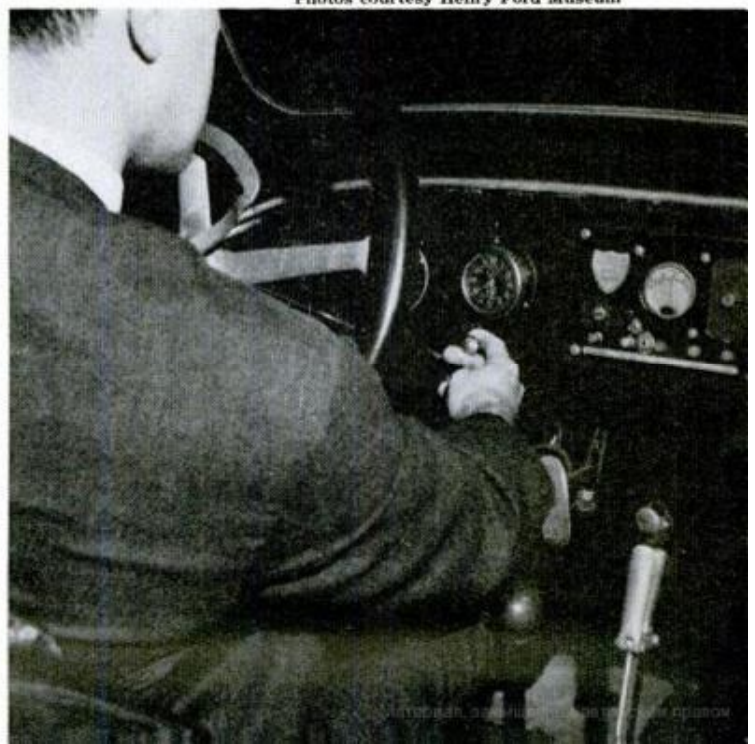
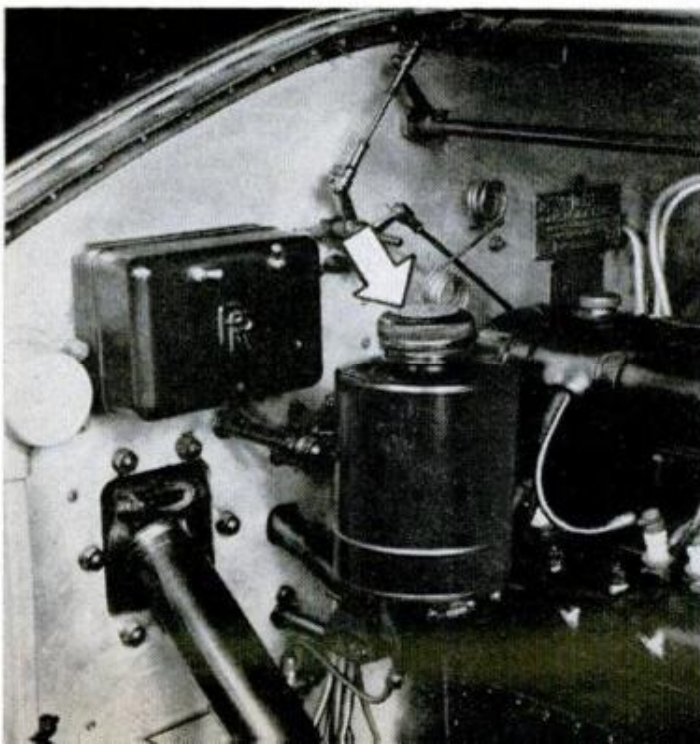
or even below the panel. A 1962 "all-new" car, which we will mercifully leave unnamed, has a small glove box in which the inadequate carrying area is attached to the hinged lid so that when you open it in a hurry, everything falls in your lap.

And so it goes. On these pages, you will see some old fashioned—even down right ancient—automotive features that are worth more than a wistful glance. In view of their obvious virtues, why haven't many of them been updated and retained on our "modern" cars? ★ ★ ★

**LUBRICATION WAS EASY** for the owner of this 1915 Rolls Royce which had central oil reservoir on fire wall. Pushing a foot pedal enabled driver to force lube through thin tubes to various points on chassis

**THE HAND CHOKE**, an ancient and honorable automotive device, found on this 1916 Mercer, has been resurrected by a number of U.S. compacts. For all too many motorists, alas, correct "choking" is a lost art

Photos courtesy Henry Ford Museum



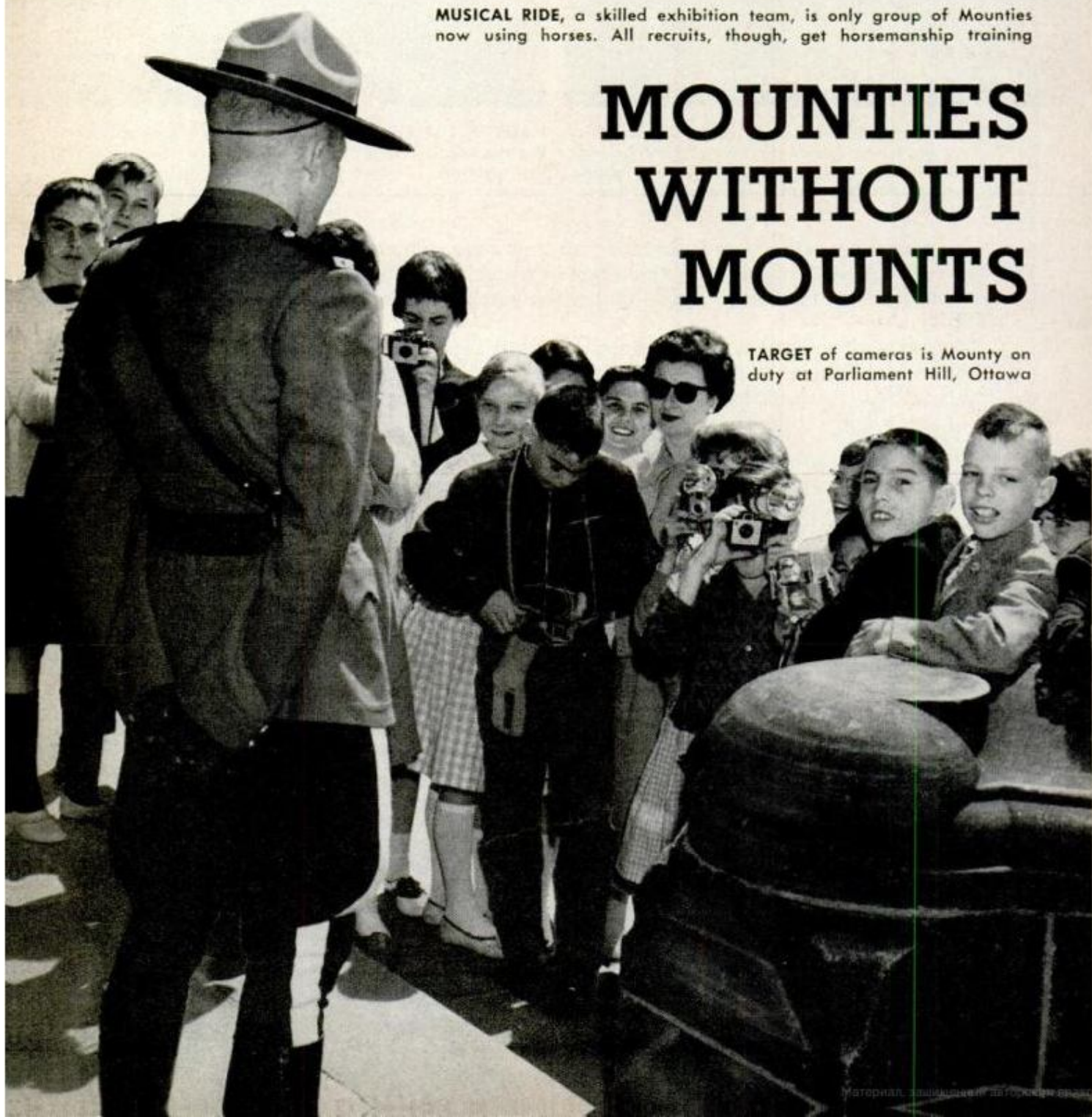


**"Only horses left"**

**MUSICAL RIDE**, a skilled exhibition team, is only group of Mounties now using horses. All recruits, though, get horsemanship training

# MOUNTIES WITHOUT MOUNTS

**TARGET** of cameras is Mounty on duty at Parliament Hill, Ottawa







**SNOWMOBILE** is one of many modes of transportation the RCMP uses to patrol the vast area of Canada. Members of the force also use snowshoes and dog sleds when necessary, as well as cars, airplanes, boats and ships

*Planes, boats and snow sleds have replaced their beloved horses—and now the most modern of criminal labs backs them up in their dogged determination to “get their man”*

**By John A. Linkletter**

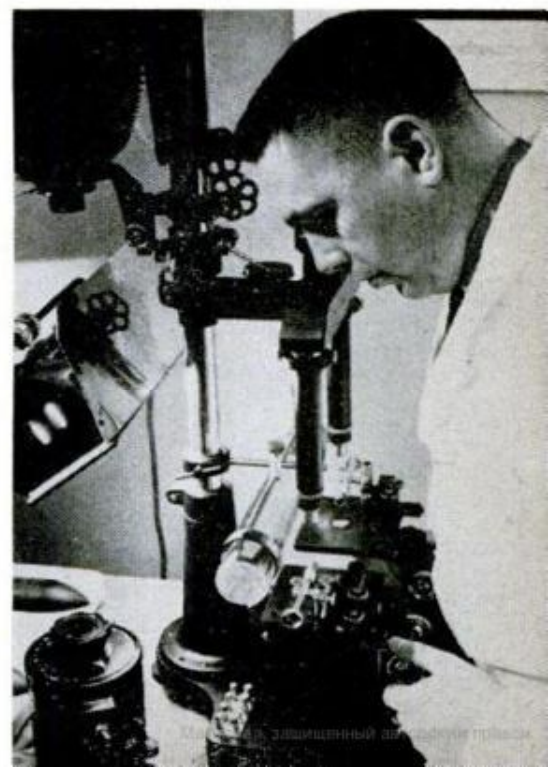
**T**HERE ARE MORE of them on ships now than on horses—yet they're still called the Royal Canadian Mounted Police.

The mention of Mounties immediately brings to mind the famous scarlet tunic—yet most of the time you'll see them in brown tunics or in business suits. When they do don the “Review” order uniform

for dress occasions, the red tunics of today's policemen resemble those that symbolized law on Canada's plains even before the time of the Custer massacre south of the border.

Their capture of criminals is popularly pictured at the close of a chase on dog sled through a swirling Yukon blizzard. This

**COMPOSITE PHOTO** of a criminal is assembled from descriptions, left; a technician compares bullets, right





**WOLF BOUNTY** is the subject of solitary conference. The policeman, of the Peace River Detachment, is on game patrol in northern Alberta



**RECALLING** a criminal case in a remote area of Canada is Inspector Andrew Mason-Rooke, head of the RCMP's Crime Detection Laboratories



**NEW BABY** is registered by member of force in Coppermine, N.W.T. A Mounty often represents other branches of the Canadian government in addition to the RCMP. Member in charge of Coppermine detachment is also district registrar for Department of Northern Affairs in connection with the administration of Eskimo affairs

**SMUGGLING** across the U.S.-Canada border is one of the RCMP's headaches. Here police have captured load of smuggled cigarettes





PILOTED BY MOUNTIES, a CF-FHW Beaver and CF-MPG Goose of the Air Division fly over Vancouver, B.C.

can still occur, but arrests are more likely to follow a chase by auto (if there's any chase at all) on evidence gathered by field investigators, fingerprint analysts, ballistics experts or even atomic scientists.

There's little wonder that the perpetually red-coated horse-riding dog-sledding image of the Mounted Policeman persists. They *were* originally a mounted force. Many of their case reports read like legends, filled with the elements of the strong and virile "good guys" pitted against evil in an arena of snow, loneliness and danger. And one of the vivid memories visitors retain of Canada is the brilliance of the Mounties' scarlet tunics on Parliament Hill in Ottawa, Ont.

Today's policemen, though, are occasionally exasperated that the horse, dog sled and parka concept of the RCMP so overshadows the other work they're doing.

Modern scientific methods have been put into use—and many have been originated—by the RCMP to combat the skillful and ingenious modern criminal. Much of the scientific work is done in the force's Crime Detection Laboratories, located in Regina, Sask., Sackville, N.B., and Ottawa.

Heading the laboratory system is a man who well typifies the dog-sled-to-science

range of abilities needed by members of Canada's unique federal police force. Lean, pipe-smoking Inspector Andrew Mason-Rooke, whose uniform is most often a laboratory coat, started his career (like all Mounties) as a recruit and came up through the ranks.

He spent 10 years in the field in western Canada and the Yukon Territory, then was attached to the first crime lab at Regina.

Some of the pioneering work of the Crime Detection Laboratories is found in their records. In 1943, Cpl. A. Mason-Rooke is credited with developing the technique of identifying firearms by the mark on a rimfire cartridge case. In 1944, the lab developed a water-filled bullet-recovery trap now in use all over the world.

In 1958, nuclear physics produced damning evidence that was admitted into a murder trial. According to Cpl. F. M. Kerr, who presented the evidence, the lab's findings would have produced a conviction, had the Mounties not been "scooped" by a surprise witness (to whom the accused had confessed) whose evidence did the job.

Credit for the conviction, though, is not as important as the fact that the court case is believed the first in the Western Hem-

(Continued to page 232)



## WHAT'S NEW FOR

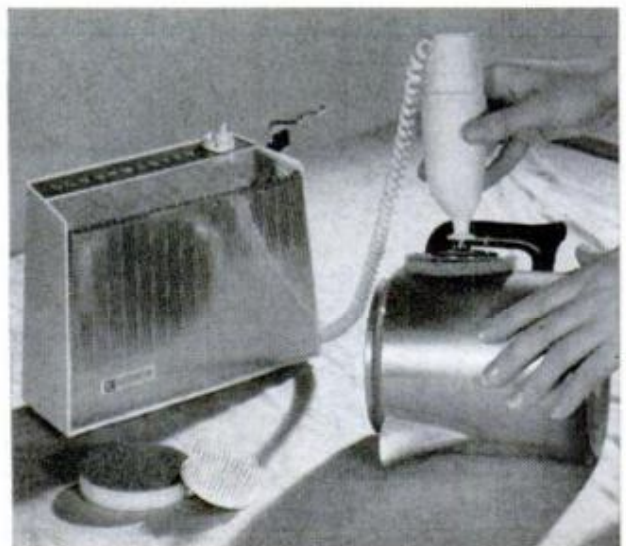
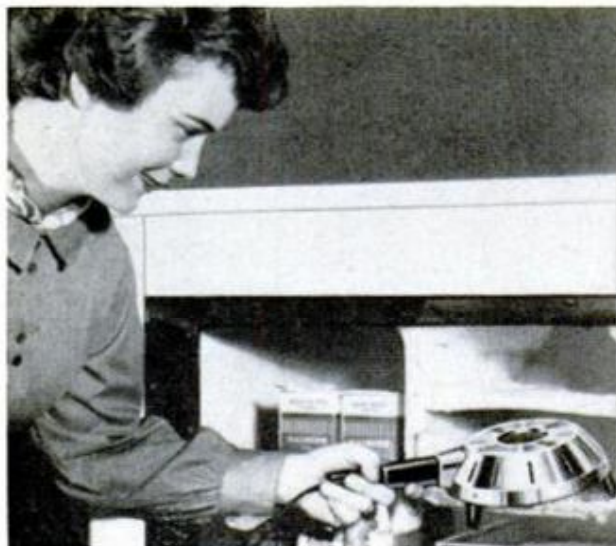
**ADD A PANTRY** to your kitchen with a food storage closet. Swinging doors give access to inner half-doors and removable rear shelves—eight sets in all. This six-footer holds 22 cases of canned goods or doubles as a broom closet. Units are 36 inches wide and 25 inches deep to match most kitchen counters. Made in various heights and choice of hardwood, laminated plastic or paint-grade pine by Modern Cabinet Co., 6611 Salt Lake Ave., Bell, Calif.



**MATCH ANY KITCHEN DECOR** with color inserts in this foldaway range hood by Nutone, Inc., Cincinnati 27, Ohio. It comes in three sizes with a choice of two fan units, starting at \$47.95 plus inserts and fan

**INFRARED HEAT WAVES** from this aluminum refrigerator defroster speed up that bothersome chore. Using ordinary house current, it works on freezers, too. Price is \$6.95 from Osrow Products, Glen Cove, N.Y.

**DESIGNED FOR KITCHEN WORK**, portable, self-powered Scourmaster performs hundreds of home, workshop and garage cleaning and polishing jobs. \$29.95 complete, Minitone Electronics, Inc., New York 10, N.Y.





**DON'T UNPACK, JUST STACK** "Lug-a-ture" that combines real portability with the utility of furniture. Drawers pull out of these suitcases and overnighters when stacked to form chests, dressers, desks or night stands. For more information, write the Matralin Co., Inc., 701 N. State Street, Elgin, Ill.

**HANDY** for holding rubber gloves when not in use, these unbreakable plastic hands hang on a wall or back of a door. Good for drying work gloves and mittens and keeping them from being lost. \$2 post-paid from Smith Products, Box 420, Dover, N. J.

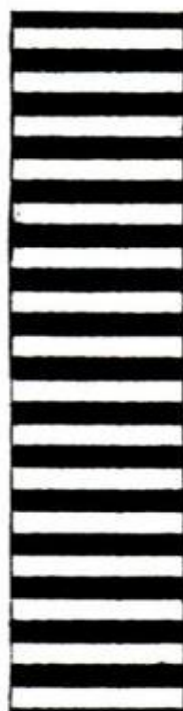


**SHOE SHINE MESS** is eliminated with Ambassador Valet Kit. A set of carnauba wax-impregnated polish puffs and buffers for both black and brown shoes, and a clothes brush, are included in a travel case for \$4.95. Royal Master Corp., Burbank, Calif.

**BATHROOM FALLS** can be virtually eliminated with No Skid, a nontoxic, odorless, antiseptic product that's sprayed on tubs and shower stalls to produce a tacky surface. Cornelia Sales Co., Dept. K-8, Cornelia, Ga., sells a three-months' supply for \$1.98



# PM Shopping Guide

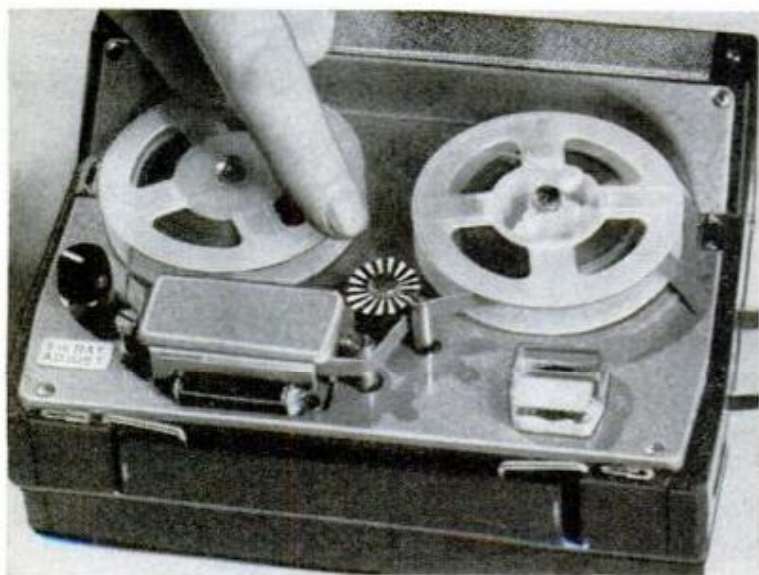


**MOMENT OF TRUTH**, with just the tape recorder between you and the salesman. Here, speed is checked with strobe tape (section of tape shown at right). Lines should show quite clearly under fluorescent lighting. Will not work with incandescent lights

*There are no doors to slam or tires to kick when you buy a tape recorder. But there are important value tests and comparisons you can make, right in the store . . .*

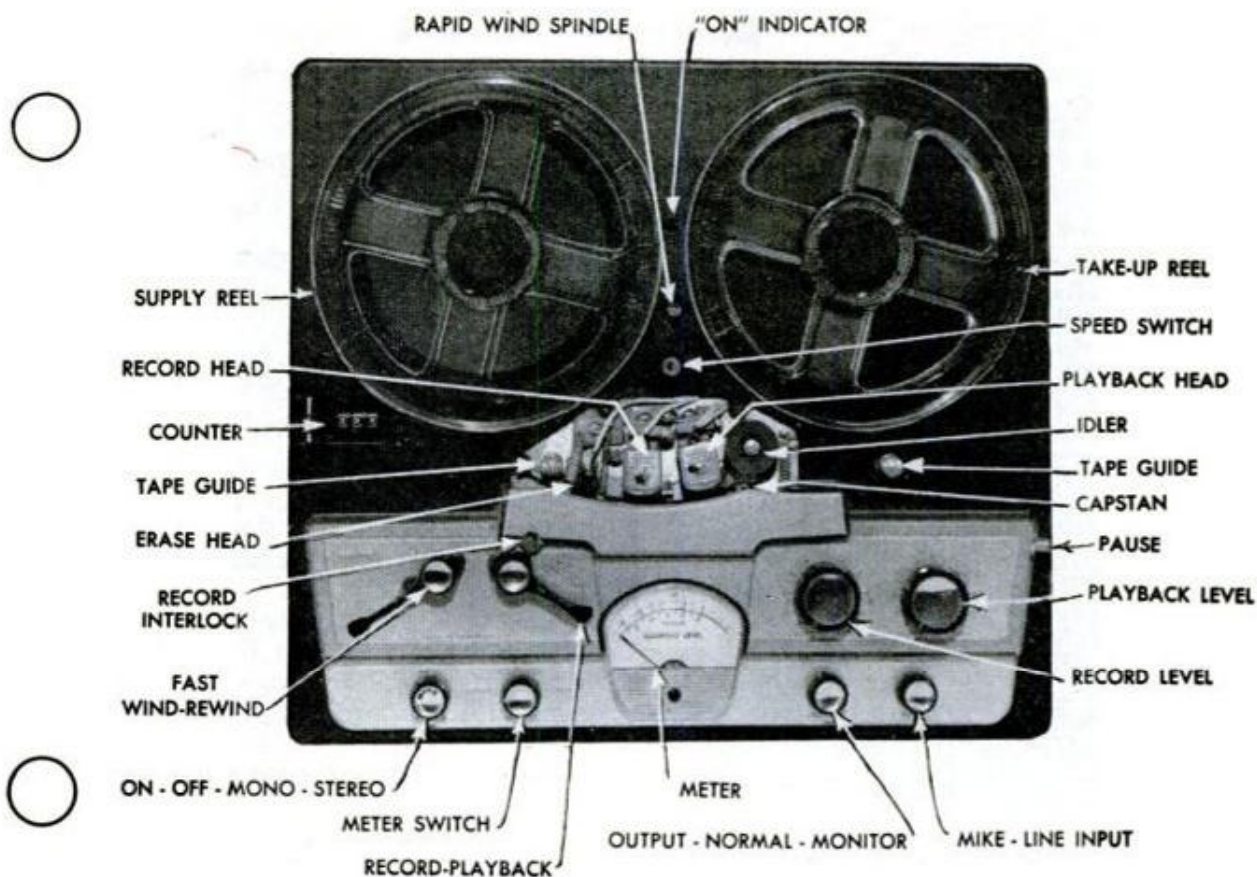
**WHETHER** you want a tape recorder for all-round family fun, a portable for traveling dictation or a hi-fi tape player for your stereo center, it's wise to test before you buy. Although units are available ranging from \$19 up into the thousands, all tape recorders should be able to pass certain quality tests to be acceptable. Here they are . . .

**Is the speed accurate?** Tape recorders operate at  $1\frac{7}{8}$  inches per second,  $3\frac{3}{4}$



**STROBE DISC** (above) can be cut out and taken to store. Under fluorescent lighting, lines should appear to stand still if the machine operates at proper speeds. Strobe tape can be supplied by store

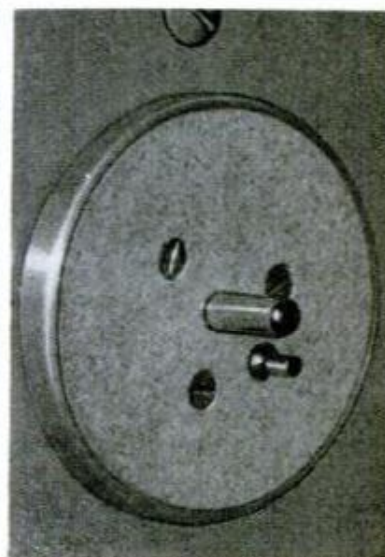
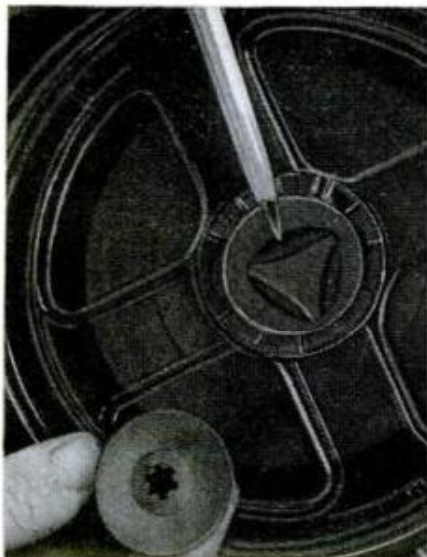
# Tape Recorders

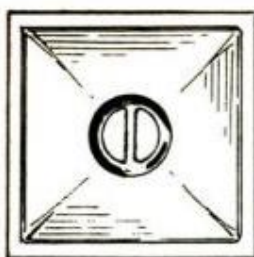


i.p.s. and  $7\frac{1}{2}$  i.p.s. You get better fidelity with the higher speed, an important factor in recording fine music. For lectures or conferences, the lower speed will provide longer playing time.

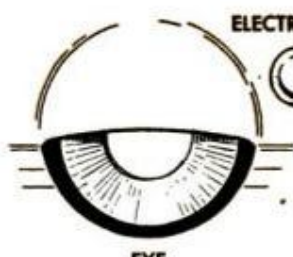
If you plan to record on one machine and play back on another, accurate speed is important. A capstan that runs too fast or too slow will result in distortion, making voices sound either like chipmunks or draggy brake drums.

**REEL CHECKOUT** calls attention to mounting methods. To operate the machine vertically, reel holders are needed. Rubber friction locks (left) spring-loaded or splined spindles (center) and retractable pin lock (right) are few of many. Note cracked reel in center photo—the spindle held too well! More rigid clear plastic reels might not have cracked. Always test first





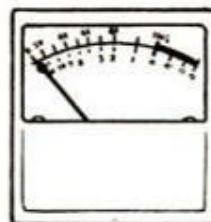
NEON BULB



EYE



SLOT



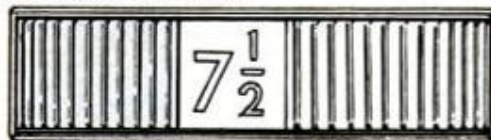
VU METER

**RECORD LEVEL INDICATORS** are the neon lamp, the magic eye electron ray and the V-U meter. Neon blinks only on audio peaks, magic eye closes slightly to indicate low-level audio, completely on high-audio peaks. Meter at right is best indicator, gives continuous monitoring of all levels. You need two for stereo recording, or a method of switching them

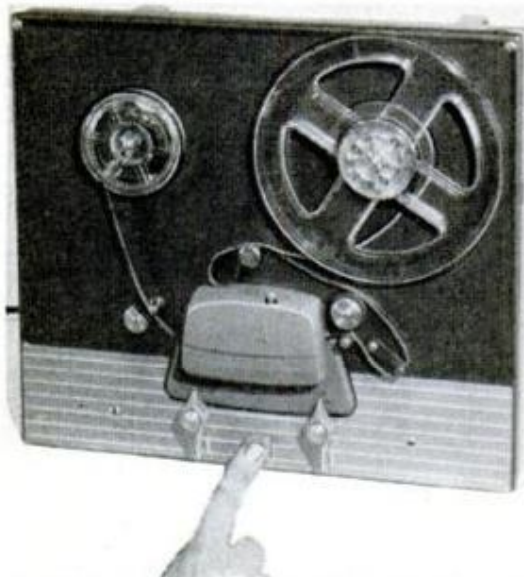
**FOR A CHANGE** in speed, use the control switch. Some types pull in and out, others turn left to right. Operate with machine ON to change speed



SPEED CHANGE SWITCHES



**COUNTER MEASURES.** Upper type counts the turns of the reel, is more precise. Lower type shows feet of tape used from reel



A store test for speed accuracy is shown on page 126. If capstan idler is covered, use strobe tape instead of the disc.

**Are tubes, transistors and wiring O.K.?** Allow the unit to warm up and thread a clean tape in place. Do not connect a microphone. Switch unit to RECORD, and with recording level raised, gently tap the unit at top, front, and sides with your fingertips. Now rewind and play back the tape, listening for tapping or crackling noises. Again, with unit on playback and playback level raised, tap as before and listen for the sound in the speaker. Such noises indicate either a loose connection in the unit or a loose element inside a tube or transistor.

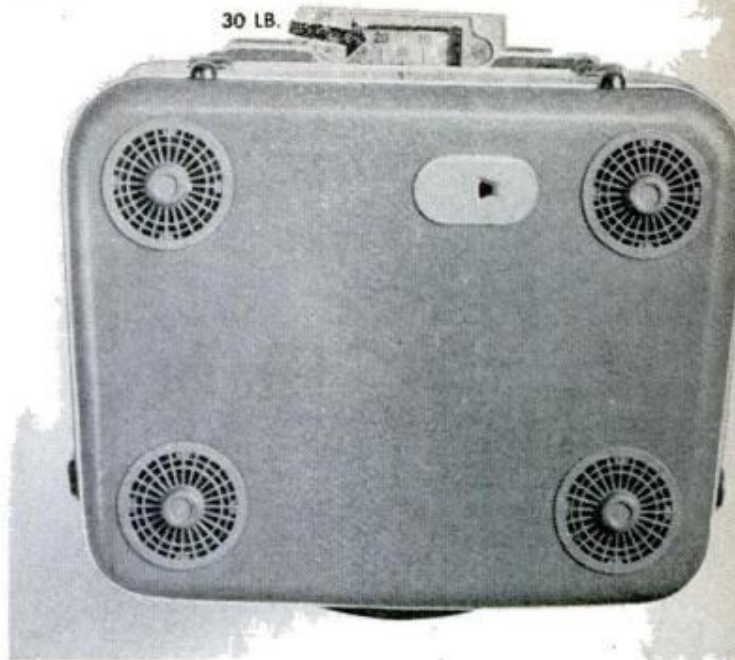
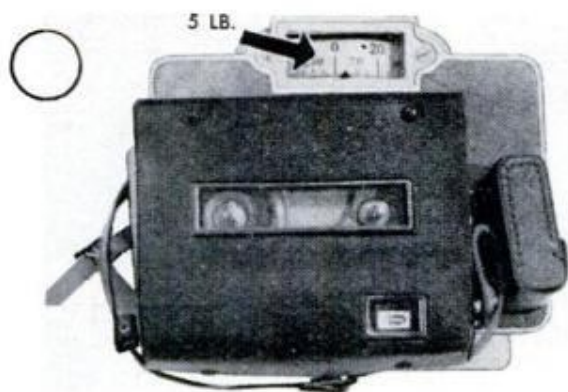
**Is the sensitivity sensible?** If you speak with your mouth almost on the microphone, you get "popping P's" and "hissing S's." The unit you buy should permit you to speak with the microphone at least one foot from your lips, without raising recording-level control to its extreme high setting. Setting should be about half-way, allowing room to increase or decrease to compensate for background noises.

**Can you monitor easily?** The common monitoring methods (top of page) tell you how strong a recording you're making as you make it. The

**ON SOME UNITS,** single braking action may be responsible for spillage with different size reels. Check machine operation in all its functions, for snap, spill or jerky operation



**FOR THE MUSCULAR**, the unit at right—an a.c.-only portable with handle—weighs in at 30 pounds. Below, five pounds with batteries included! But larger unit is hi-fi stereo and costlier



neon lamp is either on or off. It should blink only on voice peaks. If it does not, raise recording level control. If it is on all the time, decrease. The flickering green magic eye gives a better indication than the neon lamp, but is not as accurate as the V-U (volume units) meter which gives you a precise gradation of control.

You require some means for monitoring, as a too-weak recording will not play back. Too strong a recording will result in distortion, noise, or garbled "print-through," which can occur when tape recording winds onto take-up reel. Remember only  $\frac{1}{2}$  mil of tape separates the magnetic fields, and the fields can interact.

In general, a metal deck will better isolate the sensitive heads from electrical disturbances generated by the motor.

**A reel checkout.** Reel holders (page 127) are not needed for horizontal installations, but the portable, or the upright vertically-mounted units require them.

**Counter measures.** To relocate the approximate place on a tape that you want to hear again, a tape counter is usually provided. Mechanical counters count turns of the reel, not inches, feet or time. The type of counter which is engraved or screened on the panel under the reel, counts elapsed footage, and uses the tape remaining on the reel as a guide. Some higher-quality tape machines operate with clock timers to give time in minutes and seconds.

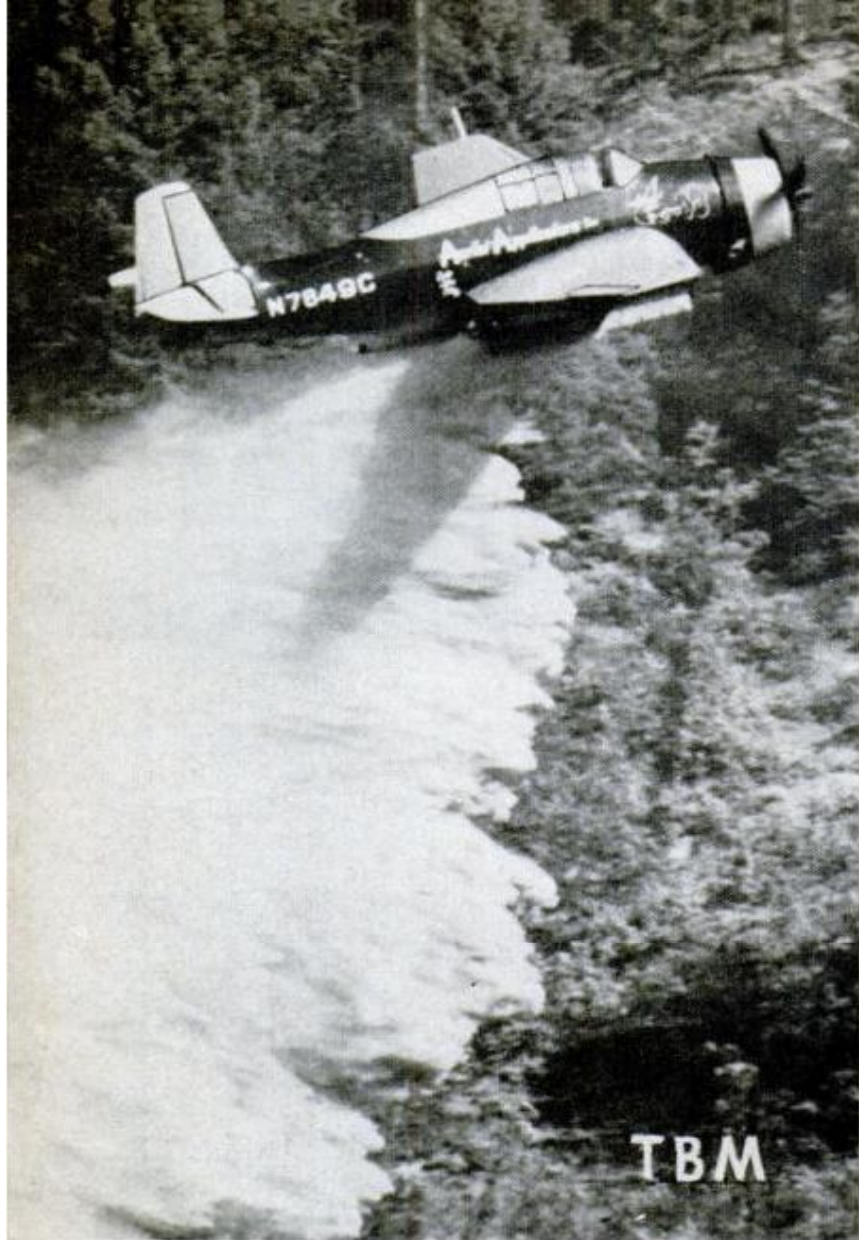
### **Inspection and operation pointers.**

Look at the back of the machine. The number of motors will be a rough indication of quality, ranging from one motor to three. If only one motor is used, then mechanical linkages and belts or pulleys must be used to make the one motor perform three jobs. These linkages can easily get out of whack, causing trouble later.

Using sharp, deliberate movements, operate the control from STOP, to PLAY, to FAST FORWARD, to REWIND. Action on the tape should be smooth with no jerking, snapping or spillage. When the machine is placed in STOP, both reels must stop. One machine we tested allowed the supply reel to continue to spin, spilling tape. Others may throw the tape completely from the head slot or even snap it. You can't blame such failings on the newness of the machine. Break-in will result in a further downgrading of performance, rather than an improvement.

**Can you live with it?** A portable should be capable of being operated entirely from the outside of the case, and have the controls extended to permit this. A great battery saver for portables is the a.c. supply for use in the home. This is usually available as an optional extra, but be sure the machine has provision for connecting it.

If you plan a cabinet-type installation, the microphone connectors should be at the front for easy access. If not, plan on adapter cables and microphone connectors.—*By Wels*



TBM

GM's "AVENGER" or TBM (same as the Grumman TBF), former Navy torpedo-bomber, now fights forest fires in Utah mountains



P-38



P-38 NOSE, that once held cannon, machine guns, now carries aerial camera

## The Old Warbirds Are Still Flying

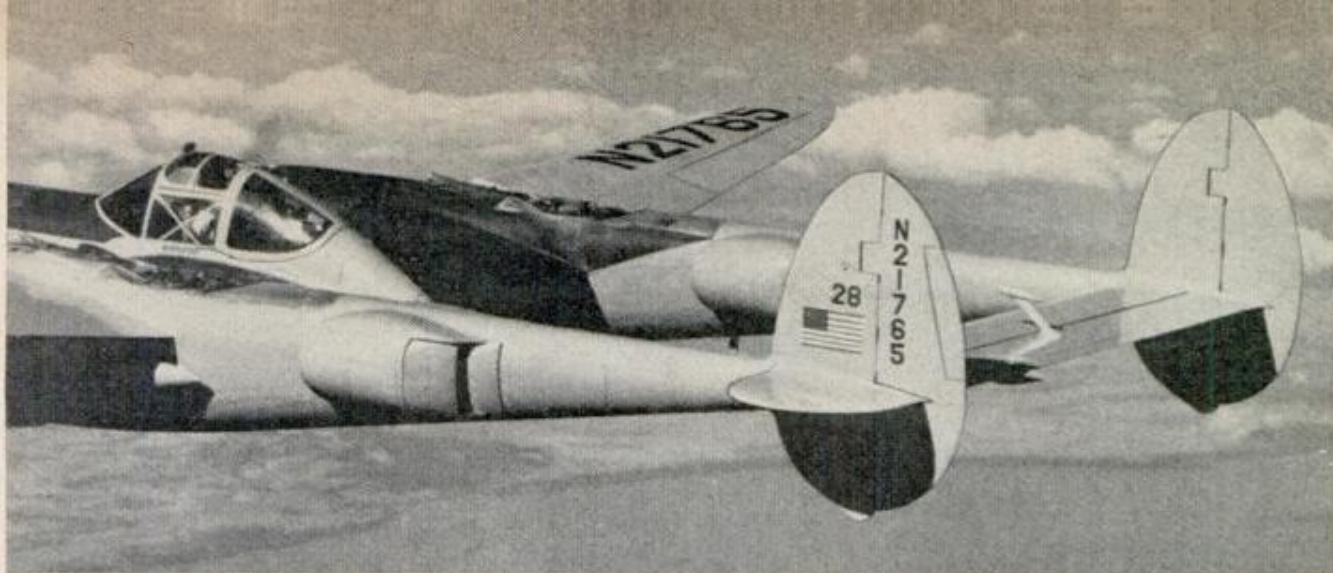
**O**LD SOLDIERS—and war planes—never die. The soldiers may just fade away, but the war birds keep on flying.

Modified, rejuvenated and converted for many purposes, from nostalgia to commercial expediency, they still cut a noble swath through the sky in an age of jets.

Built before and during World War II, some of the planes are now owned and flown privately purely for pleasure. Some of the owners, like the owners of classic cars, are unabashed sentimentalists.

**CONSOLIDATED PBY "CATALINA,"** venerable patrol-bomber, is used for geophysical surveys





LOCKHEED P-38 "LIGHTNING," South Pacific fighter, is used for high-altitude aerial mapping surveys



NORTH AMERICAN "MITCHELL" (B-25s flew Doolittle Tokyo raid) is executive plane for trading-stamp firm



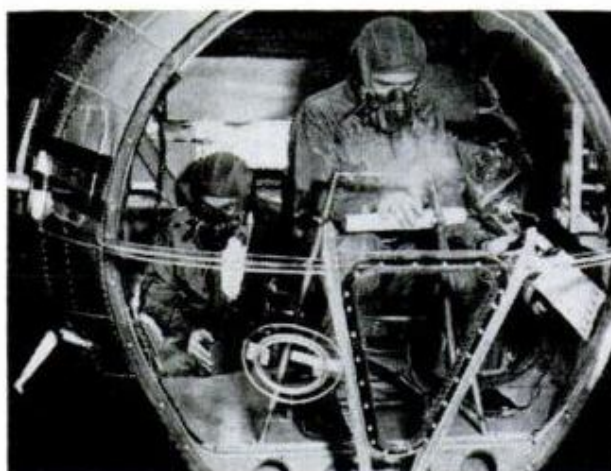
GM's FM-2 "WILDCAT" (same as Grumman F4F), early Navy fighter, is used as private plane by airline pilot



BELL P-63 "KING COBRA," big brother of P-39, is an Air Force fighter privately owned for "Sunday flying"



DOUGLAS A-26 "INVADER," big brother of A-20, was sold as executive plane by West Coast manufacturer



BOEING "FLYING FORTRESS," great bomber, was converted for aerial mapping by Philadelphia firm

Ernie Saviano of La Grange, Ill., an airline pilot who owns two Navy *Wildcats*, says, "Somebody has to see that a few of these great planes survive." The *Wildcats*, used early in the war in the Pacific, still have the old hand crank for retracting the wheels.

Some of the planes have been modified slightly for commercial purposes. They are used for such things as fighting forest fires and aerial mapping. Fairchild Aerial Surveys of Los Angeles, Calif., modified the noses of several P-38s to accommodate aerial cameras and cameramen, pressurized the cockpits and now uses them at

altitudes up to 37,000 feet. Aero Service Corp. of Philadelphia, Pa., uses P-38s and B-17s for high-altitude mapping, and the PBY for low-altitude geophysical surveys, especially in northern Canada where landing fields are scarce and the amphibian can land on water.

Many of the war birds, especially the medium bombers, have been bought from government surplus by firms which specialize in converting them into luxury executive planes and reselling them to businessmen. In many cases it is more economical to fly the rebuilt warbird than it is a new plane. ★ ★ ★



**NORTH AMERICAN P-51 "MUSTANG,"** famed long-range fighter is converted into a tandem-seat executive



**GOODYEAR FG-1 "CORSAIR"** (same as Marine's F4U, but without the folding wings) is private "runabout"

**B-26**



**MARTIN B-26 "MARAUDER,"** medium bomber, was converted by commercial firm into an executive plane

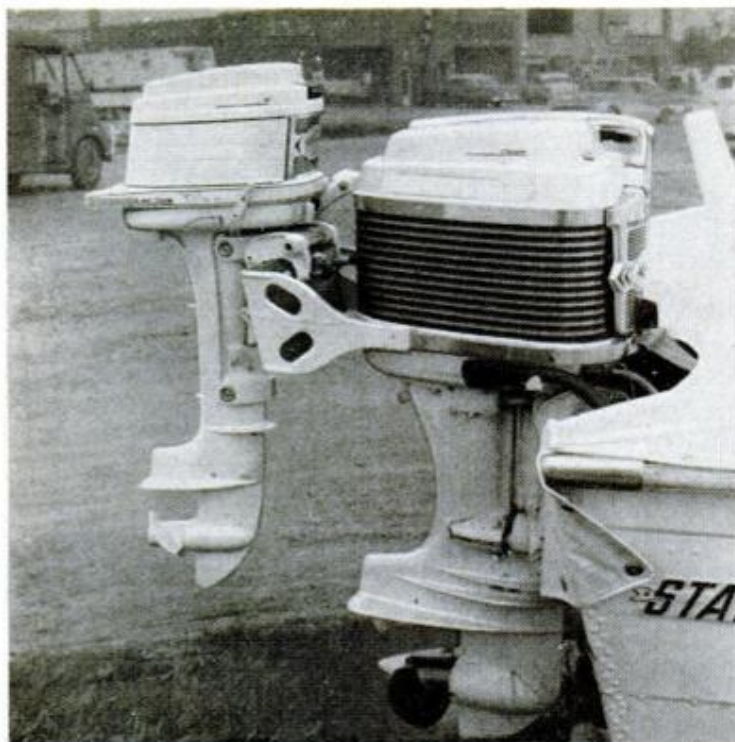
**B-30**



**CONSOLIDATED B-30 "LIBERATOR"** (same as B-24 but with longer nose) carries men for construction firm

MARCH 1962

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## Piggyback Outboards

Combining two outboard motors—a big one for speed and a small one for trolling—isn't new, but a Denver fisherman, Lou Garber, has worked out the easiest method so far for mounting the unmatched pair. His 10-horsepower fishing motor mounts piggyback behind his 60-horsepower traveling motor.

At speed, the big motor raises the boat onto a plane, lifting the small motor free of the water, so there's no drag. At fishing speeds, the boat lowers until the small motor is at working depth. Since it's attached to the bigger motor, it can be steered with the regular remote steering system. The mount, developed from a stock "flying transom," bolts directly onto the frame of the bigger motor.



## Ragtop Rain Detector

Convertible owners can leave their tops down in rainy weather when using a new electronic rain-sensing and top-raising apparatus that mounts under the dash and rides in the glove box.

When parking with the top down, the owner pulls the sensor out of hiding, switches it on, and leaves it on the seat. The first drop of rain puts the top without draining the battery whether the ignition is on or off. The unit, by Bedol Electronics, 1971 W. 85th, Cleveland 2, Ohio, costs \$39.95.



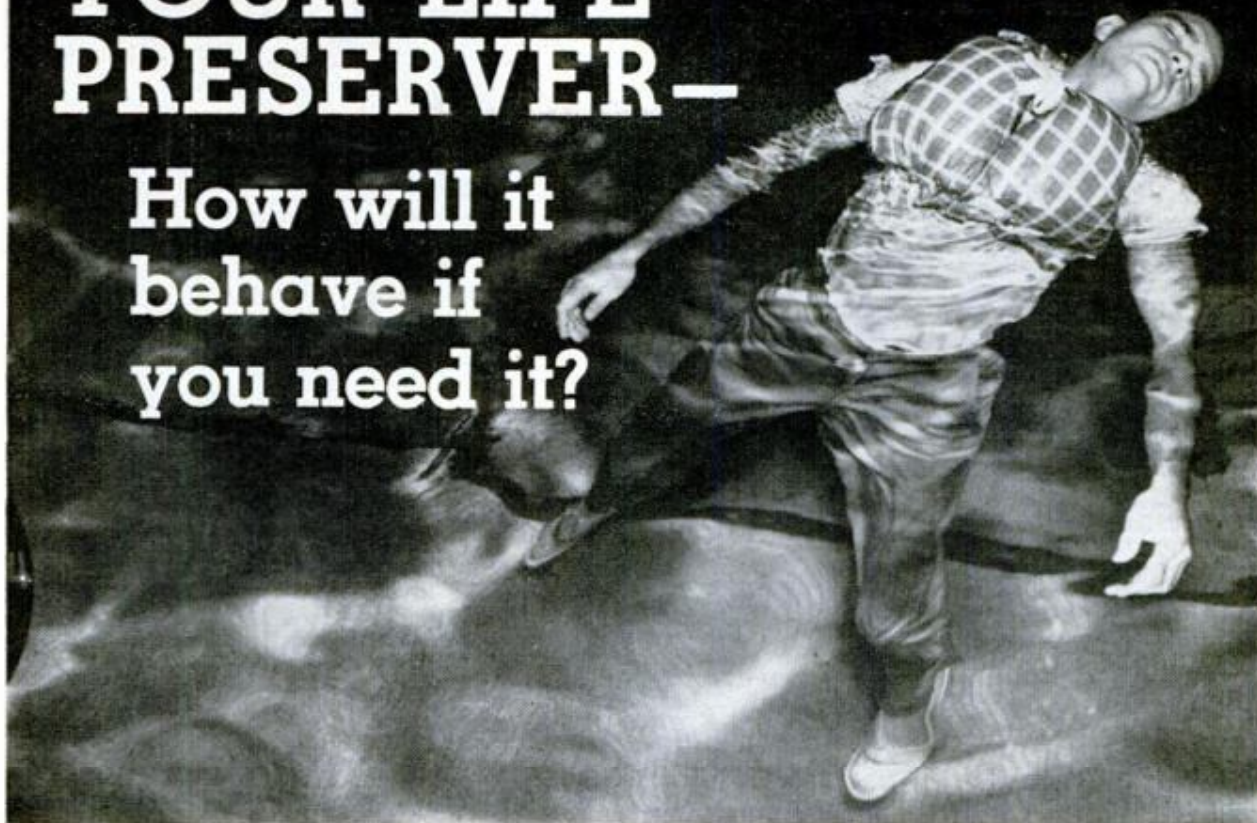
## Strum and Stroll

With its transistor amplifier and loudspeaker built in, a new electric guitar is completely portable. Four dry cells power it for up to 150 hours.

The amplifier operates from two pickups; either the lower, upper, or both can be selected by push-button switches. Two external jacks permit connection of the guitar to an outside amplifier, or connection of the internal amplifier to extra speakers. Manufactured in Italy, the guitar (called the Bikini) is sold in the U.S. by Hershman Musical Instrument Co., 61-63 West 23 St., New York 10. Price is \$59.

# YOUR LIFE PRESERVER—

How will it behave if you need it?



**PLAYING DEAD**, PM's vest tester demonstrates how buoyant vest holds unconscious man's head above water

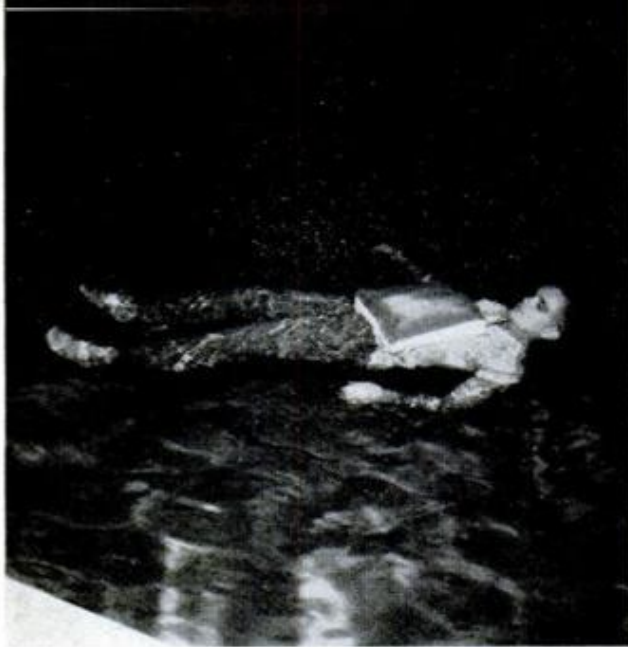
**WOULD YOUR "LIFESAVER"** really save your life? That sounds like a senseless question, but the answer could be important if you ever have to go over the side with one.

Have you ever actually tested your life preserver? Don't feel guilty if the answer

is no. PM's outdoors editor conducted a summer-long informal survey on the water last year, and of the hundreds of boaters, fishermen and water-sports buffs questioned, only a handful—less than five percent—had ever been in the water with the device they were staking their lives on.

**NORMAL SWIMMER**, below left, rides high and comfortable. Loose vest, right, slides up out of control





**BUOYANT CUSHION** provides fair flotation if worn correctly, left, but slips away from unconscious swimmer

To get a better idea of how the different types of lifesaving devices work, PM's editors set up a simple testing program. We sent a shopper to a nearby marine-supply store with instructions to buy one of each Coast Guard-approved device, plus a selection of other popular types. We borrowed an average-sized tester, Bayard Richards of the PM promotional staff, and the big Olympic swimming pool at Chicago's Sheraton Towers Hotel. One at a time, we fitted the devices on our "victim," threw him into the pool, and watched to see how he came up. All of the devices worked, but some worked better than others. Here's how:

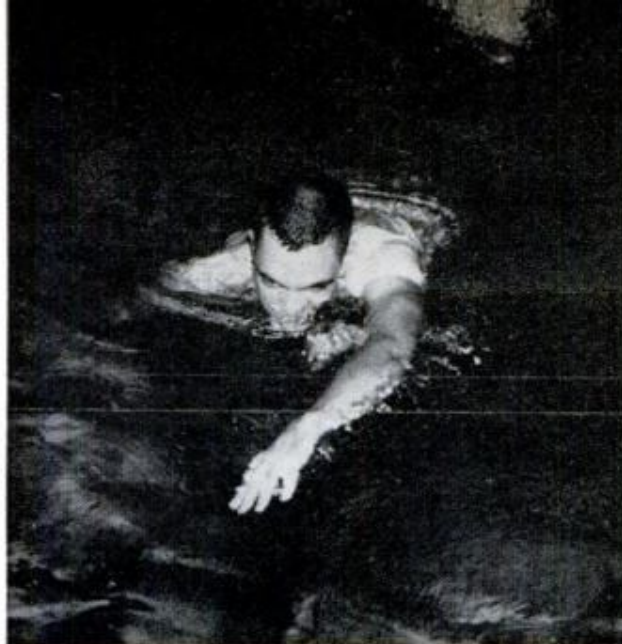
For our tests, we chose a three-pad buoyant vest, a yoke-type buoyant vest, a buoyant cushion, a water-ski belt, an inflatable fisherman's vest, and a floating coat designed for hunting and fishing in cold weather. That's a good, representative selection of the devices you'll see on any summer afternoon out at the lake.

Incidentally, the much-misused term "life preserver" actually describes *only* the big jacket-type device required on boats over 40 feet or those carrying paying passengers. We didn't include this type which is seldom seen on pleasure boats. Bigger, bulkier, more expensive—and better—than

**YOKE-TYPE VEST** holds swimmer high and upright, left; keeps unconscious man riding high, face out of water







**SKIER'S BELT** proved easiest to swim in, lets swimmer tread water effortlessly—while he's in control

most other devices, such an "official" life preserver is always Indian Orange in color, and bears its identification notice stamped or stenciled (no tags) on the canvas cover. Such preservers are inspected at the factory by the Coast Guard. But there are other *approved* devices, made to Coast Guard specifications without official inspection, which are identified by a cloth tag sewn on the cover.

Coast Guard-approved vests and cushions are made of kapok or fibrous glass sealed in plastic film, or unicellular plastic foam, and covered with fabric or plastic material.

The soft pads are easier to wear and more comfortable; the fairly-rigid foam is more durable and can't be damaged by puncturing. All approved types give about the same amount of flotation, but there is some price difference. The foam types can cost from 25 to 40 percent more than the soft-pad types.

Buoyant vests come in two basic styles; the regular vest, usually made up of three flotation units, two fore and one aft, and worn like a jacket; and the yoke or bib type, which is one big slab of flotation with a neck hole near the top and a waist strap

(Continued to page 218)

**LACKING COAST-GUARD OKAY**, but effective, fisherman's vest, left, and buoyant-insulated jacket tested well



# Show Stoppers for '62



## Cruiser Performance in a Kit Houseboat

ONLY KIT HOUSEBOAT on the market, this new 22-footer is a roomy, sleep-four design with a good V-bottom. It will plane and do 20 m.p.h. with a 40-horsepower outboard. It will pull skiers and do up to 30 with one of the big 75-80-horsepower models. Beam is an inch under 8 feet; headroom is 6½ feet. Galley, head and other facilities are built in. The plywood

kit for this *Vacationaire* boat which bears some resemblance to the 1959 PM houseboat design is priced at \$700. It can be powered by either inboard or outboard motors in almost any horsepower range, and can be assembled by a non-boat-building handyman. The *Vacationaire* kit is sold by Luger Industries, Inc., 9200 Access Road, Minneapolis 20, Minn.

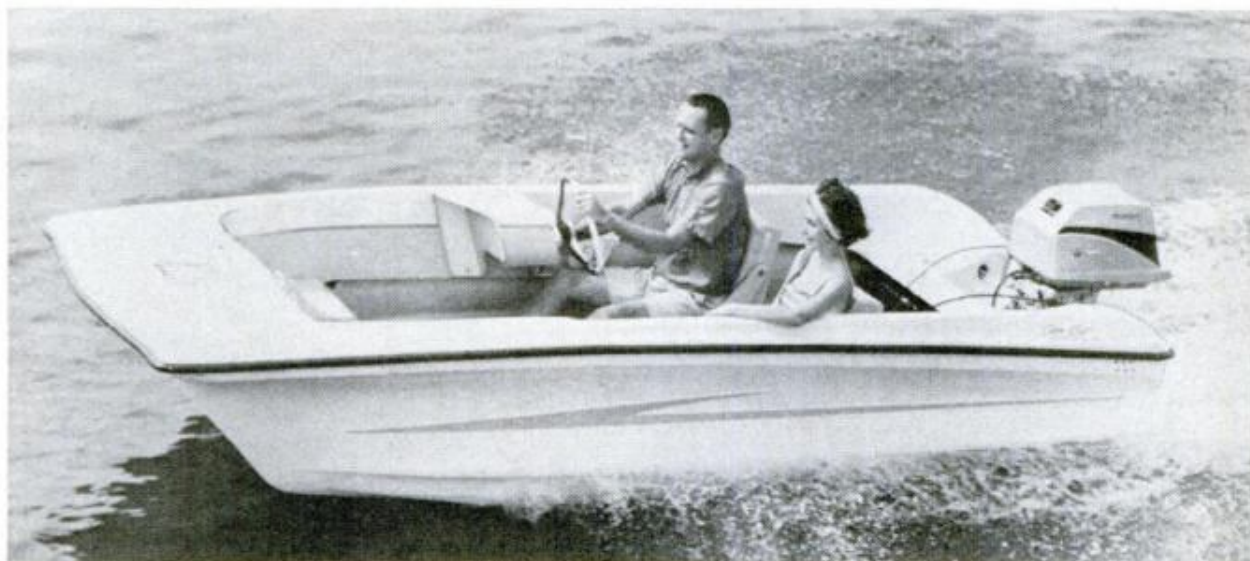
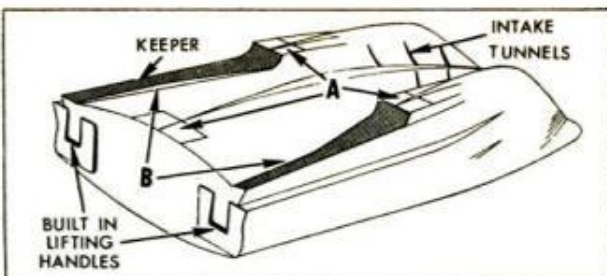


## Runabout Convenience in a Stock Cruiser

ONE INTERESTING SOLUTION to the perennial problem of passenger weight distribution in outboard cruisers is this *Cruis-a-bout*. Cruiser passengers don't like to be cooped up in a forward cabin, but their weight astern in the cockpit makes it hard to plane the boat. The *Cruis-a-bout's* open forward cockpit lets everyone sit in

the sun for pleasure riding, but a snap-on soft top encloses the cabin for foul-weather running or sleeping aboard. Buttoned up, with seats converted to bunks, it's much like the usual outboard cruiser. The boat is 16 feet long, has an 80-inch beam, and will take up to 90 horsepower. It's made by Sea Ray Boats, Oxford, Michigan.

*There's plenty new under the sun at your boat show this year. Here are four good examples . . .*



## New Concept in Airlifted Multihulls

**AERODYNAMIC LIFT**, coupled with well-designed three-point stability, give this new outboard hull unusual speed and maneuverability with only one motor of moderate horsepower (shown with a 30-hp. Bundy). Drawing above photo shows how it works: Air coming through intake tunnels lifts hull at speed, reducing wetted bottom area to a minimum. Hull rides on

three points (A) like a hydroplane, while concave "keepers" behind forward points (B) deflect air, water and spray downward and inward, adding to the over-all lifting effect. This new Devil Ray series is available in both sports (shown) and deluxe models in either 14 or 16-foot lengths. They're made by Custom Craft of Buffalo 7, New York.

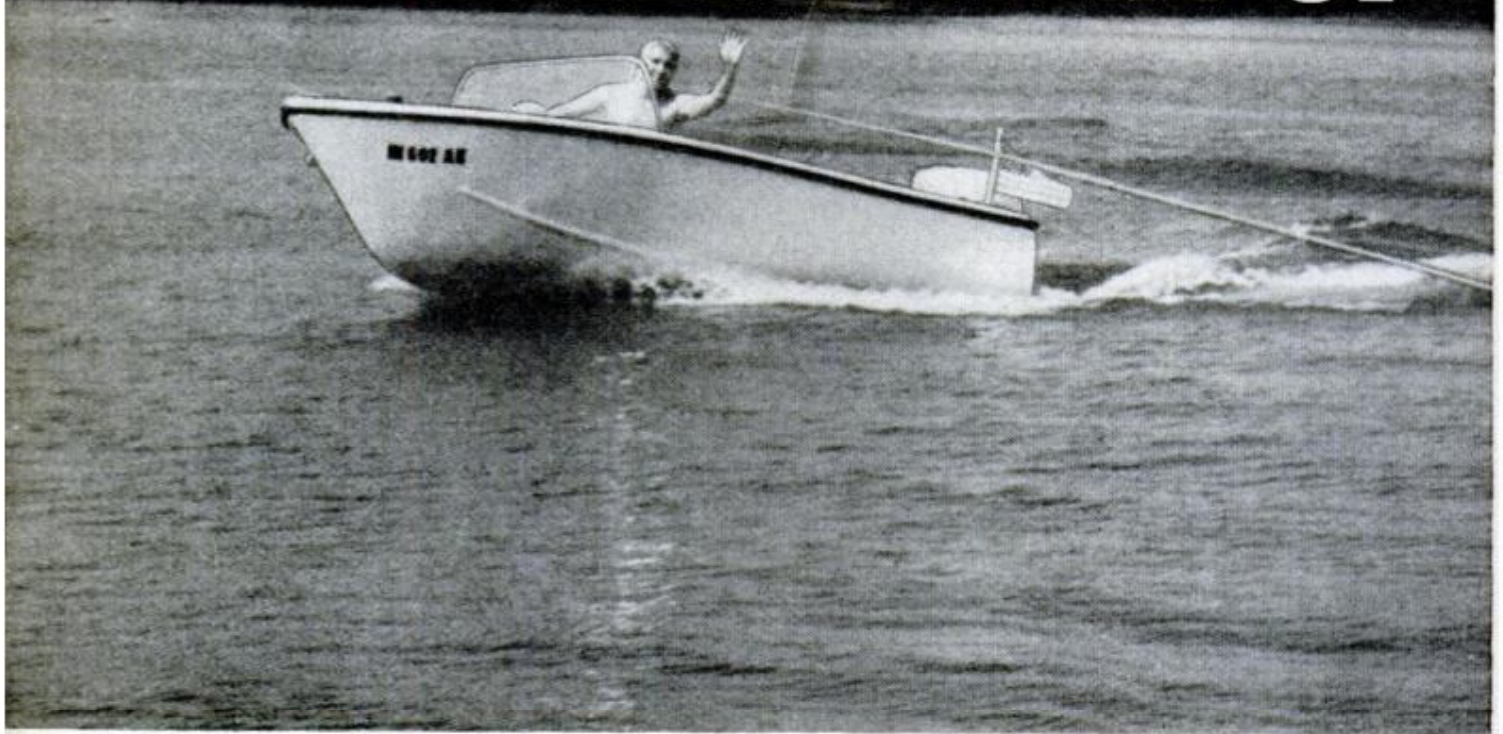


## An Unconventional Open Runabout for Fun

**LOW-SLUNG, COMPLETELY OPEN**, but very fast and stable, the Sun Sled offers a lot of unconventional comfort in an enormous single cockpit covered with thick upholstered cushions. One wide rear seat holds the driver and three passengers; the rest can sit anywhere they like. Built of mahogany planking except for fiberglass

fore and aft decks, the craft has an unusual triple-V bottom best described as a rounded cathedral hull. Powered by a 100-horsepower Interceptor inboard through an Eaton Powernaut stern drive unit, the 17-foot boat will do over 40 m.p.h. The Sun Sled 17 is made by Century Boat Co., 1860 Broadway, New York 23, N. Y.

# BITTER BATTLE OF



## “Fishermen are out-of-date . . .”

By Joseph N. Bell

(Howard E. Hartman's son-in-law)

**Bell:** I have nothing against fishermen. For the most part, they're pleasant—if somewhat sedentary—citizens who go plodding unimaginatively about their business. I understand the divorce and crime rates among fishermen are low, which is commendable. The big trouble with fishermen is that they accept rigidly and without question two wildly inaccurate myths:

—that confirmed lovers of fishing outnumber all other citizens by a large and growing majority;

—that God created the waterways of the world for the private and exclusive use of fishermen.

Possibly there was a time when the first statement was superficially true—back in the days when hungry citizens found fishing the only alternative to starving. What has escaped the fishermen of today is that things have changed. The power boat has been developed to a remarkable degree of refinement. And it is being used and enjoyed by far more nonfishermen than the anglers will admit.

In Michigan last year, for example, powerboat registrations were so heavy that the State had to put on extra clerks to handle them. And while this was going on, *fishing license sales were actually declining*. There are almost six million powerboats in the United States today, manned in large part by five million people who water ski.

But in the United States—where a majority supposedly calls the tune—a minority of fishermen continue to set the rules for the use of our lakes and rivers. And the public officials who have the final say in such matters are gen-

# THE WATERWAYS



**“We won’t give up our rights . . .”**

By **Howard E. Hartman**

(Joseph N. Bell’s father-in-law)

erally men of fishing persuasion who are determined to perpetuate the myth of the fishing majority. As a result, boaters are second-class citizens.

**Hartman:** Every once in awhile, I have a nightmare about speedboats. I dream that the legal bars that still protect a fragment of our inland waters for fishermen were dropped—as our boating friends so loudly and frequently urge. In my nightmare, the waters of all of my favorite fishing lakes are suddenly and completely clogged with hordes of soft-headed idiots piling into each other at supersonic speeds in overpowered boats. As fast as they go to the bottom, new powerboats take their places. And watching sadly from a safe vantage point ashore are the people who like to swim and fish.

I think of this nightmare frequently—whenever I hear the boating boys sound off. We’ve managed to hold the line fairly well on the little Indiana lake where I’ve had a cottage for 20 years. But I’ve given up trying to fish on other, larger lakes around here. Fishing on them today is like trying to listen to good music beside a buzz saw.

That’s really what fishing is—listening quietly and peacefully to the music of nature. We do far too little of



Here are some bitter words. How do you feel? Choose up sides, and come out with fighting letters addressed to: Outdoor Editor, Popular Mechanics, 200 E. Ontario St., Chicago 11.



"The plodding, unimaginative fishing minority sets the rules . . ."

"Lakes are clogged with soft-headed idiots in overpowered boats . . ."



that these days. Instead, we go screaming off in ten forward gears in all directions headed for absolutely nowhere. I'm not saying that we don't have to put up with a certain amount of this sort of thing as a sop to "progress." What scares me is that someday it will take over completely and there won't be any place left to enjoy nature as God intended we should.

I get a big laugh out of the boaters' claims that they're being discriminated against. If they get much faster or much more frequent, I won't have to dream my nightmare any longer; I can just look out of the window of my cottage. There's no frustration comparable to sitting quietly in a boat, watching a cork bobbing gently on the lake's surface, at a momentary peace with a troubled world—only to have it violated by a maniac in a speedboat who thunders down on you, riling the water, scaring hell out of the fish, and completely destroying whatever peace of mind you had managed. And that's not all they destroy. There were more deaths in the water than on the highways of New York State over the last Fourth of July week end.

This isn't true of all powerboat drivers, of course. As a matter of fact, it's probably only a small group—maybe five or ten percent—that spoils the water for everyone else. These are the jockeys who have never learned consideration for other people—they're just as bad in an automobile—but when you turn them loose in a lake or river with too much horsepower and no restrictions, no one else has a chance.

I'm willing to try and live with the speed boys, *providing they're properly controlled*. But I refuse to give up and turn our waterways over to them. Surely there must still be a place for a quiet contemplation of nature and nature's sports.

**Bell:** I'm glad to know the fishermen feel they are holding the line at my father-in-law's Indiana lake. They're not just holding the line; they're holding the whole lake!

I have a cottage there, too. My family and I like to water ski. Have you ever tried to pull an adult on a pair of water skis at ten miles an hour? It's like trying to run through warm glue. But that's the top speed at our lake—10 m.p.h. This speed limit is perfectly practical for a canoe or a cement barge. But for boating or skiing, it leaves something to be desired.

So the fishermen—bless 'em—have our lake all to themselves. Which is to say that the lake is usually empty in the heat of the day, except for a few intrepid city dwellers who have rented outboards and are putting laboriously around under the careful scrutiny of the local conservation officer.

**Hartman:** Indiana's laws regulate boating speed by the size of the lake. If my son-in-law wants to water ski, he can drive to a half-dozen lakes within 30 minutes of here where he can scare all the fish he wants to—legally.

There has to be some sort of check on these boat jockeys; otherwise, there wouldn't be a decent place to fish in the whole state. Fishermen ask very little. A fisherman requires *one-fiftieth* as much lake surface as a water skier! And I don't think even my son-in-law will contend there are fifty times as many skiers as fishermen.

It seems to me that the method used in Indiana is fair enough. If they ever let down the speed bars completely on our lakes, fishermen might just as well pack up and head for some other state. The speed addicts don't want to share facilities; they want to dominate them. I suppose that's the nature of the powerboat. It's either completely in your hair or not around at all. It's hard to share a bed with a threshing machine, no matter how well intentioned either you or the machine may be.

**Bell:** Wrong. About sharing facilities, I mean. Those of us who enjoy skiing and other water sports would be glad to share our lakes with the fishermen. We'll be happy to give the fishermen the morning and late afternoon hours completely uncontested if we can just have a few hours at midday to run our boats fast enough for the water sports we enjoy. But we can't even get anybody to listen.

**Hartman:** My experience with speed-boaters is that if you give 'em an inch, they'll take the whole lake. Once we open the gates, we've had it—and another fisherman's lake gets boiled in engine oil. No, sir. No compromises. We'll defend this line.

**Bell:** Okay, dad, man the bulwarks. We're strong and we're getting stronger. We want to live with you in peace—but we want to live a little faster than ten miles an hour. ★ ★ ★



### Boat Snaps Onto Roof of Camping Trailer

One of the newest of the multipurpose camping trailers is a reinforced plastic model that carries an eight-foot dinghy snapped onto the roof. The matched components are built of fiberglass and Vibrin;

the trailer sleeps two inside, has a separate cooking and storage area in the rear. The 75-pound boat lifts easily on and off, and latches in place. Built by the Trailorboat Co., San Rafael, Calif., it sells for \$895.



### Thermoelectric Outboard

Making recreational use of a recent scientific development, this fisherman is driving his boat on a gas flame! His electric trolling motor is powered by a thermoelectric generator instead of the usual storage battery.

The generator, the box on the starboard side of the boat, delivers power continuously by maintaining a temperature difference across the semiconductor materials inside. The heat is supplied by a small propane gas flame; water carried through the hose over the stern cools the low-temperature side. The experimental outfit was built by Westinghouse labs.

**IDEA PROJECT**

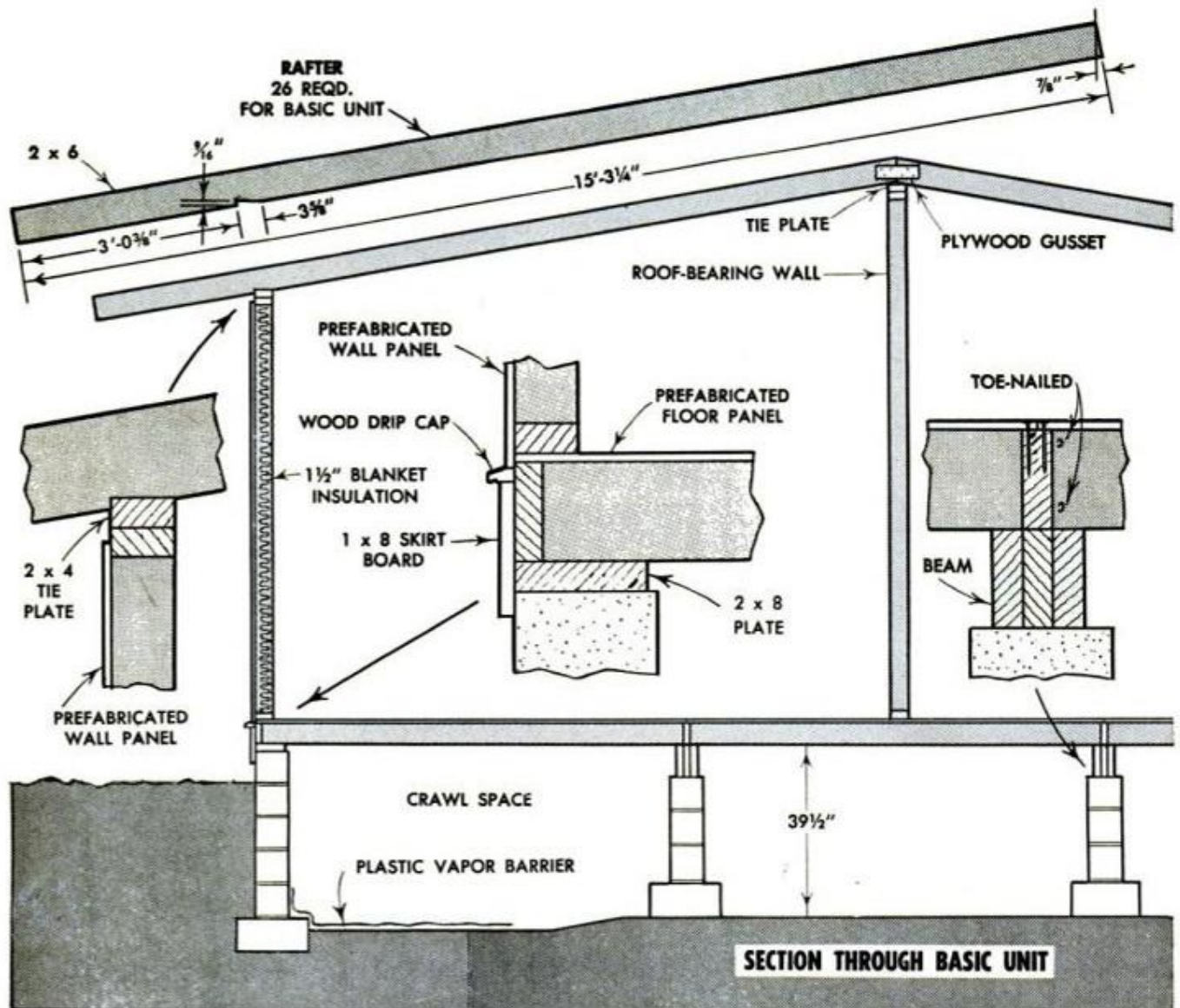
# START YOUR VACATION HOME at Home

**PART II**

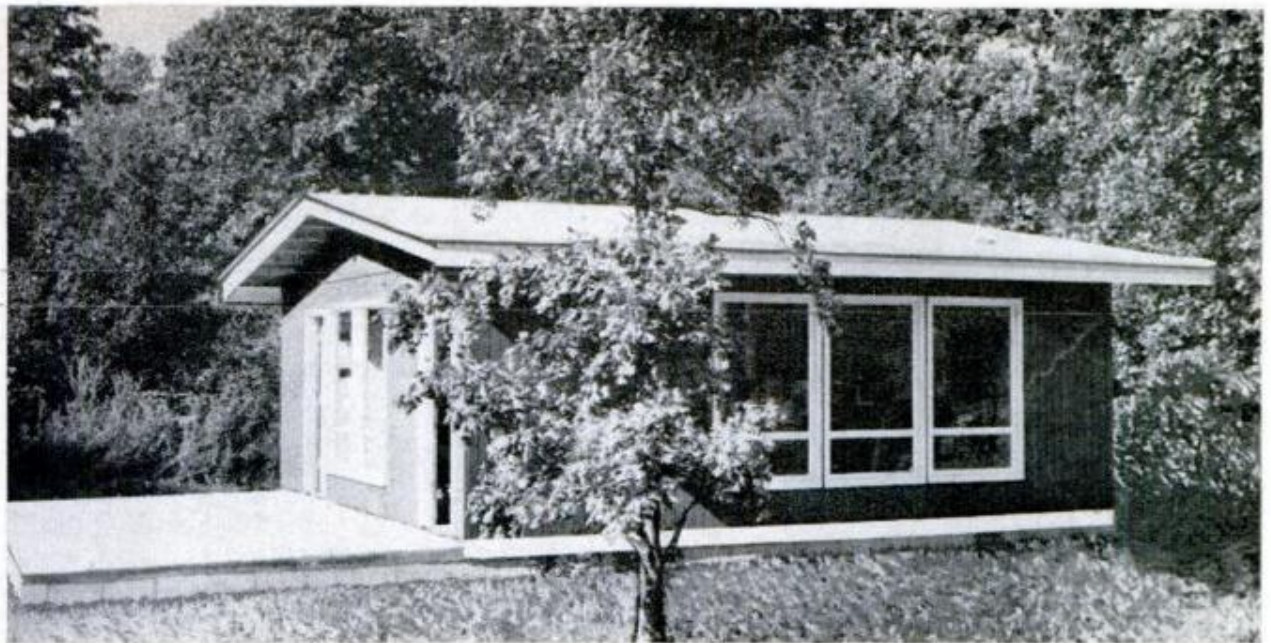
ASSUMING THAT you have the eighteen floor sections for the basic unit completed and stockpiled, you are ready to prefab the exterior and the interior walls of the PM Vacation Home introduced last month. Where 2 x 6s were used in the floor sections, 2 x 4s are used in the walls, and where 1/2-in. sheathing was used to cover the floor sections, 5/8-in. sheathing is used to cover the wall sections. Other than this, assembly of the wall sections is similar to that of the floor sections, these being covered as before on the outside only.

Of the 24 sections required for the exterior walls of the basic home, several are identical, some are made right and left hand, others require only one of a kind. All are 4 ft. wide and 8 ft. long. As with the floor sections, it will pay you to take the time to rig up a building form for positioning and nailing the members together. Stop blocks located on the form as before will assure uniform spacing of the studs and identical over-all dimensions.

There are several things to note in studying the exterior wall sections individually detailed in Fig. 6. First, window and door sections, as well as wall section X-48SP, have doubled 2 x 6 headers across the top, whereas all others have conventional 2 x 4 plates, top and bottom. Secondly, with the

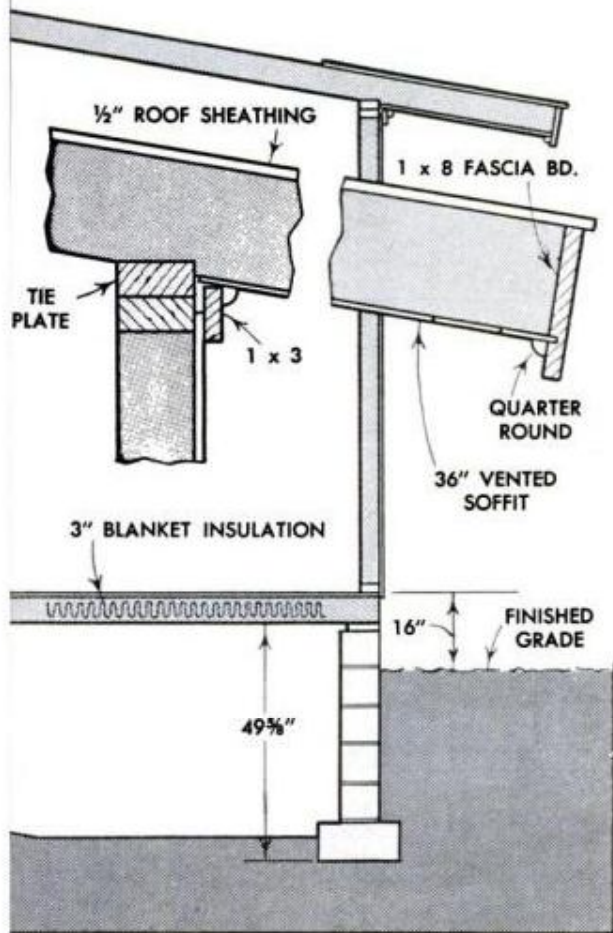






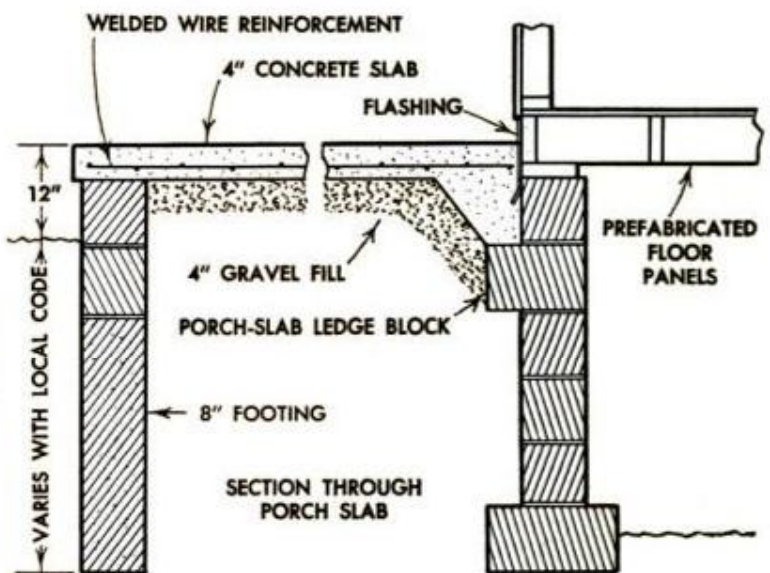
exception of wall section WAF-4854-24, the 4 x 8 sheathing on each section overhangs the bottom plate  $\frac{3}{4}$  in. This is done to prevent water from entering at the floor line and also to make the sections self-aligning during erection. The overhang at the bottom results in the sheathing being  $\frac{3}{4}$  in. down from the top, but this is later covered with a 1 x 3 trim board. All wall sections are made to simply butt together when placed side by side, and except where

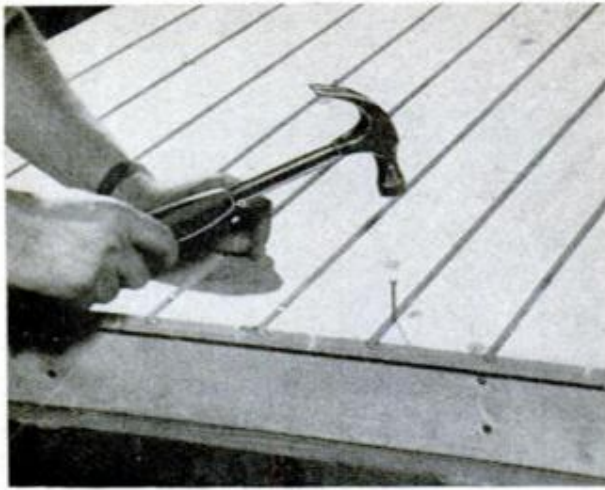
noted otherwise, full 4 x 8-ft. sheets are applied as is without cutting. Here the exceptions, of course, are the door and window sections which require only a portion of a full sheet. Both the length and the number of studs required vary with each section, some requiring as few as three studs, others as many as five. True of all sections, the headers and the top and bottom plates are nailed to the ends of the studs, the headers being toenailed.



**COMPLETE PLANS**

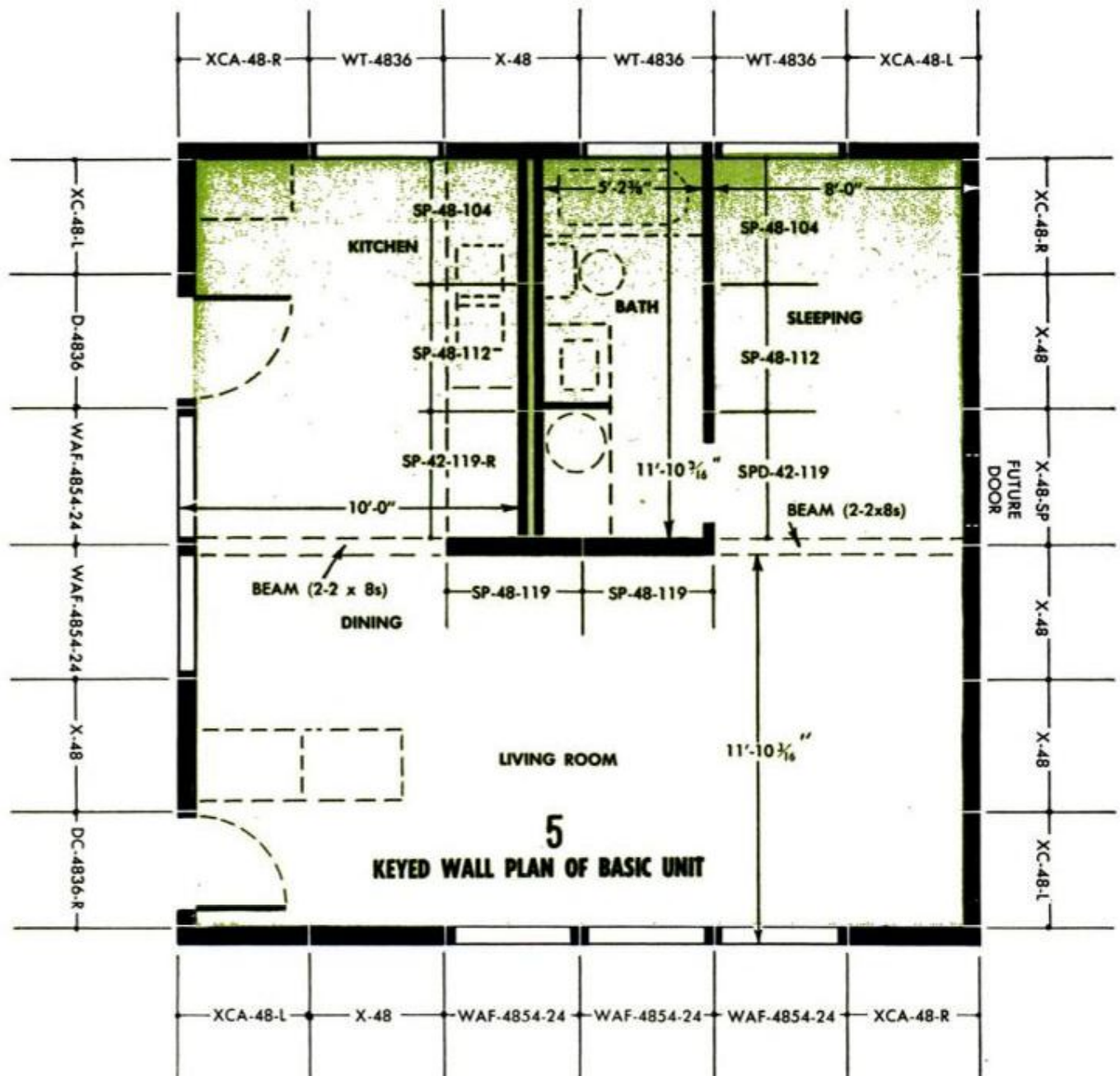
including a material list, are available for the PM Vacation Home. Each set contains 14 sheets which detail the basic home as well as the add-on units. The cost of the plans is \$20.00 for one set, \$35.00 for four sets. Each additional set is \$5.00 when ordered with the initial set. Order from Plans Department, Popular Mechanics Magazine, 200 East Ontario Street, Chicago 11, Illinois.

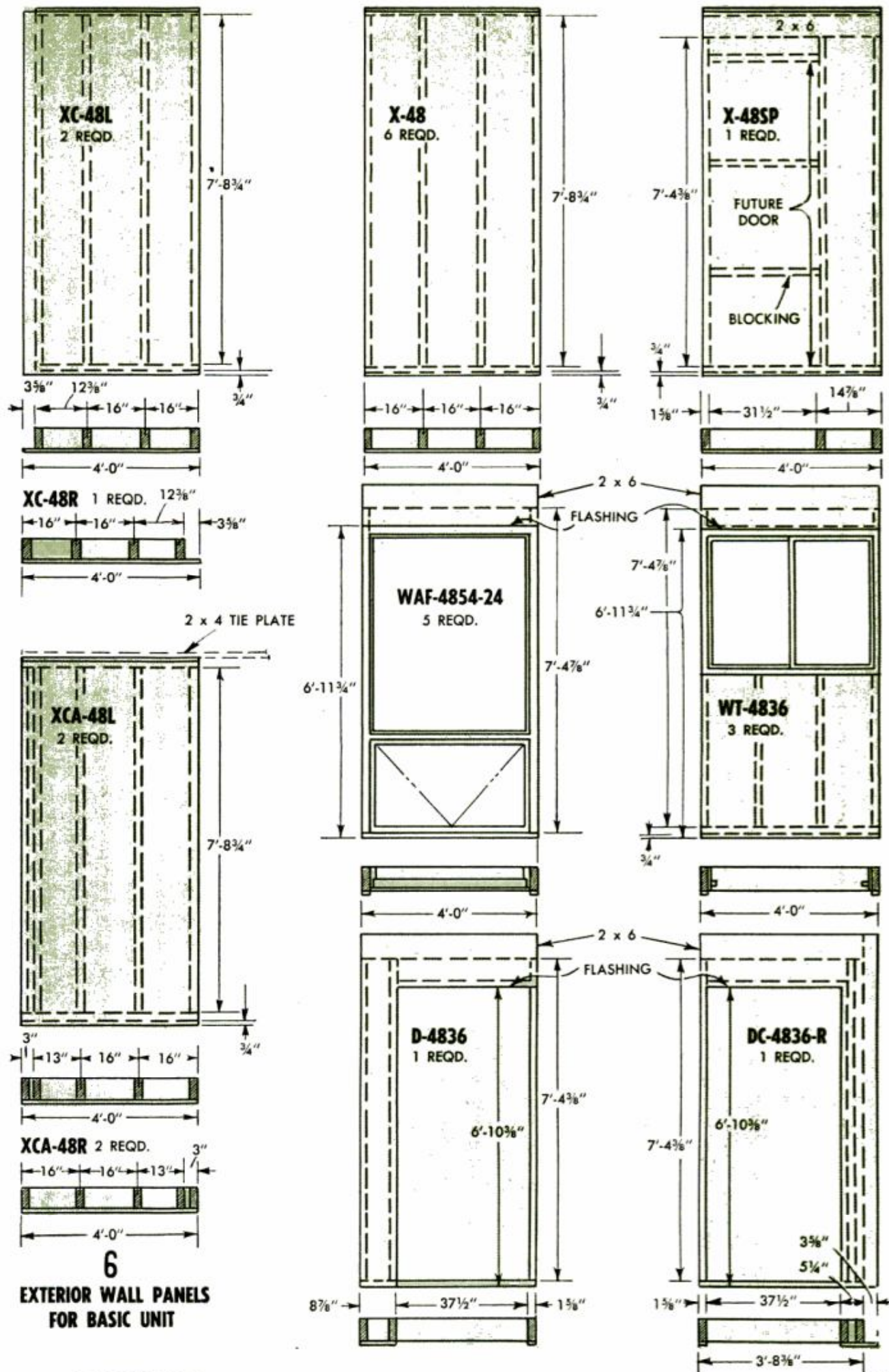




**VERTICAL-GROOVE SHEATHING** makes an attractive exterior siding. Here  $\frac{3}{8}$ -in. plywood is being applied by driving the nails in the grooves where they are hidden. Note how lower edge of plywood panel overhangs bottom plate of 2 x 4 framework

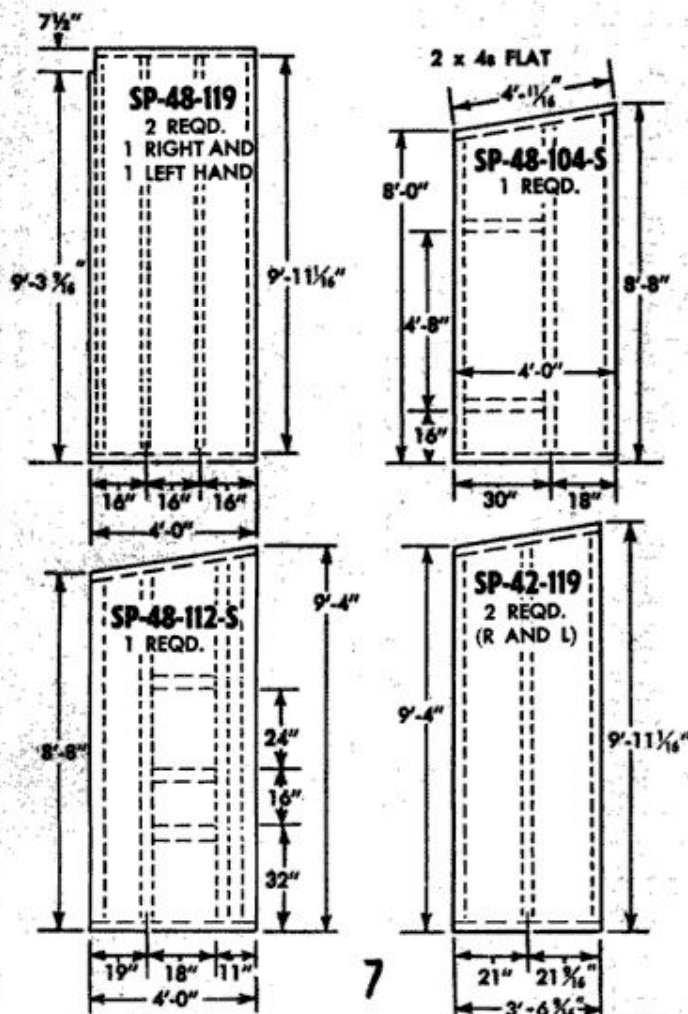
You have a choice of several different materials, both plain and textured, for sheathing. Vertical-groove plywood, called Texture One-Eleven, was used in prefabricating the walls of the pilot home. Similar textured panel boards are available in hardboard, also in coated insulating boards. Whatever is used, the material itself provides the exterior covering, nothing is applied to it. Where a plain panel board is used, battens will be necessary to cover the wall joints. However, with vertical-groove boards, battens are not necessary. The sheets have a rabbet along one edge which when butted against the square edge of the sheet in the adjoining wall section, forms a matching groove and an invisible joint. In applying such material it is necessary to let the rabbeted edge of the sheet overhang the edge of the supporting frame a distance slightly less than the width of the rabbet





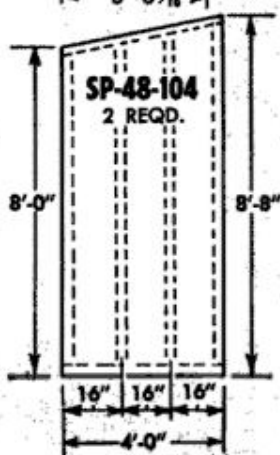


**RAKE PANELS** which form the overhang at gable ends of roof are toenailed to the supporting gable plate



**INTERIOR WALL PANELS FOR BASIC UNIT**

EXCEPT for sections SP-48-119, all interior walls are 2 in. thick, some being made from 2 x 4s placed flatwise, others from 2 x 2s. Where two of each are required, frames are identical but faced on opposite sides to make them right and left-hand wall sections

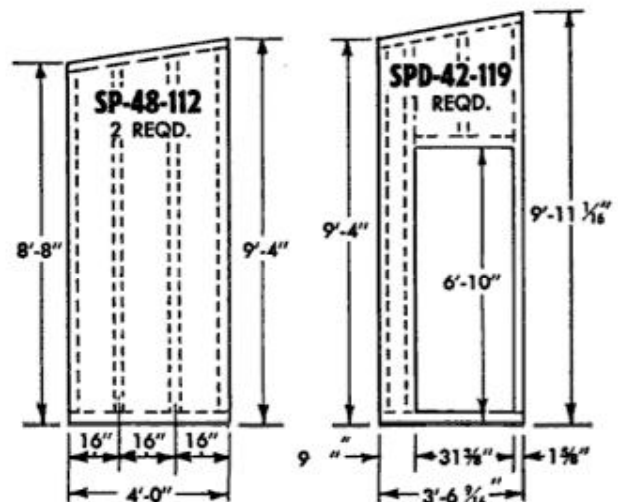


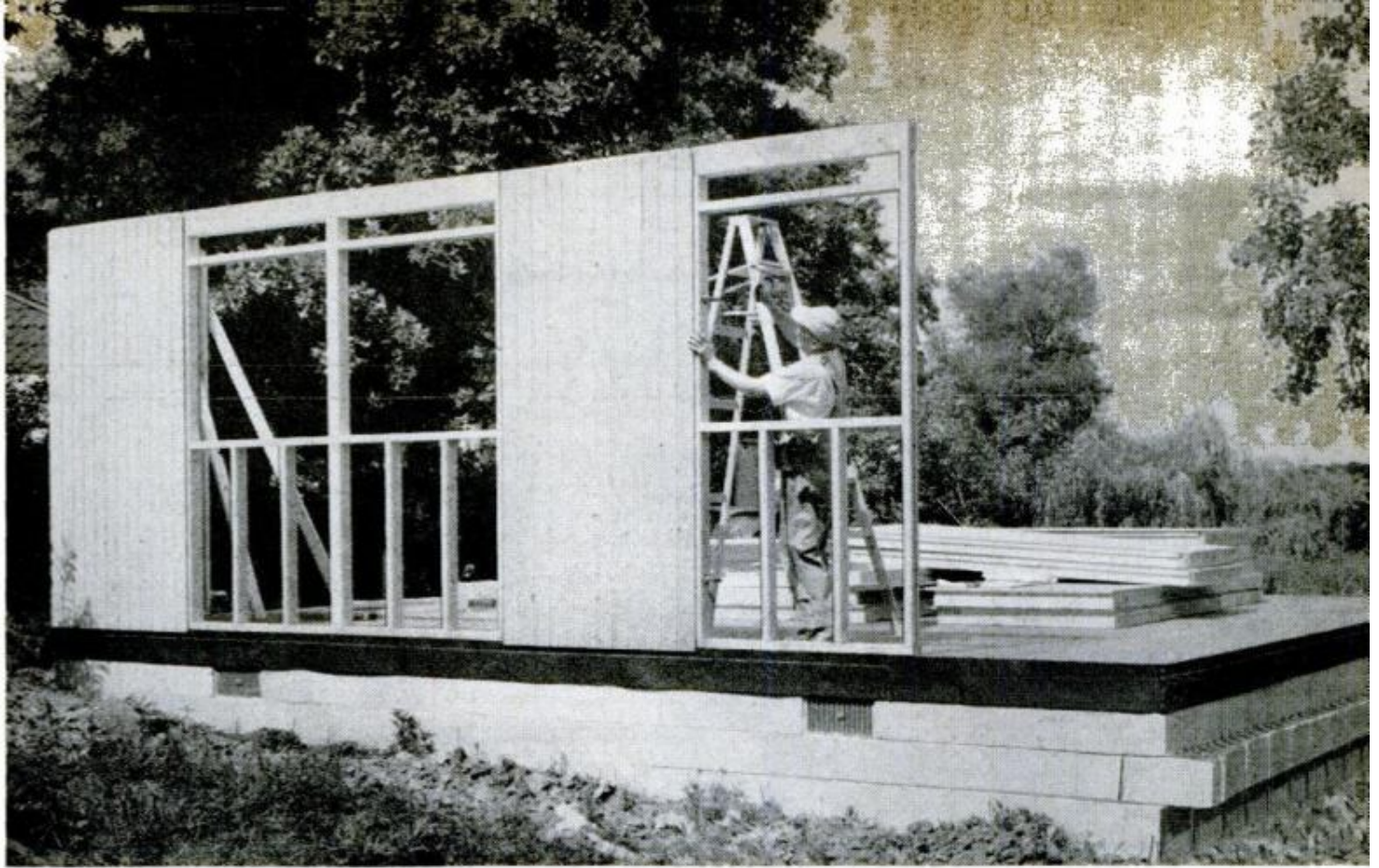
itself. Thus when the wall sections are joined together, the overhanging rabbeted edge laps the 2 x 4 of the adjoining section, effectively sealing the joint between the two abutting sections. A simple gauge block can be used to assure a uniform overhang from top to bottom. In following this method, care must be taken in handling and stockpiling the prefabbed sections so as not to damage the overhanging edge.

Wall sections WAF-4854-24 and WT-4836 show the window sash in place. These, of course, would be installed on the job after the walls are up since there would be too great a chance of breakage if installed beforehand through transporting to the site and in nailing the sections together. Window sections are designed to accept stock sash. In the case of sections WAF-4854-24, the upper sash is fixed, whereas the lower sash opens inward. In the other window sections the windows are of the sliding, or bypassing, type.

The keyed floor plan, Fig. 5, shows where each of the individual wall sections go in making up the four exterior walls of the basic unit, also the location of the interior walls. Note in the case of the interior walls that a plumbing wall is formed by two 2-in. walls positioned 8 in. apart. The space between provides room for the plumbing for the kitchen and bath. Fig. 7 details each interior wall section. With the exception of wall sections SP-48-119, which are assembled like the exterior walls, all other interior sections either are made of 2 x 4s placed flatwise or of 2 x 2s.

Sections SP-48-119, along with two built-up beams of 2 x 8s, form the load-bearing wall for the roof. In actual erection, a second 2 x 4 plate, running the length of the wall, serves to align and tie the whole center wall together. The roof rafters at the ridge rest on this top plate. The two sections required for the interior load-bearing wall require five studs and are assembled right and left hand insofar as the notched





**HERE WALL SECTIONS** across rear of basic unit are being erected. Window sections normally would be faced with sheathing at time of prefabbing. Note how sections are braced to floor to hold them plumb

upper corner is concerned. Actually they are both alike but are positioned when installed to provide support ledges for the two 8-ft. beams. This also is true of sections SP-42-119, both being alike but made right and left hand when it comes to facing them with paneling. It is best to leave the interior-wall sections uncovered for now and then face them later after installation of plumbing and wiring. Then, too, your interior paneling is material you would try to have delivered to the site by a lumber dealer in the vicinity. As each exterior and interior-wall section is completed, label it so you will know right where it goes.

The floor and wall sections are all that are prefabricated, although there are other members which can be precut at home to save time on the job. These include the 26 roof rafters, the two beams for the load-bearing wall and the parts that make up the four rake panels which form the overhang at the gable ends of the roof. Roof sheathing, foundation sill plates, floor beams and other lineal stock is material you would have delivered since it wouldn't pay you to cart it for any distance when it could be obtained in the area.

Next month you'll be shown how the roof is applied, how the walls, floor and roof are insulated and how the window and door frames are installed.



**C-CLAMPS ARE USED** to hold wall sections in line while spiking abutting studs together, above. Time can be saved on the job by priming window and door frames at home before carting them to building site



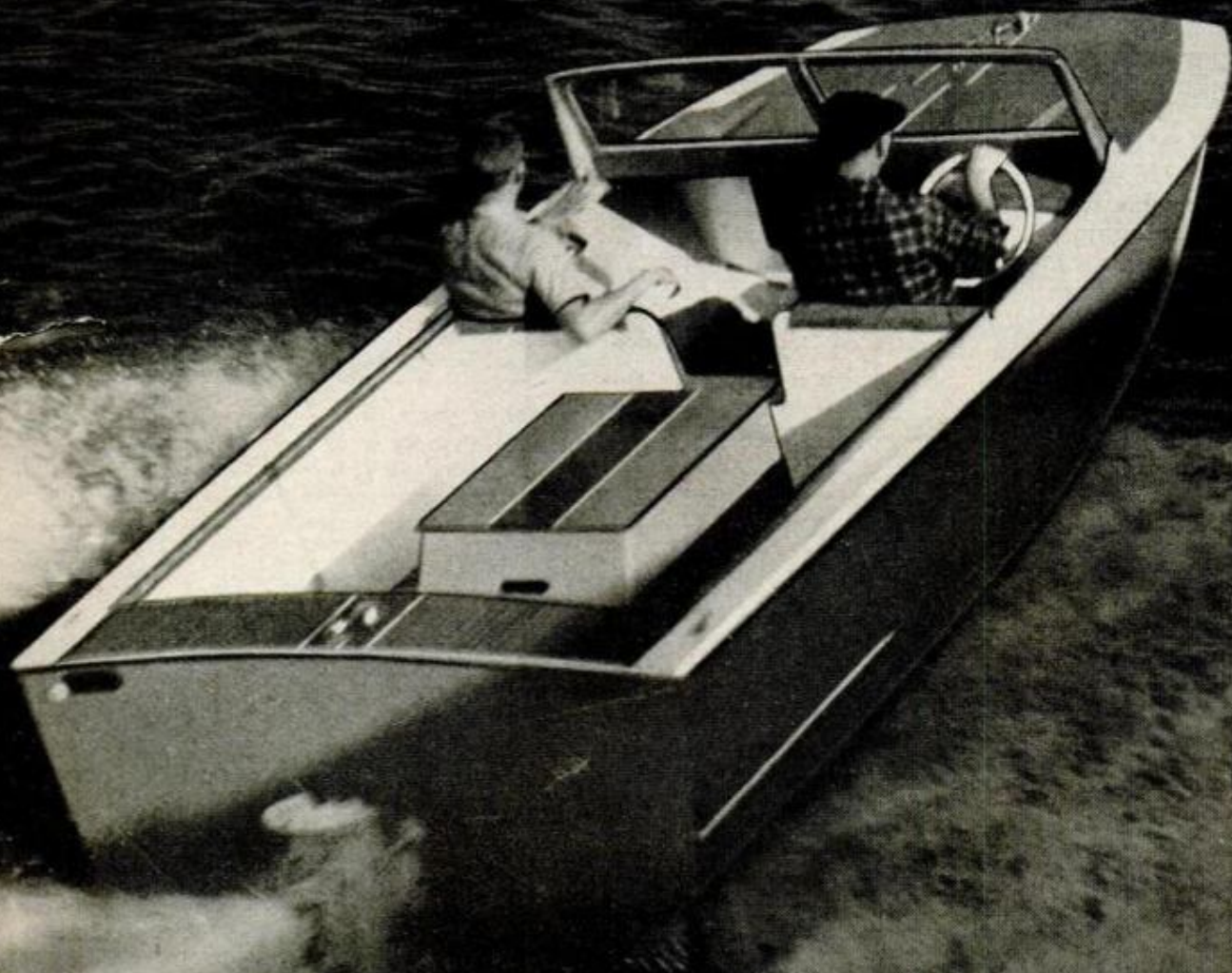
# For New Thrills Afloat

# Build the **PM JET**

Designed by William R. Nielsen, Jr., S.S.C.D.



First do-it-yourself boat ever designed for turbojet propulsion, this trim runabout will leap to a plane in its own length for skiing. Remove the deck and it becomes a roomy fishing boat which slips easily through shallow snag-filled inlets. An attention-getter on any water, it's also easy to build



WEIGHS ABOUT 1300 POUNDS



WITH NO LOWER UNIT to worry about, the PM Jet can easily skim through the shallowest, snag-filled water

**By Arthur Mikesell**

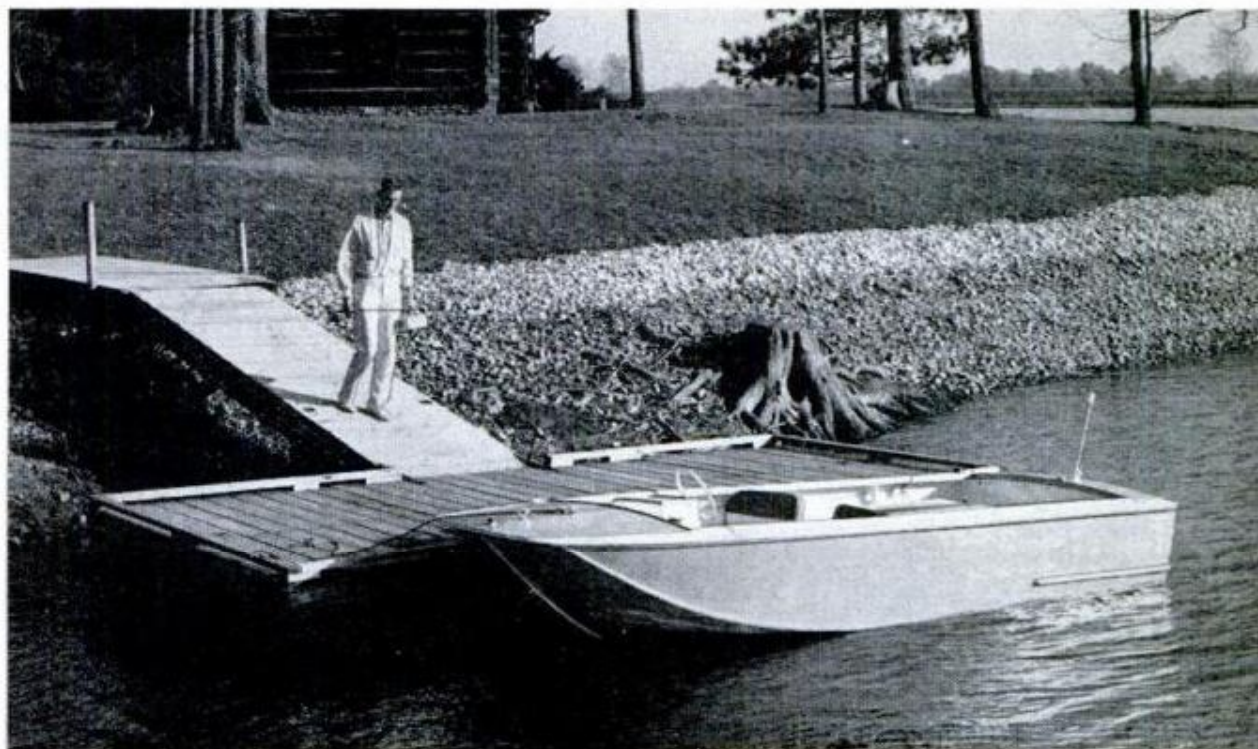
**PART I**

**O**VER THE past couple of years we have received a great number of letters asking whether it's possible to install a turbojet unit in a regular outboard hull. Most of these people were particularly enthusiastic about a jet's shallow-draft capability. Skiers liked the strong initial thrust and safety of this propellerless propulsion system. However, few had even seen a jet installation and fewer still were aware of the many problems involved in such a project.

Unfortunately, the special hull characteristics required for efficient jet operation just aren't found in standard boats; in fact they would be considered defects with any other type of drive. In response to so much interest, however, it was decided by the editors that *PM's* 1962 project boat would be a jet, the first build-it-yourself boat specifically designed for this new propulsion system.

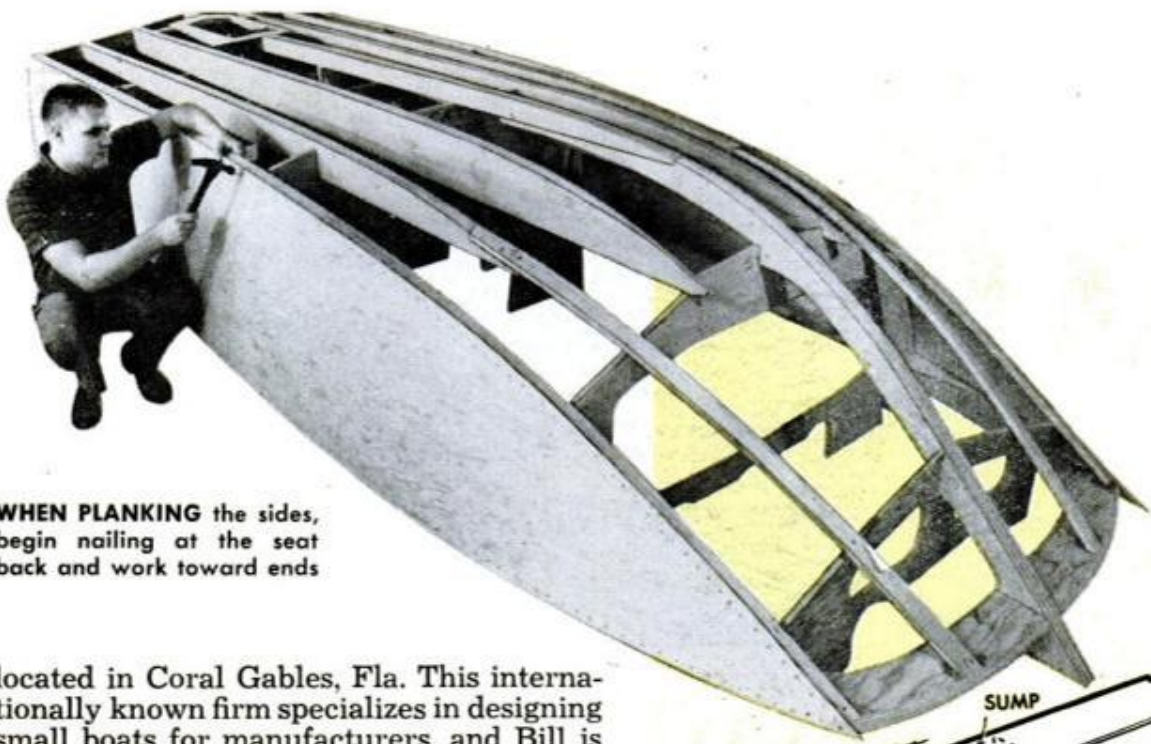
To design the boat, we chose jet-specialist Bill Nielsen of the Cole-Nielsen firm

**LIFT OFF THE DECK** and it's a roomy, go-anywhere fishing boat which will take you to those hard-to-reach inlets



MARCH 1962

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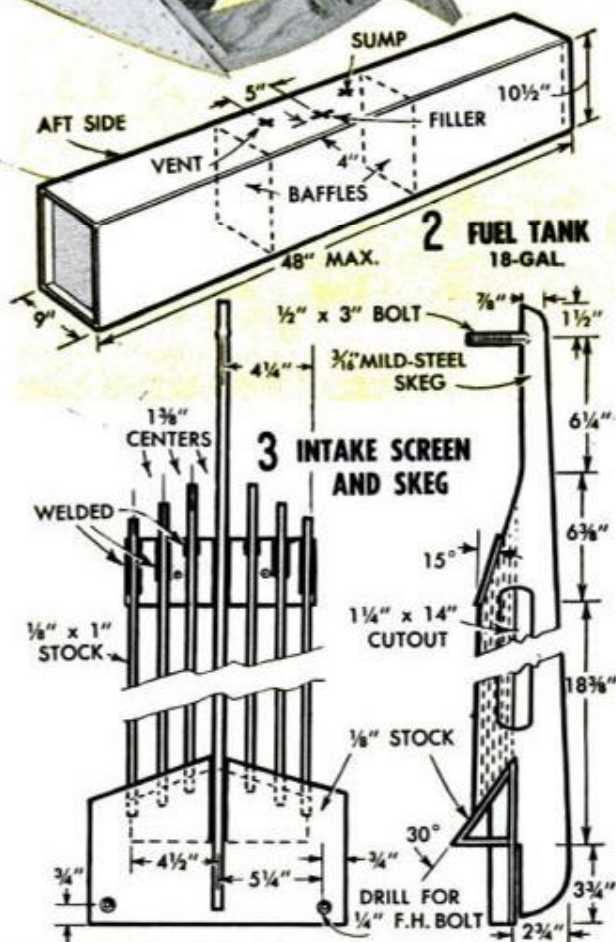
**WHEN PLANKING** the sides, begin nailing at the seat back and work toward ends

located in Coral Gables, Fla. This internationally known firm specializes in designing small boats for manufacturers, and Bill is one of the few naval architects with practical experience in designing jet boats.

At the outset, we decided that this boat should be both exciting and practical, fast and stable. The *PM Jet* turned out to be an outstanding success on all counts. Its 15-ft. 11-in. length and 6-ft. 6-in. beam make it a roomy boat with good load-carrying ability. Since a jet drive requires no lower unit, its use in this modified Garvey hull allows exceptionally shallow draft with no worry about snags. It's a fast boat, too. With the two-stage jet unit driven by an Interceptor 100-hp. engine (a marine conversion on the compact Comet-Falcon block), the pilot model was able to top 35 m.p.h. and do it in shallow, obstructed water where prop boats would have to be coned at an idle.

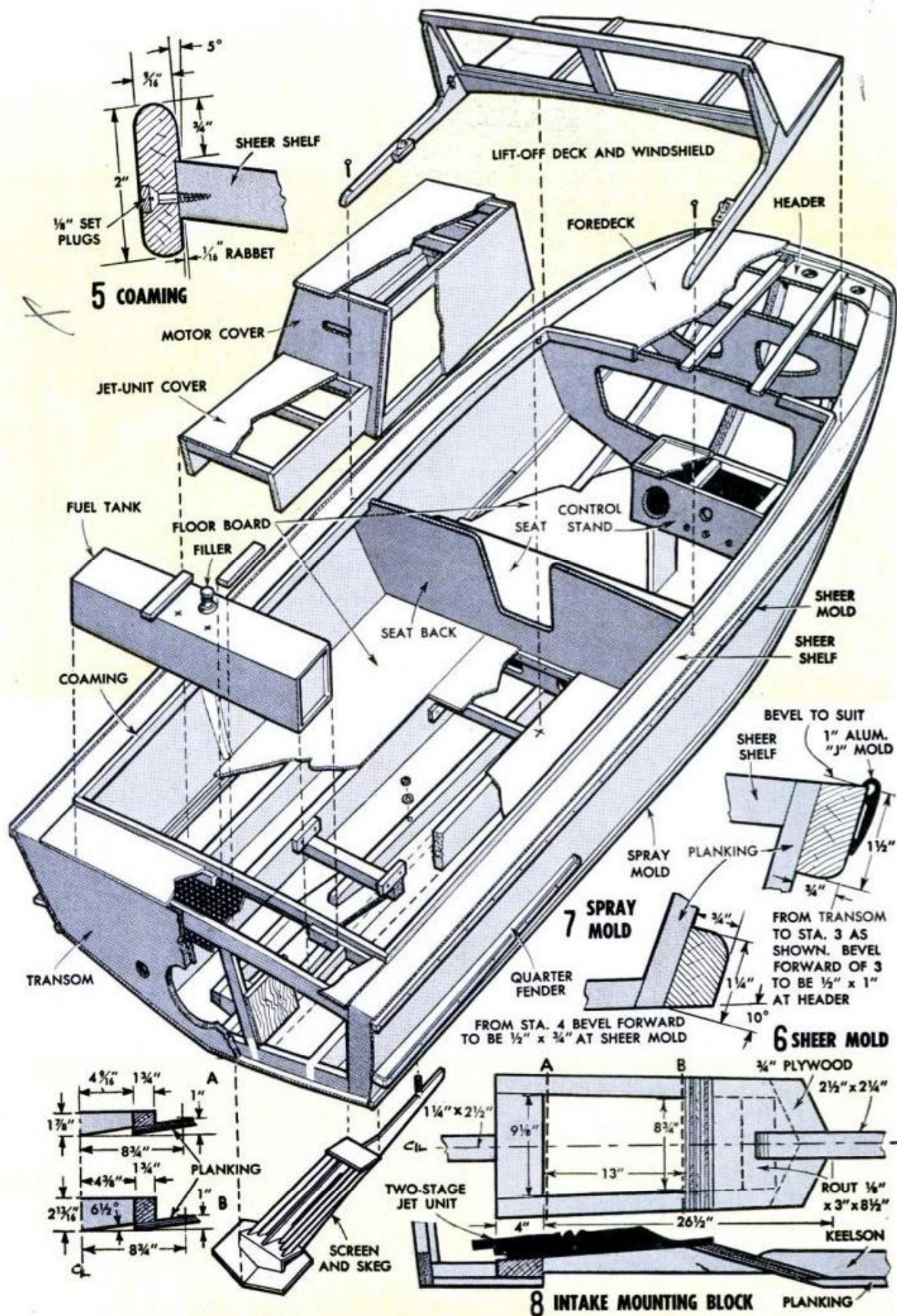
The exciting features of the *PM Jet* go beyond the jet drive. Lift off the removable portion of the deck and you have walk-around space ahead of the control stand, making the boat ideal for hunting or fishing. As for cost, the jet drive and motor combination compares well with in-board-outdrive installations in the same power range.

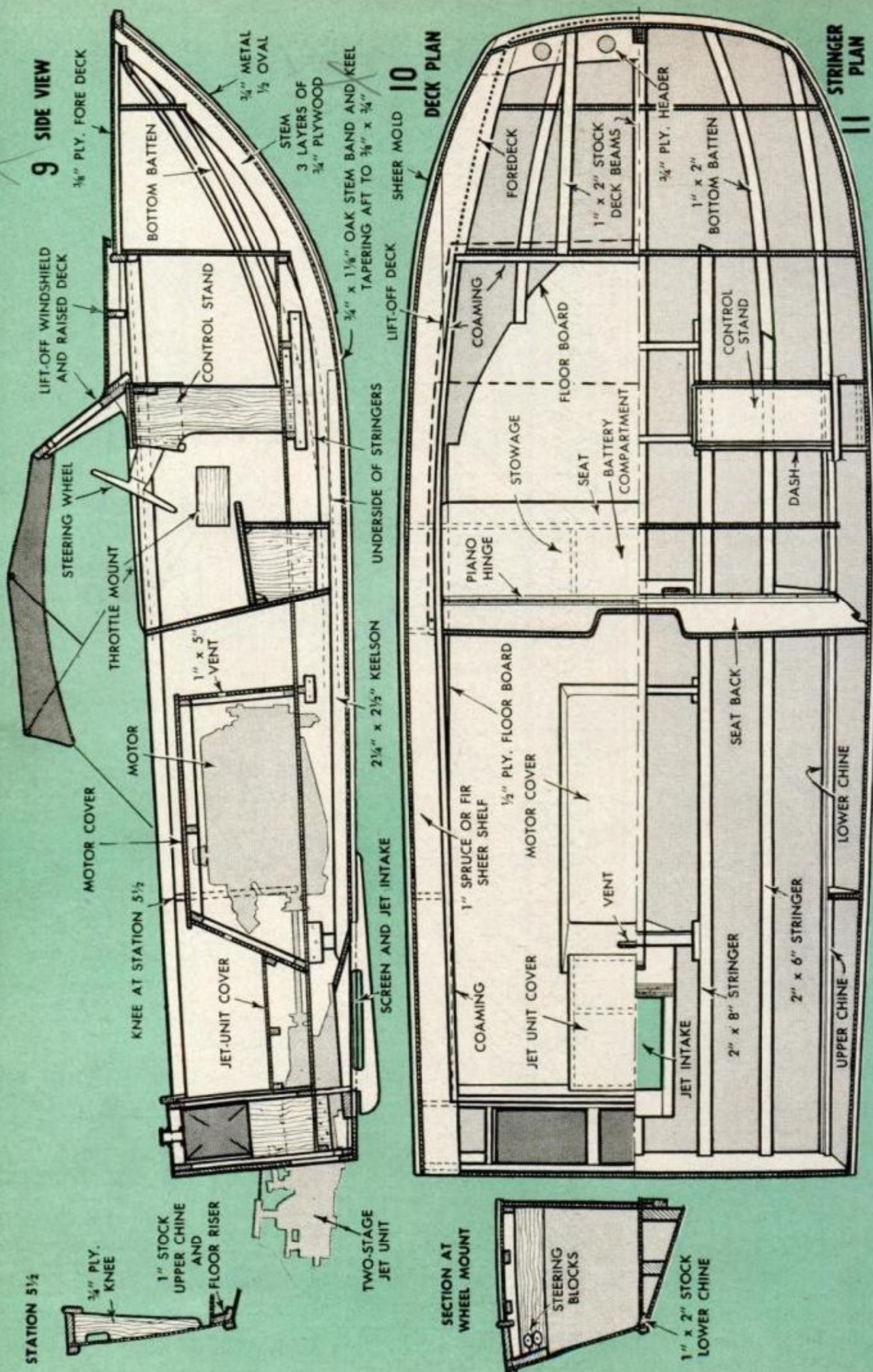
Before going on to the construction, one point should be made clear. Jet units are *not* standardized. Each make requires a different shaped intake cutout in the bottom of the boat, different transom cutouts and a different mounting block. The jet unit used in the *PM Jet*, Fig. 4, is the two-stage 75-2 model built by Buehler Turbo-craft of Indianapolis, Ind. Any details included here pertaining to the jet installation apply to this unit only. If you are considering another make of jet, check



**POPULAR MECHANICS**





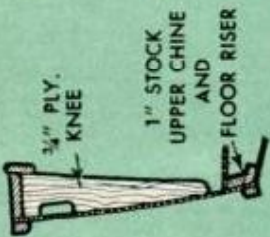


**9 SIDE VIEW**

**10 DECK PLAN**

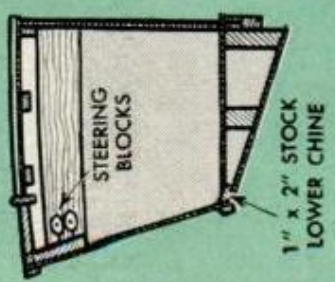
**11 STRINGER PLAN**

STATION 5 1/2



TWO-STAGE JET UNIT

SECTION AT WHEEL MOUNT



**STEM IS EXTENDED** past header so that extra material serves as a leg to bring header to correct height

with the manufacturer *before* you start building to find out necessary modifications.

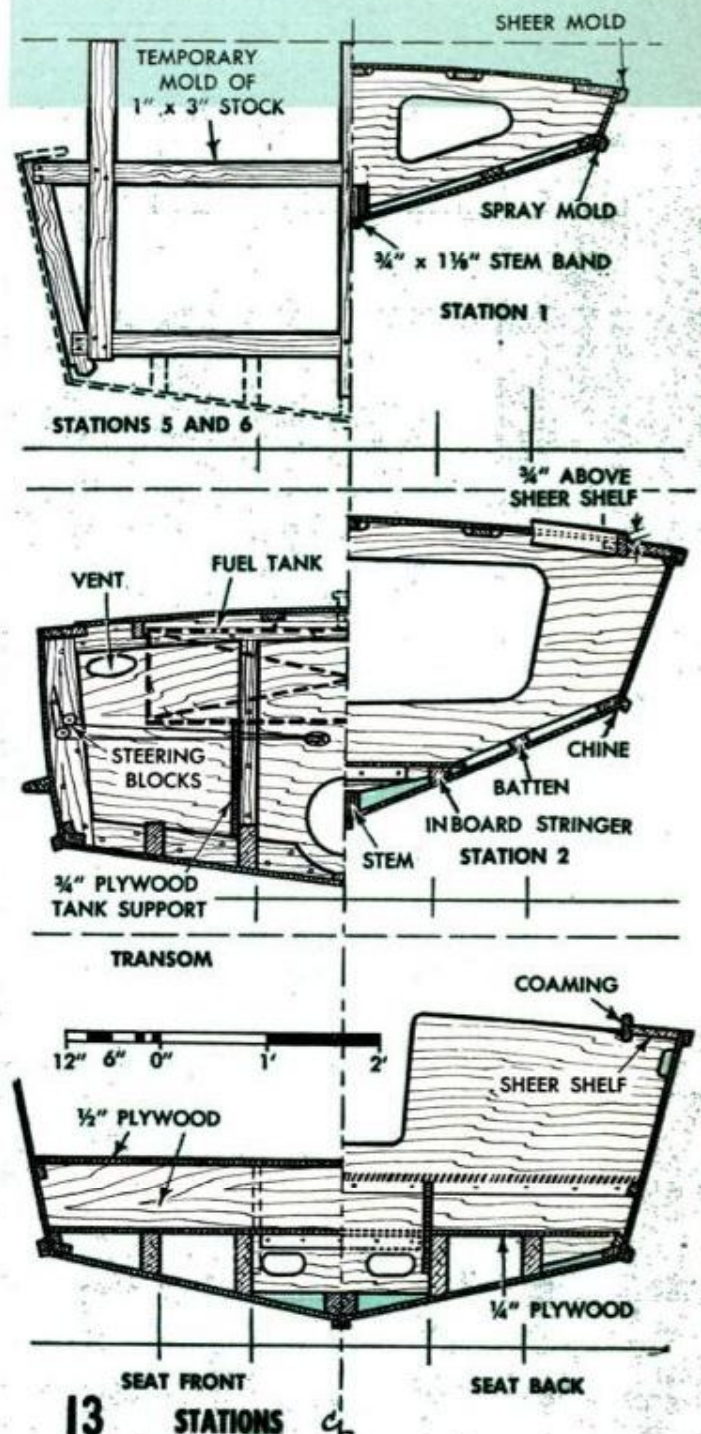
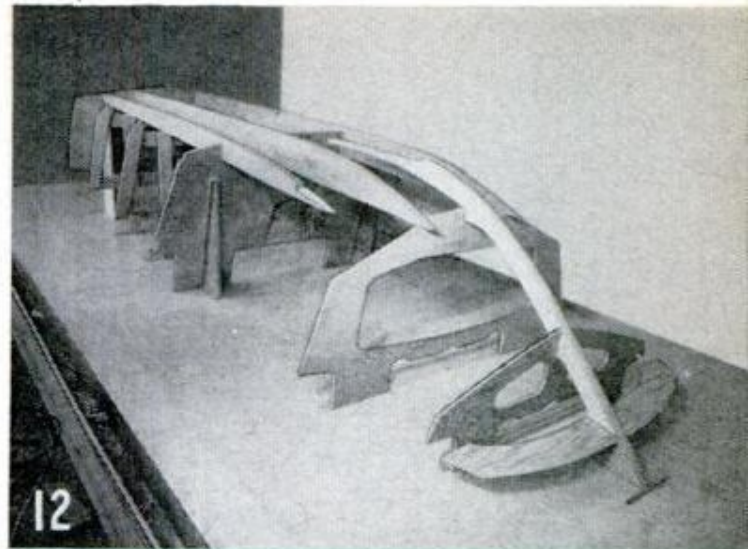
A word about materials might also be in order. All planking is  $\frac{3}{8}$ -in. fir plywood, either marine or exterior, grade AB or better. Because the panels required are unusually long, your dealer may not have them in stock. If he has to put in a special order for them, they might not be delivered for a month, so check with him before starting construction to avoid delays later.

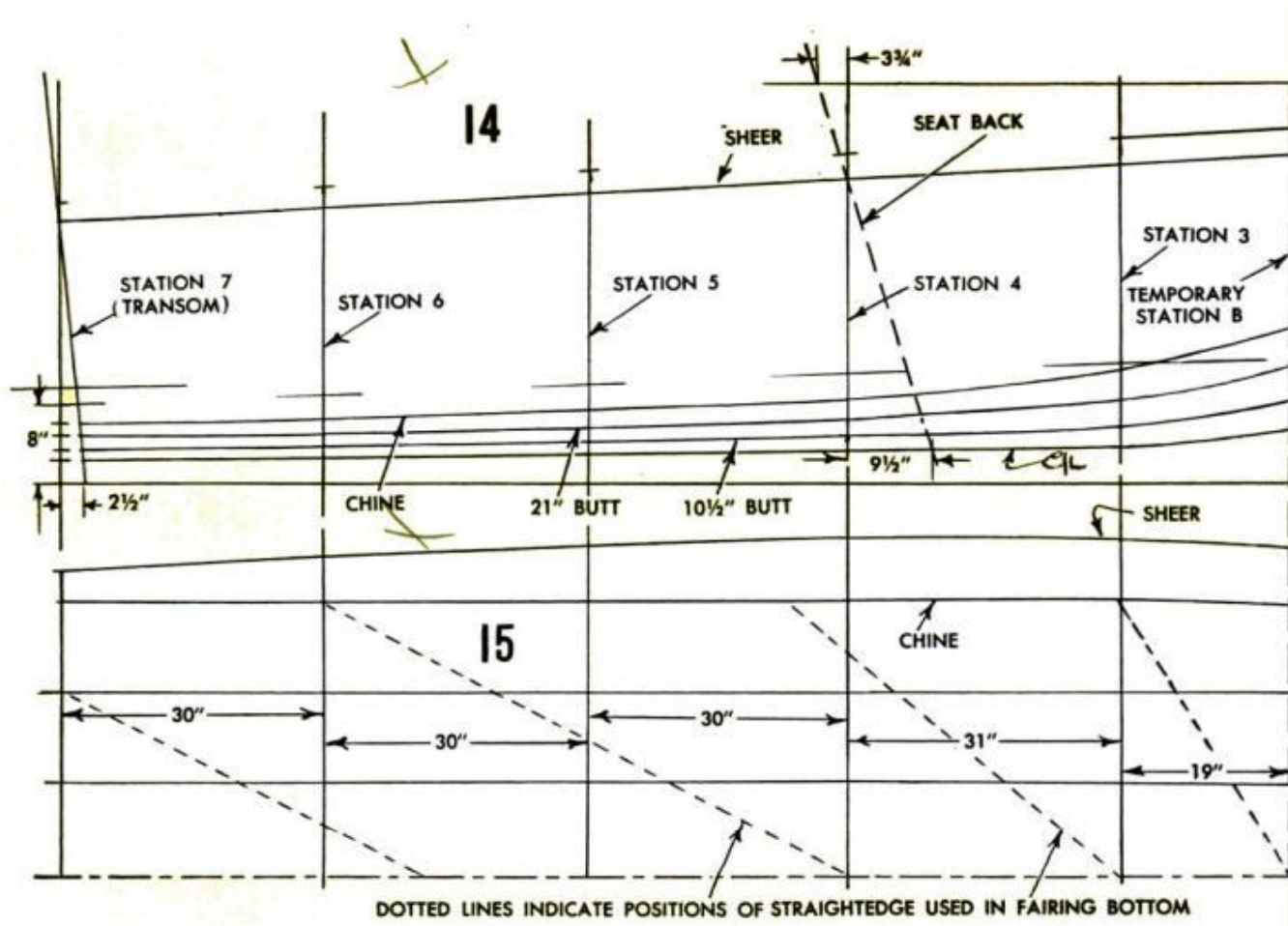
The length of all fastenings should be at least three times the thickness of the outer piece through which they pass, wherever possible. In general, serrated bronze nails (Stronghold, Anchorfast, etc.) are used to secure the planking, and these should be at least 1 in. long. Chines, battens, sheer shelf, etc., are mounted with  $1\frac{1}{2}$ -in. No. 10 flathead brass wood screws. Use waterproof glue at all joints and bedding compound under all molds. The bulkheads, transom and stem are all cut from  $\frac{3}{4}$ -in. exterior fir plywood, with the stem consisting of three layers of plywood held together with glue and screws. For a complete list of materials used in the *PM Jet*, turn to page 214.

Since no building frame is used in constructing this boat, it is extremely important that you have a stable, level nailing platform to hold the frame in line. We built the *PM Jet* on a construction floor made from scrap 2 x 4s and plywood. If you don't care to build a complete floor, you can make a rigid frame slightly larger than the outside dimensions of the hull and floor at only those points where bulkheads and temporary molds will be mounted.

Lay out a centerline on the construction floor and mark off the station spacings, being careful to keep them square to this line. After cutting out the bulkheads and transom, Fig. 13, make up the temporary molds from scrap 1 x 3 stock. Use no glue when assembling these molds as they will have to be dismantled later. To bring the bulkheads and transom up to the correct height above the base line, Fig. 14, you may either leave extra stock on the upper part when cutting them out to serve as legs, Fig. 12, or mount temporary 1 x 3 legs on them. Side supports cut to the proper angle should be mounted to the legs on the transom and seat back to add stiffening and give the proper rake.

Draw an accurate centerline on all bulkheads and molds, then position them on the building floor and nail the legs to cleats which have been secured to the floor at the





station lines. Next, make up the stem leaving the fore end long as shown in Fig. 12 so that the header can be mounted on it at the correct height above the base line. After mounting the header, set this stem-header assembly in place and add the keelson, making sure that all these members fit snugly at the bulkheads. When all parts have been aligned, secure them with glue and screws.

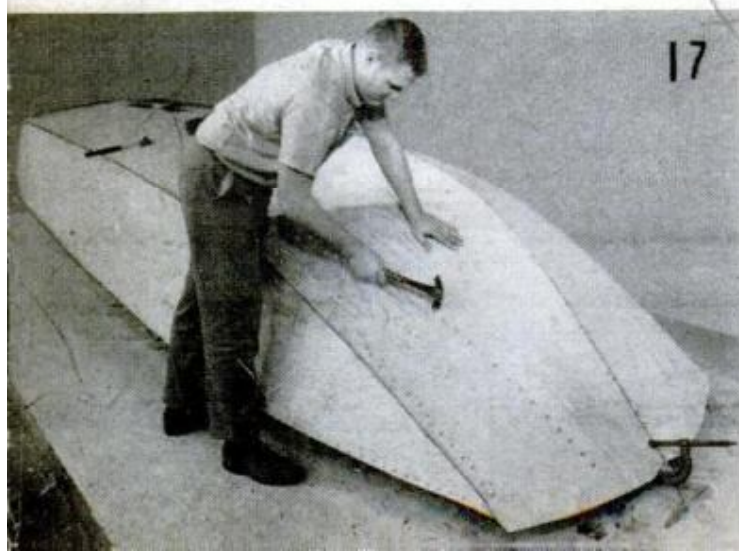
The four stringers, Fig. 11, are now cut and beveled about 6 degrees on the planking side. All dimensions from Figs. 14, 15 and 16 pertaining to stringers (shown as buttock lines) are for the inboard or deepest side. Notch the fore end of the outer stringers to receive 1 x 2 battens and mount

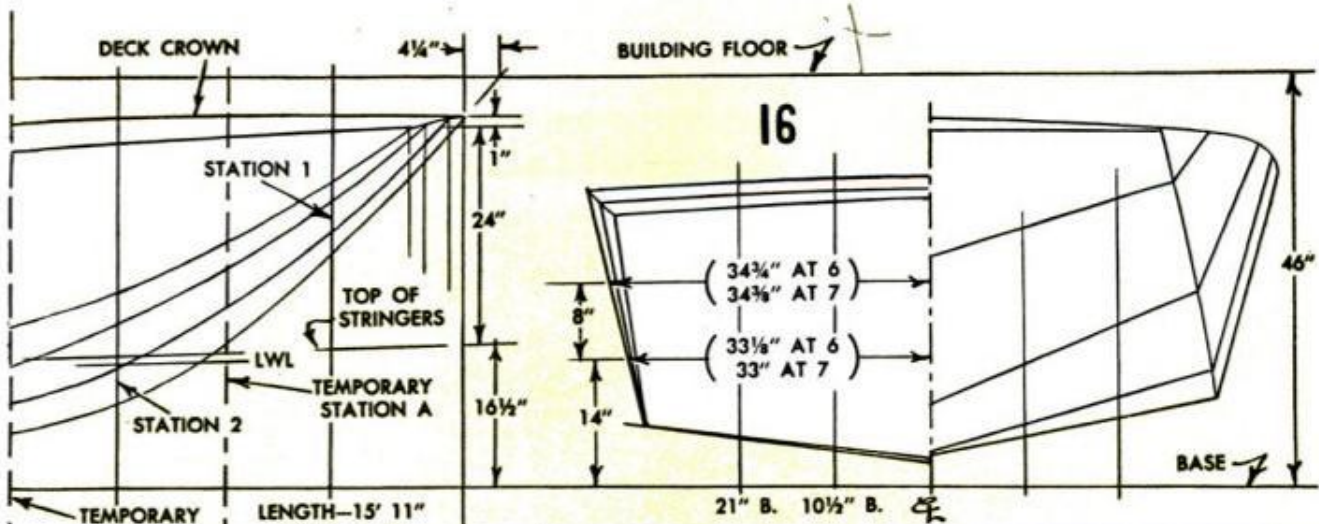
these battens to the stringers at a slight toe-in angle. Then bend the battens over the bulkheads until the fore ends are hard against the header but forward of the final position and clamp them in place. Saw off the surplus using the lower surface of the header as a guide, draw the battens closer to their final position and saw off more material. Repeat this operation until the battens are in their final position and have the proper angle. Then secure them to the header with glue and screws.

You are now ready to lay out and mount the two-piece sheer shelf. Using temporary cleats attached to the bulkheads, molds and transom, clamp the 1 x 10 board from which the longest part of sheer shelf will be cut

**BOTTOM PLANKING** can be clamped to header to make nailing easier and assure contact at the centerline

**USE PLYWOOD** surface of intake block as a sawing guide when continuing intake angle through planking





	STATION	7	6	5	4	3	B	2	A	1
ABOVE BASE	CROWN	32"	STRAIGHT LINE		38"	39 3/4"	—	41"	—	41 1/2"
	SHEER	30"	STRAIGHT LINE							39 3/4"
	CHINE	6 1/2"	7 1/8"	8"	9 1/2"	12 7/8"	17 1/8"	21 1/2"	27 1/4"	34 1/4"
	21" BUTT	5 1/8"	5 3/8"	6 1/8"	7 1/8"	9 3/8"	13 1/4"	18"	24 3/8"	32 1/4"
	10 1/2" BUTT	3 3/8"	4 1/2" +	4 7/8" +	5 1/4"	6 3/8"	9 1/2"	13 3/8"	20 1/8"	28 7/8"
		2 1/2"	3 1/8" +	3 3/8"	3 7/8"	4 1/4"	6"	9 1/4"	16"	26 1/2"
FROM GUNWALE	SHEER	35"	36 1/2"	37 3/4"	38 1/2"	38 3/4"	—	35 3/4"	—	29 3/4"
	CHINE	31 3/8"	31 3/8"	31 3/4"	31 3/4"	31 3/8"	—	29 3/8"	—	26 3/4"

MEASUREMENTS TO INSIDE OF PLANKING AND UNDERSIDE OF DECK.  
SIDES ARE STRAIGHT LINES FROM SHEER TO CHINE EXCEPT AT STATIONS 6 AND 7

to the underside of the frame at the proper crown. Then lay a batten on this board so that it is in contact with the outer side of all stations, clamp it in place and use this as a guide for marking. Remove the shelf and make a bevel cut of about 15 deg. with the line marking the narrow side of the cut. It is best to cut on the outside of the line so that a bit of stock is left for final trimming.

After cutting the scarf, Fig. 10, clamp the shelf in position again. Now put the second length of 1 x 10 in place, clamping

**KEEL AND STEM BAND** is mounted after fiberglassing is completed. It can be faced with aluminum molding

it to the header and two forward bulkheads. Use a batten to continue the sheer line of the first piece to the header and then follow the outline of the header. Remove both pieces of the shelf and bevel-cut the sheer line of the second section as you did that of the first. Using plenty of glue, join the two pieces at the scarf cut with a simple butt joint reinforced with a temporary backing plate which will be removed after the coaming line has been laid out and cut.

(Continued to page 212)

**PAINT BOTTOM** of hull before turning it and make sure that hull cradle is padded to protect this finish



SHOP AND CRAFTS

*Make  
Your Own*  
**BANJO**

X38

X 38  
**By Gustav W. Stamm**

*Although making a banjo is less of a challenge than most musical instruments, it can be an intriguing test of skills for craftsmen*

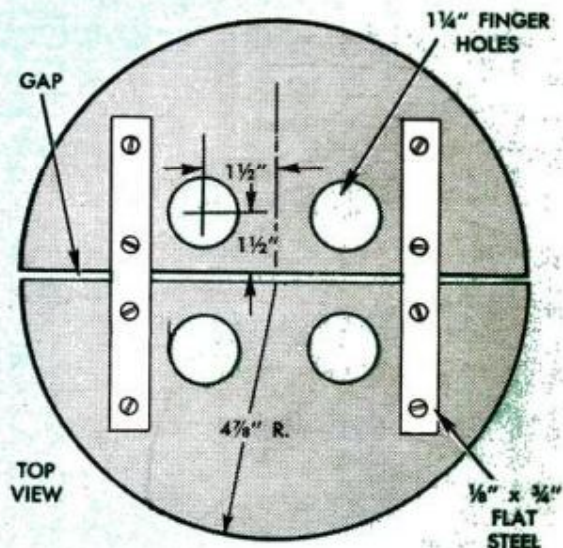
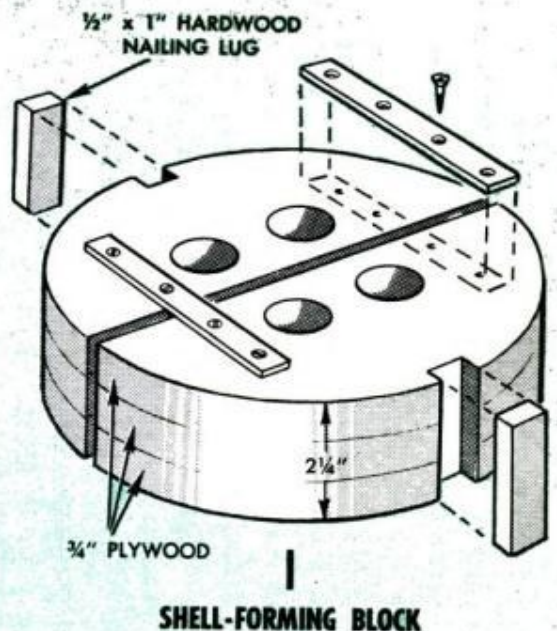
**W**ITH THE possible exception of the fingerboard, calfskin head and a few other parts which you can buy at reasonable cost, you can craft an excellent five-string banjo from hardware and lumber-store materials. With only a few hand tools and the materials at hand you're set to start from scratch.

Begin by making the form on which you laminate the shell, Fig. 1. Sandwich and clamp three pieces of  $\frac{3}{4}$  x  $10\frac{1}{4}$  x  $10\frac{1}{4}$ -in. plywood with glue in both joints. When dry, scribe a center line and bandsaw the block into two parts. Place a length of  $\frac{1}{4}$ -in. stock between the halves, clamp together and then screw two flat-steel cleats to each face as in the lower detail, Fig. 1. Locate the center, scribe a circle on one face on a  $4\frac{7}{8}$ -in. radius. Bandsaw just outside this line and save the waste pieces. Drill four  $1\frac{1}{4}$ -in. through holes located as in the lower detail, Fig. 1. Cut two  $\frac{1}{2}$  x 1-in. grooves 180 degrees apart in the rim for loose-fitting nailing lugs, or blocks, as in the upper detail, Fig. 1. Remove two of the steel cleats, take out the  $\frac{1}{4}$ -in. strip and reassemble. The opening left by removal of the  $\frac{1}{4}$ -in. strip allows the form to collapse sufficiently to permit its removal after the shell has been completed.

The shell consists of eight  $\frac{1}{16}$  x  $2\frac{3}{8}$  x 36-in. strips of maple veneer. The final finishing strip is wood-grained plastic of slightly greater width and the same length. The wood strips are built up (laminated) around the form with the ends butt-joining alternately on the nailing blocks. Both ends of each strip are bradded to a nailing block to hold them temporarily in place. The end result of this procedure is a laminated ring with walls about  $\frac{9}{16}$  in. thick.

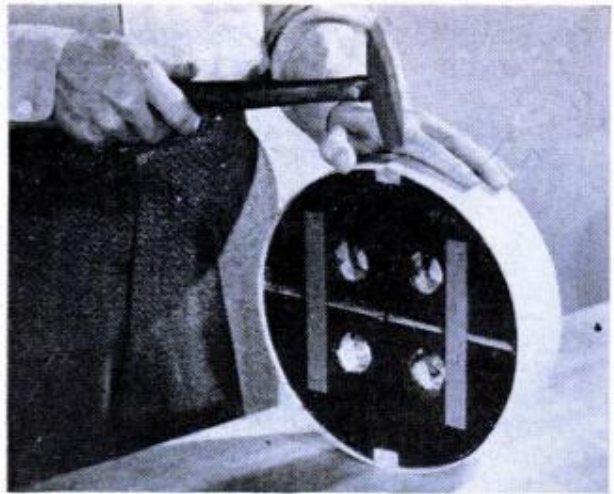
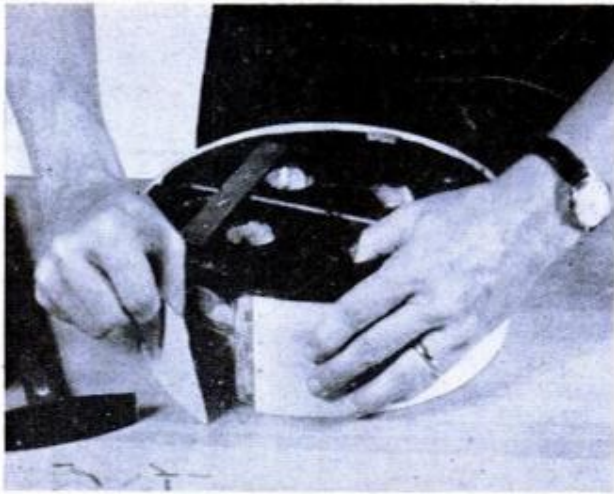
The first step is to place the eight strips of wood laminate in soft, warm water and allow them to soak for several hours. Then you remove four of the strips, coil them into a roughly circular ring and hold in place with a cord as in the photo at the right. Do the same with the second lot of four strips.

While the strips are drying, cut the two waste pieces you sawed from the form into four triangular blocks of roughly the same size. Saw off the right angle corner of each to give a flat about 1 in. wide. This gives you four clamping pads, or cauls, each



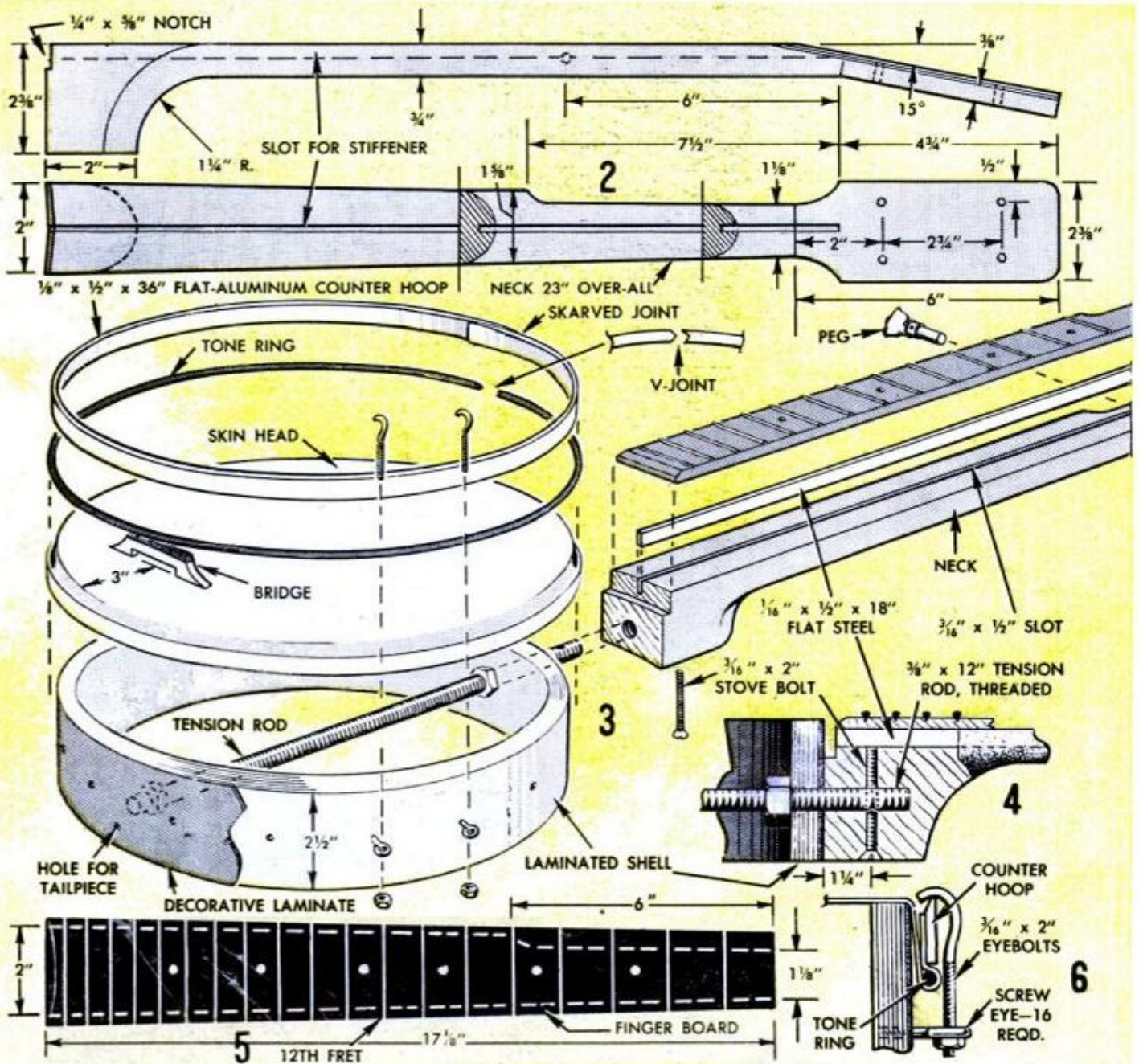
**STRIPS** used in laminating shell are soaked in water and pre-bent by forming four strips into a ring and holding with cord until dry



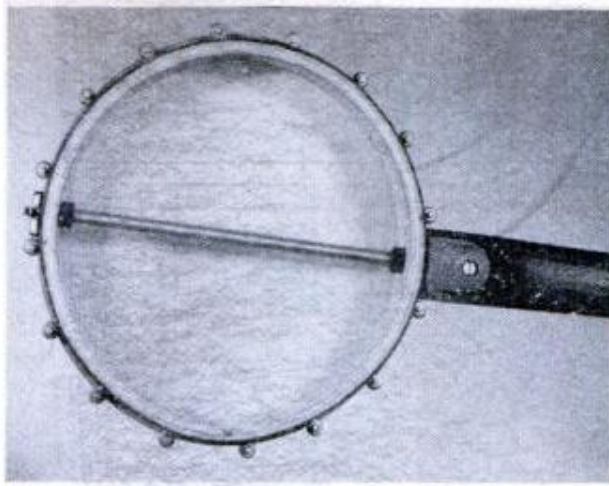


**FIRST STRIP** being attached to form. Ends must butt, not overlap. Note that starting end already is attached to nailing block with brads. Finish end is trimmed about  $1/16$  in. short to prevent buckling

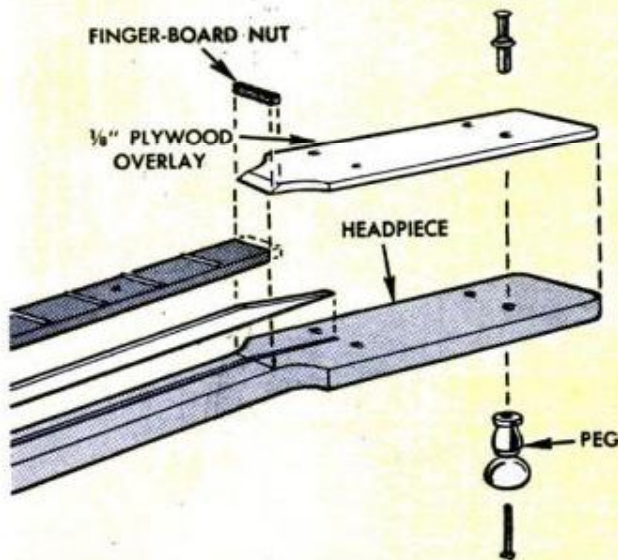
**FINISH END** of first laminate strip being bradded in place. This strip is then coated with glue and starting end of second strip is bradded to nailing block opposite butt joint of first strip. Use  $1/2$ -in. brads







**COMPLETED HEAD** with all parts in place. View is looking up at underside and shows the tension rod and the rounded underside of the neck. Note the location of the tension-rod locking bolt in neck



**DOWN VIEW** of the finished banjo head showing the five strings, bridge, skin, hoop, tone ring and a part of the fingerboard completely assembled



suited to the purpose, as the curved face of each one is the same radius as that of the form. Two C-clamps can be used on each caul, the fixed pads of the clamps being inserted in one of the 1 $\frac{1}{4}$ -in. finger holes.

The next step after the veneer is dry, or nearly dry, is to brad one end of the first strip to a nailing block on the form, using  $\frac{1}{2}$ -in. brads. Wrap the strip tightly around the form, cut about  $\frac{1}{16}$  in. short and brad the finish end to the same nailing block. Now you are ready to laminate the shell by gluing strips successively, one over the other, with the butt joints alternating on the nailing blocks. Here's how you proceed: Coat the first strip which is already on the form, with glue (don't use quick-setting white glues) brad the starting end of the second strip to the nailing block opposite the one on which the butt joint of the first strip was made. Locate the first caul with its end near the starting end of the strip. Clamp the caul in place, using two C-clamps, one on each side of the form. Continue the procedure around the form until all four cauls are in place and clamped. Then brad the finish end of the strip to the nailing block, trimming the finish end if necessary to form a butt joint. Remove the clamps and cauls. The butt joints do not need to be tight, but be sure before bradding that the ends do not overlap. Continue this same procedure, step by step in sequence, until you have applied four strips. Then leave the clamped cauls in place until the glue dries thoroughly. Wipe off any excess glue with a damp cloth before it sets. Now, with the first four strips in place you apply glue to the face of the fourth strip and simply repeat the procedure just described step by step in sequence until all eight wood strips have been glued in place.

The finish strip of wood-grained plastic laminate is applied with contact cement. This strip should butt-join over one end of the gap in the form. The material must be applied with contact cement which is brushed onto the surface of the wood laminate and the inner surface of the plastic strip and allowed to dry to a stiff tacky stage (or as directed on the container). Remember that these two coated surfaces will adhere instantly on contact, so be sure you have the starting end of the strip correctly located before bradding it. When you're sure of the location, press the strip into contact about one fourth of the way around the circumference of the shell. Then clamp one of the cauls into position over the area in contact. Continue to press the strip into contact all the way around

(Continued to page 210)

# Winking-Eye CLOWN RADIO

*Familiar magic-eye tubes make this clown come alive!*

**T**HIS AMUSING clown-face radio is a child delighter. Voice or music broadcasts come out of the mouth and the eyes blink in tempo to the sound. You regulate volume by twisting the clown's nose.

The secret of the winking eyes is to mount two 6E5 magic-eye tubes in correct position behind the clown face cutout and wire them into the radio circuit according to the diagram shown at the top of page 164. This is a low-cost circuit of the detector-amplifier type designed to provide the minimum performance which might satisfy youngsters.

You can obtain better performance, if you happen to have a working model of a small a.c.-d.c. radio, by wiring the clown eyes into it, following the circuit shown on the bottom of page 164.

After preparing the metal work for the built-from-scratch receiver, mount the tube sockets and the transformer. Following the schematic diagram, wire the chassis.

When the circuit is wired and checked, prepare an antenna at least 50 feet long. If you are in an ordinarily good signal area, you can probably run the wire around the ceiling of the room. In a less favorable spot, run the wire up to the roof. Connect



the antenna lead to the top of the ferrite coil. We used a Fahnstock clip for this terminal to facilitate removal.

Plug the radio into a 110-volt outlet, and turn the switch on. Allow a short time for warmup, and listen at the speaker for a signal. If none is present, rotate capacitor C1 until a signal is heard. Peak the signal by adjusting ferrite antenna L1. Our unit, operating in downtown Chicago, was able to bring in three different stations with a roof-top antenna.

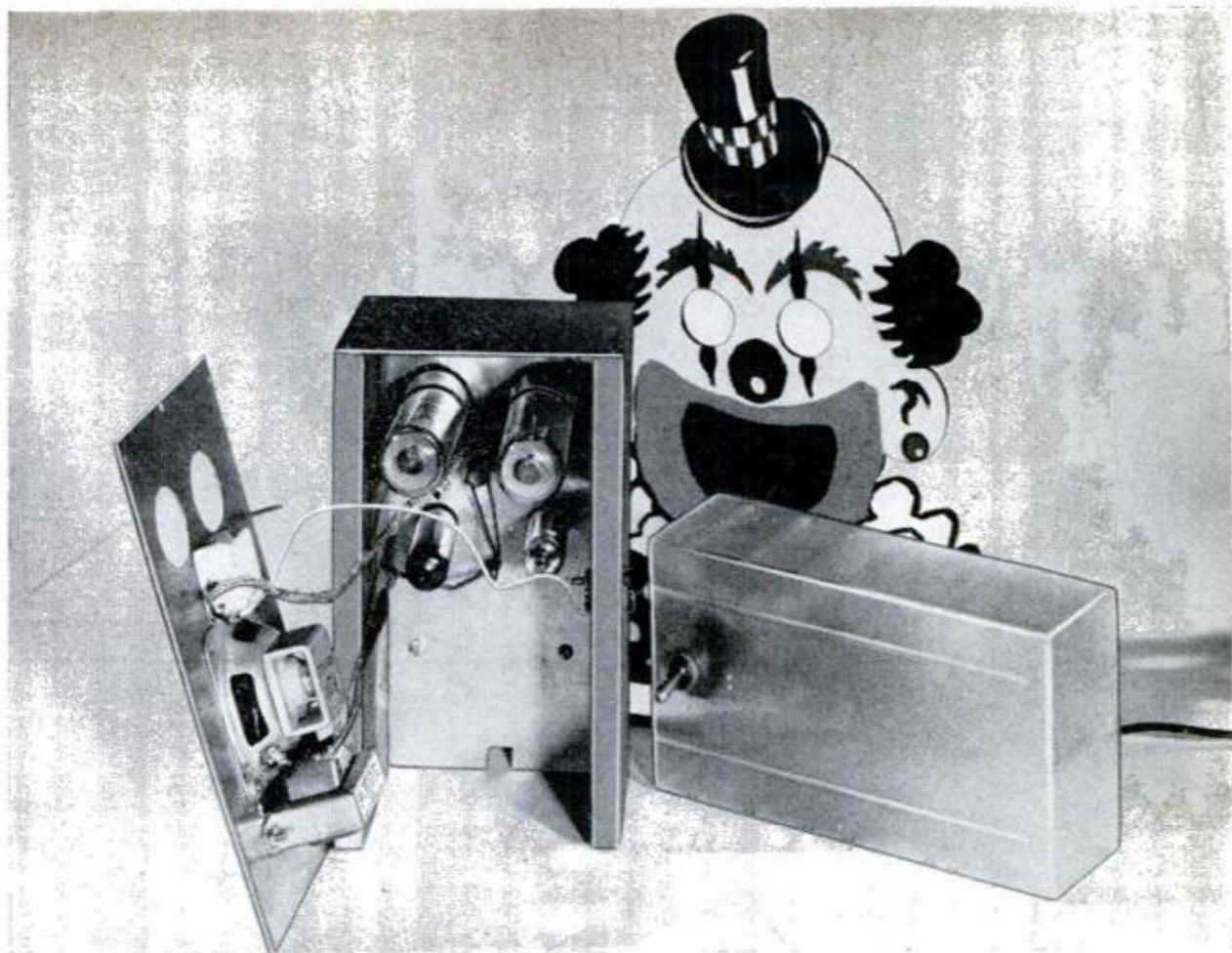
**Now connect the eyes.** Connect capacitor C7 to the plate of the 50C5 (pin 7). The eyes should deflect quite strongly. If they close and remain closed, this indicates that

## CLOWN RADIO PARTS

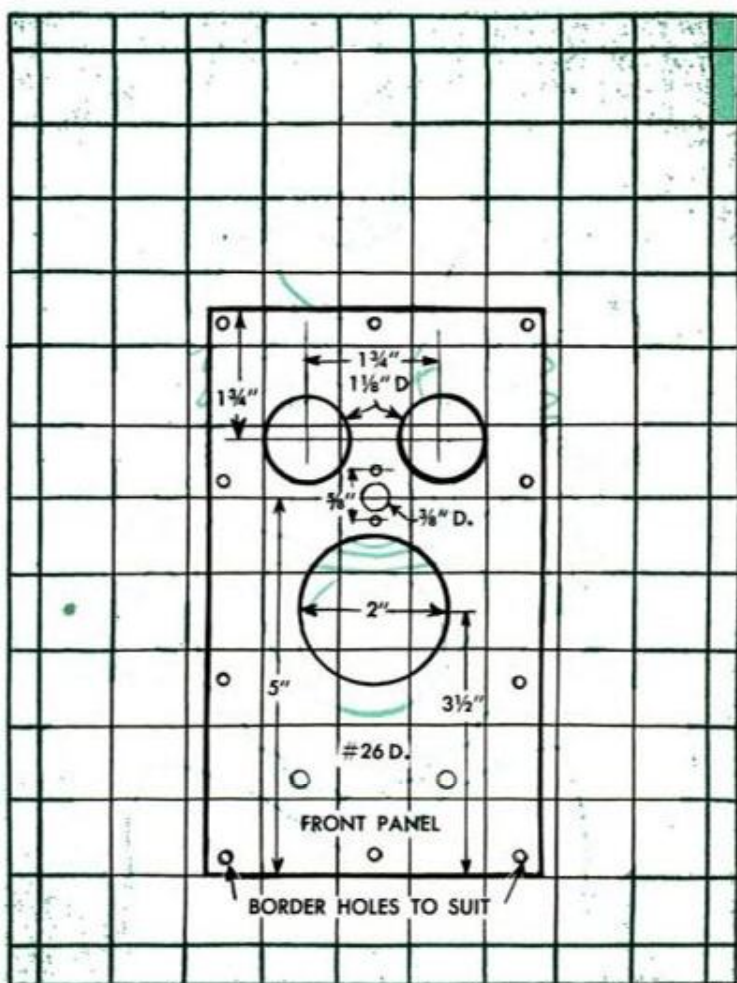
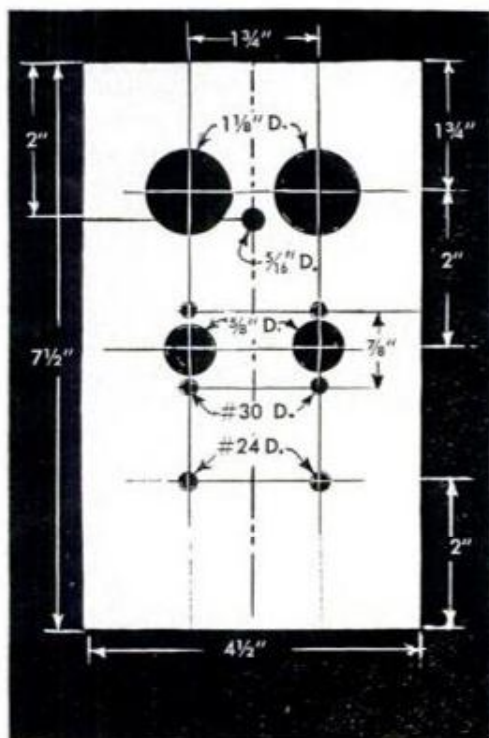
L1—Ferrite loopstick antenna  
C1—365 mmfd variable capacitor  
C2—330 mmfd mica  
C3—20 mfd electrolytic, 25 volt  
C4—30 mfd electrolytic, 150 volt  
C5—30 mfd electrolytic, 150 volt  
C6—.02 mfd paper, 400 volt  
C7—.02 mfd paper, 400 volt  
R1—220 k, ½ watt  
R2—470 k, ½ watt  
R3—150 ohm, ½ watt  
R4—1500 ohms, 2 watt  
R5—1 megohm, ½ watt

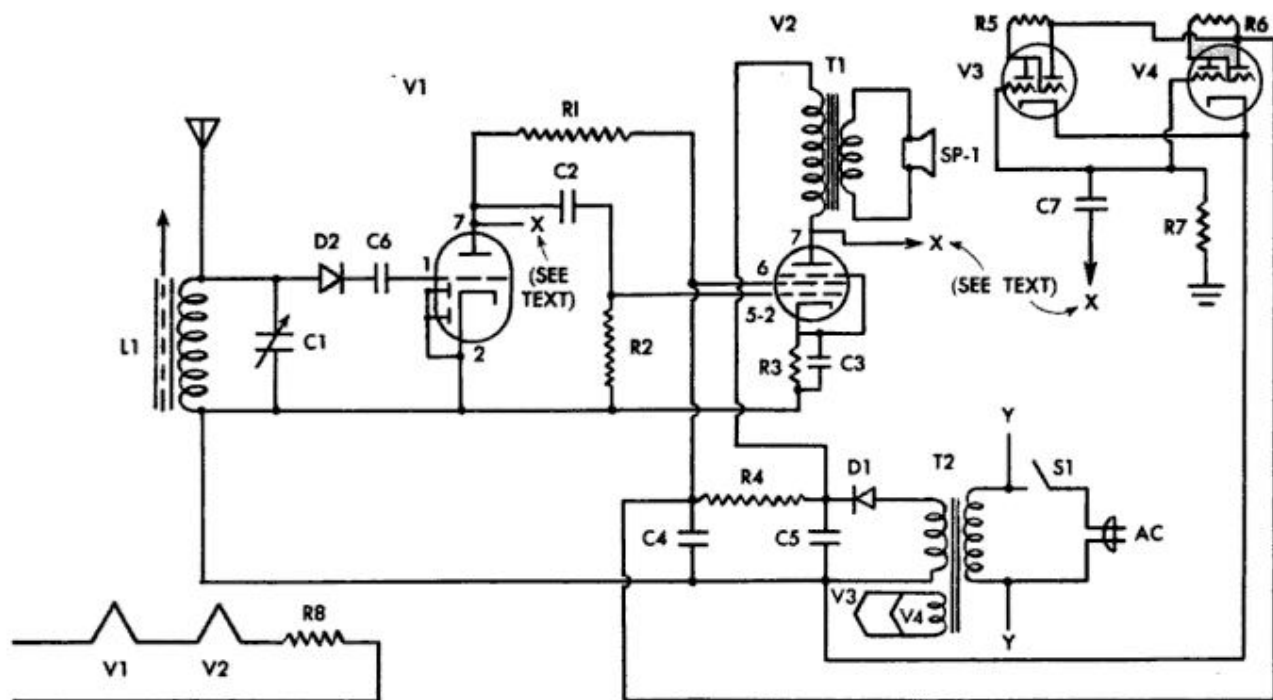
R6—1 megohm, ½ watt  
R7—1500 ohm, 2 watt  
R8—300 ohm, 5 watt  
V1—12AV6 tube  
V2—50C5 tube  
V3, V4—6E5 tube  
D1—70 MA silicon diode  
D2—1N34 germanium diode  
T1—Output transformer, universal  
T2—Power transformer, 110-volt input, 6.3 volt, 120-volt output. Allied Radio #61 G 410 or equiv.

Prepunched chassis and clown face available from  
Experimenter's Supply Co., 1924 W. Columbia Ave., Chicago, Ill.



**DISASSEMBLED UNIT**, above, shows relative parts placement. Rear panel pattern is seen below. Use drawing at right to layout a panel for front, as well as clown face. Grids are spaced one inch apart. Plastic cover mounts switch, protects small fingers from electrical jolts. Use hard-board for face, paint with enamel colors





**SCHEMATIC DIAGRAM** shows wiring. C1 mounts on separate panel. Use shielded wire for C1 connections

too strong a signal is being applied. Should this occur, connect the capacitor to the plate of the 12AV6 instead. You will notice, in testing the unit, that the eye action is better on voice than on music. This is because spoken material requires a no-signal space between words. Music peaks from note to note, but often maintains a minimal signal level in the background.

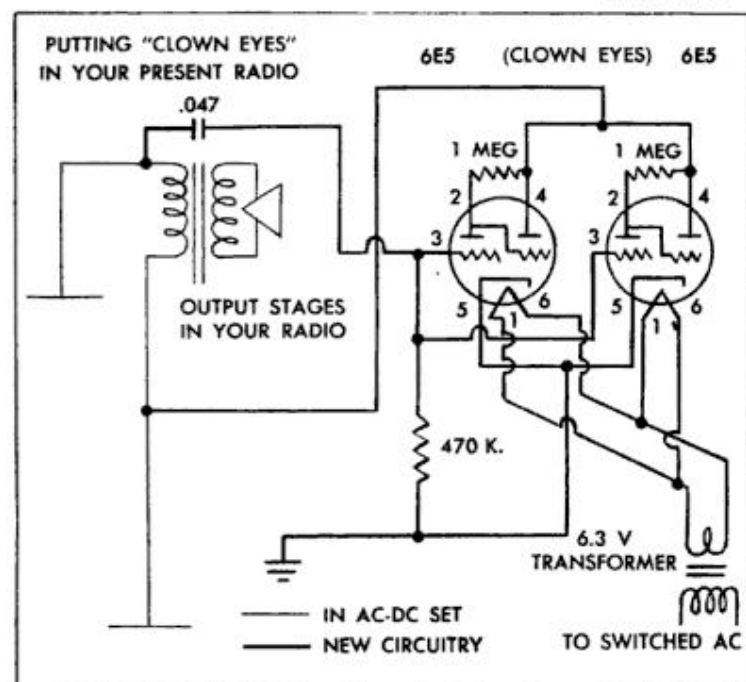
Assemble the front and rear panels using 1/2 x 4-inch boards for the sides.

**Paint the clown face with enamels.** Select

bright, gay colors except for the center of the mouth area which is painted black. You can tape a piece of black cloth over the speaker hole to fill the gap.

Nail the face to the base using wire brads. Now assemble the chassis to the base, using brads through the side pieces. Be sure the shaft of the tuning capacitor comes through the nose opening and the 6E5 tubes appear at the eyes. Select a large diameter round knob for the nose and paint it red with fingernail polish.

## ... Or Make Your Present Radio Into a Blinking Clown



You can improve the reception of the unit by using an a.c.-d.c. receiver. Using the circuit shown at left, wire in the two 6E5 tubes. Connect the primary of the filament transformer to the switched a.c. in the set.

Extend the volume control and switch leads to the clown's nose. You will notice that we have connected the .047 capacitor to the plate of the final output tube. If the eyes do not open sufficiently during no-signal conditions, this means that they are being over-driven. You can correct this by connecting the .047 capacitor to the plate of the first audio tube instead. This will be a 12SQ7 or a 12AV6, and lower the drive.

—Gus Wesenfeld

## QUICK AND EASY

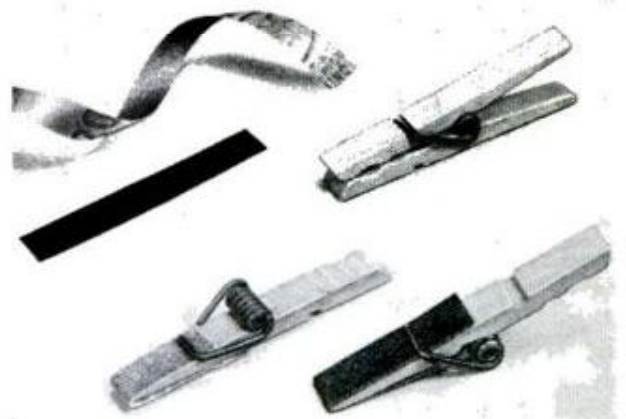
### Quickie Carton Table

A corrugated carton, a sharp knife and 10 minutes is all it takes to make this sturdy playhouse table for the younger set. Obviously, the size of the table depends on the size of the carton you use. Cut off the top just below the opened flaps, being careful, of course to cut it square and straight all around. Then cut away the sides and ends to form legs, rails and braces. If the table is made from a relatively small carton you'll need to leave braces only at the ends when cutting. But if it's cut from a large carton and is near normal table height, the legs will need braces all around. Also, you can strengthen the top by gluing in cardboard ribs underside. Width of the leg webs and braces should be at least  $2\frac{1}{2}$  in. and the braces should be about the same width. If desired, table can be spray-painted in a bright color.—*Frank Shore*



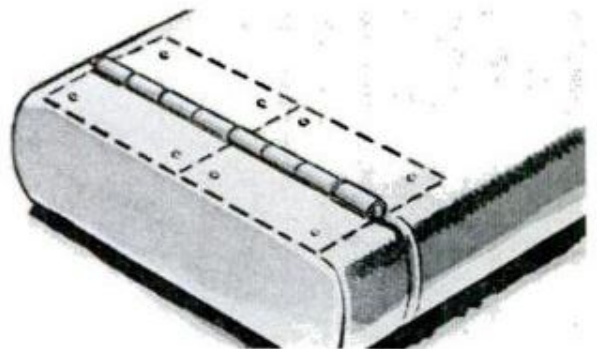
### Model Sander

A small sanding block, for use in model building or wherever light abrasion is required, can be improvised from a spring clothespin. Remove one half of the pin and reverse the spring. Then fold a narrow strip of sandpaper, emery or crocus cloth over the leading edge and anchor each end under the spring. The abrasive can be shifted as it wears. Use only a fine abrasive, as cutting action of the coarser grades will be difficult to control in small areas.—*Bil Toman*



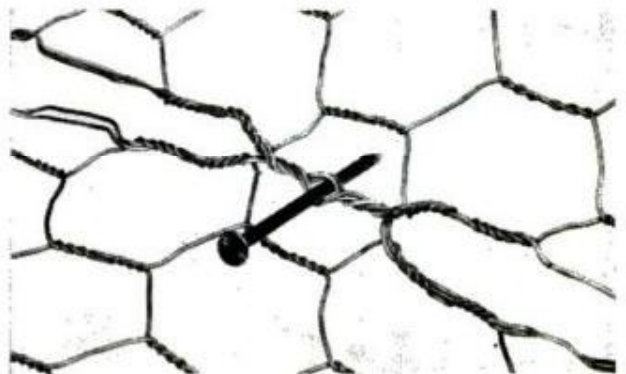
### Hinges for Free

Think twice about tossing away those empty tobacco cans. The hinged lids will provide neat little hinges for toys and other small projects and they won't cost a cent. Simply cut away the top portion of the can, leaving enough metal on each side of the hinge for attaching like regular hinges. Extra tiny hinges can be made by cutting the hinge section into fours rather than two as shown.—*Thomas Taylor*



### New Twist

With poultry netting now being used for more than just fencing in the chicken yard, extra width is often required. Two pieces of netting can be joined with a strong, durable seam by placing the edges side by side and twisting them together with a double turn, using a 5 or 6d nail. Withdraw the nail and repeat the operation every four inches. Do not make more than a double turn of the nail as the wire may break.



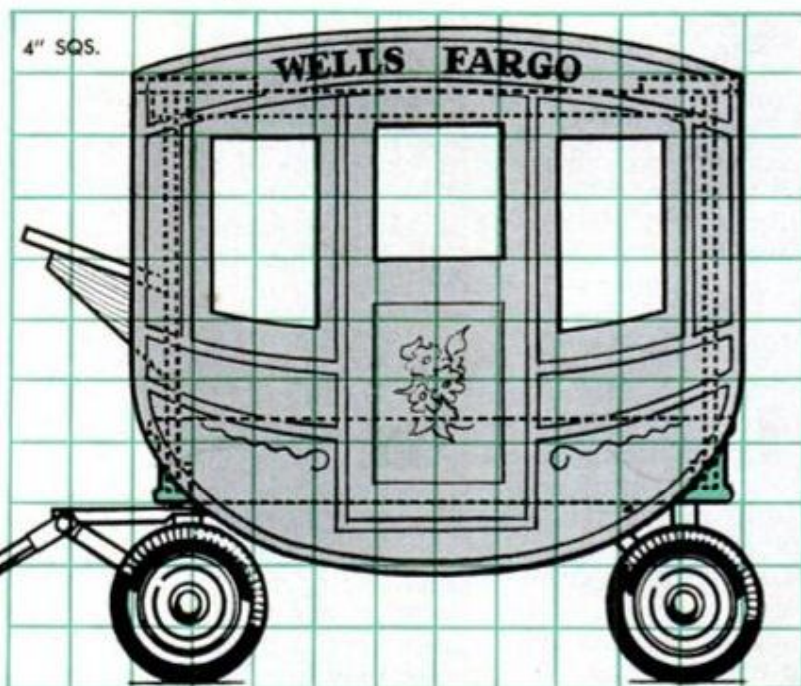
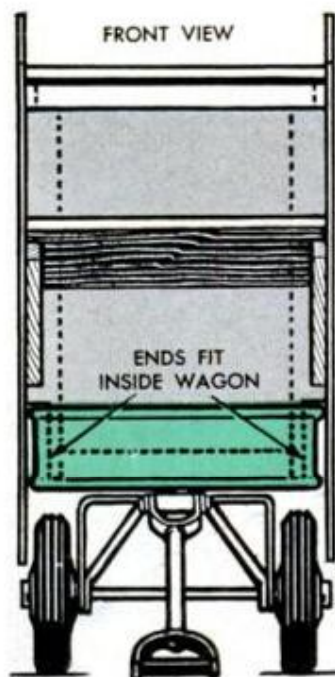


## Dodge City Stage

THE BRIGHT-YELLOW stage comes careening down the narrow mountain road with a whooping Apache war party in hot pursuit! High on his box, the stage driver yells encouragement to his team, and the cowpoke riding shotgun fires away at the screaming redskins.

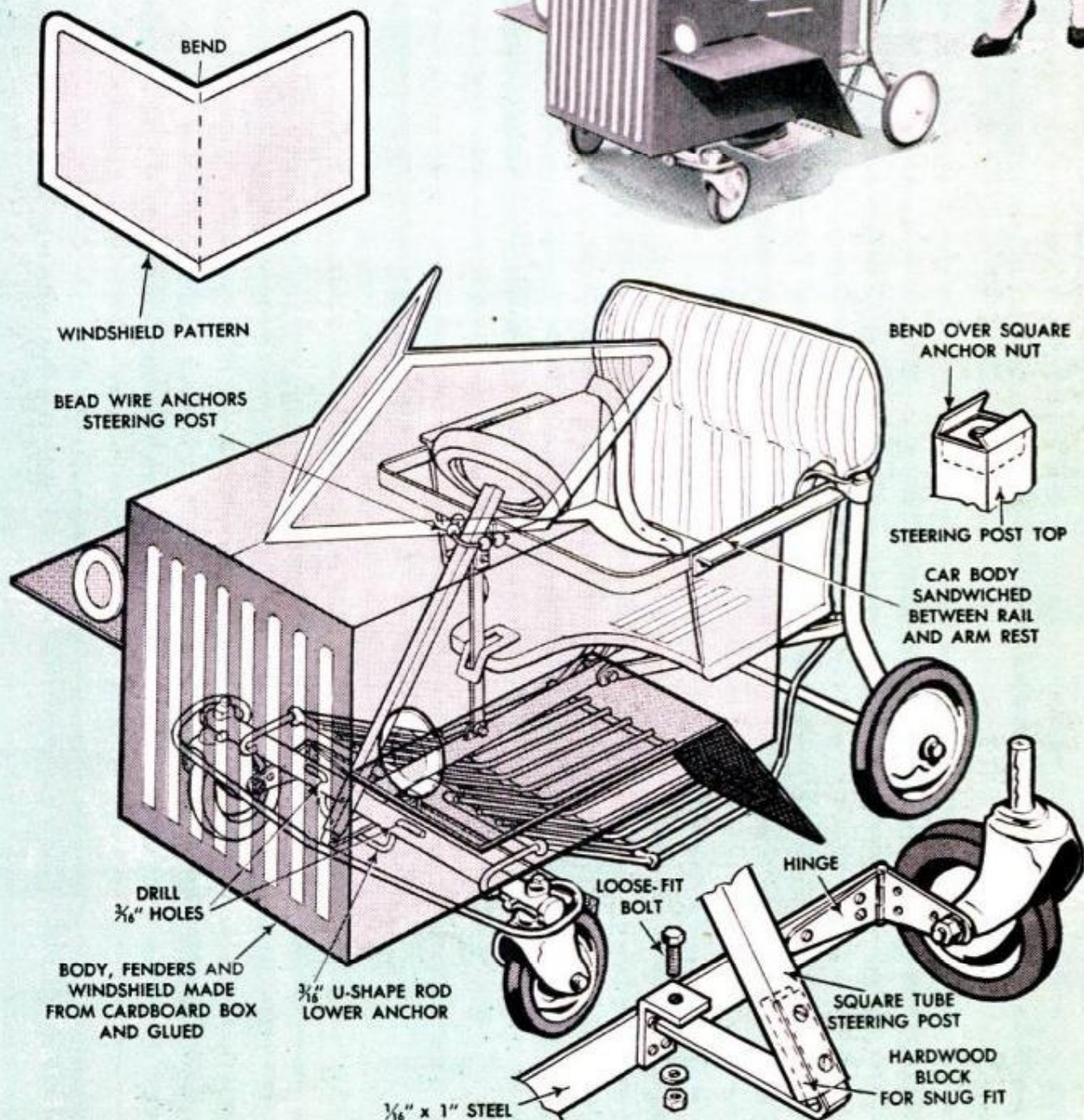
The stage-coach body is designed to merely rest in a coaster-wagon without fastening. When the wagon is needed for space-age games, the coach body is simply lifted out and stored in a corner of the garage. You can make both sides from a single panel of  $\frac{3}{8}$ -in. plywood 40 in. x 72 in. Framing is cut from  $\frac{3}{4}$ -in. lumber with a solid bulkhead in front on which the driver's seat and footrest are mounted.

Paint the coach yellow and use masking tape to add the black trim. Decals available at your paint store will make the coach look like the real thing. For use with a "two-horse" team, bind an extension to the wagon tongue and add a crossbar at the end. —Hi Sibley



# STROLLER COMPACT

MOM PUSHES and Junior steers this make-believe auto which is an ordinary stroller converted with a steering gear and a corrugated grocery carton into a sidewalk compact with fenders, raked windshield, headlights and painted speed lines. One good look at the lower detail below and you'll know how to build the steering gear. The square-tube steering post is adapted from a discarded towel bar and as you will note the sides of the carton are sandwiched between the rail and arm rest to hold the body securely in place.—Wayne Mullen





## Completing the Triple-Top FUN TABLE

By John Jetchak

**C**ONSTRUCTION at this point has detailed the building of the pool table and its compartmented base. Now all you have to make is the piggyback top and your fun table is completed. This separate lift-off, flip-over top, which rests on the pool table, lets you play table tennis on one side or operate an HO-ga. train system on the other by merely turning it over. As described in the beginning article of the series, December 1961 issue, the pool table incorporates a storage base which provides a convenient place to keep the rolling stock, scenic mountain and other lift-off train props when you want to flip the top for table tennis or remove it for pool.

Since it could pose a problem of getting so large a panel into the average basement, the piggyback top is made in two sections and hinged to fold flat. You can buy two-piece table-tennis tops from mail-order

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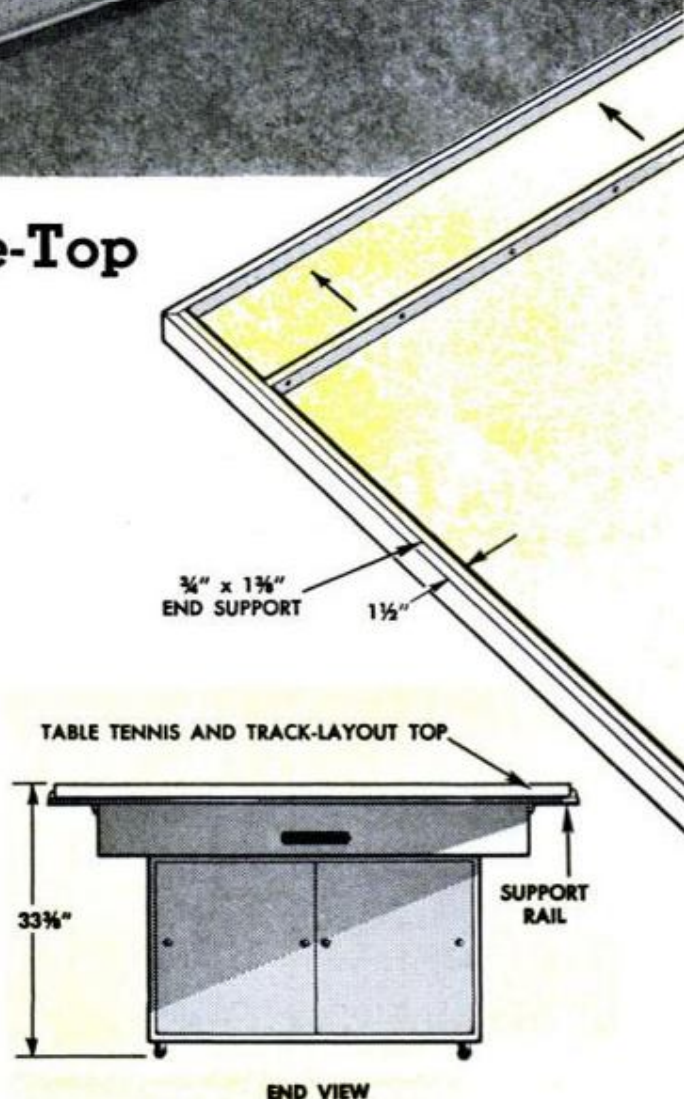
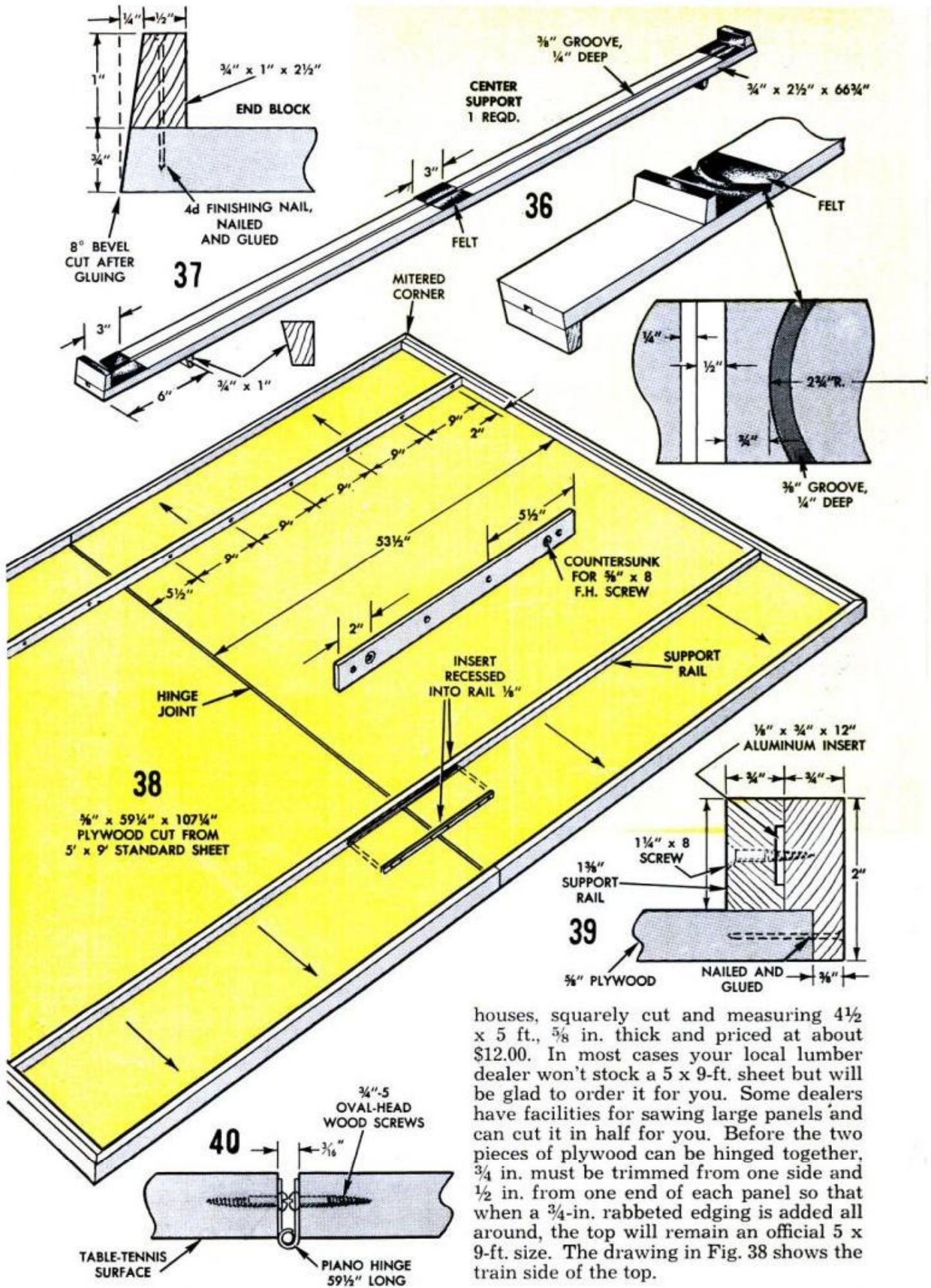


TABLE TENNIS AND TRACK-LAYOUT TOP

END VIEW

POPULAR MECHANICS





houses, squarely cut and measuring 4½ x 5 ft.,  $\frac{3}{8}$  in. thick and priced at about \$12.00. In most cases your local lumber dealer won't stock a 5 x 9-ft. sheet but will be glad to order it for you. Some dealers have facilities for sawing large panels and can cut it in half for you. Before the two pieces of plywood can be hinged together,  $\frac{3}{4}$  in. must be trimmed from one side and  $\frac{1}{2}$  in. from one end of each panel so that when a  $\frac{3}{4}$ -in. rabbeted edging is added all around, the top will remain an official 5 x 9-ft. size. The drawing in Fig. 38 shows the train side of the top.

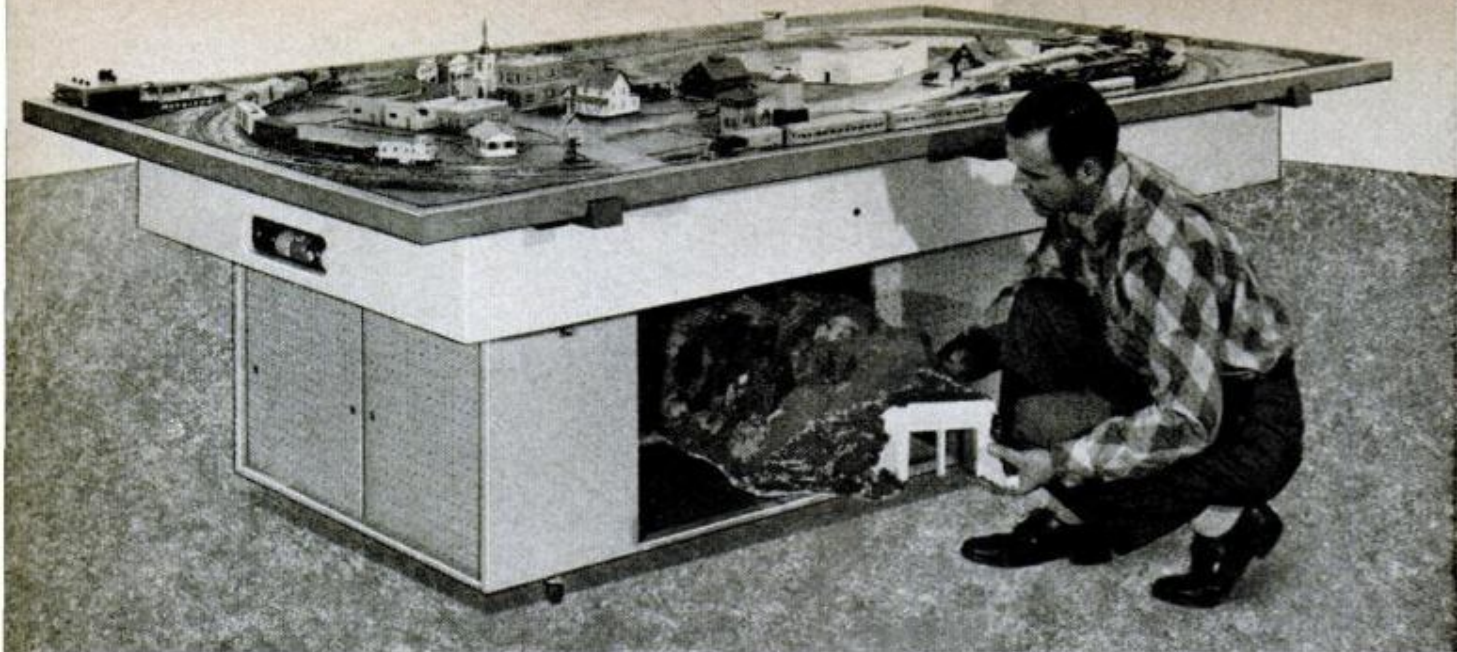
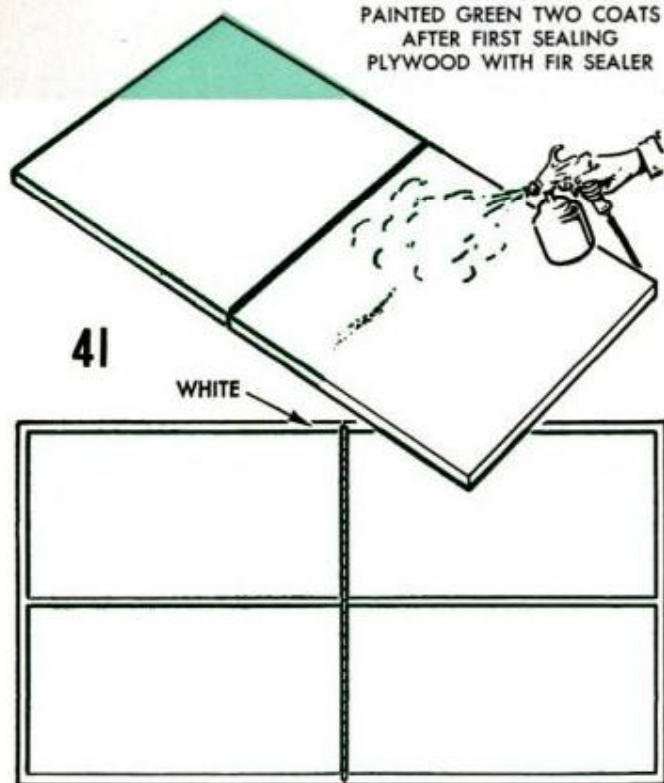


TABLE-TENNIS SURFACE  
PAINTED GREEN TWO COATS  
AFTER FIRST SEALING  
PLYWOOD WITH FIR SEALER

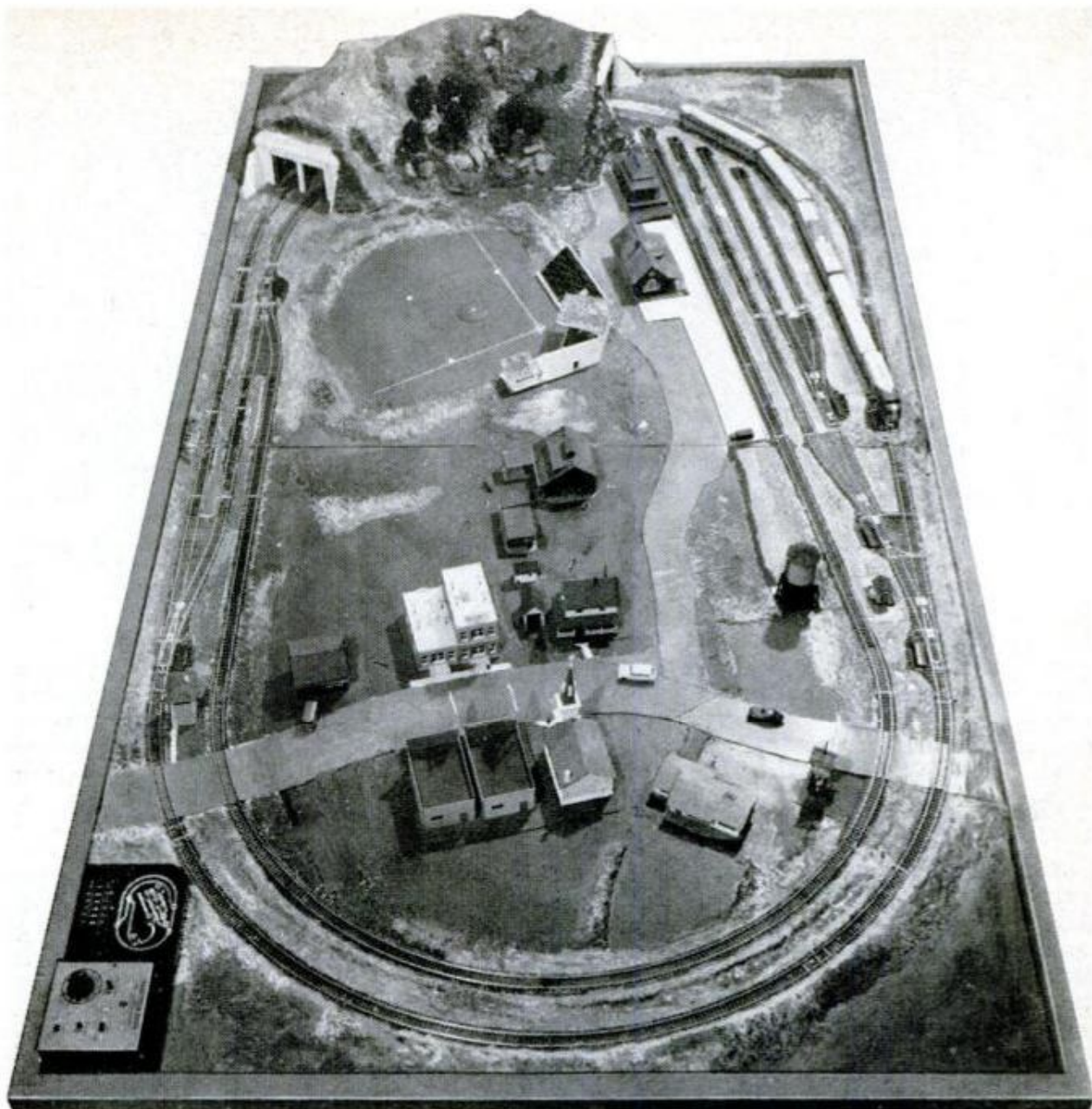
THE LIFT-OFF MOUNTAIN should not be more than 10-in. high so it, along with other model-train props, can be stored in the base of the table when you may want to switch to table tennis or a game of pool



The outer edging is made double-thick all around with an inner one of  $\frac{3}{4} \times 1\frac{3}{8}$ -in. strips. Fit the strips at the ends of the table top first, cutting them to fit between the outer edging, and permanently attach with glue and nails. The full-length strips along the sides of the table are attached with screws only (no glue) so that when you wish to fold the top, the strips can be removed. The side strips really serve as locking cleats which hold the two halves rigid and in alignment. Additional strength at the hinge point may be gained by embedding a flat-metal strip in a recess cut in the inner face of each side strip. The sectional detail, Fig. 39, shows how the metal strip fits flush and is fastened in the recess with flat-head wood screws. Except for final painting, this completes the piggyback top.

The detail, Fig. 40, shows how the two panels are hinged together with a standard 6-ft. piano hinge cut down to 59½ in. long. Note particularly that the barrel of the hinge is placed so it is on the table-tennis side of the top. The edging measures  $\frac{3}{4} \times 2$  in. You'll need two pieces 60 in. for the ends and four pieces 54 in. for the sides. These are mitered and rabbeted like a picture frame and are glued and nailed to the plywood edges so the edging will be flush with the table-tennis surface. The side edging butts together at the hinge joint. The 2-in. edging not only conceals the plys of the wood but also provides the necessary clearance for the track layout when it is placed in a face-down position.

To protect the pool table when the lift-off top rests on it, three cross-rails are placed crosswise and padded with felt where they rest on the rim of the table. These actually support the piggyback top. Two of the crossrails are made alike. The third differs in that it is grooved lengthwise on the top to receive the piano hinge and grooved on the bottom to sit over the curved rims of the side-pocket backs. The hinge groove automatically positions the top when the table-tennis side is placed face down. Two rubber-tipped tacks centered on the locking cleats and spaced 2½ in. apart will automatically seat the top when the table-tennis side is placed face up. Hook blocks are nailed and glued to the ends of all three crossrails and to the underside 8 in. in from the ends. In each case, the blocks are spaced to suit the width of the pool table and the piggyback top.



**THIS BIRD'S-EYE VIEW** of the HO-ga. model-train system gives an idea of the fairly extensive layout possible on a 5 x 9-ft. top. Actual track layout and arrangement of buildings and other props is left to the builder

The 5 x 9-ft. top provides the model-train enthusiast with a good size area to work out whatever track layout suits his fancy. As you see in the original, a tunnel was placed over double tracks at the far end of the layout, with the engineer and tower-man controls located at the opposite end. Silhouette bases for the buildings and other lift-off props help to relocate them each time they are replaced. One thing to keep in mind in building roadbeds and terrain is to keep the modeling material away from the locking cleats of the table so it will not interfere with the removal of the cleats if necessary. The tracks, of course, are butted at the hinge joint and current is continued by jumper wires made long enough to permit the top to still fold.

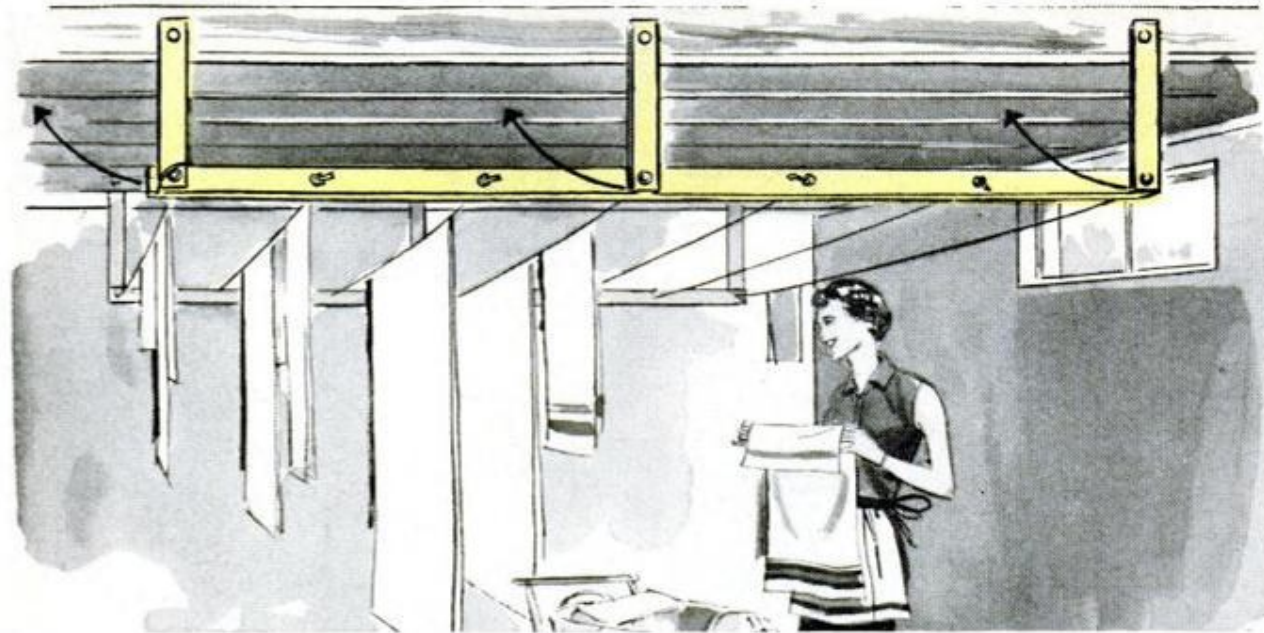
(Continued to page 208)

## MATERIALS LIST

(All dimensions actual sizes in inches)

- 2 pcs.— $\frac{3}{4}$  x 2 x 60—End edging
- 4 pcs.— $\frac{3}{4}$  x 2 x 54—Side edging
- 1 pc.—6' length  $\frac{1}{2}$  x  $\frac{1}{2}$  continuous (piano) hinge
- 60 — $\frac{3}{4}$  x 5 oval-head wood screws
- 2 pcs.— $\frac{3}{4}$  x  $1\frac{3}{8}$  x  $58\frac{1}{2}$ —Inner end edging
- 2 pcs.— $\frac{3}{4}$  x  $1\frac{3}{8}$  x 105—Locking cleats
- 2 pcs.— $\frac{5}{8}$  x  $4\frac{1}{2}$  x 60—Table-tennis playing field
- 2 pcs.— $\frac{1}{8}$  x  $\frac{3}{4}$  x 12—Flat alum. or steel
- 28 — $1\frac{1}{4}$  x 8 F.H. wood screws (for side edging)
- 4 — $\frac{5}{8}$  x 8 F.H. wood screws (for metal strips)
- 4d & 6d Finishing nails
- $\frac{1}{4}$ -lb. can patching compound
- 3 pcs.— $\frac{3}{4}$  x  $2\frac{1}{2}$  x 61-11/16—Table crossrails
- 12 pcs.—Wood blocks  $\frac{3}{4}$  x 1 x  $2\frac{1}{2}$  (for table crossrails)
- Strips of felt— $2\frac{1}{2}$  wide

## Basement Clothesline "Retracts" When Not in Use



If your basement is cluttered with that wintertime spiderweb of dangling clotheslines, you'll appreciate these self-storing hangers. When not in use, just push on one end of each and up goes hanger and lines against the ceiling joists. Bolt the support-

ing 1 x 2s to the joists and to the horizontal 1 x 2, applying just enough tension to hold the hanger in the up position. Drill spaced holes in the horizontal members and thread the clothesline through the holes, knotting it at each end.—*M. Krucker*

### Higher or Lower

Ever been on a plank painting a ceiling or roof overhang and wished you were, say, 6 in. higher or lower? Holes bored through opposite sides of a stepladder for a removable pipe rung will provide an intermediate spacing between the steps to give you a variation in height which makes working from a plank more convenient.



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### Out They Come

Those stakes used to support forms for walks, patios and other small concrete jobs, may be pulled without damage and preserved for future use if you bore a hole near the top of each to admit the point of a pick. The head of the pick will provide enough leverage to lift the stakes with little effort.—*G. E. Hendrickson*



POPULAR MECHANICS



### No Grater Shade

A cute idea for a spotlight over a snack counter is to use a common food grater for a shade. Besides being appropriate, the shade when lighted "twinkles" like a star. Simply drill a hole through the handle.

### Warm as Toast

For the cold night that may catch you on a camping trip keep a piece of plastic film in your blanket roll. Place the film between the lower blankets. It wards off dampness, keeps you warm all night.—*John Krill*



MARCH 1962



## Coming Up Next...

**ELECTRIC 1901 SIDEWALK CAR.** As you see, it's just like a 1900 era open touring car cut down to kid size. Seats four and does a sizzling seven miles per hour. It's driven by geared motor or converted auto generator operating from 12-volt battery. You buy hard-to-make parts and build the rest yourself. Look for it next month.

**SWEEPER FROM OLD LAWN MOWER.** Yes, it's been done and in an April craft feature we'll show you how, with step-by-step pictures and drawings, to convert parts of a push-type mower into an efficient sweeper that picks up grass clippings, candy wrappers, twigs, leaves—anything sweepable that litters your lawn.

**ANIMATED EASTER EGG.** The Easter-egg-and-bunny legend gets a new twist in this giant picture egg, made from papier-mache. A window lets you watch bunnies perform inside when a crank is turned. The shell is built up over an inflated toy balloon with strips of paper laid in flour paste. A novel centerpiece for Easter.

**WORKING WITH SHEET METAL.** Working with sheet metal can be impossible or easy. The trick is in knowing how to handle the stuff—how to bend it, cut it, seam it, roll it, hammer it, crimp it, to make all manner of useful items used in everyday living. Shop article coming next month tells in words, pictures and drawings how to work sheet metal.

# Solving HOME PROBLEMS

**1. TYING A NECKTIE** so that the two ends will come out the same length is often difficult since some ties are longer than others. To mark the correct starting length stick a piece of adhesive tape to the inside of the longer end, and you'll always come out right



**2. ELECTRICAL OUTLETS** seem to hold a strange fascination for inquisitive tots and there is always the danger that they could be seriously injured by inserting hairpins or other objects into the slots. To prevent this, cover the slots with strips of tape

**3. TO FORCE RHUBARB,** remove both ends from an old oil drum, place it over the hill of rhubarb and then bank soil around the base. The drum will hold the sun's heat and will protect the early growth from those cold spring winds





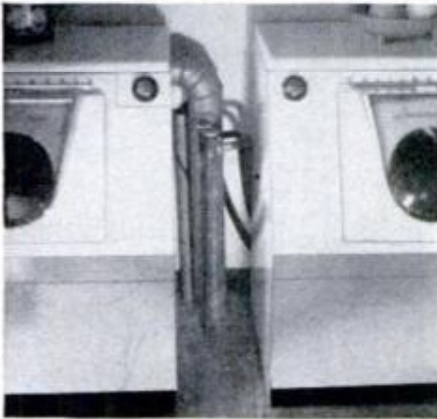
4

**4. LABELS ON MEDICINE** bottles will often become so smudged and blurred as to be unreadable. You can protect the label by applying a coat of colorless nail polish right after purchasing the medicine

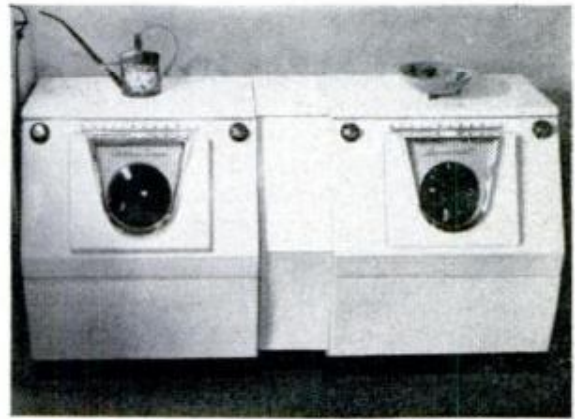
**5. PIN-UP BOARD** for gardeners provides place to post planting schedules, special seed packets, seasonal memos. It's made from a long, narrow carton with sides and ends cut away to provide a bin at bottom



5



6



**6. WHEN LOCATION** requires that there be a space between washer and dryer, installation can be made more pleasing by building a matching filler unit of 1 x 2s and plywood cut and fitted to contour of washer-dryer

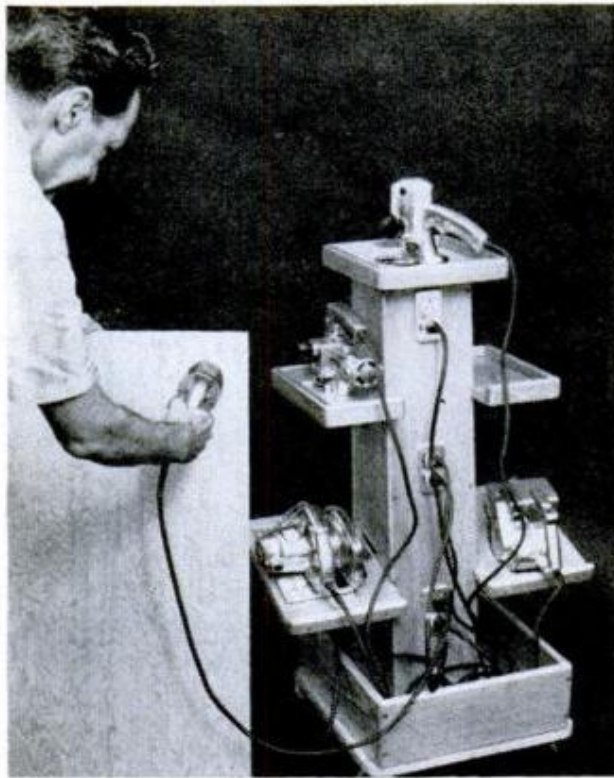
**7. HANDY DOORSIDE RACK** for milk and bread deliveries can be made by attaching a discarded bicycle basket next to the back door. The rack will also be handy for holding bundles while you unlock the door

**8. FOLLOWING A RECIPE** can be especially difficult if you're interrupted by phone calls or delivery men. To avoid overlooking an important step, mark your stopping point with a bobbypin clipped to the card

8



7

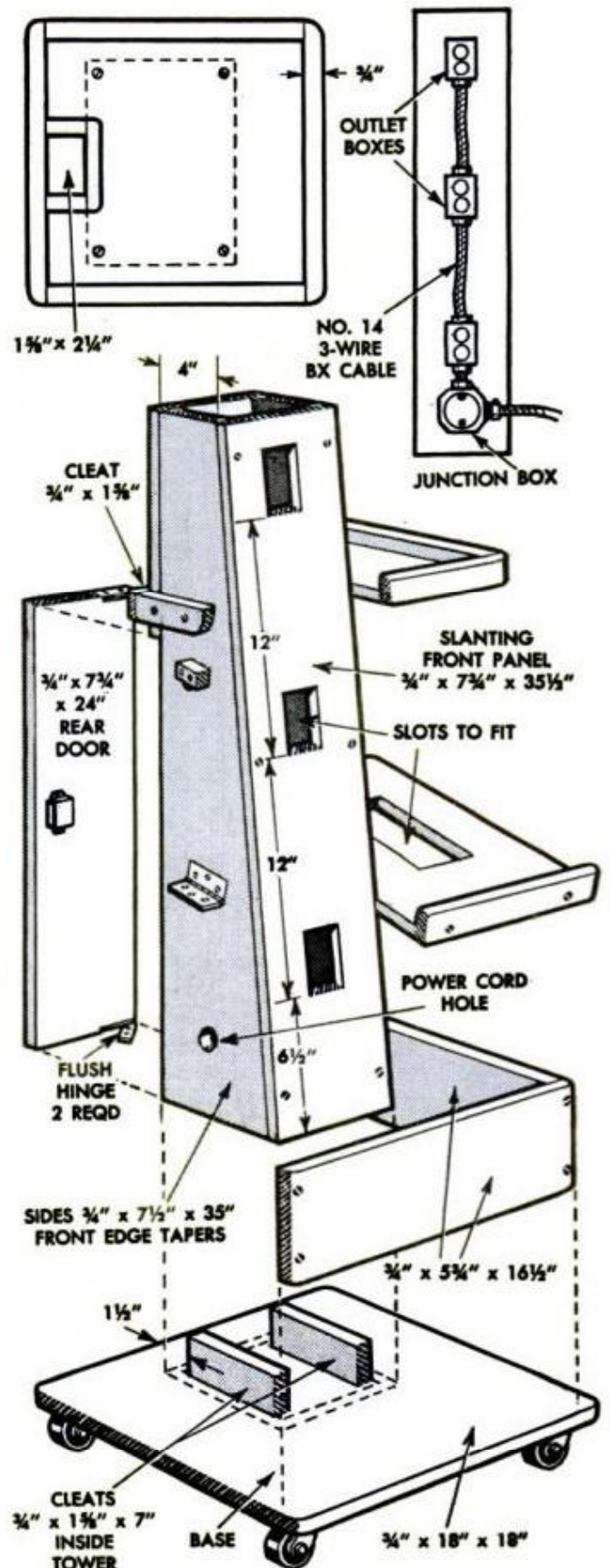


# POWER

ANYONE WHO uses more than one portable power tool in a home shop or on the building site will be quick to see the time-saving features of this tool tower. It has individual storage shelves and outlets for five of the most commonly used portable tools. A boxed base stores the cords when the units are not in use. There are no tools piled up on the bench or floor, no trailing cords underfoot while you're working in an unfinished room or on a project in the basement shop. A single power cord plugged into a wall or ceiling receptacle feeds the six outlets you see in the detail.

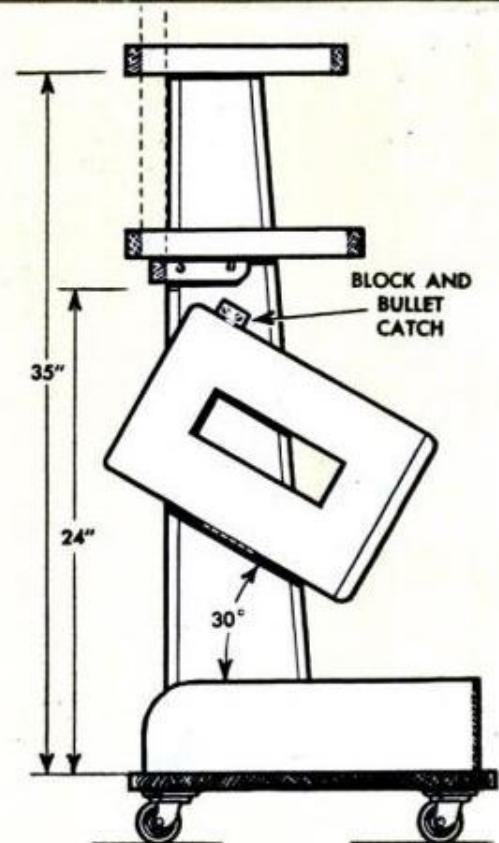
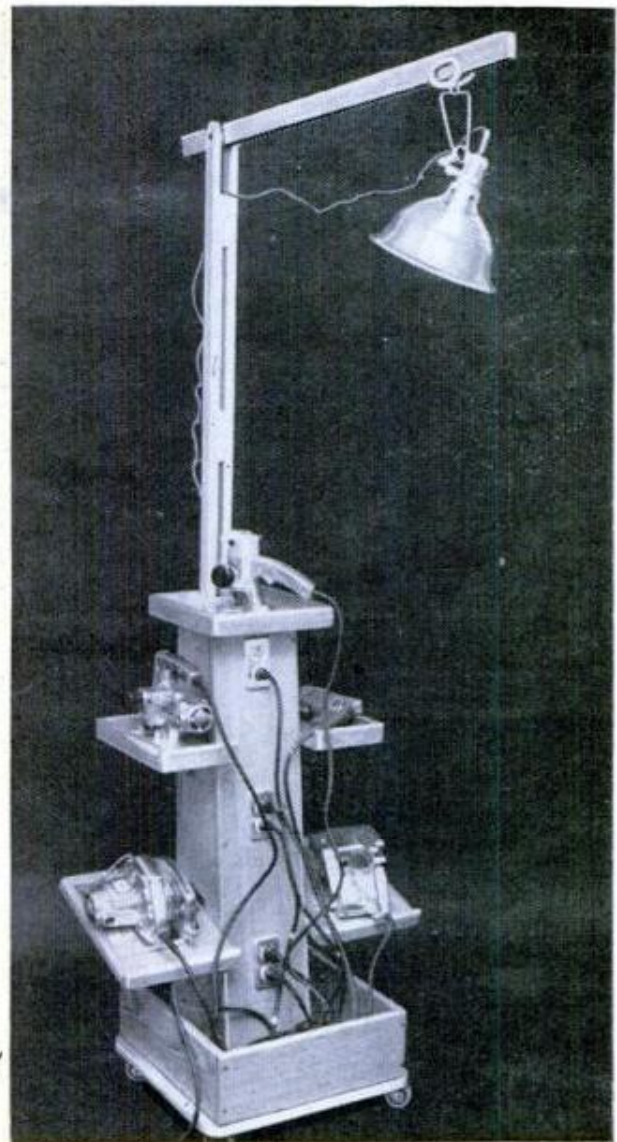
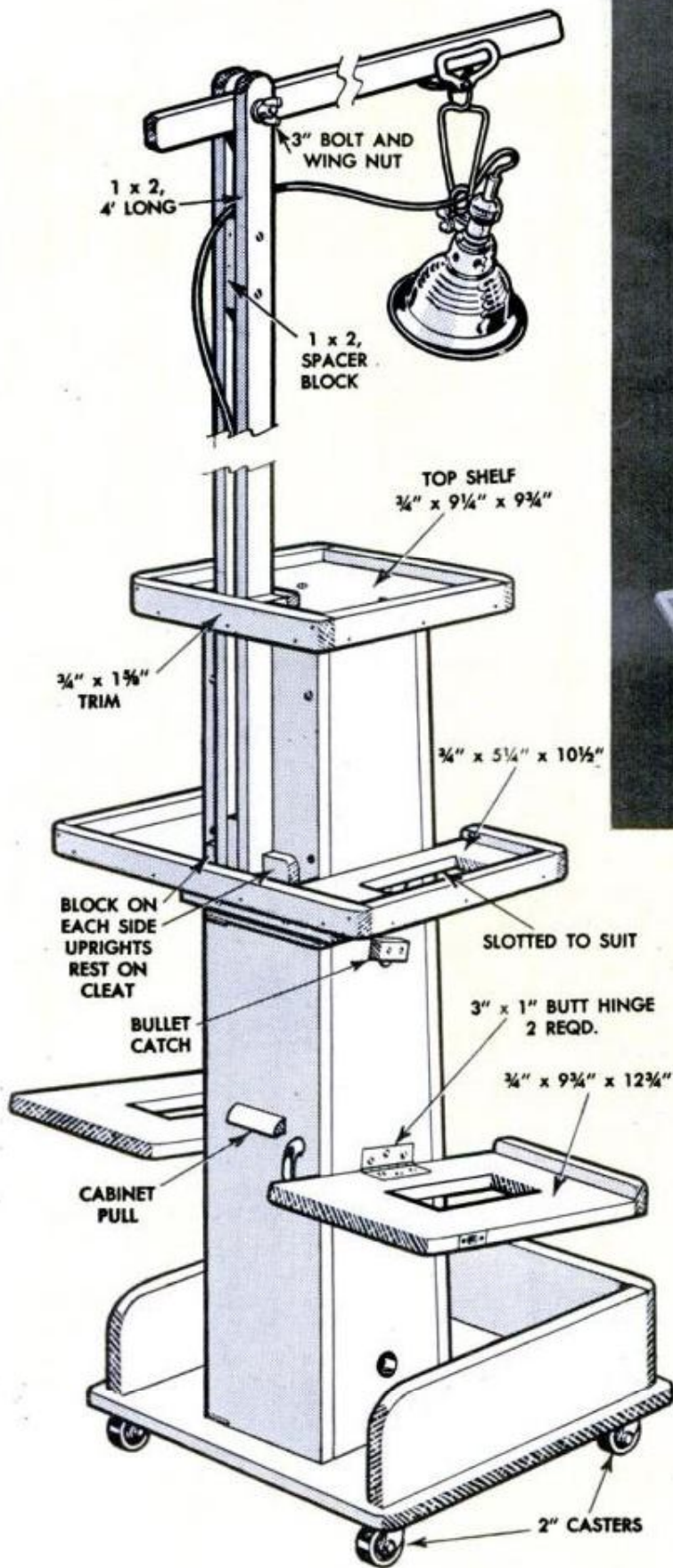
Construction is simple butt joinery, all the parts being fastened with glue and nails or screws. The top shelf is square, the second shelf is U-shaped, that is, it is fitted around the column. On the original pictured, the two lower shelves are hinged at an angle of 20-30 degrees for convenience in placing the larger tools such as portable saws; also to permit folding should it be necessary to store the tower in restricted space. These shelves are made with openings to take blades of portable saws so that the tools are supported level and in an upright position.

If you wish to add the light boom, pictured and detailed on the opposite page, cut an opening in the top shelf and support the lower end of the upright at the second shelf with cleats. Use a photo flood lamp of the clamp-on, adjustable type. Fit and hinge a door at the back or the straight side of the tower. Wire the outlets to a single junction box having a receptacle in the cover plate.—Hayden Ricker



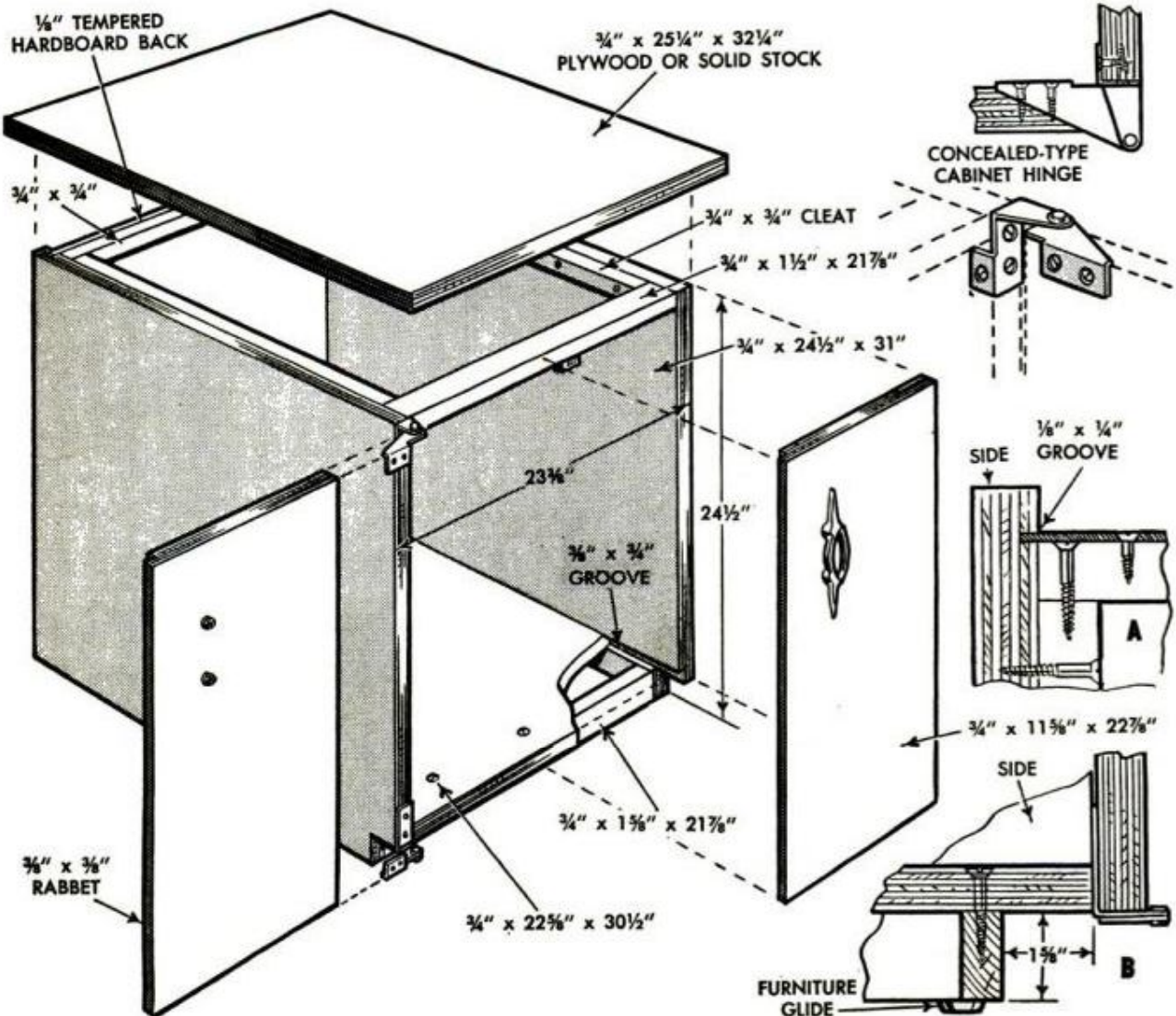


# TOWER





# DUAL-PURPOSE TABLE STORES GUEST BED





**P**ROVIDING accommodations for overnight guests is always a problem in small homes and apartments. Since most housewives don't want to allot precious closet space to a rollaway bed, the unexpected guest is likely to find himself spending the night curled up on a short sofa which was definitely not made for sleeping. If you're faced with the problem of where to park a stand-by bed here's the perfect solution—simply park it in this dual-purpose cabinet table.

The table can be used in your family room, doing double duty as a game table, TV stand or end table. Two such end tables placed at the ends of your sofa will provide sleeping accommodations for a visiting couple, and you can make up the sofa as a bed for one child. Used as a night stand in the guest room (if you are lucky enough to have one), it will give the room sleeping space for three. In a vacation home, such an arrangement will come in especially handy for those last-minute guests who drop in for a Friday-evening swim and stay the week end.

The table may be constructed of  $\frac{3}{4}$ -in.

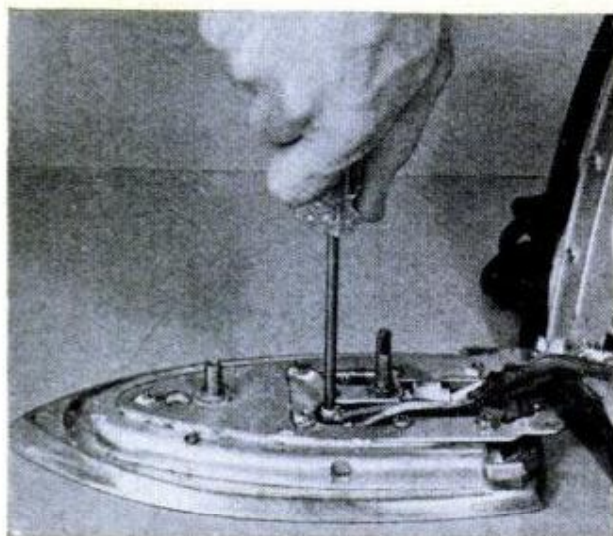
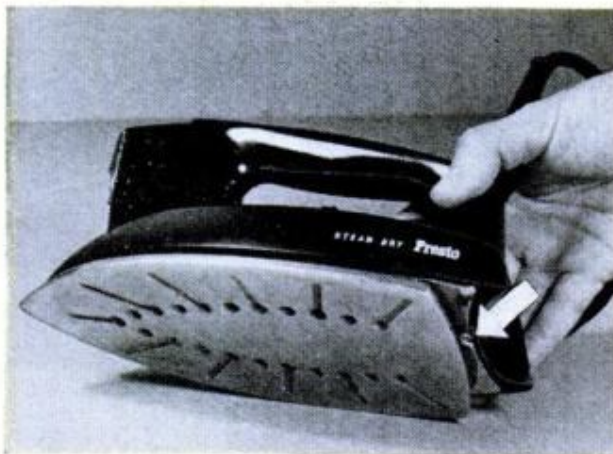
plywood or solid stock, from pine or hardwood. If you plan to locate the table with its back to a wall, you may use  $\frac{1}{8}$ -in. tempered hardboard for the back. However, should you decide to use it as an end table where all four sides will show, make the back of the same material used for the sides and top. Assemble the table according to the plan on the opposite page, securing all joints with both screws and glue. The top is attached from the underside with screws which run through  $\frac{3}{4}$ -in. cleats.

Finish and hardware will depend on the decor of the room where you plan to use the table. If made of cabinet wood, you may wish to stain it to match other pieces in the room. If made of pine, the table can be enameled. You might even add a colorful decalcomania or stenciled design on the side panels. As for the handles, either brass or aluminum will blend well with a modern room. For an early-American look, try using hammered-iron handles or plain white porcelain knobs.

The table shown here is dimensioned to fit a Burton-Dixie bed, but dimensions can be altered as required. ★ ★ ★

# ELECTRIC IRON

# Household



**E**LECTRICAL parts of both the older type dry iron and the newer steam irons are quite simple, consisting of a thermostat and heating element. Broken plugs, worn line cords, defective thermostats and heating elements are the commonest electric-iron troubles. Heating elements deteriorate in time and the points in thermostatic controls become burned and possibly pitted, necessitating a thorough cleaning or replacement.

Usage subjects the cord to flexing, twisting and kinking and even scorching. In time the insulation and even the braided wire are likely to break down. This usually happens at the ends of the cord, either at the plug or the iron. If the iron refuses to heat normally, or not at all, check the cord at the iron and the plug and then go over the insulation closely. If you discover breaks or frayed ends or a damaged plug, it usually is best to replace the cord.

If the cord is okay, then you will have to probe further. On nearly all irons there's a small access plate, usually at the heel of the iron or at the rear of the handle as in the upper left and center photos. Removing this plate lets you see the internal connections, which should be clean and tight. However, on some irons it will be necessary to remove the handle and top housing to get at the terminals, lower left-hand photo.

You may run into difficulty when you come to removing the handle and housing. Sometimes a single small screw or pin is the key to the whole disassembly sequence, and you

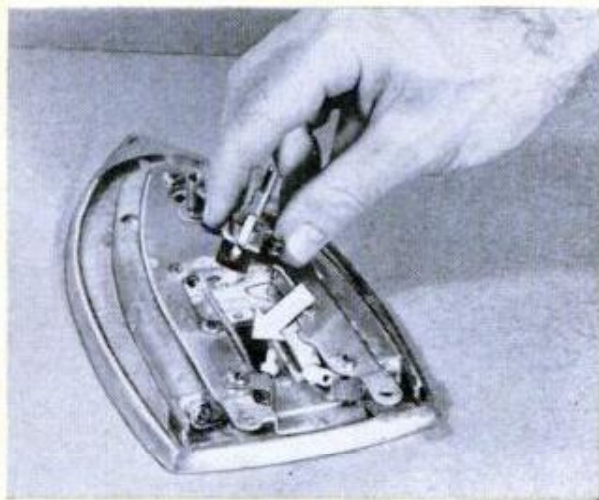
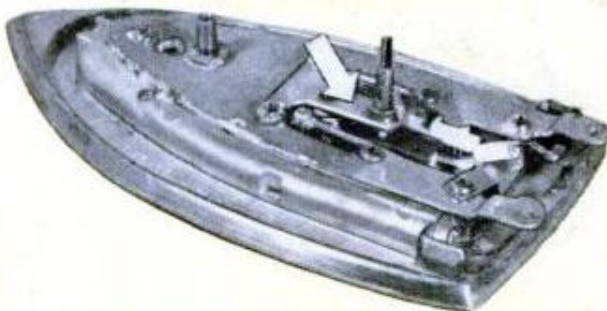
# Appliance Fix-It File

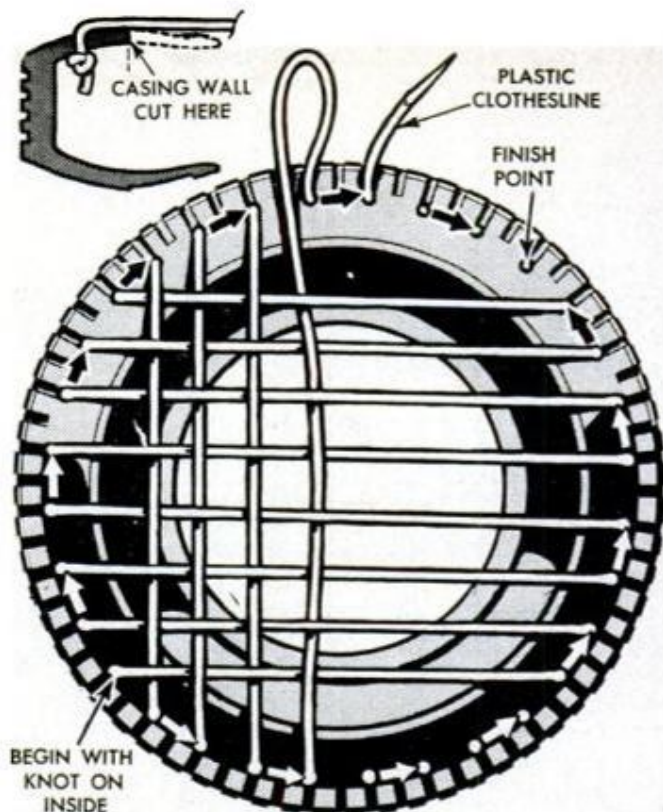
may have to do some careful searching to locate it. Don't pry, lift, or pull unduly on parts that refuse to budge. Don't attempt to pry the housing from the base, or iron, and in all this be especially careful not to scratch or nick the sole of the iron.

If the trouble is erratic temperature control, the fault likely will be found in the thermostat. The stat consists of a set of contact points which are in contact, or closed, when the iron is cold, also a thermostatic arm which reacts to the heat by bending closer and closer to the points. At a temperature predetermined by the setting of the temperature control dial on the handle or elsewhere, the arm separates the points, shutting off the current to the element. When the iron cools slightly the arm retracts, allowing the points to close and the cycle repeats. If the points are corroded or pitted, remove the assembly as in the center and lower photos at the right and clean them, using a very fine flat file, fine sandpaper or the fine side of a fingerboard. If the points are pitted, the unit should be replaced.

In most older-type irons the heating element can be removed and replaced simply by disassembling the sole plate and replacing the element itself. But in most of the newer irons the element is sealed into the sole plate and if defective, it will be necessary to replace the sole plate.

Replace all parts in reverse order and be careful not to damage the seals around the water container in a steam iron.—*John Pennington*





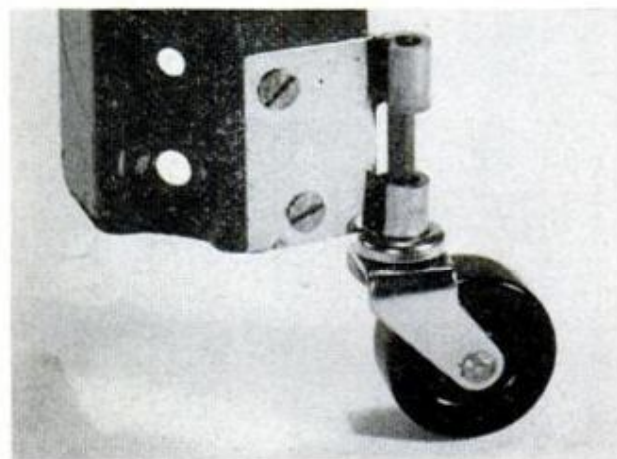
## Make Fun With a **JUMP DRUM**

Youngsters with pep to spare, even tots that are past toddling, will find this jump drum excitingly new and different with more bounce per ounce than they can get out of any bed spring or the sofa cushions. It's made with a length of plastic clothesline and an old auto tire.

Prepare the casing by cutting away the inner portion of one side wall and drilling  $\frac{3}{16}$ -in. holes for the clothesline  $1\frac{1}{2}$  to 2 in. apart around the outer edge next to the

tread. Cut the end of the clothesline at an angle to provide a sharp point to push through the holes in the casing. Use soap to lubricate the line so that it will pass through the holes easier. Be sure that there is no slack in the line before you tie the final knot. Paint the inner tube a bright color to outline the jumping area, slip it inside the casing with the valve stem on the side opposite the clothesline and inflate.

—Richard W. Norton



## It Hinges on a Hinge

Taking advantage of the ready-formed socket provided by the loops of common butt hinges, one craftsman solved the problem of mounting swivel casters on his power-tool stands. Hinges of the loose-pin type were used with hinge pins slightly smaller in diameter than the stems of the casters. The loops were spread open enough with a cold chisel to permit the casters to swivel freely, after which part of the hinge leaves were cut off before attaching them to the machine-stand legs with flat-headed stove bolts.—Henry Hanscom

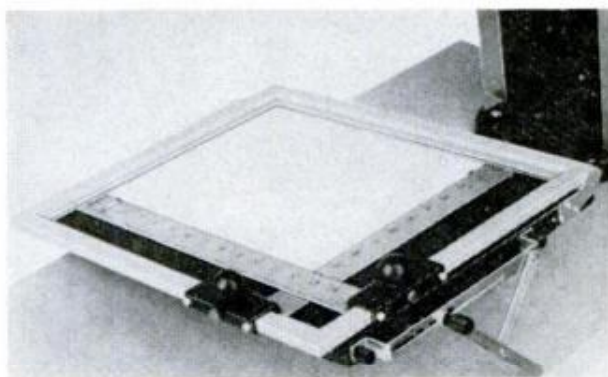
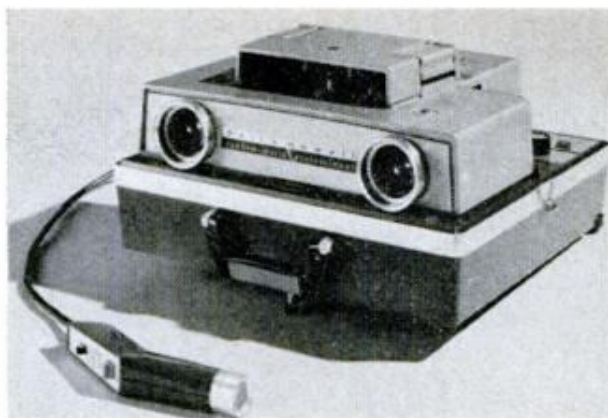
## FOR SHUTTERBUGS

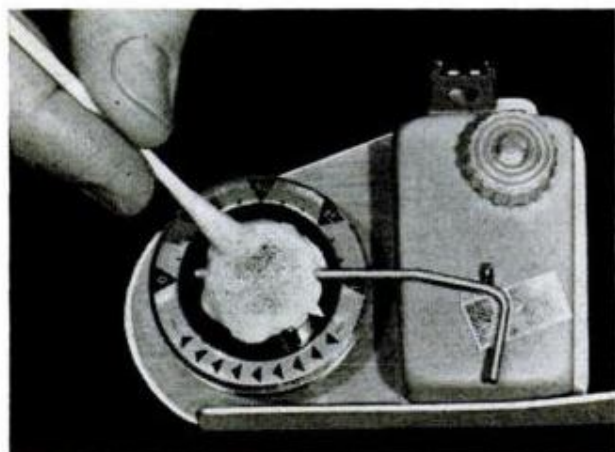
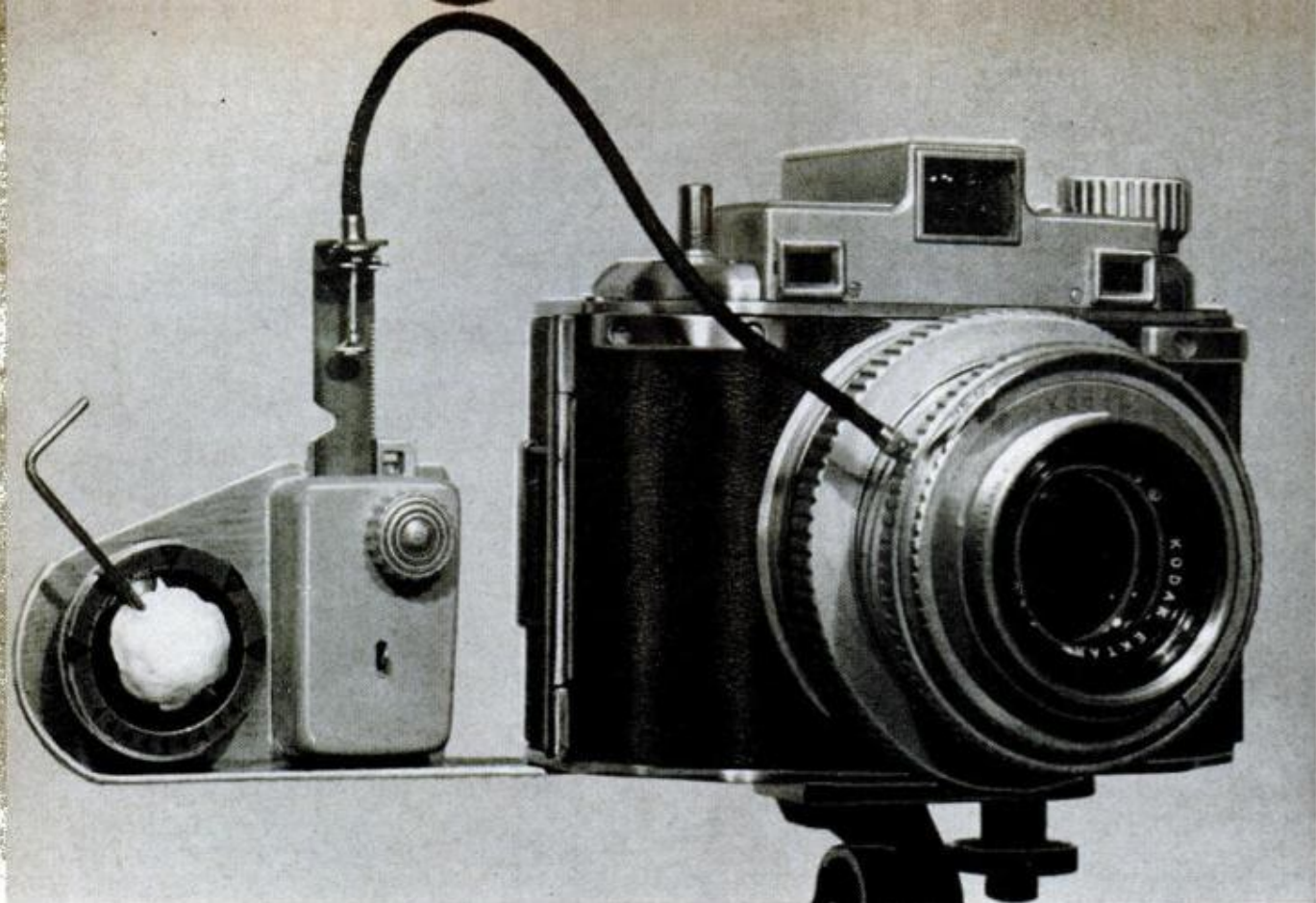
**SLIDE PROJECTOR** has two separate optical systems side by side in single unit. Using a remote-control unit and synchronized irises, operator can fade out one slide while fading in another. With it he can produce lap-dissolves similar to a professional motion-picture production. Sells for about \$300. Bell & Howell, 7100 McCormick Rd., Chicago 45, Ill.

**OMEGA AUTOMATIC EASEL** features a new locking system, automatic paper grips and stops that extend versatility of easel. Tilting attachment corrects the distortion. Paper edges are in sight under masking bands when looking through control windows. Easel is \$67.50; tilting attachment is \$10.60. Simmon Omega, Inc., 257 Park Ave. South, New York 10, N.Y.

**BATTERY-POWERED** flood light features new power pack designed to carry from a shoulder strap. Powered by rechargeable nickel-cadmium cells which connect to ordinary household circuits, light will operate continuously for 32 minutes before recharging. For stills or motion pictures. Priced at about \$400. Sylvania Electric, 730 Third Ave., New York 17, N. Y.

**COMPACT STARMATIC II CAMERA** provides aim-and-shoot simplicity with a fully automatic electric-eye exposure control. When light is inadequate for a proper exposure, warning signal is visible in viewfinder. Flash pictures are easy with this camera. Takes 12 exposures on 127-size film. Priced about \$35. Made by Eastman Kodak Co., Rochester 4, N. Y.





**ACTIVATOR WIRE** is mounted on the face of the pocket timer with epoxy. Note the spacer card at right

**RED FLAG** hung from the activator wire will give a long-distance signal when 10-second timer is tripped



## Super-Delay Shutter Release

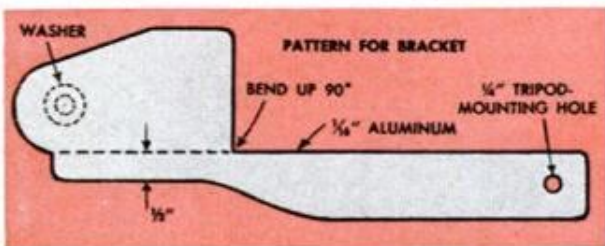
HERE'S A compact timer that will do away with those out-of-breath expressions in your delayed-action pictures by allowing from two minutes to an hour of delay instead of the usual 10 seconds. The main component is an automatic pocket timer alarm which can be purchased from Lafayette Radio Electronics Corp. for \$2.95. This timer, originally designed as a parking-meter timer with key-chain attached, is teamed with a Kodak auto-release timer which sells for about \$5 at most camera shops. While the Kodak timer will give only the normal 10-second delay if used separately, it will trip the shutter after much longer delays when activated by the pocket timer.

The aluminum bracket for mounting the two timers will vary with different cameras. In every case, however, the arm of the bracket which attaches to the camera should be no more than  $\frac{1}{2}$ -in. wide so that it will permit the activator wire to swing past. Both timers are attached to the bracket with epoxy. Before mounting the pocket timer, file off the plastic lip which holds the key chain. The faces of the two timers must be parallel in order that the activator wire may trip the release lever on the photo timer. Since the pocket timer is slightly thinner than the photo timer you'll have to





**HERE'S WHAT** the pocket timer looks like. Actually, it's a parking-meter timer with a key chain attached

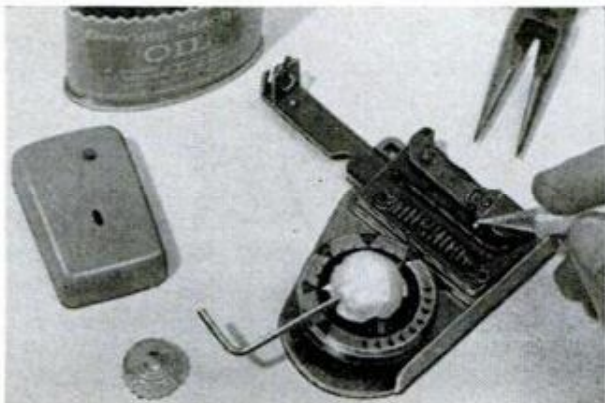


slip a  $\frac{3}{4}$ -in. washer under it to bring the face up to the correct level. Also, make sure that you mount the pocket timer so that its center is exactly in line with the release lever of the photo timer.

The activator wire is mounted on the face of the pocket timer with epoxy and must be bent slightly to avoid tension while the epoxy sets. Place a small piece of  $\frac{1}{16}$ -in. cardboard under the hook in the wire while the epoxy hardens to assure clearance.

The release lever on the photo timer must be given hair-trigger action if it is to be tripped by the activator wire. Unscrew the wind-up knob and pry open the case with a knife. If you flatten the slight kink in the release lever with a screwdriver, you'll find that it will operate much easier. In fact, you'll probably have to hold it down each time you wind up the timer. For a finished appearance, paint the blob of epoxy with black enamel.—*Tommy Thomas*

**RELEASE LEVER** in photo timer must be straightened in order to give the switch hair-trigger operation



MARCH 1962

## FOR CAMERA BUGS

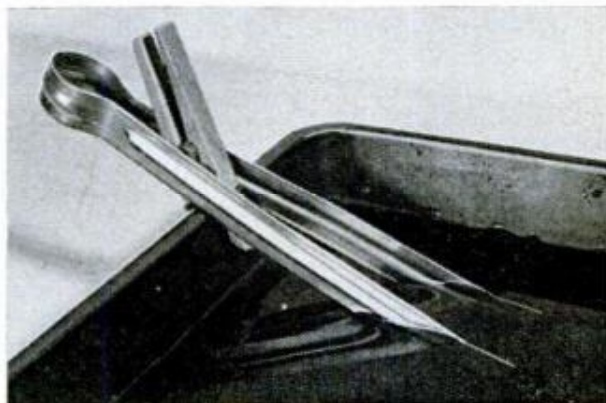


### String Along With a Cordpod

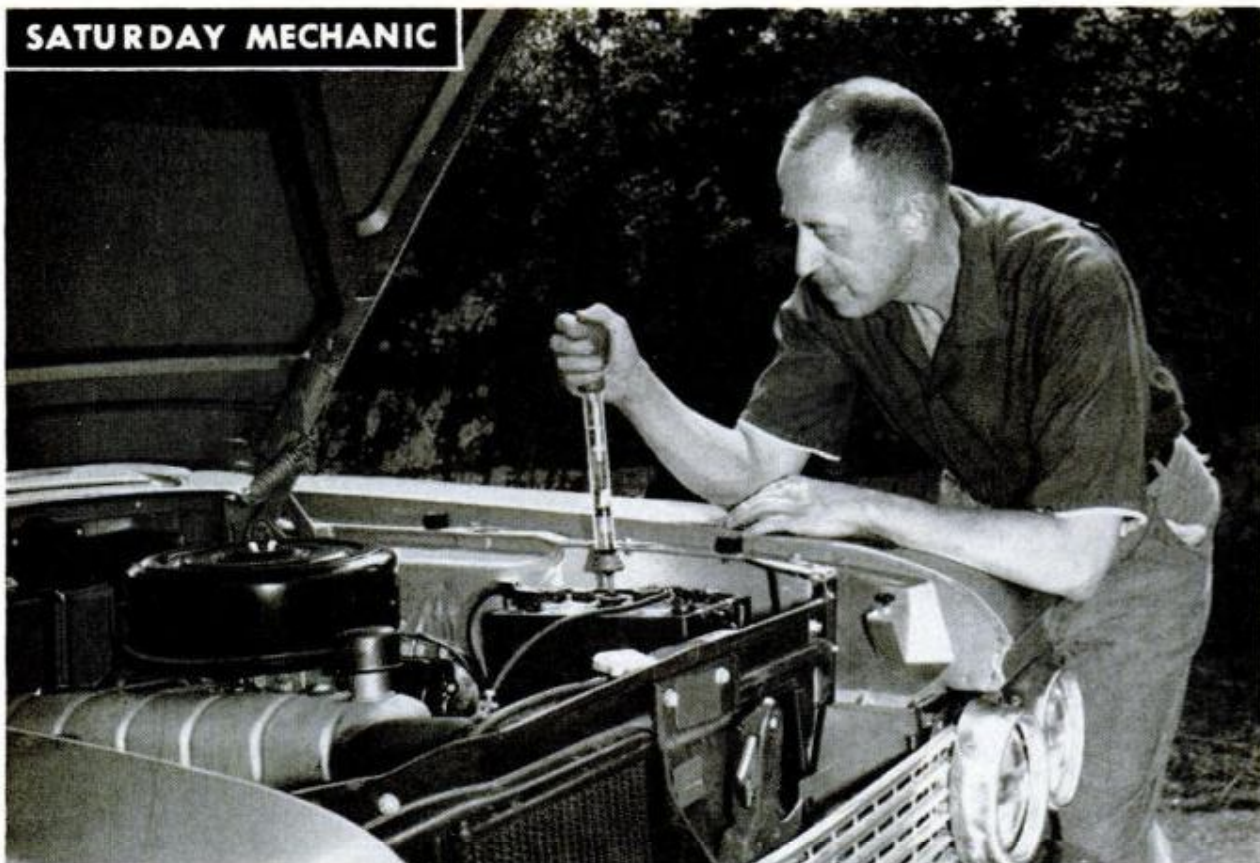
Easily carried in pocket or gadget bag, this "cordpod" is simply a short length of cord tied to a thumb bolt. To use it, turn the bolt into the tripod socket of your camera and place the cord under your foot. By pulling upward on the cord, you will provide enough tension to steady the camera. If you cut the cord long enough, it can be used in a standing position too.

### Stop Those Diving Tongs

To keep print tongs from slipping down into your developer tray, just clip a spring clothespin to the side of the tray. When you're not using the tongs, slip them over the clothespin. You'll find that the pin won't get in the way but will keep the tongs readily available at all times.



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**1. HYDROMETER TEST** will show if the battery is fully charged. Fully charged, the reading should range from 1.275 to 1.300; half charge, about 1.225; very low 1.150. If reading is 1.1250, battery should be recharged

## Battery and Starter Checks

*Carried out periodically, they can give you tip-top performance  
save fuel, reduce wear and replacement costs*

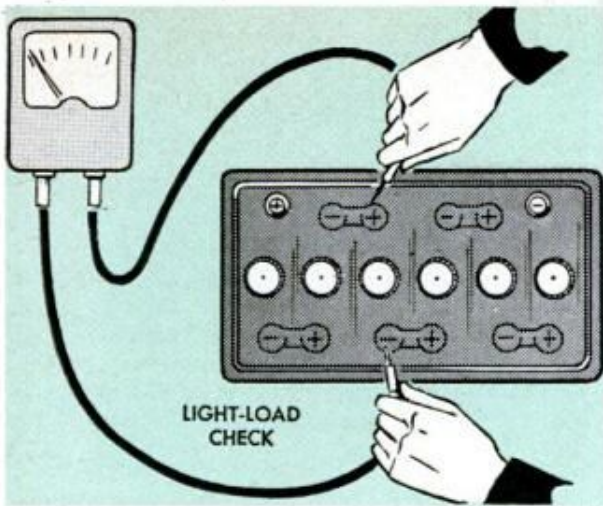
**By William J. Hector**

**2. MOTOR ANALYZER**, with accessories, can run a complete series of accurate electrical tests on your car

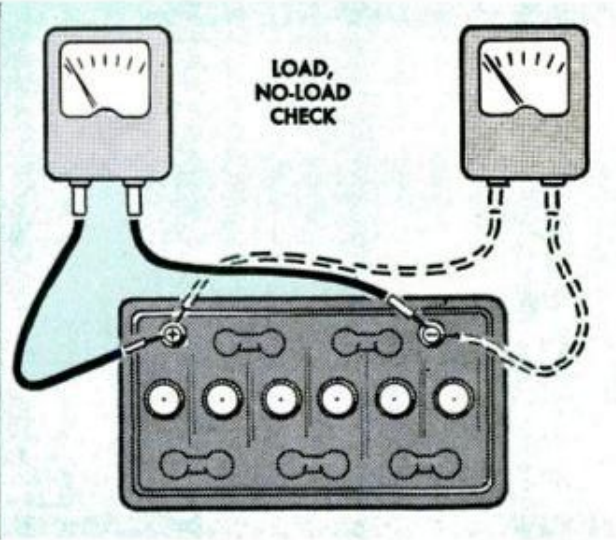
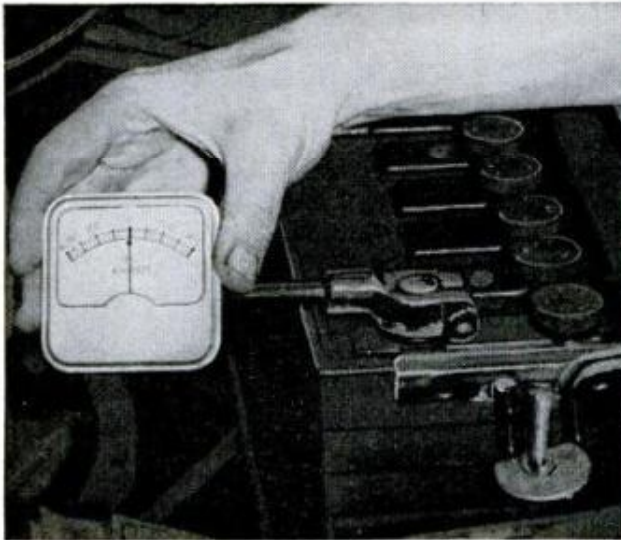


**P**RO MECHANICS don't gauge car-performance factors by guess. Even though they may be good guessers they don't risk leaving anything to chance. They use special measuring instruments. Saturday mechanics who like to get peak performance from their cars might also consider purchase of test units that can be put to good use in running routine checks. Car manufacturers provide tune-up specifications which are to be performed with test equipment. Instrument checks will pay off not only in time saved but also in fuel savings, wear and possible early replacement of parts which may not have given a full measure of service.

Ordinary tune-ups are not at all difficult or involved, especially if you use an analyzer like that pictured in Fig. 2. With this unit and its accessories it takes only a few minutes to run checks on the battery, starter, generator, condenser, plugs, cables, timing, distributor and regulator. It tests

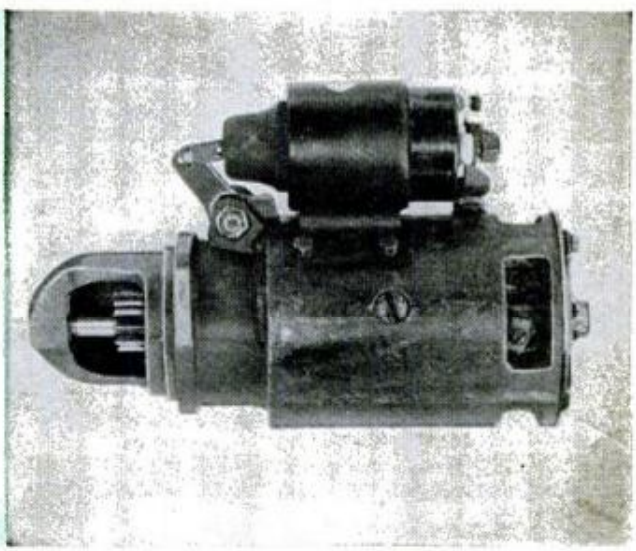
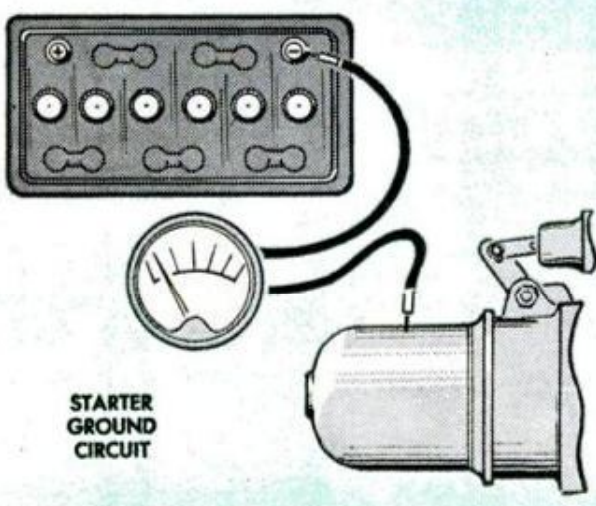


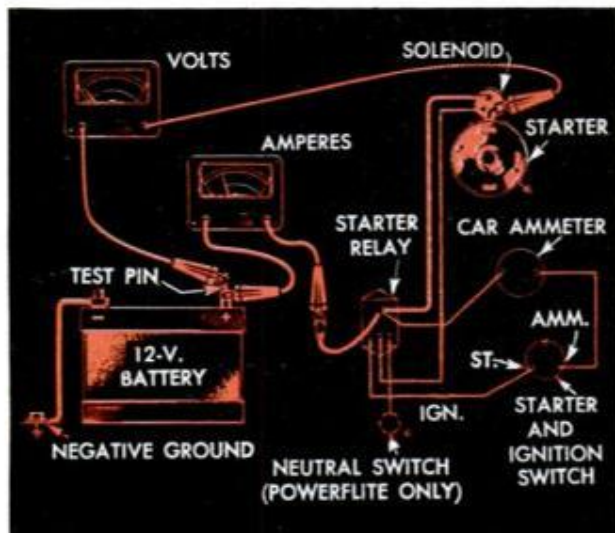
**3. BEFORE MAKING** a light-load battery check be sure electrolyte (fluid) level is up to the indicator mark. Hold starter switch on for three seconds. If motor starts, turn off ignition. Then, with lights on, check cells



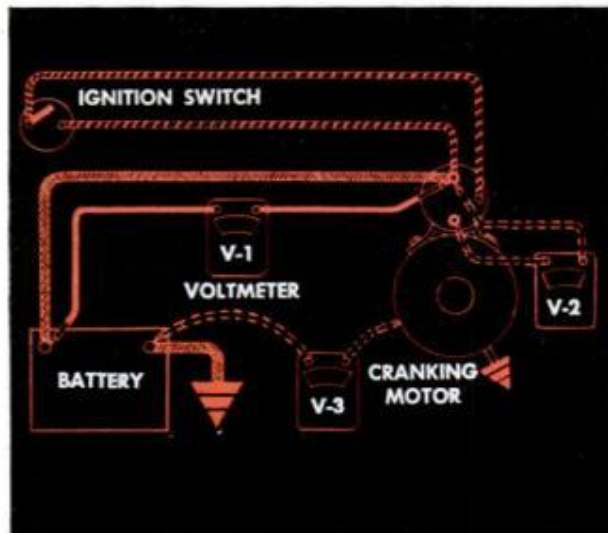
**4. WHEN MAKING LOAD CHECK** observe polarity, positive to positive, negative to negative no matter whether you have positive or negative ground. Induction-type ammeter at left requires no contact with circuit

**5. IT'S IMPORTANT** to check out ground circuit. As starter-motor housing should be at same electrical level as the grounded post on battery, any loss or voltage drop can be measured between the two points. More than .2-v. drop can mean poor connection, cable wire gauge too small, or the cable itself is defective





**6. ANOTHER METHOD** of testing for voltage drop in starter-motor circuit on Chrysler cars is to hook up meters as shown. When starting motor is operated voltage drop should not exceed 0.2 v. per 100 amps.



**7. TO ISOLATE** trouble in starter circuit, according to Allen Elec. & Equip. Co., meter leads are moved across each connection until defective one is located by voltage drop. Note three positions of meter

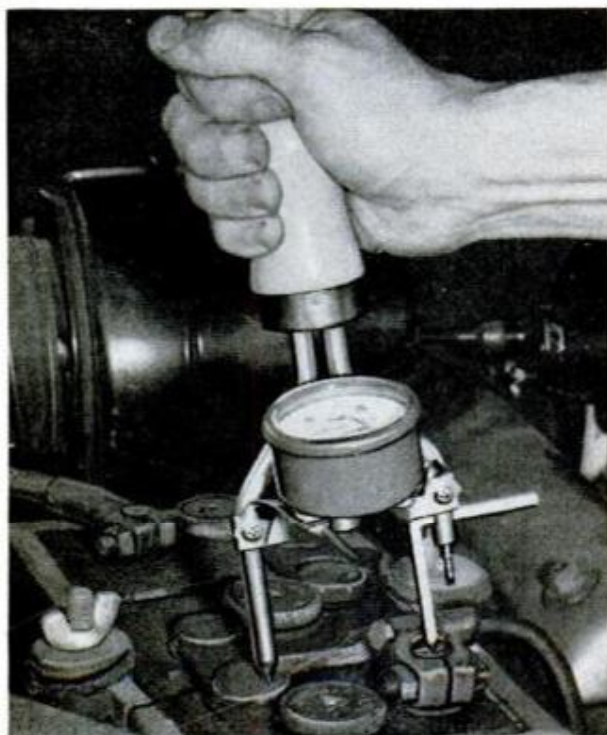
## TOOLS

Box wrenches, ammeter, hydrometer, battery terminal puller, voltmeter reading to .01 v.

## MATERIALS

Grease or petroleum jelly, distilled water, steel wool, baking soda, clear water.

**8. THIS TESTER** checks each cell under load just as if motor were being cranked. Tester is relatively inexpensive, provides a check favored by many experienced auto mechanics over other test methods



6 and 12-volt systems on 4, 6, and 8-cylinder engines and for good measure you can also check dwell angle and point spacings at all speeds. Such test units with all accessories can cost \$100 or more and the outlay is justified only for those Saturday mechanics who wish to keep car performance up to manufacturer's specs by running periodic checks over long periods of time.

But there are many accurate checks that can be made with much less expensive instruments, such as the voltmeter to measure voltage and the ammeter to measure amperes, or current flow. When using electrical test equipment it is necessary to observe electrical polarity when hooking up the test units. Voltmeters are connected across (in parallel) with electrical circuits. Ammeters are connected in series. Start with the highest range first if you are using a multirange meter. Make connections first before turning on the power.

**Identifying polarity.** It is necessary to know whether your car has a positive or negative ground if your battery markings are unreadable. To find out turn your voltmeter to the highest range and connect the negative test lead to the battery-post cable leading to the motor block. Touch the positive lead to the battery post opposite. If the meter needle goes up normally, you have a negative ground. If the needle reverses off the meter scale, you have a positive ground. Then, when your test equipment instruction book tells you to hook up to positive, or to negative, you will know which way is correct. It is important that the battery, Fig. 13, be at its best. There are several tests you can make.

**Battery no-load check.** Check by turning off any current-consuming devices and switches. The reading should be either 6.3

or 12.6 for a fully-charged unit. If lower, check separate cells, Fig. 4. Figures should not vary more than .05 v. from the lowest to the highest cell.

**Specific-gravity test.** A hydrometer, Fig. 1, gives an accurate picture of the battery condition by testing the specific gravity or density of the electrolyte (battery fluid). This should be done when the fluid is at the proper level. If necessary, add water to the indicated level. Use only distilled water; never tap water. Drive the car before checking.

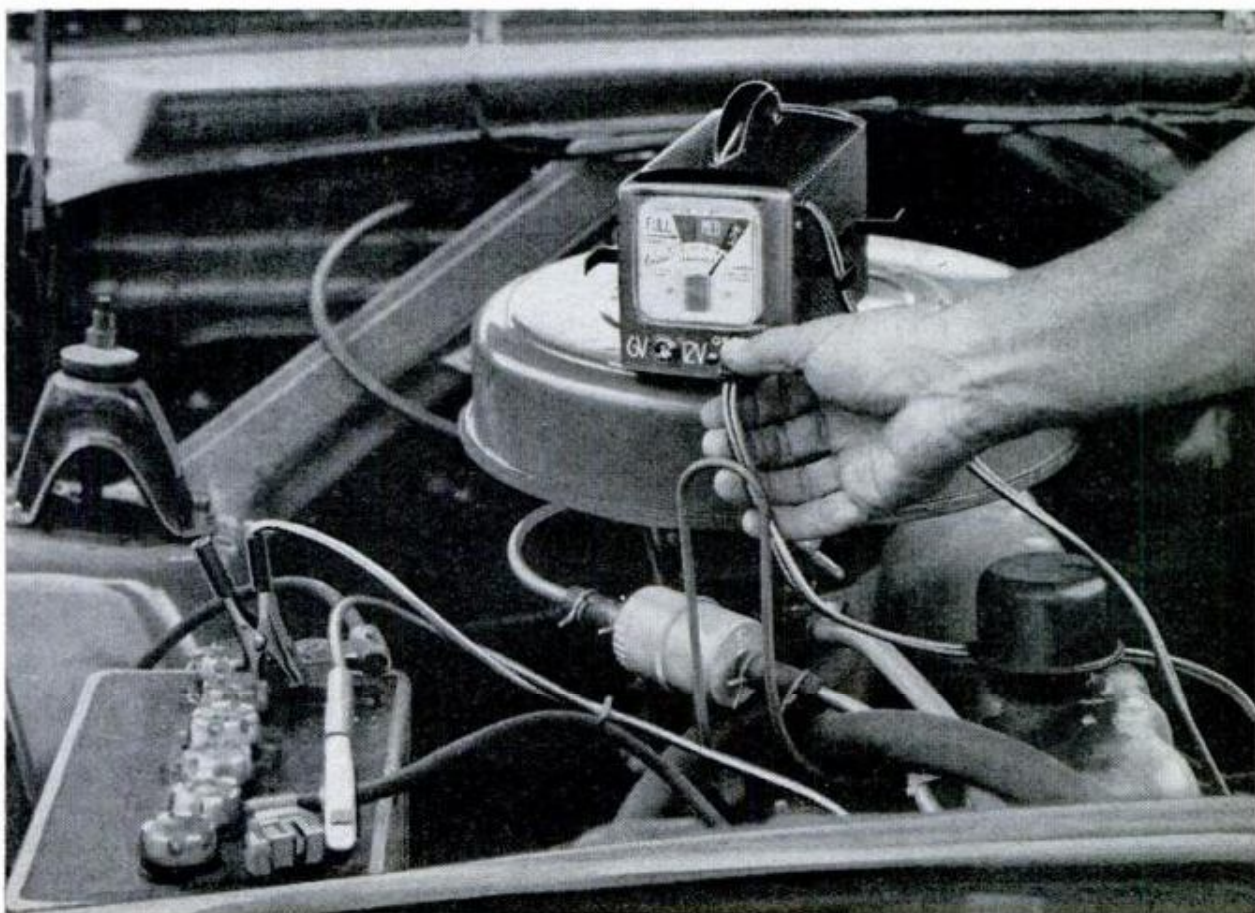
Take a reading with the hydrometer, compensating for temperature variations as specified. For the tune-up tests you should have readings of 1.250 to 1.275. If below 1.250 recharge the battery with a charger, Fig. 10, using a 5-amp. charging rate. Charger should be of the type that tapers off automatically. After charging and before testing, remove caps and blow out hydrogen gas (it's explosive) that may be present to cause inaccurate readings.

Clean the battery surface and terminals of any corrosion by swabbing with a solution consisting of a teaspoonful of baking soda in about a pint of water, Fig. 9. All cell caps should be on to prevent any of the soda water getting into the cells. Rinse with clear water. Remove the terminal



**9. SODA-WATER SOLUTION** poured or swabbed over corroded battery and rack removes the coating. Use about one teaspoonful of soda in a pint of water. After cleaning, coat parts with petroleum jelly

**10. EFFICIENT BATTERY CHARGER** utilizes silicon rectifiers. It is rated at 10 amps., 6 and 12 volts. Fits in the glove compartment and can be placed anywhere under the hood when in operation



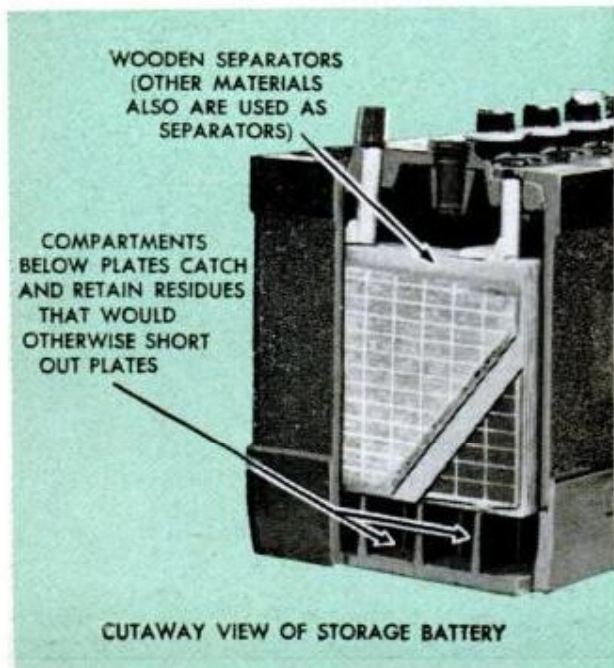


**11. BATTERY-CLAMP PULLER** removes the cable clamp from the post without damage to the post or clamp



**12. HEAVY-DUTY** starter switch enables you to start engine without helper. It's inexpensive, saves time

**13. CUTAWAY VIEW** looking into a typical storage battery shows wooden separators and sediment traps



clamps and clean the inside with steel wool or a steel brush. The clamp, or terminal, puller in Fig. 11 will pull the terminals from the posts without damage. Clean the battery posts, ground strap to motor, battery or starter and solenoid to switch. Then apply a thin coat of petroleum jelly to the battery posts before replacing the clamps.

**Battery load check.** Position the voltmeter across the battery posts, Fig. 4. Remember the voltmeter has polarity which must be observed when connecting across the whole battery or individual cells, positive to positive, negative to negative, no matter whether you have a positive or negative ground. Hook up voltmeter leads to battery posts, not to the cables. If the no-load voltage checked okay, the battery should maintain a minimum voltage under heavy load. Special battery loads are used in garages, using a carbon pile to create an artificial load. You can create this load by turning on the headlights, heater, and any other accessories that might be used simultaneously. With the ignition switch off, have someone press the starter, or the separate starter switch, Fig. 12. Take a reading. Repeat. Do not operate the starter more than 20 seconds at a time without allowing a few minutes between tests to cool off the starter motor.

The voltage should not drop below 5 or 10 volts (6 or 12-volt battery) and the starter should not slow down unduly under test. Also, check the individual cells which should test at least 1.65 v. If the starter turns over slowly, either it needs attention or excessive resistance is present in the circuit.

**Light-load check.** Of all the battery tests available this has proven to be most accurate, according to battery manufacturers. Test in this way: Bring electrolyte level up to the mark and hold starter switch on for three seconds. If motor starts, turn off the ignition. Turn headlights on low beam for one minute. Then, with lights still on, check individual cell voltages, Fig. 3. A reading of 1.95 or more on any cell with less than .05-v. difference between any high or low cell is okay. A reading of less than 1.95 on any cell indicates the need for recharging. If any cell shows a reading of more than 1.95 v., a difference of more than .05 v. exists between the lowest and highest cells; replace the battery.

If all cells test less than 1.95 v., recharge the battery one or two times. This necessitates a long charge with the average home battery charger. If a satisfactory reading is not achieved after the second charging period, replace the battery. Of course, it is possible for a low reading to occur due to

(Continued to page 204)

# Better CARKEEPING



● **TRACING AUTOMOTIVE TROUBLES** by ear can be most difficult due to the variety of sounds and high noise level produced by the engine. One serviceman solved this problem by constructing a simple device consisting of a short piece of heavy wire pressed into the top of a discarded auto radio antenna. The lower end of the antenna is threaded to screw into a nut which in turn is brazed to the receiver magnet of an old fashioned wall or desk telephone. By holding rod tip on engine parts, it is easy to pinpoint trouble

● **ENGINEERS** have proven that regular tune-ups will cut gas consumption and reduce hydrocarbons emitted at the tail pipe. A Detroit company which sent its cars to the garage every 5000 miles for a routine check found that these cars used 15 to 20 percent less gas and gave off 60 percent less hydrocarbons than models which had not received this regular service

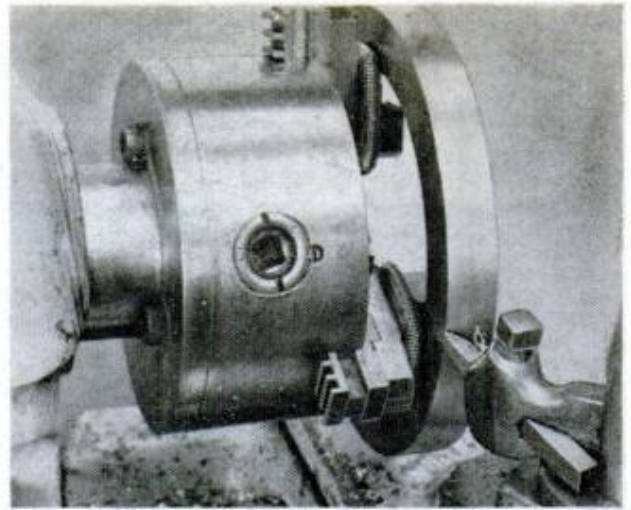
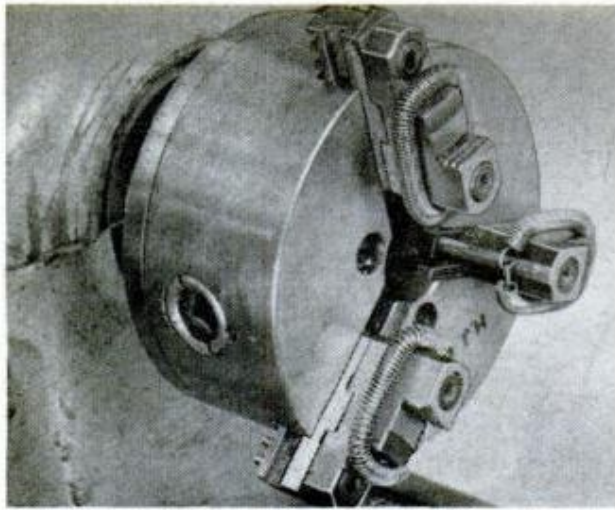
● **WHEN INSTALLING** a head gasket, try soaking it in hot water for a few minutes before you are ready to use it. The hot water will soften the asbestos core, making the gasket compress more readily and conform to the two metal surfaces. After installing the wet gasket, drop the head into place and tighten it down in the usual way. Engine heat dries the gasket

● **IF YOUR CAR** is equipped with an alternator, be careful that you don't accidentally ground the terminal output screw as this can cause the destruction of both wiring harness and alternator. To prevent such an accident, make sure that the terminal is well covered by the vinyl boot cover, or if no cover exists, protect the terminal with electricians' plastic tape

● **TOUCHING UP** a scratch, nick or chipped paint spot usually doesn't seem worth the bother of cleaning the brush afterward, so such spots tend to be neglected (and begin rusting) until there are enough of them to justify dirtying a brush. Cotton swabs used in baby care make ideal touch-up brushes allowing you to cover scratches when they occur

● **OLD PISTON RINGS** can be used to keep carbon and other debris out of the cylinder bores when doing a valve or ring job on an L-head engine. Cover each cylinder opening with a paper cap. Then force one of the old rings a short distance into the cylinder to hold the cap in place. When you pull the paper and ring out, all the grit will come out with it

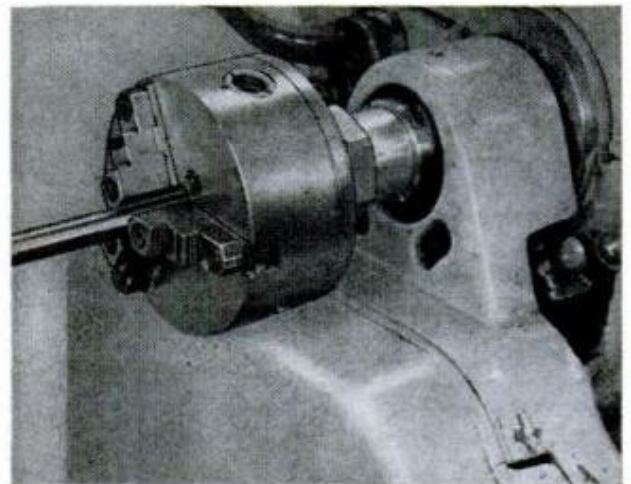
● **SOME PEOPLE** apparently are still afraid that spark plugs will be harmed by abrasive cleaning. A plug manufacturer stresses the fact that glaze hasn't been used on the firing ends of spark plugs since the early 1920's when leaded fuels were introduced. When properly done, abrasive cleaning removes only foreign deposits, does not erode or damage porcelains



**1** WHEN HOLDING work in three-jaw chuck for turning outside diameters it usually is necessary that the work be held so that the outer face clears the chuck jaws. One reasonably accurate method of doing this is to snap short extension springs over the jaws as in the left-hand photo. Springs of various diameters can be used to hold the work out just the right distance. Example is shown in the right-hand photo

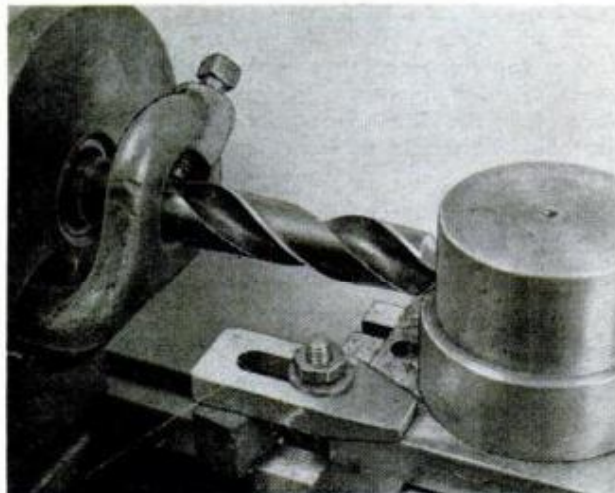
# 10 LATHES HINTS

that machinists can keep in mind for those special jobs

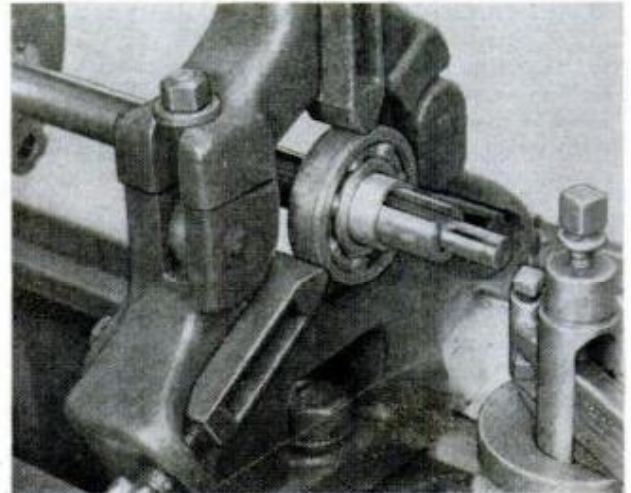


**2** THREE-JAW CHUCK mounted on threaded adapter and force-fitted onto outer end of lathe spindle, centers bar stock which is fed through spindle for duplicate operations. Outboard chuck prevents whip

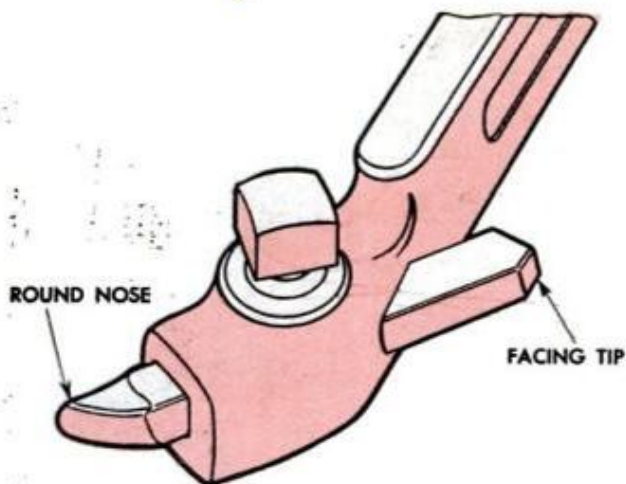
**3** DRILL BITS seated in the headstock spindle of the lathe may tend to slip in the tapered sleeve. This can be prevented by driving the bit with a dog in the manner pictured. Setup gives a positive drive



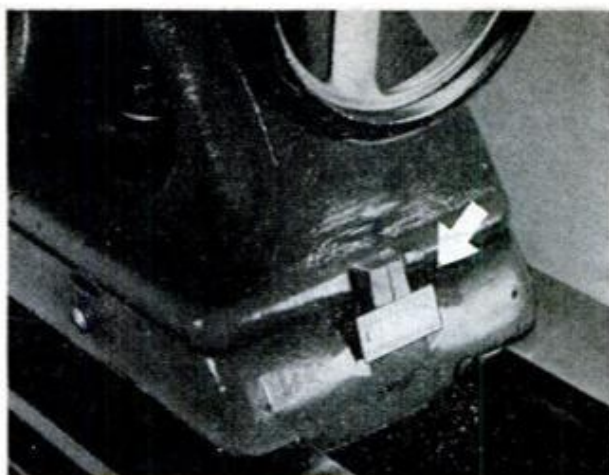
**4** HERE'S A SURE WAY to seat a steady rest on work having a keyway. Bore out a sleeve to fit tightly over work, and turn down outer diameter to take a ball bearing. Then set up job as pictured



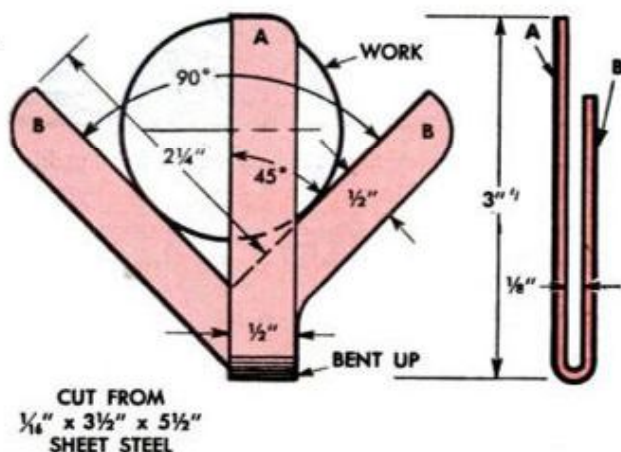




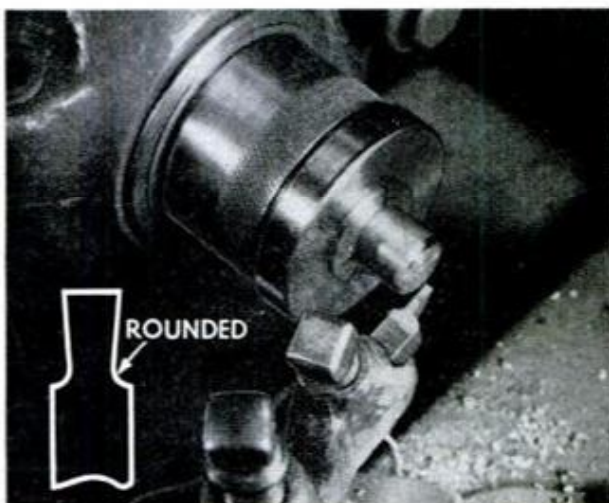
**5 QUICK CHANGE** from one cutting edge to another is often helpful in lathe work. For example, grind round-nosed and facing tips on ends of tool. The switch can then be made in seconds



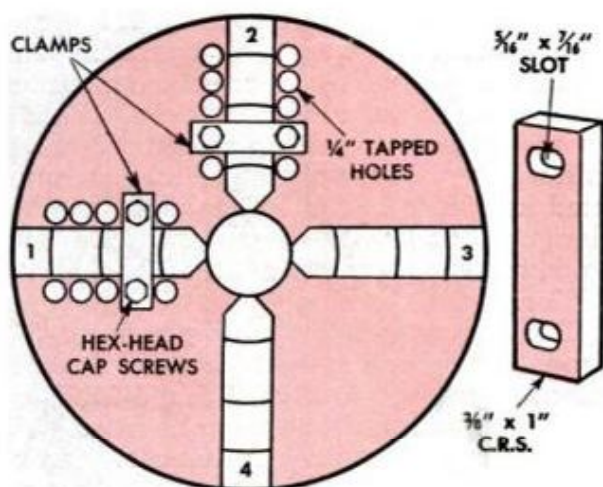
**8 SHORT LENGTH** cut from steel rule and cemented to lower section of lathe tailstock makes it easy to set over for taper turning. Center rule section on witness mark on sliding section of tailstock



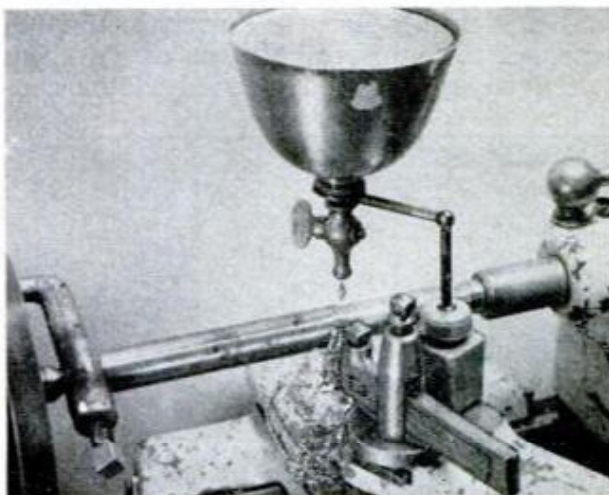
**6 HANDY CENTERING HEAD** can be made from 1/16-in. mild steel. Make a yoke shape and file to 90 degrees between arms, B. Cut leg, A, offset so that when bent up as in detail one edge centers



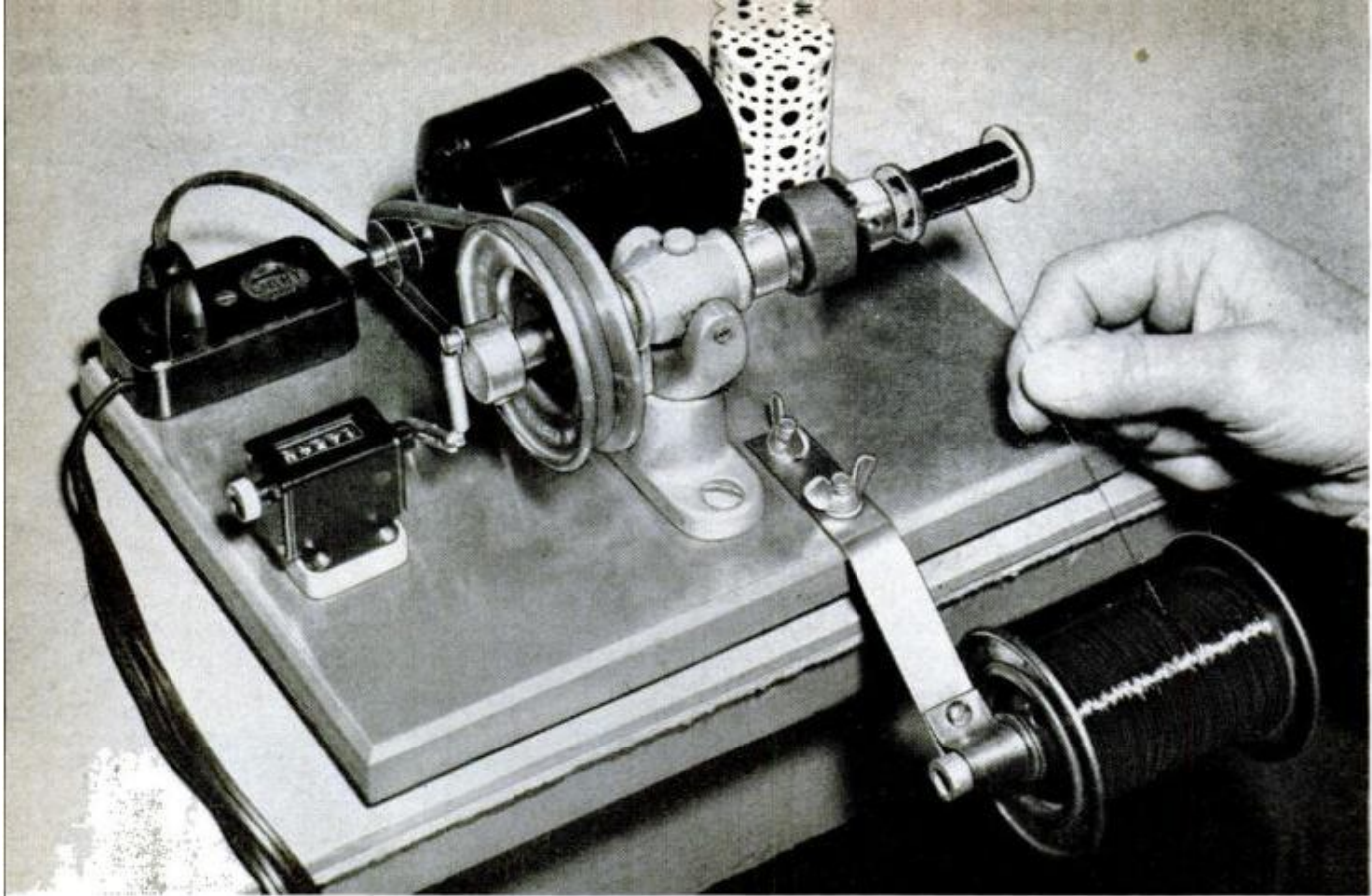
**9 BY GRINDING** square lathe bit as cutoff tool with rounded shoulder at end of grind, tool can be made to do two operations simultaneously—cut off and break one corner of workpiece to a radius



**7 FOUR-JAW CHUCK** works as three-jaw centering type when two jaws are fixed with clamps. Drill and tap holes for screws on each side of adjacent jaws. Tighten and loosen jaws No. 3 and 4 only



**10 COOLANT DRIP CAN** mounted on magnetic base travels with carriage. Brass pet cock is soldered to threaded base of oil-can spout. Altered can is inverted and carried on the swiveling arm



**1. WINDER** is self-contained unit that turns out coils almost as fast as winding bobbins on sewing machine

## Coil Winder Counts the Turns

By Harold P. Strand

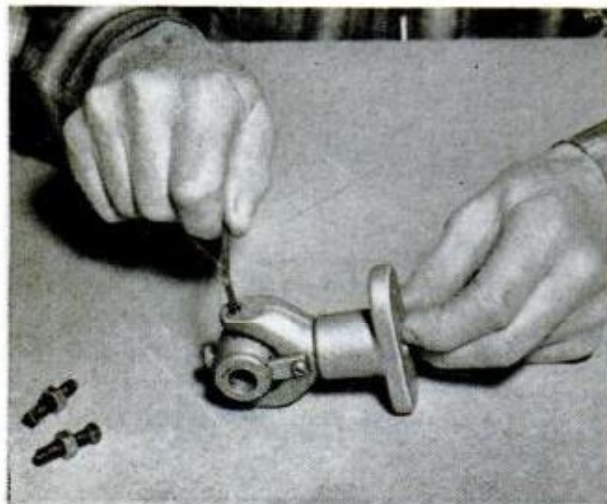
**L**ABORATORIES, model shops and electrical experimenters often need to wind special coils for small transformers and other electrical apparatus of an experimental nature. It is difficult, if not impossible, to do a neat, sure job of winding such coils, especially if a large number of turns of wire is involved, without equipment for the purpose.

This coil winder is almost fully automatic, in that it features a counter to keep track of the number of turns of wire and is driven by a variable-speed motor con-

trolled by a foot rheostat, a setup that gives the operator full control of the winding process from start to finish. It's assembled from stock items, a sewing-machine motor and a drill chuck that holds the winding form securely. The total cost for all new items will run about \$25.00. It handles wire sizes from No. 38 to 20. These wire sizes generally cover the range of those commonly used in light electrical equipment.

The counter pictured in Figs. 1, 5, 7 and 8 is a ratchet type with an operating arm and spring driven by an eccentric mounted on the end of the winding spindle. It has a convenient reset knob for resetting to zero, and will serve the purpose well when operated at speeds below 1000 r.p.m. It is not designed for higher speeds and may tend to skip when operated at speeds above 1000 r.p.m.

The motor is a variable-speed a.c.-d.c. type,  $\frac{1}{15}$  hp., and is controlled by the foot rheostat you see in Figs. 7, 8 and 11. Usually motors of this type must be fitted with a suitable base, which, in this case, can be a short length of steel angle bolted to the motor and winder base as in Fig. 8.



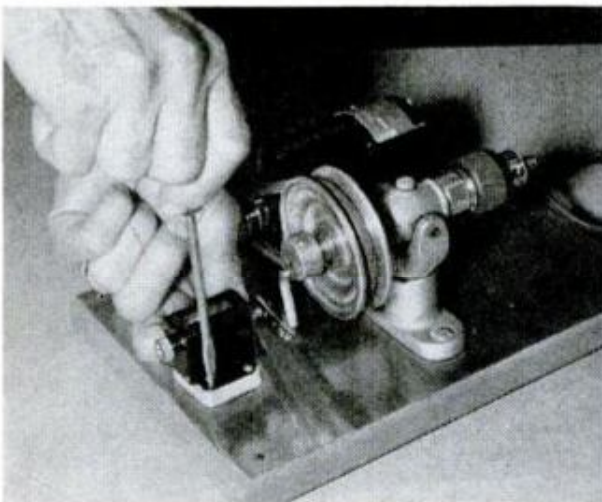
**2. ORDINARY SHAFT HANGER** provides stand and bearing for spindle. Setscrews with locknuts are replaced by socket screws. Note locking braces, Fig. 12

The simplicity of the setup is easily seen from Figs. 1, 8 and 11, but one needs to note the changes made in the shaft hanger that serves as a bearing for the winding spindle. First of all, the setscrews and locking nuts that normally support the self-aligning bearing are removed and socket setscrews substituted as in Fig. 2. Then the body of the bearing yoke is drilled through to take a 1/4-in. stove bolt which holds two braces, or stops, Figs. 2 and 12. The upper ends of these are rounded to fit the contour of the bearing housing and serve to prevent it from tilting. When fitting these braces, be sure that when the bolt is tightened, the braces hold the bearing level with the axis of the bearing parallel with the base.

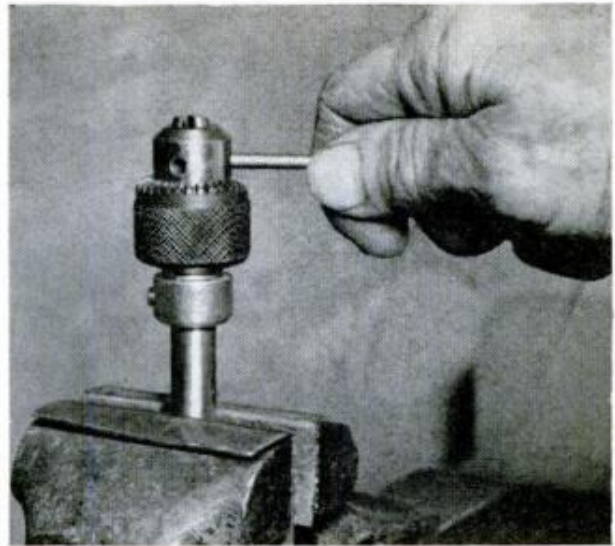
The drill chuck which holds the winding bobbin has a 3/8-24 thread, so all that is necessary to attach it is to shoulder the end of the 1/2 x 4 1/2-in. spindle and cut a 3/8-24 thread on the shouldered end. Use a shaft collar between the chuck body and the end of the hanger bearing as in Fig. 3. The eccentric at the opposite end of the spindle is a shaft collar drilled and tapped for a 9/32 screw which serves as a crank pin. The offset of the holes center to center is 3/8 in., which gives the crank a 3/4-in. stroke.

When assembling the pulley and chuck on the spindle, Fig. 4, adjust for minimum endplay, but be sure the parts do not bind. Mount the component parts, motor, winder counter and receptacle on a base made as in Fig. 11. Some experimenting will have to be done in order to assure proper operation of the counter. The pitman is a spring, Fig. 10, and the exact location of the counter on the base must be found by experiment. The counter is placed on a base of 1/4-in. plywood. When the crankpin, or pivot pin, is at its position nearest the counter, the arm must be free to permit the

**5. COUNTER** is located by experiment. Counter ratchet should engage and disengage positively as otherwise unit will miss. Speed should not exceed 1000 r.p.m.



MARCH 1962

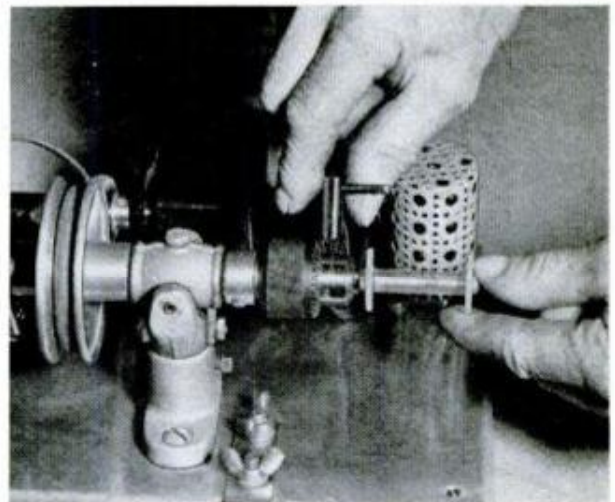


**3. CHUCK IS TIGHTENED** on threaded end of spindle by inserting rod in holes taking geared chuck wrench. Note that shaft collar is placed below chuck

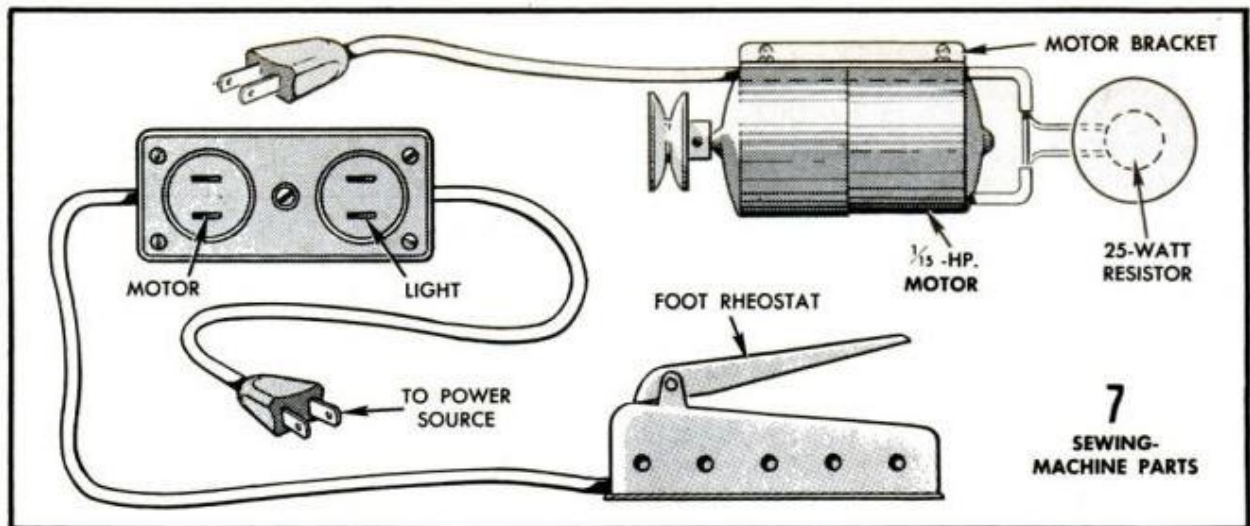


**4. ENDPLAY** in spindle should be reduced to minimum by adjusting pulley and collar so that spindle just turns freely. Lock parts in position with setscrews

**6. CHUCKING** small plastic bobbin in 1/4-in. geared drill chuck. Bobbin spindle is made by cutting head off 1/4-in. bolt. Bolt must be straight, perfectly round



195



**7. YOU GET** all these parts, except the 25-watt resistor, with the sewing-machine motor. Resistor is optional

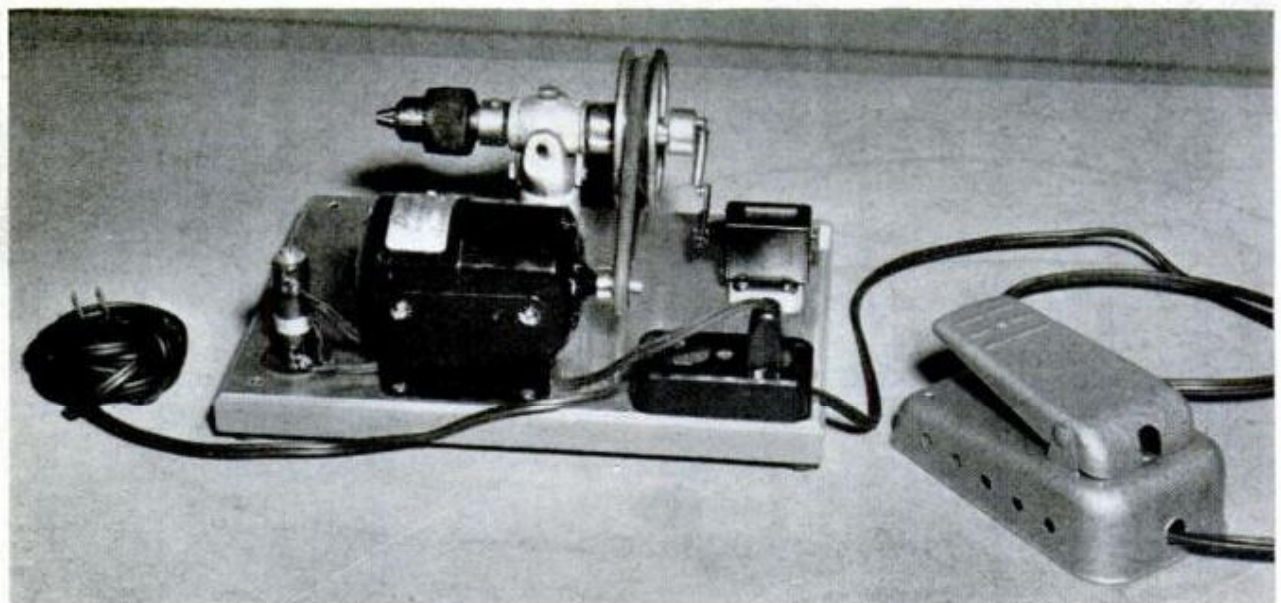
## MATERIALS LIST

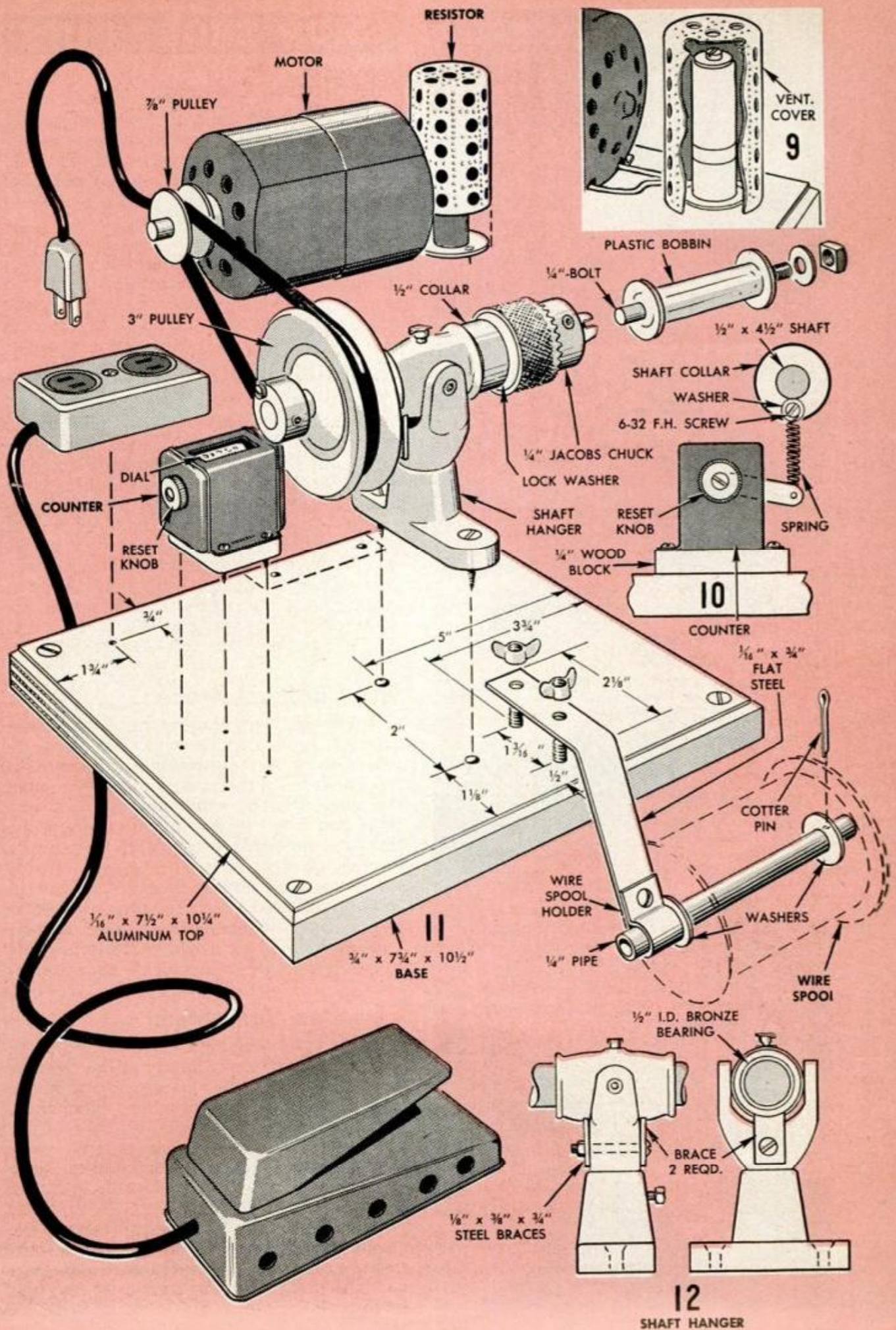
- 1—Sewing machine motor, 1/15 hp.
- 1—Foot rheostat
- 1—Motor-light receptacle unit with cords
- 1—Pulley,  $\frac{3}{8}$ " dia. bore,  $\frac{1}{4}$ "
- 1—Round rubber belt
- 1—Attachment plug for motor cord
- 1—Tubular resistor, 25 ohm, 25 watt
- These parts obtained from Parker Products Co., 17 Crawford Drive, Tewksbury, Mass. \$15.00 postpaid.
- 1 pc. Fir plywood,  $\frac{3}{4}$ " x  $10\frac{1}{2}$ " x  $7\frac{3}{4}$ "
- 1 pc. Sheet aluminum  $1/16$ " x  $10\frac{1}{4}$ " x  $7\frac{1}{2}$ "
- 1—Shaft hanger for  $\frac{1}{2}$ " shaft
- 1—V-pulley, 3" diameter
- 2—Shaft collars,  $\frac{1}{2}$ "
- 1 pc. Steel shafting,  $\frac{1}{2}$ " dia.,  $4\frac{1}{2}$ " long
- 1 pc. Flat steel  $1/16$ " x  $\frac{3}{4}$ " x 8" (spool holder bracket)
- 1 pc. Steel pipe,  $\frac{1}{4}$ ", 5" long (spool holder spindle)
- 2—Washers to fit over  $\frac{1}{4}$ " pipe (spool holder)
- 1—Cotter pin (spool holder)
- 2—Wing nuts,  $\frac{1}{4}$ " (spool holder)
- 2—Flat-head screws  $\frac{1}{4}$ " x  $1\frac{1}{4}$ " long (spool holder)
- 2—Flat-head wood screws No. 10,  $1\frac{3}{8}$ " long (shaft hanger)
- 4— $\frac{3}{8}$ " Rubber feet,  $\frac{1}{4}$ " (use under base)
- 1 pc. Flat steel  $\frac{1}{8}$ " x  $\frac{3}{8}$ " x  $1\frac{1}{2}$ " (bearing braces)
- 2—Socket setscrews,  $\frac{1}{4}$ -20,  $\frac{1}{2}$ " long (shaft hanger yoke)
- The following available from Lafayette Radio, 165-08 Liberty Avenue, Jamaica 33, N.Y.
- 1—Key chuck,  $\frac{1}{4}$ " capacity, HD-186 \$2.98 plus postage
- 1—Stroke-actuated counter, 5-digit with reset knob

counter ratchet to catch and move the first number into position in the window. At a point opposite the first position the ratchet must release. Once an operating position has been assured, screw the counter to the base as in Fig. 5 and then test again for proper operation with the motor running at top winding speed of 800-1000 r.p.m.

The 25-watt resistor, Fig. 9, is optional. It serves to hold motor speed below that of the low point on the foot control during the initial start of winding. The resistor is cut in in series with the motor. Fig. 11 shows how to make a suitable spool holder and bracket and also suggests a method of making a plastic bobbin for coils having permanent forms. Of course, bobbins can be made to suit almost any purpose. The plastic bobbin is chucked as in Fig. 6 and 11, the spindle being made by cutting the head off a  $\frac{1}{4}$ -in. bolt. Use a round rubber sewing-machine belt from motor to spindle pulley. ★ ★ ★

**8. SELF-CONTAINED UNIT** ready for table-top operation. Resistor at left of motor is shown without cover





## SHOP SHORT CUTS

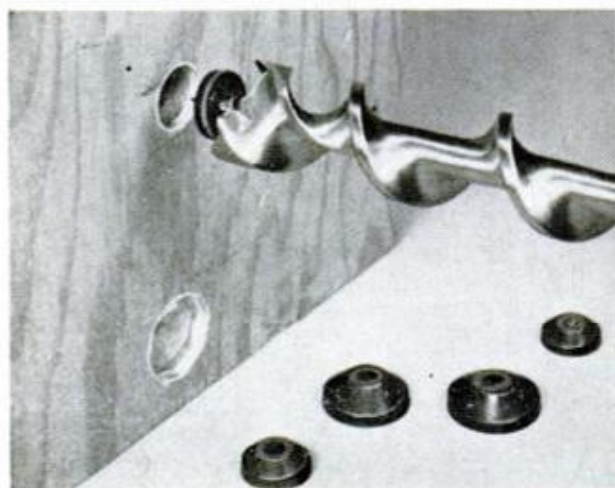
### File Under Control

You get better control of a file on a delicate job by cutting away a portion of the handle, leaving a flat as pictured. This not only gives a better and surer sense of lateral tilt of the file, but offers a somewhat easier and more comfortable grip when doing heavier work, such as filing a flat surface. Cut away only the wood portion of the handle back of the metal, ferrule and sand the flat surface smooth, rounding the edges only slightly.—*Martin D. Koehler*



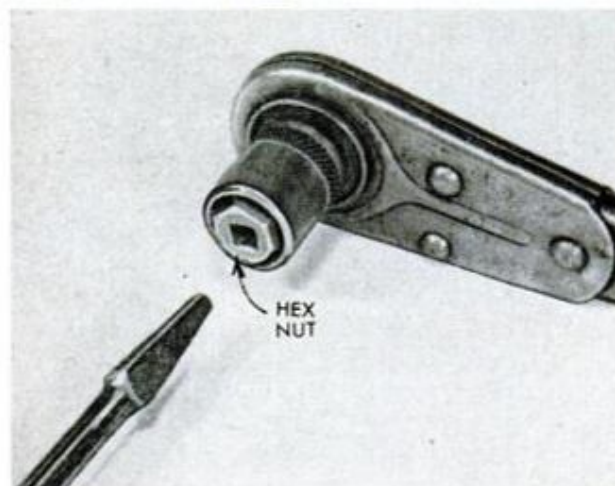
### Auger-Bit Pilot

You've known for a long time about using a short length of dowel as a pilot for an auger bit when enlarging a hole concentrically, but did you ever think of using a faucet washer? It accomplishes the same thing as the dowel—pilots the bit accurately—and it does not split or wedge tightly in the smaller hole, making it necessary to drive it out and start all over again. All you have to do is select a faucet washer of the right size, turn it onto the screw point of the bit and proceed to bore the hole to a larger diameter.—*Bil Toman*



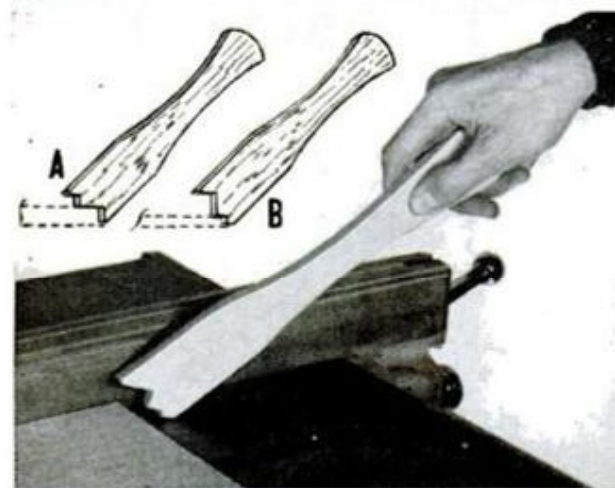
### Short Ratchet Brace

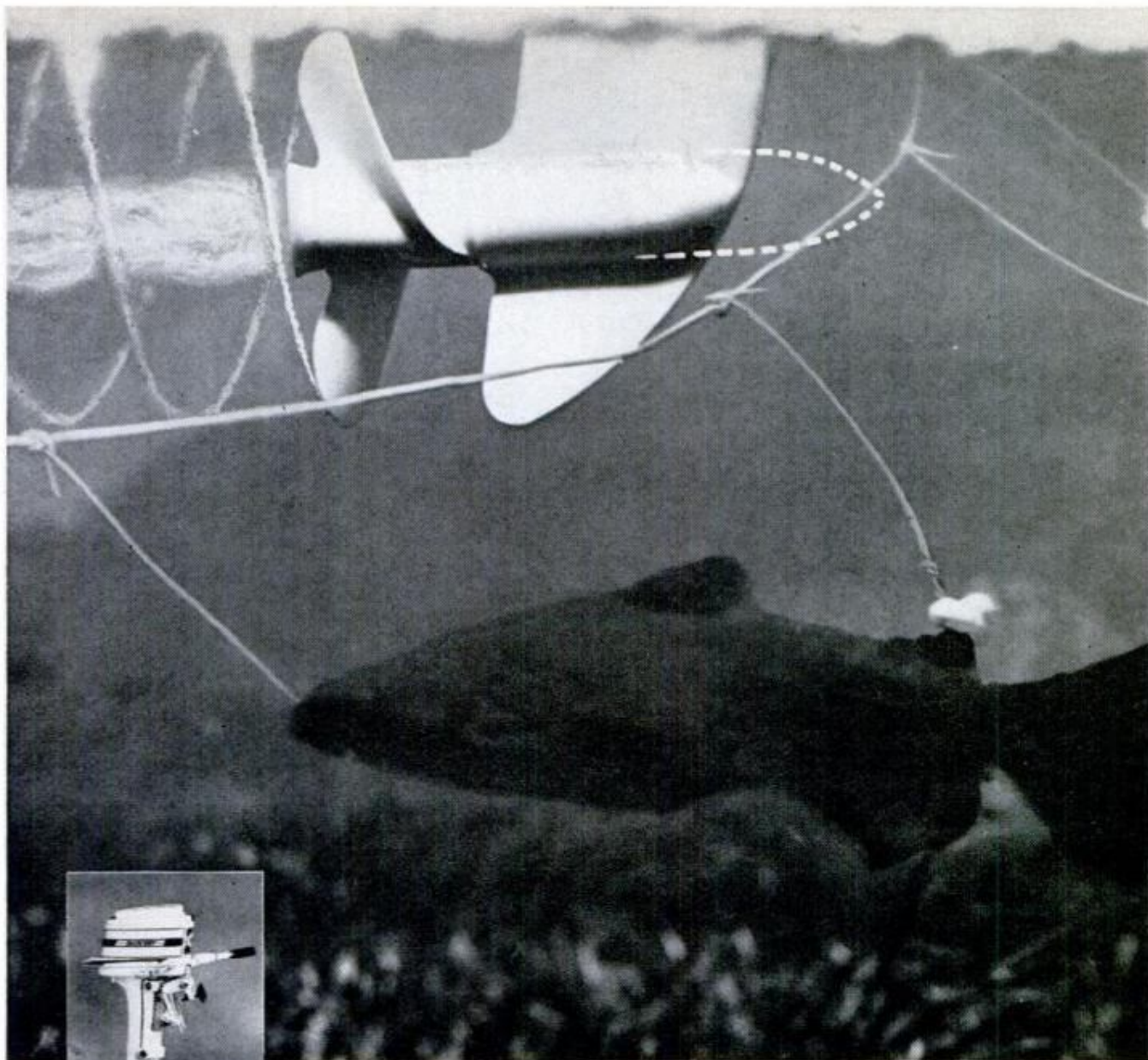
Of course, a regular ratchet brace takes care of most problems in boring holes where there isn't room for a full swing of the sweep. But there are times when even the ratchet brace won't do the trick, and then you have to improvise. Square the threaded hole in a hex nut, drop it into a wrench socket, snap the socket onto a ratchet driver and you've got the short ratchet pictured. Fit the squared hole in the nut over the shank of an auger bit and you can bore a hole in places it's impossible to reach with any other tool.—*H. Hanscom*



### Two-Step Push Stick

When you make a push stick—and there should always be one handy at the circular saw—cut two notches instead of one in the end as is the usual practice. The extra notch is not only an added utility feature, it's a safety bonus as you can safely handle stock in a wide range of thicknesses. Note the two sizes of notches in details A and B. The smaller notch takes stock  $\frac{1}{4}$  in. thick with just enough clearance to prevent the corner from riding on the saw table, permitting the stock to chatter as it is pushed past the blade. Flip the stick over and you have a  $\frac{1}{2}$ -in. notch for stock up to 2 in.





*Photographed underwater at Florida's Silver Springs*



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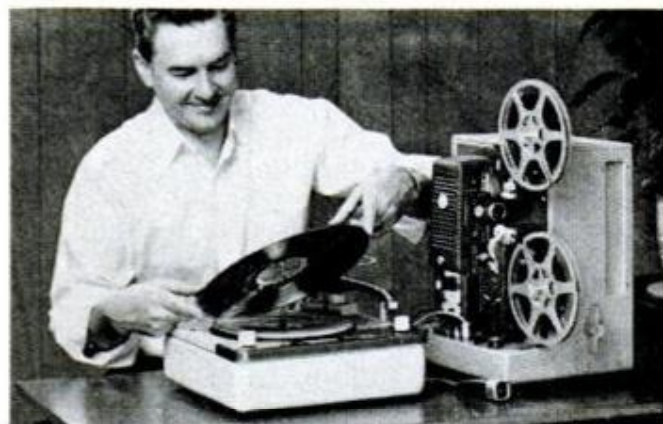
All this is made possible by Kodak's discovery of a way to put quality magnetic sound on narrow 8mm film—and by the Kodak Sound 8 projector, which both records and plays back the sound.

You simply take your processed film to your dealer. Ask him to have a magnetic stripe, such as Kodak Sonotrack Coating, applied to the film edge.

As you project the "striped" film through your Sound 8 projector, talk into the mike to record voice commentary. For music and sound effects, hook in your record player or tape recorder.

You can play back your new sound movie instantly. To improve any sections of sound, just reverse the film and re-record; erasure of previous sound is automatic.

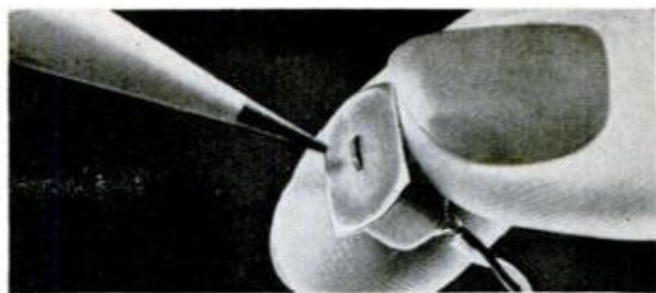
Kodak Sound 8 projector, with microphone, long-play record and built-in speaker, is less than \$350. See your dealer. Many dealers offer terms as low as 10% down.



**RECORD RIGHT ON THE FILM** — voices or "live" sound effects through mike, music from your record player or tape recorder. Play back through projector's built-in speaker or your present hi-fi equipment.

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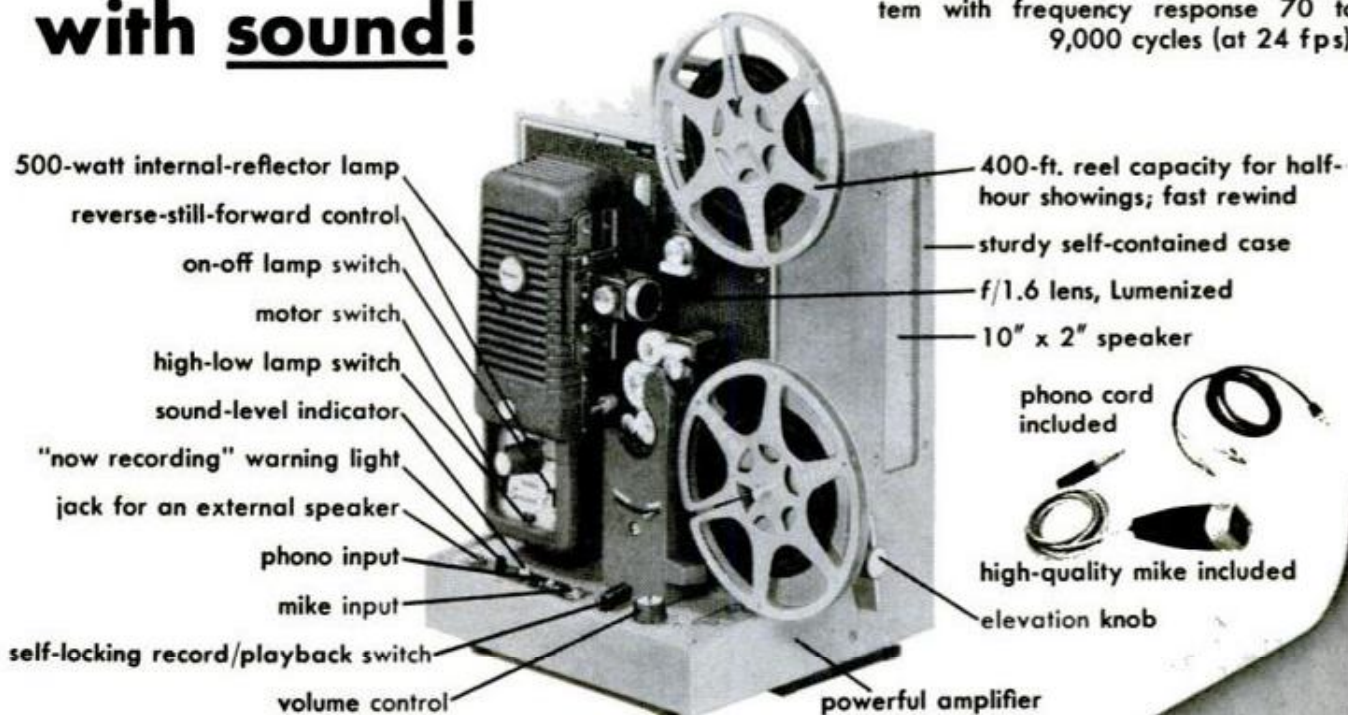
**LONG-PLAY (33 $\frac{1}{3}$ ) RECORD OF BACKGROUND MUSIC** and 13 special sound effects comes with your Kodak Sound 8 projector. It's high-fidelity, of course.



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# CLINIC FOR HOMEMAKERS

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## Tuck-Pointing Masonry

**Q**—We own a home faced with brick and many of the mortar joints have softened and are starting to disintegrate. How should I repair them?—J. B., Minn.

**A**—Unlike most masonry jobs, tuck pointing is relatively easy, even without previous experience. A good mortar mix consists of one part cement, one part hydrated lime and six parts sand—thoroughly mixed together before the water is added.

Prehydrating the mortar eliminates most of the initial shrinkage. This is accomplished by mixing a third of the required amount of water into a batch about two hours before it will be used. After curing, the rest of the water is added and mortar reworked just before tuck pointing.

All disintegrating joints are raked out at least a half inch in depth. Joints and surrounding areas are soaked thoroughly. Using a denser mixture than normal, joints are packed with mortar, flush with the brick facing. A piece of board is handy for compacting the joints.

When the mix has partially stiffened, joints are smoothed with a striking or raking tool, such as a metal rod or pointing trowel, so that joints match the rest of the wall. Sometimes new areas may be closely



matched with old ones by going over joints with a brush which is practically dry, though this is only for appearance.

## Starting a Compost Heap

**Q**—Our neighbor tells us not to discard leaves, old flower plants and grass. He says we should save them for a compost pile. Do you think it's worth while bothering with one?—J. D., Ind.

**A**—Yes it is. A compost heap doesn't require a lot of work, and it's a good way to dispose of lawn and garden refuse. Primarily, though, it's an inexpensive source of garden humus.

You can start a pile anytime of the year—the sooner the better. On most properties there will be some out-of-the-way spot for hiding compost. The area may be shielded by shrubs, hedges or perhaps a fence. Just



keep in mind that the location should be near water and close to the garden.

There are many ways of handling compost but, whatever you do, a few basics should be kept in mind. A heap should be about four to five feet high. Many prefer using two or three stacks so that compost may be turned periodically, shoveling it from one bin to another. Raw materials may include most organic matter: Leaves, clippings, healthy plants, even coffee grounds. Diseased plants, bones and branches should be omitted.

To retain water, the top of a pile is shaped like a saucer. Debris is kept wet but never soggy so air cannot circulate and stop decomposition. Moisture, air and a build-up of heat are all necessary. A low heap will lose too much heat; a high one will restrict air. If a masonry-block or a wooden bin is used, the sides should be left open for air to circulate.

A stack is made with thin layers of raw materials, using about six inches of plant litter, a thin layer of commercial fertilizer and a thin layer of top soil. ★ ★ ★



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## **Battery and Starter Checks**

*(Continued from page 190)*

loss of battery acid from filling with water when the cells are discharged. Then, when the battery is charged the fluid will overflow through the discharge vents. The result is diluted acid. You'll have to determine this through an analysis of the hydrometer test.

Now that you've gone over the battery system and know its condition the next in line for checking is the starter or cranking motor. Since it is subjected to heavy-shock loads, the bolts holding the unit to the motor block should be checked and tightened to the specs with a torque wrench.

**Starter-motor amperage draw.** The average 6-v. starter draws between 150 and 250 amps. As this is a very heavy current, special equipment is necessary to measure it. An instrument taking advantage of the inductive qualities of flowing electric current resulted in the design of the inductive ammeter, Fig. 8. Low in cost and simple to put in operation, it will give an adequate indication of the current flow in the starter circuit. The 12-v. system uses half the current of the 6-v. system.

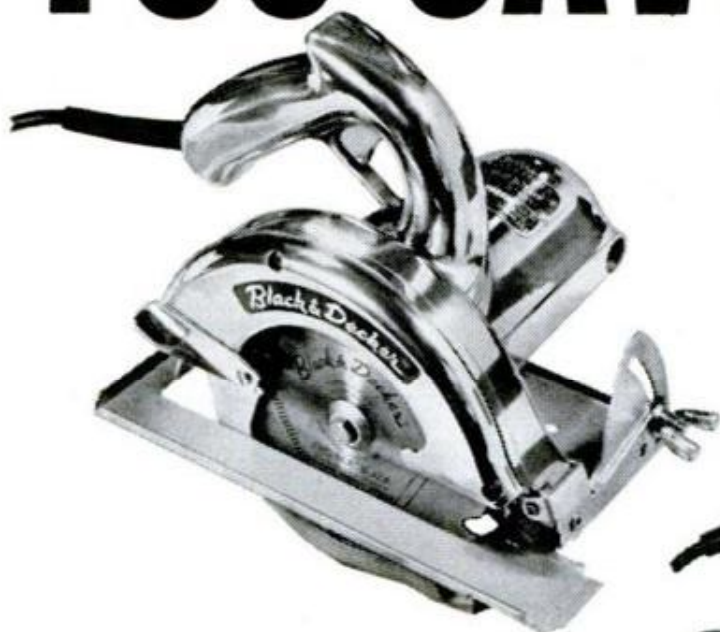
Place the meter yoke over the battery cable and take a reading as the starter motor is turned over with ignition off. If cranking is slow and the amp.-reading high, this would indicate mechanical friction or a grounded armature or field. Low amperage indicates a low battery or poor connection.

**Starter ground circuit.** It is important to check out the ground circuit. Since the starter-motor housing should be at the same electrical level as the grounded post on the battery, any loss or voltage drop can be measured between these two points, Fig. 5, also Figs. 6 and 7. More than .2-v. drop can mean a poor connection, wire gauge too small, or the cables are defective. In these checks the inexpensive portable starter switch, Fig. 12, enables you to control the starter without a helper. The full-load voltage is also an indication of the cranking voltage. Only when battery capacity is checked outside of the car is it necessary to make a separate check.

**Loss at connectors.** While clean connectors reduce voltage loss to the minimum, special tests must be used occasionally because of damage to cables due to corrosion that may not be visible. Also, correct cable size is necessary to avoid current loss. Using your voltmeter, check the voltage from the insulated battery post to the center of the solenoid battery terminal on the starter. Then connect the meter across the

*(Continued to page 206)*

# MAN ALIVE, YOU SAVE A FIVE



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solenoid motor terminal and solenoid battery terminal. More than 2-v. variation in either test indicates excessive resistance. If the solenoid fails to operate, check for resistance in the solenoid control circuit by closing the starter switch and hooking up the meter from the solenoid-battery terminal to the solenoid-switch terminal. Readings in excess of .75 v. (6-v. system) and 2.5 v. (12-v. system) show excessive resistance. If these figures are not exceeded and the solenoid is inactive, then connect the meter from the ground to the solenoid switch terminal. This should activate the solenoid if the reading is slightly higher and solenoid isn't warm.

If these checks don't add up to a perfect score then there's the question, overhaul the starter motor or replace it? When anything other than replacement of brushes and cleaning is necessary it's safest to replace the starter with a rebuilt unit. This also is a recommended procedure for generators, voltage regulators, carburetors and fuel pumps that prove to be defective under test. ★ ★ ★

## Bumpers for Spaceships

Meteor bumpers on spaceships will be needed to provide psychological protection for astronauts, according to the director of the Smithsonian Astrophysical Observatory at San Antonio, Texas.

Dr. Fred L. Whipple said that the sound of tiny "cosmic puff balls" exploding on the surface of the fast-moving space craft might unnerve the occupant, especially near the earth where the concentration of space dust is heaviest.

He suggests that a thin outer shell around the major walls of the space vehicle would insulate it from the sound, and it might also protect the wall itself from pinholes that some of the meteors could punch in it.

## Russia Expands TV System

There will be 15 million TV sets in Russia by 1965, according to a writer in the Soviet magazine *Literature and Life*. There are now three million sets picking up signals from 70 stations. Prof. P. Shmakov says the relay system will be greatly expanded during the next three years and there will be 160 stations. Additions include three new studios in Moscow, two to transmit programs in black and white and a third for color broadcasting. There will be an increase in the use of television for cultural services and in the interests of science, technology and the national economy, says Professor Shmakov.

# GRAVELY & YOU—power partners!



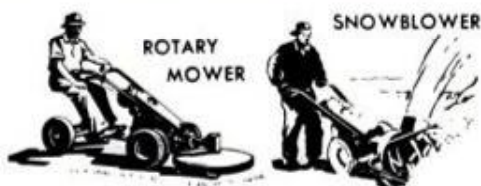
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Model 77 **\$19<sup>95</sup>**

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## Triple-Top Fun Table

(Continued from page 171)

Now to finish your fun table. First soften all edges by rounding slightly with medium garnet paper. Patch up any nail holes, dents or knot-holes, especially the voids in the edges of plywood. Allow patching compound to dry thoroughly before sanding down flush. Finally clean off all dust with a vacuum cleaner.

Remove cushions and pocket backs and mask off all areas not requiring a finish, including the casters. Take extra care in masking the felt bed. Use masking tape for sharp lines, along with newspapers for large areas. Remove sliding doors and substitute cardboard. A multicolor spatter paint, called Varichrome, was used to paint the original, Pepper-N-Salt (black and white) being used for the pool table and "Spring Song" (green) for the storage base. First apply the primer coat which is recommended for the color you choose. This dries flat in a matter of minutes. A roller is preferred to a brush when applying the primer to the perforated doors as a brush has a tendency to fill the holes. Spatter paint is applied with a spray attachment of your vacuum cleaner, and if you haven't tried this attractive novelty finish, you'll be surprised how durable a finish it is and how well it covers minor nicks and hides that "plywood look." Apply a clear primer of the type that tames wild grain to the inside surfaces of the storage units if desired. Use the primer also on both surfaces of the table-tennis top. Allow to dry thoroughly. Normally this takes overnight. Then apply at least two full coats of a non-reflecting table-tennis green paint, Fig. 41. Allow the paint to thoroughly set, 24 to 48 hrs. Mask off a  $\frac{1}{2}$ -in. strip for the four outside edges, and a  $\frac{1}{4}$ -in. strip lengthwise down the center, using newspaper along with the tape to cover the large areas. A spray can of flat white held over the top surface and directed toward the edge at about 45-deg. will give you a clean line without spray falling on the sides. Pull off the masking tape very carefully as soon as the paint has set. Paint the table crossrails to match the table-tennis top and the HO-ga. layout. ★ ★ ★

### PLANS ARE AVAILABLE

If you would like to build this Fun Table but have missed parts I, II and III of the series in the December, January and February issues of the magazine, a set of plans, plus an instruction booklet, is available. Write Blueprint Dept., Popular Mechanics, 200 East Ontario St., Chicago 11, and enclose \$3.50.



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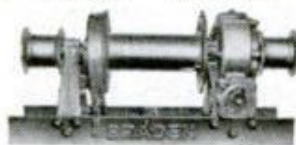
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## Make Your Own Banjo

(Continued from page 161)

until the ends meet in a butt joint, clamping the cauls in place as you go. Leave the clamps on for a time as contact cement attains its greatest strength after it "ages" a few hours.

Then remove clamps, cauls and the flat-steel cleats. Loosen the halves of the form from the shell by pressing a pocketknife blade between the inner edge of the shell and the outer edges of the form halves. Once loosened all around, the halves should drop out. Pull the nailing blocks free, catch the projecting ends of the brads with pliers and pull them out of the shell, working carefully so that you do not split the wood. Snip off any brads that will not pull easily and file flush. Finish the edges of the shell to a uniform width and soften the corners with fine sandpaper.

The balance of the construction will be quite clear from Figs. 2 through 6. The neck, Fig. 2, is cut to rough form from a piece of selected mahogany about  $2\frac{3}{8} \times 2\frac{1}{2} \times 24$  in. Work the piece down to the dimensions given, paying special attention to the sectional shapes, lower detail, Fig. 2, and to the shape and finish of the headpiece, Figs. 2 and 3. Note that the neck is grooved on the top face to take a steel spine, one end of which extends past the fingerboard into the headpiece. This projection is covered with a  $\frac{1}{8}$ -in. plywood overlay which is glued to, and becomes a part of, the headpiece, Fig. 3. Sand all surfaces glass-smooth.

### The Fingerboard

The fingerboard, Fig. 5, is a guitar fingerboard adapted to use on a banjo by cutting it down to the size and shape indicated by the dotted lines. The fingerboard and the nut, Fig. 3, are attached to the neck with glue. Now, note closely the assembly sectioned in Fig. 4, which shows how the neck is attached to the shell. Drill the through hole for the tension rod, which is a  $\frac{3}{8}$ -in. threaded rod available from any hardware store, on the joint of the outer lamination of the shell. The hole taking the inner end of the rod is drilled only about halfway through the shell. The outer end of the rod cuts its own threads in a tap-size hole drilled into the big end of the neck. After turning it in tightly drill the tap-size hole for the locking bolt, Fig. 3, right through the tension rod and then tap the hole in both the wood and metal. Countersink the hole for the locking bolt and turn the bolt in tightly. Draw the nuts on the tension rod moderately tight and nick the threads so that they cannot loosen.

Now, note closely the relative positions

of the counter hoop, tone ring and calfskin head in Fig. 3. These parts assemble as in the sectional view, Fig. 6. Here ordinary eyebolts and screw eyes are used as counterhoop clamps, each eyebolt being altered to suit the purpose by cutting away about one third of the eye as in Fig. 6. The location of the holes for the screw eyes in the shell is not detailed in Fig. 3. The position of the holes must be determined after altering the eyebolts. You can, of course, purchase ready-made clamps, also the hoop and tone ring.

Note that the ends of the tone ring meet in a V-joint, while the ends of the counterhoop overlap and are scarved (or skived, if you like). Note also that the top edge of the hoop is beveled as in Fig. 6. This can be done quite accurately with a file. The hoop, being one of the exposed parts, should be highly polished. The wood of the neck should be finished in the natural color with several coats of violin-maker's varnish or a bar-top finish which is semigloss. Addition of the pegs, tailpiece, bridge and strings completes the instrument.

If you'd rather work from a kit, then everything needed, which includes all the parts and materials, is available in kit form for \$19.95 postpaid from Musicraft Studios, 823 Foster St., Evanston, Ill. ★★

**SOURCES OF SUPPLY** and information on articles are published in the free **WHERE-TO-FIND-IT** list. Send stamped, self-addressed envelope to **SERVICE BUREAU, 200 E. Ontario, Chicago 11, Illinois.**

### Built-In Fire-Burglar Alarm

Set off at temperatures above 132 degrees, a fire-alarm system includes a prowler switch which can be flipped to make known the presence of burglars.

A typical system includes four heat detectors, about the size of a dime, mounted in the ceiling in susceptible areas. The main control panel can be mounted anywhere out of view. The wiring is also hidden.

The alarm goes off when the air temperature reaches 132 degrees, well below the level of ordinary flames (paper burns at 363 degrees). The warning is sounded by an alarm bell, heard throughout the building. As optional equipment, there's a red flashing roof-top light.

The system plugs in like any electrical appliance, or is permanently connected. The burglar switch is usually in the bedroom.

The system, which sells for \$113.61, is made by Security Devices Co., 911 Rosehill Drive, Altoona, Pa.



# TRIGGER A NEW TEMPEST LE MANS FIRE ALL FOUR BARRELS!

There's more to Pontiac's new Tempest LeMans than its bucket seats, comfortable as they are, or its full carpeting and special trim, handsome as they are. The real bomb in this baby lies up under the hood.

The standard four comes in 110, 115, 120 and 140 h.p. versions. But if you're willing to lay out a few dollars more, you can have yourself a four-throated version of Tempest's 194.5 cubic inch mill. This little jewel puts out more torque than any other production four in the world—215 ft.-lbs. at 2800 rpm. Maximum h.p. reads 166 @ 4800—again, more h.p. than any other production four in the world. That's a horsepower jump of 11 over last year. Those eleven horses come from improved carburetion, better velocity and distribution in the intake manifold and a freer breathing exhaust. It takes premium fuel, and it delivers premium performance.

Next time you've got a few minutes, drop in at your Pontiac dealer's and borrow a new Tempest for an hour. If he doesn't happen to have the four-barrel job handy, either the standard 4 or optional V-8 engine will do fine, just fine. Go find yourself some road and ease open the throttle.

And then see if you can say no to Tempest.

TOTAL TORQUE MULTIPLICATION\* WITH TEMPEST POWER TEAMS

TRANSMISSION GEAR RATIOS	REAR AXLE RATIO CHOICES				
	3.08:1	3.31:1	3.55:1	3.73:1†	3.90:1†
<b>3-SPEED MANUAL</b>					
1st—2.94:1	N.A.	9.73:1	10.44:1	10.97:1	11.47:1
2nd—1.68:1	N.A.	5.56:1	5.96:1	6.27:1	6.55:1
3rd—1.00:1	N.A.	3.31:1	3.55:1	3.73:1	3.90:1
Reverse—3.32:1	N.A.	10.99:1	11.79:1	12.38:1	12.95:1
<b>4-SPEED MANUAL</b>					
1st—3.65:1	11.24:1	12.08:1	12.96:1	13.61:1	14.24:1
2nd—2.35:1	7.24:1	7.78:1	8.34:1	8.77:1	9.17:1
3rd—1.44:1	4.44:1	4.77:1	5.11:1	5.37:1	5.62:1
4th—1.00:1	3.08:1	3.31:1	3.55:1	3.73:1	3.90:1
Reverse—3.66:1	11.27:1	12.11:1	12.99:1	13.65:1	14.27:1
<b>TEMPESTORQUE AUTOMATIC</b>					
Low (Plus Converter) 3.64:1	11.21:1	12.05:1	12.92:1	13.58:1	14.20:1
Low (Gears Only) 1.82:1	5.61:1	6.02:1	6.46:1	6.79:1	7.10:1
Drive—1.00:1	3.08:1	3.31:1	3.55:1	3.73:1	3.90:1
Reverse—1.82:1	5.61:1	6.02:1	6.46:1	6.79:1	7.10:1

\*The higher the total torque multiplication figure the faster the engine will be turning at a given road speed and the livelier the performance.  
†Must be special-ordered.

PONTIAC MOTOR DIVISION • GENERAL MOTORS CORP.

# TEMPEST BY PONTIAC

## Build the PM Jet

(Continued from page 157)

Next, lay out another line to cut the coaming edge of the shelf. Measuring from the sheer edge, mark points  $4\frac{1}{2}$  in. in at the transom,  $5\frac{1}{2}$  in. in at the seat back and  $2\frac{1}{2}$  in. in at the stem header. Connect these points with a batten bent to a fair line and mark this line. In order to provide support for the decking, move this line in about 1 in. from the header to station 2 and from the transom to a point about  $11\frac{1}{2}$  in. forward of it. Cut this coaming line with a bevel of 10 deg. opposite to that of the sheer bevel. Both the coaming and sheer bevels will be widest at the deck surface and taper toward the underside. Once the coaming bevel is cut, the sheer shelf can be clamped in place and secured. At the header use glue only, since the fore end of the shelf will require quite a bit of shaping when you fair the crown of the deck. Screws can be installed after you have completed this fairing.

### Mounting the Upper Chines

The upper chine and floor riser is mounted next. Bevel the floorboard edge of this member 15 deg. so it will fit flat against the underside of the floorboards and fasten it temporarily in place on the

bulkheads. Use a batten to mark on the inside that will come in contact with the lower chine, bending it over the bulkheads and holding it against the upper chine. Note the angle of bevel at each station and then remove the upper chine so that it can be sawed out to the marks you have made.

The lower, full-length chine is now added. While no beveling is needed to mount this member, you might bevel it about 8 deg. on the outside to reduce the amount of hand planing required later. Note that the bottom surface of the chine will be flat against the bottom planking and thus will require a minimum of planing. However, this means that there will be a slight twist in the member when it is mounted, so be especially careful when bending it. Mount the lower chine as you did the stringer and battens, using nails and glue to fasten it to the upper chine, and screws and glue to attach it to the bulkheads, transom and header. If you are careful, the bending required when mounting the chine can be performed without steaming the wood. Should you run into difficulties, pour a bit of hot water on stiff areas to make them bend easier. The bending job will be much easier if you fasten temporary cleats at the forward bulkheads so that

(Continued to page 214)

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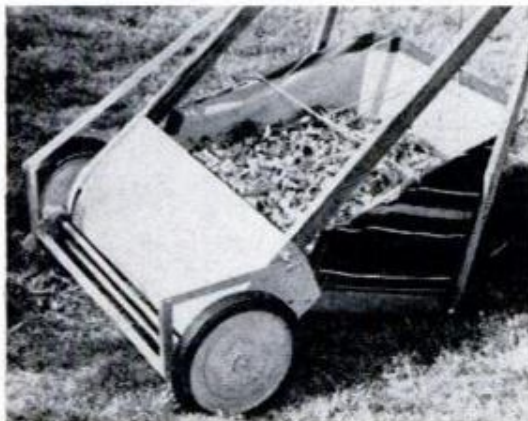
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## DON'T TOSS IT OUT

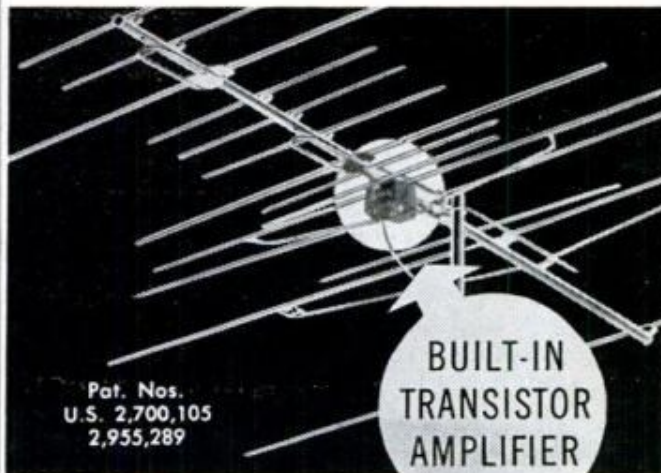


If a new power mower has relegated your old hand pusher to the junk heap, grab it quick. You can use parts from it to make a dandy lawn sweeper. Watch for this timely craft feature in

# APRIL

MARCH 1962

## WINEGARD ELECTRONIC TV ANTENNA INVENTION



### GIVES YOU POSITIVE TV IMPROVEMENT

clears up snow and interference, increases reception distance.

The Winegard Powertron is a new *electronic* antenna that will make a big improvement in your TV reception. For instance, for long distances, the Powertron will pull in TV pictures hardly visible with an ordinary antenna.

There are two reasons for this unusual performance: The Powertron has a patented Electro-Lens system that intercepts and focuses TV signals on the collector element. Here the signal is *amplified* by a built-in transistor. The result: In most cases, you can enjoy more channels. Pictures that were poor to fair become sharper . . . brighter. Snow and interference is reduced. Excellent for color or black and white.

Besides being electronically superior, the Powertron is mechanically strong and will deliver fine performance for years. It has a lustrous gold anodized finish that won't corrode or turn dull. If you and your family want better reception, the Winegard Powertron is a wise investment. See your TV dealer, or for more information, send coupon for booklet.



Winegard Co., 3001-3 Kirkwood, Burlington, Iowa

- Send FREE booklet on Powertron
- Send folder on easy way to install TV antenna plug-in outlets in each room in my house.
- Send information on long distance FM reception.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

My nearest TV station is \_\_\_\_\_ miles away

they can be used when clamping the chine in place.

You have now arrived at one of the most critical stages of construction — building the intake block, Fig. 8. To be absolutely safe, make a full-size drawing of the block and take all dimensions from this. The underside of the side pieces and filler block at the aft end should be beveled 6½ deg. The forward side of the filler block is at an angle of 90 deg. to the base, and the underside of the plywood piece forward is at an angle of 15 deg. to the base. Use plenty of glue when assembling the intake block and make sure that it's clamped tightly while drying.

Mount the intake block so that the forward edge of the aft filler block is not less than 10¼ in. nor more than 10⅜ in. forward of the inside face of the transom. *This dimension is critical.* Be sure to take the measurement square to the transom and parallel to the top of the intake block. Cut the aft end of the keelson to an angle matching the upper surface of the plywood face on the intake block and secure the block to the keelson. To complete the keel line, mount a filler piece measuring 1¼ x 2¼ in. between the aft end of the block and the transom.

You are now ready to fair the frame. Lay a straightedge across the keelson, stringers and chine at the angles indicated in Fig. 15. In each position, these angles will permit the straightedge to touch all members it crosses. Bevel all parts as indicated by the underside of the straightedge. The sides of the chines are beveled to follow the flare of the bulkhead and transom sides. The stem bevels are indicated by the straightedge and the shape of the header.

### Planking the Hull

After the frame has been faired, the planking can be done. Starting with the sides, Fig. 1, tack the first panel in place and mark it for cutting. It's a good idea to use one or two screws at each end so that the panel can be replaced in the same position after it has been cut. Now remove the panel and cut it slightly oversize to your marking. Check this panel on the other side of the frame before using it as a cutting pattern for the second side. Cover all side surfaces of the frame with glue (except the temporary molds) and mount the two side panels. When nailing into the chines, use a backing iron to properly set the nails without breaking the chines.

Once the chine edges of the side panels have been trimmed, you can install the bottom panels. If you want to be on the

(Continued to page 217)

## PM JET MATERIAL LIST

### LUMBER (Clear and free of knots)

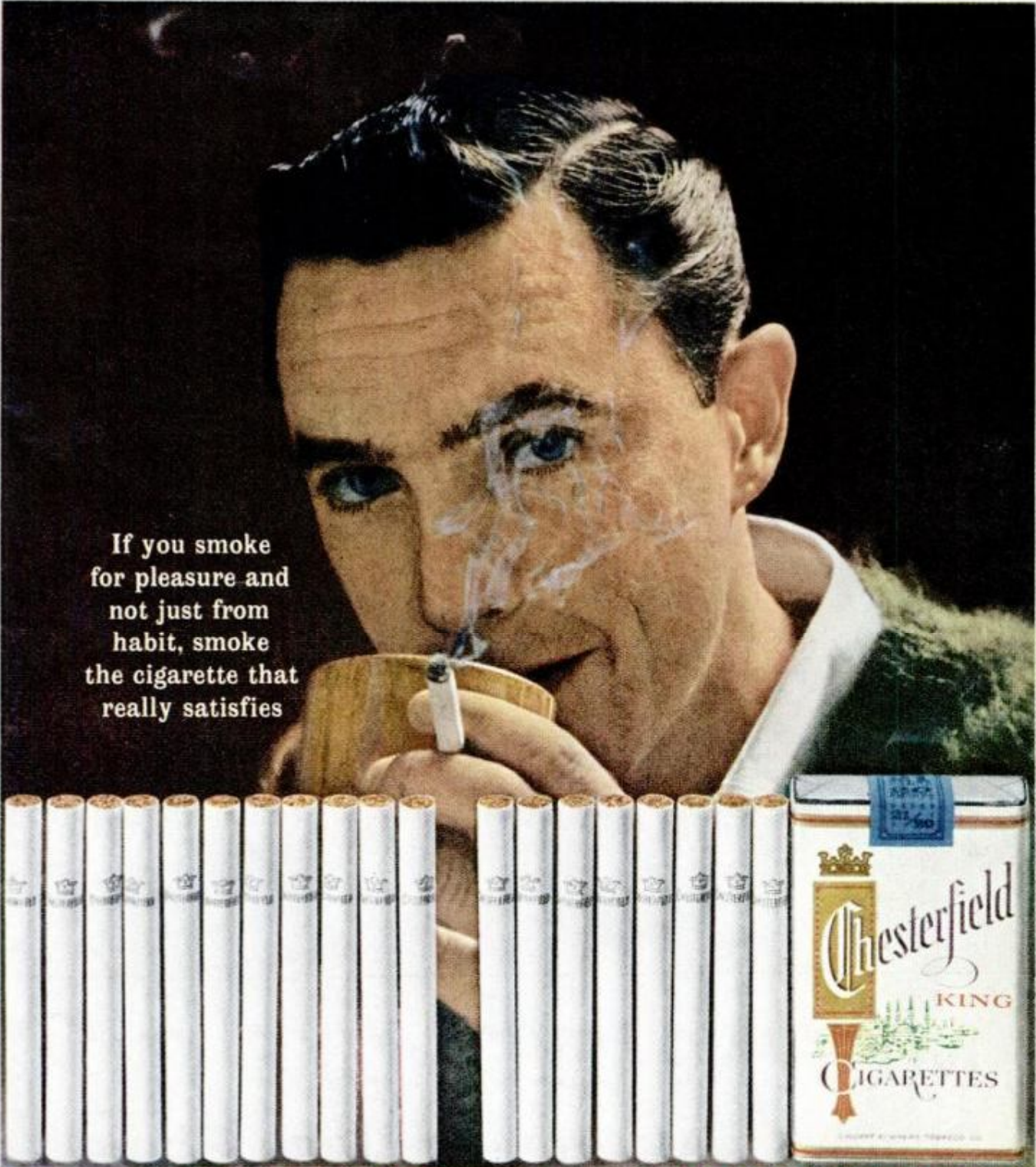
- 2 pcs.—2 x 6 fir, 12' long: outboard stringers
- 2 pcs.—2 x 8 fir, 14' long: inboard stringers
- 1 pc.—4 x 4 fir, 10' long: keelson
- 2 pcs.—1 x 10 fir 16' long: sheer shelf
- 1 pc.—1 x 10 fir, 8' long: sheer shelf
- 1 pc.—1¼ x 6 white oak, 18' long: keel and stem band, spray mold
- 1 pc.—1 x 12 mahogany, 16' long: chines, battens, molds, fenders
- 1 pc.—1 x 12 mahogany, 6' long: chines, etc., as above
- 1 pc.—1 x 4 mahogany, 6' long: chines, etc., as above
- 1 pc.—1 x 6 mahogany, 12' long: chines, etc., as above
- 1 pc.—1 x 12 mahogany, 8' long: chines, etc., as above
- 1 pc.—1¼ x 12 mahogany, 8' long, header mold

### PLYWOOD (Exterior grade AB or better)

- 5 pcs.—¾" x 4' x 8' fir: bulkheads, transom
- 1 pc.—½" x 30" x 72" fir: seat, control-stand leg
- 2 pcs.—¼" x 4' x 4' fir: removable deck, control stand
- 4 pcs.—¾" x 4' x 18' marine fir: planking
- 1 pc.—½" x 25" x 37" mahogany: engine cover
- 2 pcs.—¾" x 4' x 8' mahogany: engine box, fore deck
- 3 pcs.—½" x 4' x 8' surfaced plywood (Harborite, or similar): floorboards

### HARDWARE, FASTENINGS AND MISC.

- 5—Hold-down clamps: windshield, engine cover
  - 2—3/32" angle mending plates: removable deck
  - 2—3/32" flat mending plates: removable deck
  - 1—Lift-ring bracket aft
  - 1—Lift ring
  - 1—Gas tank nipple
  - 1—Gas tank cap
  - 8 ft.—5/16" copper tubing: gas line
  - 1—Floorshift bracket
  - 1—Floorshift rod
  - 1—Floorshift lever
  - 1—Hand throttle (aircraft type) and cable
  - 1—Instrument panel
  - 1—Bilge pump switch
  - 1—Bow light
  - 1—Stern light
  - 1—Bow chock
  - 2—Stern chocks
  - 1—Light switch
  - 1—Steering wheel
  - 1—Bow eye
  - 1—Gas vent
  - 2—Vent covers (stainless steel)
  - 1—Bilge outlet
  - 1—Bilge pump and hose
  - 6—Swivel pulleys
  - 2—Stationary pulleys
  - 32 ft.—Steering cable
  - 1—Turnbuckle
  - 2—Seat cushions and backs with snaps for attaching to plywood seat
  - 3 pcs.—1" aluminum "J" molding, 12' long
  - 2 pcs.—¼" Plexiglas, 15" x 31"
  - 2—¾" piano hinges, 6' long
  - 1 pc.—¾" aluminum oval molding: quarter fender and cutwater
  - 1—Ignition switch
  - 1—12-v. battery
  - 2—Battery cables
  - 1—Battery box
  - 1—Engine wiring harness
  - 1—Dash wiring harness
  - 5 ft.—Exhaust hose
  - 2—Exhaust hose clamps
  - 1—Exhaust tube and flange
  - 3 qts.—Waterproof glue
  - 23—5/16" bronze carriage bolts, length to suit: installation of jet unit
  - 2½ lbs.—1" 12-ga. serrated bronze nails (Anchorfast, Stronghold, or similar)
  - 3 doz.—2" No. 10 F.H. brass wood screws: attaching stringers and keelson to bulkheads, transom, etc.
  - 1 gross—1½" No. 8 F.H. brass wood screws: attaching chines and battens
  - 6 doz.—1" No. 8 F.H. wood screws: attaching floorboards and transom cover
  - 1 pc.—½" perforated hardboard, 24" x 72"
  - 1—Gas tank, galvanized, either 20-ga. riveted and soldered or 18-ga. welded
  - Jet unit, drive shaft and engine
- NOTE:** If you are planning to build the PM Jet and would prefer to work from larger drawings than those included here, a set of plans on 2½' x 3' sheets will be available next month. To reserve a set of these plans, plus a booklet containing the text and photos, send \$7.50 to Popular Mechanics, Blueprint Department, 200 East Ontario Street, Chicago 11, Illinois.



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## Porter-Cable Power Block Plane

You can plane any surface . . . any edge . . . make bevel and rabbet cuts . . . do *dozens* of useful jobs with this new Model 167 Power Block Plane. It's a real problem solver—and it's the only one of its kind on the market.

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safe side, make a pattern of the forward half of each panel (where most of the curve is) from low-grade 1/4-in. plywood. Using this plywood pattern, cut the 3/8-in. panel slightly oversize and tack it in place. Make sure that the inner edge lines up perfectly with the centerline down the keelson, but leave a bit of extra material at the chine. Now coat all bottom surfaces of the frame with glue (again, excluding the temporary molds) and secure the first half of the bottom in place. You can avoid ripples or bulges in the planking by lightly securing the panel at either end with a few loose screws, then nailing from the middle of the panel toward the ends. Finally, use a saw to continue the shallow forward angle of the intake block through the plywood planking.

Before mounting the second half of the bottom planking, put the panel in place and recheck the fit, especially at the centerline. Trim as necessary and repeat the process of gluing and fastening, Fig. 17. After trimming surplus stock at the chines, plane a 1-in. flat strip down the centerline to receive the keel and stem band. To complete the planking, saw the plywood edge of the intake cutout to match the forward angle of the intake block, Fig. 18.

### Fiberglassing the Hull

If you plan to fiberglass the boat (and we strongly recommend it), this should be done before applying the keel and stem band, spray rails and sheer molds. Following the manufacturer's instructions, apply one layer of 8-oz. cloth with sufficient resin to bond and fill as required. When you have completed this step, the keel and stem band may be applied, Fig. 19. This should be a strip of white oak measuring about 3/4 x 1 in. Use bedding compound under the band, and fasten it with screws. An aluminum half-oval cutwater may be added, if desired, but not until the hull has been painted.

The spray mold is mounted next, Fig. 7, after which the entire hull should be primed and the bottom painted with a good quality marine paint, Fig. 20. Don't paint the sides yet, since some fastenings will have to be made through them when mounting the steering system and control stand.

Before turning the boat right side up, prepare a cradle matched to the underside contour so that it will support the hull at three places—the transom, station 5 and just forward of station 2. This cradle should be level, free of twist and padded so that it won't damage the finish.

Once the hull has been turned, you are

ready to mount the sheer mold and header mold. The sheer mold, Fig. 6, is made from 1 x 2 stock trimmed and beveled as illustrated. Use screws to mount it, running them through the mold and planking into the sheer shelf. Remember to use bedding compound under the mold. The header mold, Fig. 10, is cut from a piece of 1 1/4-in. stock wide enough to follow the curve of the bow. In order to fit the plywood planking, the inner surface of this mold must be beveled. The outer surface may be left square since it will be covered by aluminum molding. When mounting the header mold, make sure that its upper surface is even with the upper surface of the sheer shelf and bend it to a slight crown so that it will be slightly higher amidship. After applying bedding compound, attach this mold with screws running through the planking just above the header.

After fairing and trimming the edges of the header mold, the decking can be installed. Bevel the forward ends of the 1 x 2 deck beams to match the angle of the planking. After installing these, fair the crown of the deck with a batten bent to the correct curve. If you plan to fiberglass the sheer shelf for its full length, don't mount the 3/8-in. plywood fore deck until this job has been completed. The two pieces of the deck are joined at the centerline and overlap the sheer shelf about 1 in. so that the edge of the deck will be a continuation of the line formed by the outside of the coaming.

Construction of the *PM Jet* will be concluded in the April issue.

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### Camera Stops Light Beams

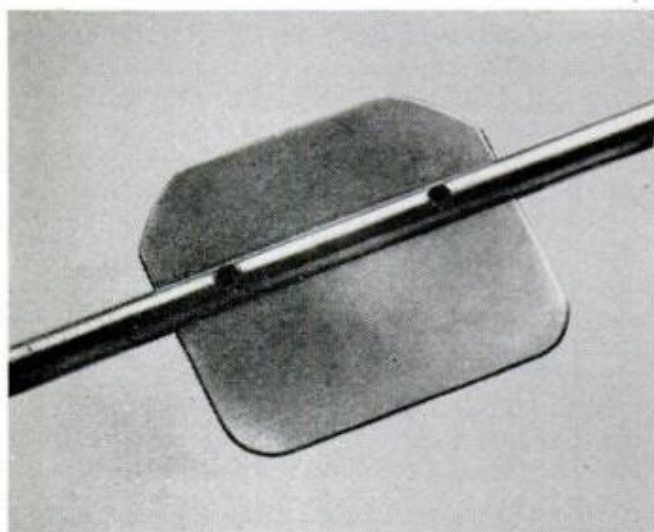
Events lasting a few micromilliseonds are caught by a camera that converts them from an optical to electronic image, then reconverts them to an optical image for reproduction on film. Even a light beam can be stopped and photographed at several points along its path.

The camera's lens focuses light from an object on the photocathode of a converter tube. There the focused light is converted from an optical to electron image. The electrons carrying picture information are next focused and accelerated to a fluorescent screen at the end of the tube, where they are reconverted to an optical image.

The camera, developed by Space Technology Laboratories, can take both frame and streak photos. With it, scientists expect to photograph some heretofore unobservable events. It may be able to measure the speed of light to an accuracy of one part per million, important in space calculations.

# Test your automotive I.Q!

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1. Recognize this part found on your automobile?



2. What does this symbol stand for?

The picture at top is a close-up photo of the butterfly valve of a carburetor. The life preserver stands for Quaker State Motor Oil—because it is the best engine life preserver. Refined from 100% pure Pennsylvania Grade Crude Oil, it keeps your car on the road, out of the repair shop—and saves you money. Insist on Quaker State—the best engine life preserver.



QUAKER STATE OIL REFINING CORP., OIL CITY, PA.

## Your Life Preserver

(Continued from page 137)

around the bottom. While both vests are classed alike, the newer yoke type is becoming increasingly popular, since many boaters find it more comfortable to wear, especially when sitting, because it has no pad behind the wearer's back.

Both vests did a good job of floating PM's tester face up and head out of the water, though the yoke vest worked best on an "unconscious" swimmer. The collar on the yoke vest helped turn him upright no matter how he hit the water, and supported his head better in a dead-man float.

While both vests are good, neither is efficient if it isn't worn properly, with all ties fastened and all straps snugly in place. Worn loose, the vests slid up around the wearer's neck, where they got in the way and lost flotation value. They're not very comfortable out of the water.

Both vests made swimming difficult. Their face-up flotation and bulk across the chest made forward strokes of the arms both awkward and tiring. A backstroke proved the best way to swim in either type.

### Buoyant Cushions

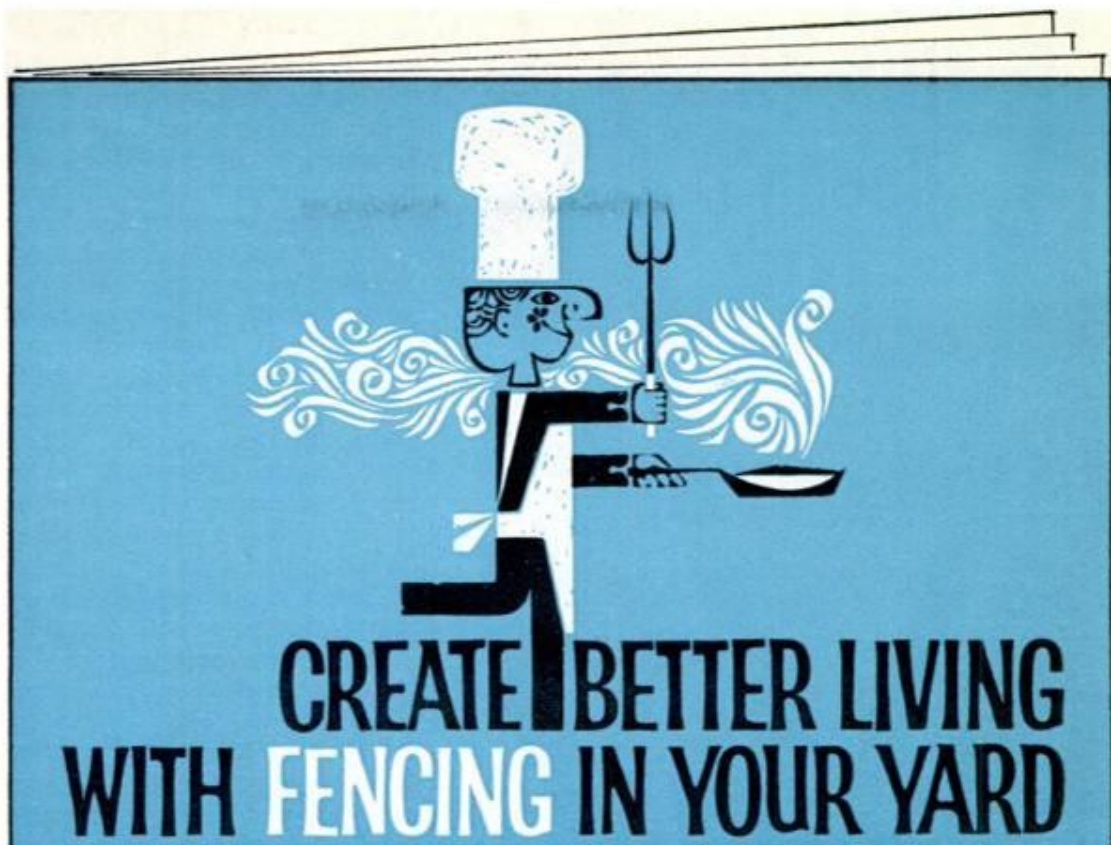
Most commonly used—and misused—of lifesaving devices is the buoyant cushion. It's also least expensive and most convenient, but least satisfactory from a lifesaving standpoint. The familiar cushion, about 15 inches square and two inches thick, with grab straps on two opposite sides, is great to sit on, handy for an emergency fender, and easy to throw to a swimmer in the water. It's almost ideal—until you get in the water with it. Then it becomes a tricky, slippery bit of flotation that's hard for even a good swimmer to use, and a real workout for a nonswimmer.

Properly used—with both arms through the straps and the cushion against the chest, or one leg and the opposite arm through the straps and the cushion against the chest—it makes fair flotation. But it won't hold your head up in either position, and you can't swim well with it by any method. While it will buoy you up as long as you can hold on, the cushion certainly isn't for kids, nonswimmers, or an unconscious or injured accident victim.

One big trouble with the cushion is that, since you're not attached to it, you may not go into the drink together. A good trick, if danger threatens, is to tie one of the grab straps loosely to a belt loop with a length of light line so you'll stay together. One deluxe model now on the market has a light harness snap on one grab strap for just that purpose.

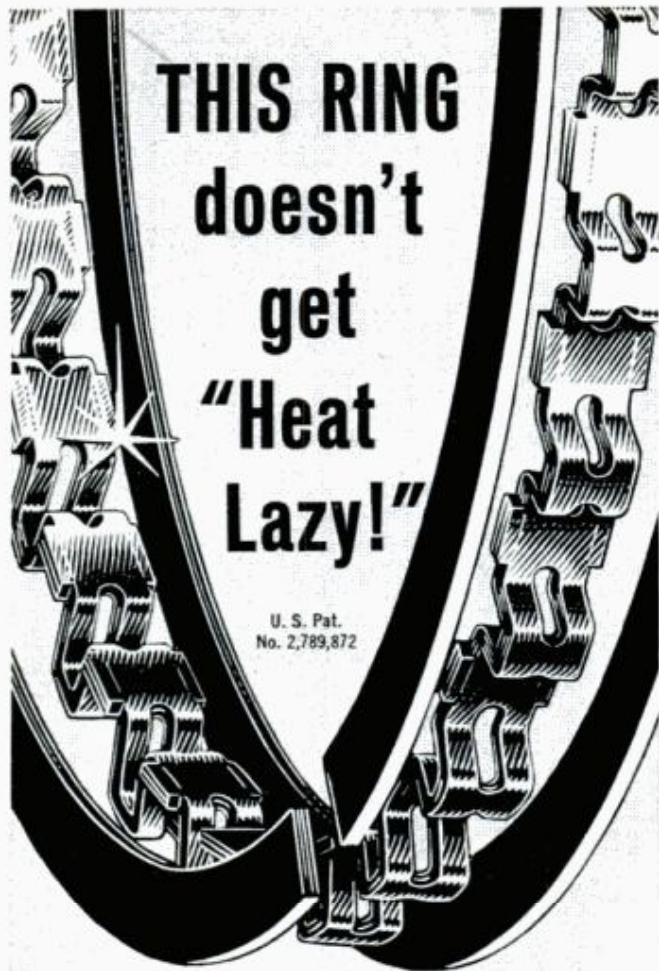
(Continued to page 220)

IDAHO WHITE PINE ■ PONDEROSA PINE ■ LODGEPOLE PINE ■ SUGAR PINE ■ LARCH ■  
 WHITE FIR ■ DOUGLAS FIR ■ ENGELMANN SPRUCE ■ RED CEDAR ■ INCENSE CEDAR



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**"Heat**  
**Lazy!"**

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 No. 2,789,872

■ Two main causes of oil consumption are: (1) loss of ring tension, and (2) plugged oil rings. It's easy to prevent them—simply install a Sealed Power KromeX ring set with Stainless Steel oil rings. Then you get *lasting* penny-pinching oil control.

■ Stainless Steel is a superior metal. It retains tension at high operating temperatures, holds its fit.

■ Sealed Power electro-polishes the Stainless Steel oil rings. They are glass-smooth, stay smooth because Stainless Steel doesn't pit or etch from action of combustion gases. Oil rings don't plug or clog. They stay clean and shiny for free flow of oil, better lubrication, less friction and less wear.

■ These rings are a cinch to install. Proven end-abutment design ends groove depth problems. Proper tension is produced without contact with bottom of the piston groove. Why settle for less? Sealed Power Corporation, Muskegon, Michigan.

**Sealed Power** Stainless Steel  
 oil rings stop oil pumping

Maybe the biggest problem with cushions grows out of their many uses. After a few seasons of being sat on, stepped on, soaked, and used as bumpers and fenders, the plastic film bags can rupture or be punctured, allowing air to escape and water to enter, and the cushion loses its buoyancy. So if you depend on cushions, either use them gently or plan to replace them occasionally.

A popular compromise between flotation, freedom and comfort is the water skier's buoyant belt. Worn around the waist, it provides good flotation for a swimmer, especially when treading water or waiting to be picked up on skis. But the belt is not Coast Guard approved. It will not hold your head out of the water, and will float you face down if you land that way. Skiers can wear the belt while behind the boat, and keep an approved lifesaving device aboard to comply with the law. Be careful, though. Some state and local laws insist on an approved device.

### Inflatable Devices

There are many other lifesaving devices, lacking Coast Guard approval but often useful to supplement approved devices. Most are inflatable, and no inflatable device can be approved. But their easy portability and quality for being built-in makes them handy, as with the inflatable fisherman's vest shown on page 137. The vest can be filled by a CO<sub>2</sub> cartridge or by mouth, and supplies flotation for one man in addition to its regular job of holding small tackle handy on his chest. While it's no substitute for an approved lifesaving device, it can certainly *supplement* the regular equipment; a fisherman can wear the vest and sit on a buoyant cushion and be doubly safe. Remember, though, that an inflatable device can be punctured.

Another effective supplementary safety device tested was a hunting jacket insulated with foam rubber sealed in plastic film. Both the jacket and its matching yellow rubber boots are buoyant—a good idea for cold-weather boaters, duck hunters, and winter fishermen.

A good approved vest can cost as little as \$4; a true life preserver around \$6; a buoyant cushion as little as \$2.50. You can spend a lot more, of course, but the flotation value doesn't increase with the cost. Few devices cost as much as a tank of outboard fuel.

Like insurance, lifesaving devices are hard to value. If you don't need them, they're useless, even a bother. If you do need them, they're priceless. Get the type that suits your need, then take it swimming and try it out. You might be glad you did.

★ ★ ★

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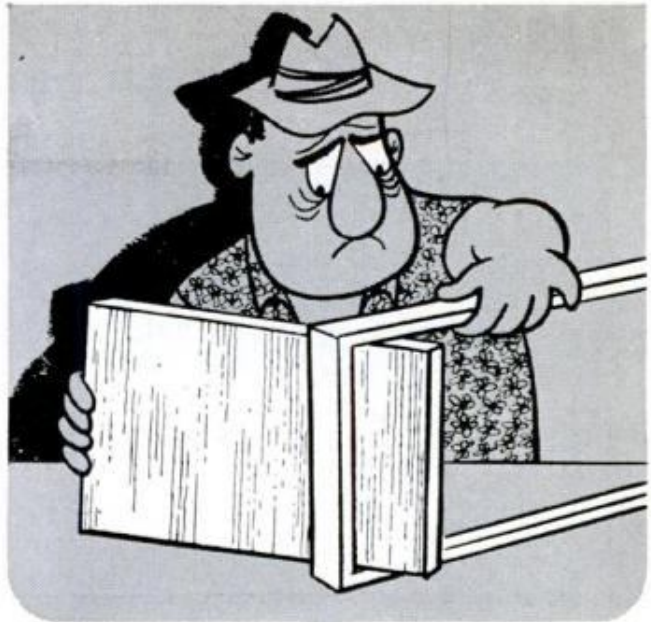
## Kiddies' Cartoon Show

Batteries and a spring motor power a tiny movie projector that shows cartoon film strips made especially for the unit.

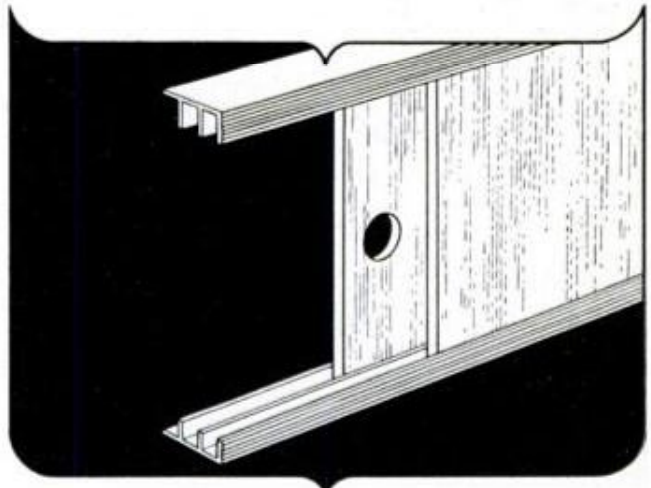
The film strip moves slowly before two lenses mounted one above the other. A small metal curtain moves up and down to let images project onto the screen, alternately from the top and bottom of the film — causing the cartoon figures to move.

The projector is \$4.95 and film 60 cents from Hertvy Co., Rego Park 74, N. Y.

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(Continued to page 224)

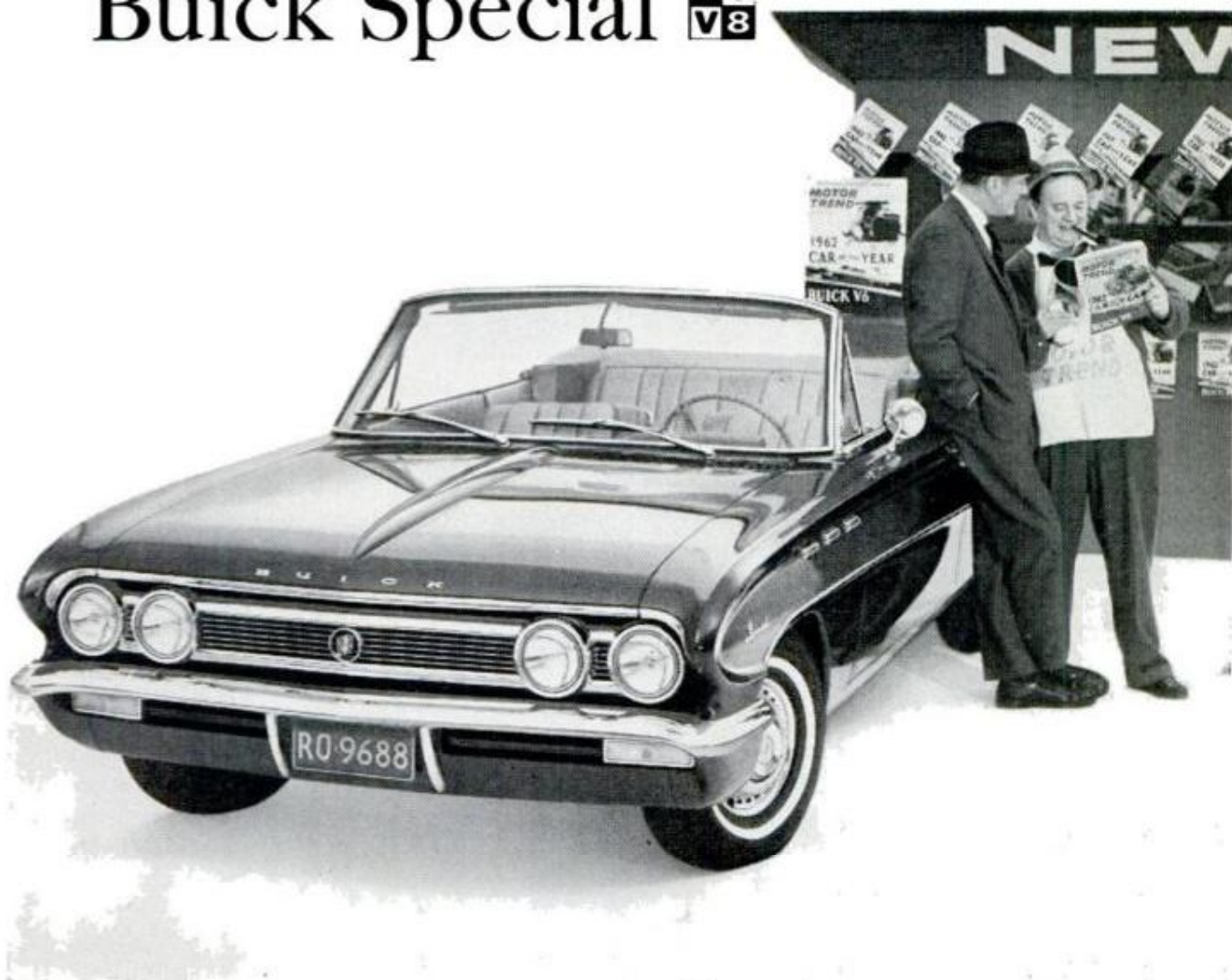
*Motor Trend magazine makes it official:*

# 1962 car of the year!

From the very first we knew we had a winner. Happy owners, car enthusiasts raved about the 1962 Buick Special with the history-making Fireball V-6 engine. And now, the editors of Motor Trend—one of the country's top car magazines—have made it official. After road-testing and evaluating all U.S. cars, they've named the V-6 Special "Car of the Year!" Here's the way they put it . . . "*Motor Trend's CAR OF THE YEAR AWARD to the 1962 Buick for pure progress in design, originaive engineering excellence, and the power concept for the future expressed in America's only V-6 automobile engine.*" Why are the car experts so hot on this exclusive Buick engine? Because only a V-6 can combine the smooth vigor of V-design with the gas savings of a straight six. Because this 135 H.P. V-6 weighs up to 140 pounds less than other sixes of comparable power. Ask your Buick dealer to let you drive a Special V-6. See how easy it is to make the "Car of the Year" your very own.

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(Continued to page 226)



## Direct Seeding Frustrates Birds

Pine-tree seeding was for the birds until a few years ago.

Foresters had to raise seedlings in nurseries, then transplant the young trees to the desired site. Short cutting the nursery route by throwing the seeds directly on the ground was a waste of money. Meadow-larks ate most of the seeds.

Now it's different. It began in 1954 when U. S. Forest Service researchers at the Alexandria (La.) Research Center discovered a bird repellent containing anthraquinone. Birds now taste one coated seed and leave the rest alone. Hence, it's been possible to reforest about 700,000 acres of forest land across the nation by direct seeding during the last seven years, two-thirds of it in the South.

Seeding is done by every conceivable method — by airplane and helicopters, by planting machines, by hand and by horseback. The quickest, and most expensive, method is by air. Much more seed is required than when it is done by row-planting machines.

In one day, a helicopter reforested 2700 acres in six hours, a job that would require 270 tree-planting machines. This was done as part of a giant 90,000-acre reforestation project in central Louisiana.

Flagmen stood on the ground to mark the route for the helicopter pilot. After the copter passed, the flagmen moved over about 90 feet and got ready for the next pass. With this system, seed fell over the entire area, since the seed scattered in a band about 100 feet wide.

Seed hoppers, resembling holsters on a cowboy's hips, were fixed on the sides of the helicopter. The hoppers fed the seed to a slinger, located at the bottom of the ship. The slinger whirled at 1700 r.p.m., scattering the seed about 50 feet on either side. The pilot controlled the hopper valves with a trigger on his control stick.

Direct seeding such as this is not only faster than conventional nursery-type tree planting, but it cuts the cost in half, too. Savings average from \$6 to \$12 per acre. On the Louisiana project, more than a half-million dollars were reported saved.

Forest researchers claim that with these direct-seeding methods, lagging landowners would "double up and catch up" on reforestation projects, and the nation's 52-million acres of cut-over lands may be restocked decades ahead of schedule.

The bird repellent was the only possible answer to discouraging the birds and allowing direct seeding. Federal laws prohibit the killing of birds, and researchers were not allowed to experiment with poisons.

MARCH 1962

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**PENNSYLVANIA**  
**Cecil**  
Desmet Lumber & Supply Co.

**East Stroudsburg**  
R. C. Cramer Lumber Co.  
320 North Courtland St.

**Erie**  
Lake Shore Lumber Co. of Pa., Inc.  
21st and East Ave.

**North East**  
Lake Shore Lumber Co. of Pa., Inc.  
45 Smedley St.

**Sharon**  
Johnson-Sizer Co.  
369 South Dock Ave.

**TEXAS**  
**Amarillo**  
Lumber & Supply Co.  
2601 East Third  
Seale Amerson Lumber & Building Co.  
4201 N.E. 8th Street

**Austin**  
Texas Lumber Co.  
1313 East 6th St.

**Ft. Worth**  
Chickasaw Lumber Co.  
2701 West Vickery

**Houston**  
Maynor Lumber Co.  
6316 Mykawa Road  
Olshan Lumber Co.  
2600 Canal

**Midland**  
Andy's Lumber Co.  
1801 West Industrial

**New Braunfels**  
Richards & Krueger Co.  
674-686 S. Seguin Ave.

**Orange**  
West End Lumber Co.  
McArthur Drive

**San Angelo**  
Armstrong Brothers Lumber Co.  
801 South Oakes

**San Marcos**  
Tuttle Lumber Co.  
228 South Guadalupe St.

**Shepherd**  
Beeson's Builders Supply Co.

**UTAH**  
**Salt Lake City**  
Lillywhite Building Supply, Inc.  
3025 E. 33rd South

**VIRGINIA**  
**Abingdon**  
Miller & Bradley, Inc.

**Chatham**  
McLaughlin Supply Co.  
Main Street

**Virginia Beach**  
Virginia Beach Lumber & Supply  
Birdneck Road

**WASHINGTON**  
**Mt. Vernon**  
J. W. Copeland Lumber Co.

**Olympia**  
Lumbermens Mercantile Co.  
502 Custer Way

**Yakima**  
Sears Lumber Market  
2318 South 1st St.

**WEST VIRGINIA**  
**Charleston**  
Wright-Bachman Lumber Co. of W. Va.

**South Charleston**  
Evans Lumber Co.

**Weirton**  
The Weirton Lumber Co.  
914 Cove Road

#### WISCONSIN

**Beaver Dam**  
Roedl-Jacobs Lumber Co.  
114 East Third Street

**Fort Atkinson**  
The Hoffman Lumber Co.  
10 Madison Ave.

**Kenosha**  
Andrews Lumber Co., Inc.  
4800 75 Street

**Racine**  
Wecks Lumber Co.  
2000 Douglas Ave.

**Sheboygan**  
Ebenreiter Lumber Co.  
1221 Erie Ave.

#### Wabeno

Twin City Lumber & Fuel  
Co.

**Wausau**  
Schuette Builders Co.  
1330 South 11th Ave.

#### WYOMING

**Lusk**  
Frontier Lumber Co.

**Powell**  
Powell Lumber Co.  
206 South Absaroka

**Sheridan**  
Vickere Lumber Co.  
135 North Gould



### Electronic Stencil Maker

Practically any material a printer reproduces — even photographs — can be transferred to a stencil or to an offset plate for reproduction by an office duplicator through use of a new electronic stencil and offset plate etching machine.

It electronically scans the original copy and reproduces it on the stencil or plate. The machine is made by Electro-Rex Corp., 387 Park Avenue South, New York 16.



### Ready for Rain or Shine

Clamped on the visor of a car, a new compartmented case holds cigarettes, a pen, sunglasses, coins and an emergency umbrella. There's also a zippered map case. Price is \$4.95 from Tod Products, Dept. 58, 12 N. 52nd St., Philadelphia, Pa.

MARCH 1962

# The inside story



of Henry Shakespeare's "Secrets of Successful Fishing" takes the mystery out of bait casting, spinning, push-button fishing and fly casting. Intricate techniques are explained as simply as a bamboo pole, hook and worm. "Secrets of Successful Fishing" is brimming with over 200 pages of step-by-step instructions, charts of balanced tackle, information that gets a fish on your hook and lands him!

Shakespeare Company, Dept. PM 108A,  
Kalamazoo, Michigan.

- Please send "Secrets of Successful Fishing," plus the 1962 Shakespeare Tackle Catalog and Pocket Fishing Calendar. I have enclosed \$5.00 (coin, check or money order).
- Please send only the free 40-page full-color 1962 Shakespeare Tackle Catalog.

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IRRIGATE • DRAIN • CIRCULATE • SPRAY  
Use 1/4 HP motor or larger . . . 1 HP for up to 3,200  
GPH; 1,000 GPH 60" high; or 3,000 GPH from 25"  
well, 1 1/2" inlet; 1" outlet, stainless shaft.



TYPE X—2 oil-less bronze bearings. **\$10.95**

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Best for belt drives. . . .

Postpaid if cash with order.

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Centrifugal and Gear Pumps in All Sizes  
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REPAIR MOST EVERYTHING MADE OF METAL



Home Appliances, Auto parts. Make and repair lawn chairs, tables, ornamental iron work, gates, wagons, etc. Solder, heat, bend, and straighten, with terrific heat from arc torch. Cut and weld up to 1/4" steel plate. A million uses for Home, auto, farm, inventors, factories, etc. Works

from any home 110 volt plug-in. Complete with dark welder's mask, arc torch, supply of carbon steel welding and brazing rods and complete Welding Instruction Book. 1 year guarantee.

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COD postage on arrival or send \$14.95 and we will send postpaid. Ideal gift for mechanically minded, relatives, friends. Order now. Available only from:

**MIDWAY WELDER, Dept. DPM-3, Kearney, Neb.**

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## Our First Moon Trip

(Continued from page 113)

Back in the blockhouse, Leroy Cooper stopped at an instrument check out point before going on to his position at the instructor console where he would talk help, suggestions and confidence to Collins, Dinswood, and Hixson for nearly a week. The short 20-foot walk to the instructor console took a long 20 minutes—also programmed in the countdown—because he had to be personally sure that every check checked.

He spent nearly three minutes observing the check on the lunar navigation transponder. The small receiver-transmitter had been placed on the moon several months earlier by a Surveyor craft. Its job was to transmit navigation homing signals.

Finally, at 8:29, the loudspeaker announced over a three-mile square area: "X minus one minute . . . X minus 50 seconds . . . . . X minus 10 seconds, nine, eight, seven, six, five, four, three, two, one, LAUNCH, X plus one, X plus . . ."

An enormous sheet of red-orange flame ripped through the already-forming dense gray smoke cloud at the monster rocket's base.

" . . . X plus three. . . "

### Blastoff!

An ear-splitting burst, painful three miles away, almost obliterated the voice on the loudspeaker. Miles away, spectators, newsmen, sightseers, relatives watched the giant shaft tremble, waver, right itself and start slowly upward. Just as thousands of spectators heaved a collective sigh of relief, the huge roar from the four solid propellant engines rolled over them. For nearly three minutes the giant engines thundered upward, pushing their precious cargo. Then . . . blank . . . nothing. No more orange-red flame, the exhaust trail was far below. The enormous booster began slowing, but the upper stages and Apollo separated and continued to climb. Then, another red flame, this time bursting from the booster portions of Saturn rockets clustered as the second stage.

Inside the Apollo control module, the sound was terrifying. Acceleration, much less than that encountered by the first Astronauts, seemed to drive eyeballs against the back of heads.

The second stage burned out and separated. The third stage cluster of Saturns and the Apollo spacecraft coasted. The third stage ignited, burned, extinguished and separated. Apollo was in free flight, headed silently toward the moon and a

landing of Americans 60 hours later on July 3, 1969.

Let's now assume the launching was the day before yesterday. Events of the past two days have become almost old hat to a nation that has witnessed preparatory Earth orbits and around-the-moon flights by these same three astronauts and by Russians.

But this flight departs from the routine. In just minutes, pilot-navigator Collins and pilot-communicator Dinswood will take their Apollo from the low moon orbit it has been pursuing for the past few hours and back it down onto the moon's surface.

That orbit will give Collins a final check on the homing beacons already positioned by earlier Surveyor craft. He will begin to lower Apollo so that it will glide in gently, buoyed by one low-thrust engine, barely over the jagged edge of the wide crater chosen a year and a half ago for the landing. Well before reaching the center of the crater's broad plain, Apollo's retro-rockets will slow the craft and bring it almost to a stop. Finally, it will settle on its landing skids.

### Return Trip

Blast-off for the trip home also has been rehearsed many times and every foreseeable problem has already been solved on Earth. There will be no huge booster engines to work with, no stage after stage to ignite, burn and drop off. Just a single small engine to release Apollo from the gentle grip of the moon's feeble gravity. Of course, to Collins, Hixson and Dinswood the blast-off from the moon will involve much more than the launch from the Earth. On the way up, the three astronauts were passive passengers while the launch was handled from the ground blockhouse; every item first had been checked by a 200-man helmeted ground crew. Now, all checks in the countdown on the moon's surface must be made by the astronauts themselves. And they must operate their engines and steer their craft during the moon launch.

Nobody here on Earth knows who won the odd-man-out, but the three already have tossed their coins to decide who will be the first American to step through Apollo's hatch and set foot on the moon. Regardless of who is first, the one who will have the assignment to spend the most time on the moon's surface is engineer-medic-scientist Hixson. He has been trained for the past two years in geology, with emphasis on lunar geology. The Army Corps of Engineers and the U.S. Geological Survey moon specialists have drummed

(Continued to page 230)

NOW...

# ROTUNDA SHOCK ABSORBERS

The quality you look for...  
performance you can count on!

There is no easier way to bring back that "new car ride" than by installing *Rotunda Shock Absorbers*. They help restore new-car riding comfort . . . improve all-round handling ease . . . cut tire wear . . . add to motoring safety through surer car control.

**Rotunda Shock Absorbers** feature large piston exposure and stable viscosity fluid to provide proper spring control and uniform action at all temperatures. They are engineered for most makes of cars (including many imports) and light-duty trucks. You can rely on their high quality to deliver top performance and durability. Yet, you pay no more to reap the benefits of Rotunda Shock Absorbers in action.

Now, as near as your closest Ford Dealer or selected service outlet, you can get quality Rotunda Parts. Ask for Rotunda Oil Filters, Shock Absorbers, Radiator Hoses, and other parts *to be sure*. You'll find them ideal for universal use on cars and trucks. Rotunda Parts are made to the same exacting specifications set for FoMoCo Genuine Parts . . . to fit right, last longer and keep maintenance at a minimum.



When you replace oil filters . . .  
replace with the best . . . Rotunda!



NOW . . . TWO TOP QUALITY LINES  
OF PARTS AVAILABLE THROUGH  
FORD DEALERS AND SELECTED  
SERVICE OUTLETS

PRODUCTS OF  MOTOR COMPANY

screens, upholstery, carpets...

hundreds of other uses.

You name 'em!



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Staples practically anything. Exclusive push-button loading and built-in staple extractor. At your stationery, department or hardware store.

only **4<sup>95</sup>**

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into him everything they have learned in many years of studying the moon from afar. He knows what outcroppings are significant, what samples to collect, where to spend his valuable photo film.

Even before he steps from the Apollo a few minutes from now, Hixson probably will be able to see clearly the answer to the question that has caused the most argument in lunar geology circles: Is the moon's surface covered with a hard lava, dust a few inches thick or dust many feet thick?

One of Hixson's first moves will be to collect samples that will indicate whether future moon camps will be able to extract water from the moon's rocks. Next, carefully avoiding pieces of meteors from elsewhere in space, Hixson will seek outcroppings of minerals that definitely belong to the moon. Such samples will indicate the moon's own composition and mineral resources, not those of billions of meteors that have struck its surface unimpeded by an atmosphere.

Finally, Hixson will walk as far as possible from his earth-contaminated Apollo capsule, wearing a sterile suit, and collect surface samples in clean containers. Analysis later will show whether any signs of life might have been brought from other planets.

When the three astronauts return early on the morning of July 10, Capt. Hixson will be the only American able to state with authority whether all the effort has been worthwhile. Whether the moon could be of benefit to man beyond what the most vivid mind has imagined, or whether it is a vast wasteland, useless to anyone. ★ ★ ★

### QUOTE:

"What is needed is a quantum jump in teaching techniques.

"Students—their capacity to learn has repeatedly been demonstrated to be far greater than what is now demanded of them—will learn more, faster and better, by matching their wits where appropriate with central computers programmed in response to the best pedagogues and scholars. Teachers, in turn, will have more time to devote to the more challenging—and rewarding—aspects in the relationship between teacher and student.

"It may well be that our national survival may be dependent upon how completely we accomplish this education revolution."

IVAN A. GETTING

President, Aerospace Corporation

POPULAR MECHANICS

**DIAMALLOY**

**Snips FOR EVERY JOB**

Stay sharp, cut clean. Eleven sizes, patterns. Chrome plated. "There is nothing finer than a DIAMOND." Made only by makers of famous quality Diamond Wrenches and Pliers.

**DIAMOND TOOL and Horseshoe Co.**

DULUTH, MINNESOTA    TORONTO, ONTARIO

## Those Wide-Awake Russians

In the USSR it is now possible to buy a five-pound box that keeps a person in such profound sleep, through electronic pulses applied to the temples, that only one or two hours' sleep is required per day.

Thousands of Russians are said to be using this device, according to Dr. Arthur C. Clarke of Clarke-Wilson associates, Colombo, Ceylon.

Dr. Clarke, a British physicist and fiction writer, described the electronic sleep inducer in a talk before the International Astronautical Congress. He predicted communications satellites in 1945.

## Liquid Movie Projection

Two glass plates between which a thin layer of methyl chloroform is circulated, form the frame holder for a new system of liquid movie projection.

The film passes between the two-plate gate, and is coated and held in place by the liquid. Air knives and a vacuum squeegee remove the liquid from the film as it leaves the gate. A recirculating system carries the methyl chloroform back to the gate for reuse, so none is lost.

Eastman Kodak Company, developers of the system, claim it improves image quality and eliminates film scratches.

## Chopped-Up Conversation

Recently, Newark, N. J., telephone users had their calls "sliced up" and translated to computer codes, keyed and mixed with other calls, and then unscrambled and put together again.

A system developed by the New Jersey Bell Telephone Co. permitted sampling the speaker's voice 8000 times per second, restoring the voice at 6000-foot intervals and then repeating. The Pulse Code Modulation (PCM) method permits many conversations over each wire. The system was designed for distances up to 25 miles. Existing cables can be used.

## Star Bright! Who Needs You?

Engaged in producing advanced navigational systems, engineers at the Norden Company's Norwalk, Conn., plant have a continuing need for true north-south directions. Rather than run outdoors every night looking for the North Star, they built their own indoor true-north reference.

When the plant was under construction, they made star sightings and, using these as a reference, sank two brass plugs in the ground outside the plant. Using these plugs as reference, more plugs were embedded in the floor inside the plant, and sightings are now made in a matter of seconds.

MARCH 1962

## SENSATIONAL EQUIPMENT VALUES GOVERNMENT & FACTORY SURPLUS



**G-1 STAINLESS STEEL TANK**  
2100 cu. inches (9 gals.) capacity, 450 P.S.I. 1/4" pipe thread port at each end. 24" L x 12" dia. Government Surplus. Shpg. wt. 19 lbs. F.O.B. Chicago.  
**No. G63 Price.....\$14.95**  
(Two for \$27.00)

**D-2 AIR TANK.** 450 P.S.I. Aviators Breathing Bottles. 500 cu. inches (approx. 2 gals.) int. vol. 1/4" threaded openings each end. Carbon steel. New. 24" x 6 1/2". Postpaid.  
**No. G391 Price.....\$4.95**  
(Two for \$8.50)

**1 H. P., 12 V. ELECTRIC MOTOR**  
1 H. P., 100 amps., 5600 R.P.M., 12 V., D.C. Double shaft motor, ball bearing const. Can run on 6 volts for lower H.P. 3/4" dia. plain shafts, flange mntgs. 9" x 4 1/2" x 4 1/2". Shpg. wt. 19 lbs. F.O.B. Chicago.



**No. G308 Price.....\$12.50**

**2 H.P. HOBART D.C. ELECTRIC MOTOR**

24 V., 90 amps., 4000 R.P.M. Converts for 6-12 V. use. 1/2" spline shaft on both motor ends. Ball bearing const. 11" x 5" x 6 1/2". Shpg. wt. 21 lbs. F.O.B. Chicago.



**No. GM315 Price.....\$13.00**

### MONROE POWER STEERING CYL. with Integral Valve



Cylinder bore 1 5/8", stroke 11 1/2". 28 1/2" L., 5/8" dia. piston rod, 2 1/2" dia. end caps. Piston rod end threaded for retaining nut. Inlet 1/4" flare fitting, outlet 3/8" flare fitting. Factory Surplus—New. Shpg. wt. 19 lbs. F.O.B. Chicago.

**No. G939 Price.....\$14.95**

### EATON POWER STEERING PUMP

Use with cylinder (No. G939). Max. rated pressure 850 P.S.I. Regulated flow capacity 2 G.P.M. Reservoir capacity 1 qt. 4 1/2" O.D. pulley. 5 1/4" x 8" x 9 1/4". Factory Surplus—New. Shpg. wt. 19 lbs. F.O.B. Chicago.



**No. GP-430-C Price.....\$17.50**



**GROBAN HYDRAULIC LIFT KIT, 7500 LB. CAPACITY.** Lift 7500 lbs. 8" in 30 seconds. Kit includes No. GP1500 hydraulic hand pump, No. G918 single acting cylinder, 48" hose, gal. of oil. Has 2 qt. oil reservoir, adjustable release valve; 24" handle; 2 1/2" bore, 8" stroke cylinder. Pin center-to-center 13 1/2". Clevis mntg. 1 1/4" dia. piston rod. Shpg. wt. 40 lbs. F.O.B. Chicago.

**No. G922 Price.....\$44.50**

**ELECTRIC TACHOMETER.** Two piece set—indicator & generator. (Speed range 0—to—4500 R.P.M.) 2 3/4" dia. dial. 1/4" square drive shaft. Postpaid.

**No. G881 Price.....\$15.00**



**PRESSURE GAUGE.** Hydraulic pressure 0-2000 P.S.I. scale. Brass case, white face, black pointer. Built-in restrictor. 1/4" pipe thread bottom connection. 2 1/2" dia., 1 1/4" deep. Postpaid.

**No. G483R Price.....\$3.95**



### GENUINE SHEFFIELD STEEL CALIPERS & DIVIDERS



Five piece set (\$14.00 value) includes: 4", 6" & 8" Firm Joint Outside Calipers; 6" Spring Joint Inside Calipers, and 7" Spring Joint Dividers. Postpaid.  
**No. G833 Complete set only.....\$5.00**  
(Two sets only \$9.00!)

Write today for free 72 page catalog of other equipment bargains. Big savings on hundreds of items.

## GROBAN SUPPLY COMPANY

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## Mounties Without Mounts

(Continued from page 123)

isphere in which evidence from "neutron activation analysis" appeared.

Cpl. Kerr explains that the process "depends on the experimental fact that thermal neutrons are able, by bombardment and capture, to form stable isotopes with many elements." The method, he adds, is so sensitive that in an analysis of hair, only one hair is sufficient.

The case involved a murdered girl who was found in New Brunswick holding some hair in her hand. Under a microscope, there was not much apparent difference between the girl's hair and the suspect's hair. But irradiated so that the phosphorus-to-sulfur-35 ratio could be determined, the RCMP was able to say that the hair she was holding was from the suspect's head, not her own.

Handwriting analyses, typewriter analyses, ballistic tests—all the weapons against crime are constantly in use. In the fiscal year ending March 31, 1961, for example, the Crime Labs did 3403 different laboratory examinations preparing evidence in 1904 cases. Qualified staff members spent 1159 days testifying before criminal law courts. Quite a change from the movie concept of the Mounties!

An easy case came along last year after a Lindsay, Ont., woman complained that she was receiving anonymous obscene letters. Sgt. D. N. Brown of the Crime Lab went with local police to the home of a suspect and had him type a sample letter. Not only did the machine's type match that of the anonymous letter—the suspect typed the sample on the *other half* of the same sheet of paper he had torn in two and used for the letter.

Along with routine forgeries, alterations of documents, etc., the labs cracked a case of phony 1921 five-cent pieces—collector's items worth \$1500 each. Two brothers in western Canada were doctoring 1920 nickels to make them look like the valuable 1921s. By analysis of the spacing of the numerals and acid etching to reveal the original numerals, the lab produced evidence that convicted the men of "defrauding the public" in a Vancouver, B.C. trial.

But all the scientific detection is not going on in the Crime Detection Laboratories.

At another location in Ottawa is the headquarters of the RCMP, a large gray stone structure which houses the administrative offices as well as the files and apparatus that have identified many criminals with their crimes.

Two thieves last year in Winnipeg, Man., for example, learned about the efficient

Single Fingerprint Section in the headquarters building. Breaking into a church, one left a single print that was found by the Winnipeg police. Sent to the Mounties, the print was identified and both men were arrested—clearing up 43 similar cases.

The section, with the elaborate classification necessary for work with single prints, identifies finger marks of some 60 or 70 criminals per year.

Another much larger section, the Fingerprints Section, staffed by 65 people, is Canada's central file of criminal fingerprint records. Each month some 24,000 or more prints come into the section for classification and identification. About half of these are criminal prints and are retained in the files; the others are civil cases and are not retained. The file contains 700,000 master sets of prints.

While observing the 50th anniversary of the fingerprint bureau in 1961 (it's the oldest in North America), the Mounties noted that one "charter member" whose prints were first recorded 50 years ago still "keeps his file active."

There's no law that requires provincial and local police to file prints with the RCMP, but nation-wide cooperation is virtually 100 percent, Mounted Police report.

Another new tool against crime has been devised by the Scenes of Crime Section. It's a facial identification kit by which a composite photo of a criminal can be put together from witnesses' descriptions, using film strips of various-shaped facial features.

These Fingerprint and Scenes of Crime Sections are three of 10 sections (others include Fraudulent Cheque, Crime Index) in the Identification Branch, headed by Supt. R. P. B. Hanson. The Identification Branch and the Crime Detection Laboratories offer their aid and facilities to all police forces in Canada.

The Royal Canadian Mounted Police is a federal force representing the law-enforcement medium of the Canadian government. In the enforcement of federal laws, the force has country-wide jurisdiction. In the provinces, exclusive of Ontario and Quebec, it performs the duties of provincial police. By special agreement it polices a number of towns and municipalities.

The four service divisions of the force include Air (with 17 aircraft) and Marine (with 31 vessels, 21 of which operate in ocean waters); the other service divisions are Depot and Headquarters.

Thus, with a total force of about 7500 (more than 1000 of whom are nonuniformed civil servants), the RCMP polices the vast land, sea and air spaces of Canada in the best traditions of its legendary past with the best scientific techniques of today. ★★ ★



# Owners Report on the Rambler

(Continued from page 101)

## SUMMARY OF OWNERS REPORT:

EXCELLENT  
61.0%

GOOD  
32.4%

FAIR  
3.5%

POOR  
3.1%



<b>Satisfied with automatic economy?</b>	
About as expected.....	50.2%
Better .....	16.9
Not as good.....	32.9
<b>Satisfied with manual economy?</b>	
About as expected.....	64.9
Better .....	13.5
Not as good.....	21.6
<b>Best-liked features</b>	
Handling ease .....	51.2
Riding comfort .....	32.1
Economy .....	28.3
Roominess .....	17.6
Solid, rattle-free .....	14.8
Parking ease .....	13.5
Size, compactness .....	13.5
Heater .....	13.0
Visibility .....	12.8
Styling .....	10.4
<b>Most frequent complaints</b>	
Door problems .....	6.6
Engine sluggish, underpowered .....	5.4
Poor workmanship .....	5.1
Difficult manual shifting.....	4.1
Brake troubles .....	3.6
Rattles, squeaks .....	3.3
<b>Had mechanical trouble?</b>	
No trouble .....	60.5
Some trouble .....	34.2
Considerable trouble .....	5.3
<b>What was trouble?</b>	
Brakes .....	6.6
Carburetor .....	6.4
Oil leaks .....	5.1

<b>Best-liked exterior features</b>	
Clean, smooth lines.....	11.0%
Car-top luggage carrier.....	7.9
Simplicity of styling.....	6.1
Absence of fins.....	6.1
Paint finish .....	5.9
Road clearance .....	5.4
15-inch wheels .....	4.6
No excessive trim.....	3.6
Trunk size .....	3.3
<b>Least-liked exterior features</b>	
Rear window .....	3.1
Bumpers, bumper guards.....	3.1
Taillights .....	2.6
Doors .....	2.6
Tailgate .....	2.0
<b>Best-liked interior features</b>	
Reclining seats .....	26.3
Individual front seats.....	11.7
Upholstery .....	11.7
Headliner .....	11.5
Dashboard .....	9.7
Headroom .....	6.4
<b>Least-liked interior features</b>	
Glove compartment .....	3.6
Uncomfortable seats .....	2.8
<b>Considered another car in</b>	
<b>Rambler's price range?</b>	
Chevrolet .....	58.7
Corvaire .....	35.1
Corvaire .....	5.9
Falcon .....	17.6
Ford .....	17.1
Comet .....	9.0
Tempest .....	9.0
Valiant .....	6.3

<b>Is Rambler only car in family?</b>	
Yes, it is.....	68.9%
No, it isn't.....	31.1
<b>Make of other car:</b>	
Another Rambler .....	3.1
Other AM make.....	1.5
Chevrolet .....	5.4
Other GM make.....	4.8
Plymouth .....	3.8
Other Chrysler Corp. make.....	3.3
Ford .....	3.8
Other Ford Motor make.....	1.6
<b>Decision to buy Rambler based on:</b>	
Economy .....	76.7
Size .....	60.5
Price .....	39.3
Styling .....	38.0
<b>How is dealer service?</b>	
Excellent .....	51.6
Average .....	41.3
Poor .....	7.1
<b>Make of car traded in:</b>	
Rambler .....	35.9
Other AM make.....	3.1
Chevrolet .....	14.8
Other GM make.....	9.7
Ford .....	8.4
Other Ford Motor make.....	4.8
Plymouth .....	5.1
Other Chrysler Corp. make.....	5.1
<b>Would buy another Rambler?</b>	
Yes, would buy.....	84.0
No would not buy.....	5.6
Undecided .....	10.4

"My wife likes the handling and she says it's easy to park."—Illinois machinist.

"Rambler is easy to park and isn't clumsy. There's no excessive, useless exterior."—New Jersey housewife.

**She's right. Overhang has been kept to a minimum.**

"Rambler's size is large enough to be comfortable, yet small enough to park easily. I drive 40,000 miles a year and they (my three Ramblers) have been the most trouble-free cars I've ever owned."—Massachusetts engineer.

*There are complaints, naturally, and here are the first seven in order of frequency of response.*

"Had to get a new seal gasket on the oil pan and the transmission case leaked."—Pennsylvania steelworker.

"Hard for people to enter the rear doors—not enough distance between seat and door frame."—Virginia educator.

"I would like to see the doors made to open wider allowing easier entry and exit."—North Carolina salesman.

**Rear doors open almost a full 90 degrees. If doors were made wider, you'd have to lengthen wheelbase to accommodate them and you'd no longer have a compact car.**

"Doors have to be slammed very hard to latch."—California retiree.

"Outside door locks are too low and hard to get to for a person over six feet tall."—Oklahoma accountant.

"Brake cylinder leaked."—Pennsylvania mechanic.

"Self-adjusting brakes caused much trouble—now corrected by using softer brake linings."—Pennsylvania finance manager.

"Pedal goes below accelerator before the brakes take hold. Had to replace the double master cylinder. All cars I have tried with this arrangement have very poor brakes."—California police officer.

**Rambler must be praised for effort in behalf of safety, blamed for rushing new device into production if not perfectly foolproof.**

"Considerable stalling until my dealer cleaned the carburetor."—Ohio manager.

"Had to have carburetor completely disassembled. Motor was stalling and still not satisfactory because it dies if gas is fed to it slowly when making a right hand turn."—California immigration officer.

**Carburetor problems led the complaint parade on the '60 model too, according to owners. We did not find this problem on PM's test car.**

(Continued to page 242)

# CRUISERS \$369 UP

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1/4 Down 2 Years to Pay

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20 FT. ISLANDER



22 FT. CARIBBEAN



## 22 FT. HOUSEBOAT-CRUISER \$699

Cruiser performance with houseboat space and facilities. V-bottom design. Planes with 40 HP to 20 MPH. Inboard or outboard power. 6 1/2 ft. headroom. Galley, toilet, lounge, sundeck. Sleeps 4 in comfort. Free catalog explains how anyone easily assembles this cruising houseboat.

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3 factory-molded sections interlock; bond into 1-piece molded fiberglass boat. Colors molded in. With Luger's patented method, anyone assembles boats exactly like factory-finished models in one evening. Brush and screwdriver only tools. A scientific triumph of simplicity and ease never known before in boat construction.



SAVE  
\$300 to \$500

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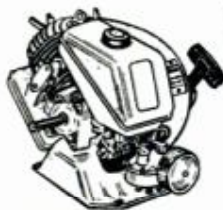
40 MODELS, 8-16 FT.  
\$41.75 Up, Save 1/2-2/3

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PAYMENTS

Roomy, comfortable naval architect designs. Smart, modern styling. Equal factory-finished boats in appearance and performance. 8 ft. dinghy \$41.75; 12, 14, 16 ft. fishing boats \$59.95 up; Runabouts 12 ft. \$104 up, 14 ft. \$139 up, 16 ft. \$189 up. Also low mail order prices on fiberglass supplies, accessories, trailers, paint, hardware.

## FREE CATALOG LUGER BOAT KITS

Dep't. B-3, 9200 Access Road, Minneapolis 20, Minn.



## Brand New 2 1/2 hp Gas Engine Sale!

Regular price \$49.50

30 day Sale

**\$29.95**

1 year factory warranty free service

Unbelievable but true! Chance of a lifetime to buy a brand new Clinton Model A400 2 1/2 hp Engine at nearly half price. Perfect for Go Carts — Scooters — Tractors — Mowers — Generators — Pumps, etc. Built-in throttle control and recoil starter — ready to go. We bailed out a manufacturer who needed cash—his loss is your gain—act fast! 1 for \$29.95, 2 for \$57.50, 6 for \$149.99 quantity limited.

Send 10c for 100 page catalog

MASTER MECHANIC MFG. CO., Dept. A-362, Burlington, Wis.

Southern Customers Order from Dept. A-362, Box 65, Sarasota, Florida

"The '62 carburetor has persistently run over-rich. After working on the carburetor of my '60 Rambler, 25-27 m.p.g. was consistent and I believe the '62 can be corrected to do the same. The company has been very good about correcting all complaints."—Florida aircraft mechanic.

"Not enough power when ascending steep grades."—Pennsylvania boilermaker.

**This might be a problem of individual engine tune. We found Rambler's intermediate speed (automatic transmission) good for fast hill-climbing at 60 m.p.h.**

"With respect to engine size (125 hp.), normal acceleration is often sluggish."—California engineer.

"Oil leak around front main bearing; new pan gasket installed and checked—it still leaks."—California compositor.

"Oil leaks. I use a quart every 100 miles and have had the car in twice for repair."—Illinois telephone worker.

**There's no real excuse for this on an engine that's been around (essentially unchanged) as long as Rambler's Six.**

"On a trip, I began to add oil; the trouble was no gasket on front inspection plate."—Wyoming railroader.

"The power-steering cylinder leaked but was fixed right away."—California refinery worker.

"Used four quarts of oil in first 1000 miles, and about 2 quarts during second and third 1000."—Pennsylvania foreman.

"I enjoy driving it very much, however, if the quality of factory workmanship continues to be as bad on their future models, I certainly will try another make."—Massachusetts sales manager.

**There should be a little red light flashing on Mr. Romney's desk right about now.**

"I have had a bad water pump, a leak in my hot water heater which caused the motor to boil, and now have trouble with dirt clogging the thermostat and no heat from the heater."—Pennsylvania machinist.

"Dimmer switch and turn signals malfunctioned."—Ohio air force officer.

"Air vent in the gas cap was plugged."—Pennsylvania crane operator.

"Improper shifting from low to second gear (automatic)—seems to stick between the two."—Pennsylvania steelworker.

"Automatic transmission was faulty from the factory."—Maryland realtor.

"Valve body trouble in transmission and we had no reverse gear. The automatic transmission leaked because no new gasket was put in when the work was done."—Wisconsin warehouseman.

(Continued to page 244)



## Now! The oil that protects you if you forget to change

We're all human. If you forget to change motor oil on time — *Pennzoil is for you.* It keeps on protecting.

Pennzoil comes from 100% pure Pennsylvania crude, refined by an exclusive process, making it the world's richest motor oil. Z-7 makes it so complete you never need extra additives. Your car performs better . . . your engine lives longer.

Insist on Pennzoil. For your nearest dealer, write Pennzoil, Oil City 61, Pa.



### When to change oil:

Below 32° F. —  
Every 30 days  
Above 32° F. —  
Every 60 days  
Never exceed  
car manufacturers'  
recommendations.

**PENNZOIL Z-7 — World's richest, most complete motor oil . . . now with protection reserve**

ENDS WRONG TURNS FROM BOTH  
ABSENT-MINDEDNESS AND  
ABSENT ROAD SIGNS



THE ORIGINAL  
**HULL AUTO COMPASS**

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dealer's, write for lit.

HULL MFG. CO., Box 246-D-3 Warren, O.



Junk that old mower? Certainly not. The April Popular Mechanics will show you how to convert it into a handsome lawn sweeper.

**GUNK®** removes grease  
-- scourfully!  
cleans -- degreases -- freshens



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GUNK CHICAGO CO., River Forest, Illinois  
serving the Midwest and Southwest  
RADIATOR SPECIALTY CO., Charlotte, N.C.  
serving the East, Southeast and far West

## shaw shoes are designed for men whose feet are part of their job!

Here's a sturdy work oxford, with all the styling, fit and comfort of a dress oxford! Shaw's high value features include full cushion insole heel to toe with metatarsal pad and cushion side arch support . . . oil resistant Neoprene sole . . . steel arch . . . Nylon stitched . . . plus the finest leathers and craftsmanship, in black or Cordovan color. **AT STORES EVERYWHERE,** or write us for details.



**IDEAL FOR**  
mechanics, filling station men, mailmen, factory workers—anyone who wants comfort and style in a work oxford! Also available as high shoe.



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YOUR 1962 BUYING GUIDE FOR PRECISION MADE RADIO CRYSTALS AND ELECTRONIC EQUIPMENT.

International Crystal Mfg. Co.  
18 North Lee, Oklahoma City, Okla.  
Rush FREE 1962 Catalog

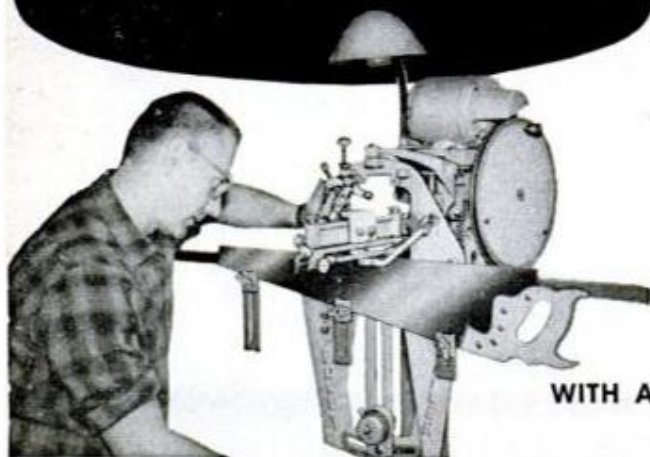
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you can always  
**BE SURE OF A JOB**



WITH A

## FOLEY SAW FILER

Have you been laid off—or afraid you may be? If you want security, plus a bigger income too—don't look for a job—start your own spare time business. In his first 2 months J. P. Robitaille earned \$300 with his Foley Saw Filer. From his starting day R. T. Hart made \$600 in 4 months. Frank P. Layne wrote—"In our town of 2,800 instead of 200 to 300 saws I did over 1,500 the first year, averaging about \$1.50 each.

FREE booklet "MONEY MAKING FACTS" shows you how to get business. The new Foley "200" sharpens hand, band and both "combination" and crosscut circular saws. Use our Time Payment Plan—pay for the machine out of your CASH profits. Send coupon today—no obligation, and no salesman will call.



FOLEY MFG. CO., 343-2 Foley Bldg., Minneapolis 18, Minn.  
Send Free Booklet and Time Payment Plan on Foley Saw Filer.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

"Automatic transmission is jerky and the dealer says there's nothing wrong with it."—Illinois airline worker.

*The automatic transmission on PM's Rambler jerked only when "kicked down" from high to intermediate for passing, was commendably smooth on all other shifts.*

*Back to the boosters—here, listed in order of frequency of mention, are the next seven best-liked features.*

"That Weather-Eye heater is the best."—Ohio machinist.

"The heater performs very well in sub-zero temperatures."—Iowa draftsman.

"Good heater—fast warmup."—Ohio retiree.

*We agree. Defroster action, too, was good on PM test Rambler.*

"You sit up straight and high enough to see out well—excellent visibility."—Oklahoma airline engineer.

"Although I don't have power steering, my car handles with exceptional ease."—Pennsylvania educator.

*Rambler has made changes in front suspension that have improved steering ease and roadability as well.*

"I have a powerpack on my car and I really get big-car performance from the 6-cylinder engine."—California bus driver.

"Although a six, it has plenty of pep."—New Jersey clerk.

"Acceleration is very fast for passing in the 50-60 m.p.h. range."—Illinois electrician.

"The new front suspension gives more road stability."—Oklahoma supervisor.

"Wind doesn't seem to sway car on highway, considering its weight."—Minnesota businessman.

"I like the double master cylinder brake system, and foot-operated parking brake."—Florida merchant.

*Once again, back to "knock": Here's the second group of complaints listed in order of frequency of their mention.*

"Manual shift is hard to work in low gear."—West Virginia steelworker.

"Very hard shifting the manual transmission; I have to force it into gear."—Minnesota auto mechanic.

"I have had some trouble with the gear shift not moving freely into position, however, I am told 2500-3000 miles are necessary to break it in!"—Arkansas educator.

*All too often the stick shift mechanism is a "stepchild," Detroit would rather have you buy the automatic.*

"The car has a definite 'lean' to the left as though a spring may be broken, numerous rattles and noises."—Wisconsin insurance adjuster.

(Continued to page 246)



## New idea for Sportsmen...in 4 flavors

It's the new AMERICAN SPORTSMAN 6-ft. tape rule. Handiest measuring tool you ever saw. Smaller than most cigarette lighters. Brilliantly colored face plate identifies your favorite sport. 1/4" steel blade has easy-to-read markings, exclusive White Clad® finish. Blade rolls out and in — butter-smooth. See it soon wherever you buy hardware. Great gift! Only 98¢.

Measure for measure, the finest made...

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SAGINAW, MICHIGAN

## King Midget

FOR 1962

Drive it for 75c a week.

Rider Agents Wanted. Send 25c for 32 page book, full details, dealer price.

Or send \$1 (refunded first order) for this plus Service and Repair Manual and 16 5x7 photos of car and factory.

MIDGET MOTORS CORPORATION, Athens 1, Ohio



WORLD'S MOST EXCITING LOWEST PRICED CAR

**BUILD A CAMPING TRAILER** for next summer's family vacation. Booklet 200 gives plans for "Two Folding Tent-Trailers." Only 35c from Popular Mechanics Service Bureau, Room 532, 200 E. Ontario, Chicago 11, Ill.

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UNEQUALLED LOW PRICE! TERRIFIC VALUE!

America's finest tractor. Ruggedly built. Easy to operate. 790 lbs. Borg-Warner clutch, trans. and diff. 140 to 1 reduction. 40% more drawbar pull than ordinary tractors. 9 H.P. engine. 20 quick change implements. HOOD-FENDERS.

Write for Catalog.

Engineering Products Co.  
1005 K-3 Anoka Avenue  
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MARCH 1962



## Easy way to strip paint

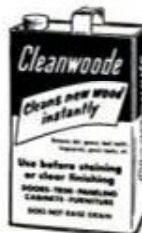
Wonder-Paste  
PAINT REMOVER

Easy to remove any finish—oil, enamel, varnish, shellac, lacquer, and other hard paints.

IT'S DIFFERENT!  
The hands are off in 10 minutes. Nothing else can do this.

All cracked and peeling paint or enamel should be removed before refinishing. Hard job? No indeed! Just apply Wonder-Paste Remover with a paint brush. It goes to work instantly—softens up coat after coat of the toughest paint or enamel so you can take it off easily right down to the surface... Ideal for doors, windows, trim, furniture and all upright surfaces because it stays put.

To clean NEW wood instantly get CLEANWOOD



Moisten a rag with this unique solvent and wipe the surface. Instantly removes dirt, grease, pencil marks, heel marks, etc. Evaporates quickly; does not raise grain of wood.

● Send 25¢ for illustrated Refinishing Manual.

Write for free literature.

Wilson-Imperial Co.  
118 Chestnut St., Newark 5, N. J.

Get Wonder-Paste and Cleanwoode at paint and hardware stores

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# SHOOT A STAPLE WHEREVER YOU'D DRIVE A NAIL!

Same Machine  
uses 6  
Staple  
Sizes . . .



**"ONE  
SQUEEZE  
AND YOU'VE  
NAILED IT!"**

WITH AN **ARROW**  
Brooklyn 12, N. Y.

**No. T-50 All-Purpose STAPLE GUN**

Available at Hardware, Building, Lumber and Stationery Dealers Everywhere.  
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in Motorcycling**



## The World's Fastest\* Motorcycle T120 BONNEVILLE

This 40 cu. in. (650 c.c.) OHV Twin with dual carburetors is the top model in the complete Triumph line. New performance, mechanical advances and breath-taking maneuverability are built into the new models. See the Triumph dealer in your neighborhood for details and easy terms.

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PUT YOURSELF  
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"Rattles in the tailgate of my wagon I assume are to be expected."—Louisiana marine.

*We don't see why wagon buyers can't get tight tailgates. The problem's been around long enough.*

"It tends to rattle a bit."—Florida city clerk.

"I had expected a little better over-all gasoline mileage (19 m.p.g.)."—Wisconsin field supervisor.

"The steering seems a bit slow and hard after driving a heavier car with power steering."—Pennsylvania accountant.

"Car doesn't corner as well as our '57—in fact, cornering is poor."—Ohio salesman.

*Problem here is likely an out-of-line front end. We felt that Rambler's cornering was above average although not in sports-car category.*

"Speedometer sticks in cold weather."—Pennsylvania insulation man.

"Front shock bolts sheared off but both were replaced by the manufacturer."—Illinois foreman.

"Broken shock absorber (dealer received word to call back this particular model and change shock absorbers)."—Virginia editor.

"Defective shock absorbers."—New Jersey accountant.

"Windows rattle and don't work properly."—Pennsylvania pipefitter.

*More best-liked items include this group of four, listed in order of mention.*

"I like the fact that I'm not in need of an oil change and lubrication every two weeks."—California food broker.

"I drive 2000 miles a month in town and get into and out of my car 20-40 times a day. I find it easy to get in and out of."—Oklahoma salesman.

*Here's a real advantage of the higher body and flat floor without that annoying "step-down" feature.*

"Exceptionally good starting in all weather."—Illinois trucker.

"I like the quality of workmanship and attention to details. There are no loose ends. It's a finished product."—Utah engineer.

*To wind up owner's statements, here, in order of response, are the final complaints.*

"Other Rambler dealers wouldn't honor my new car warranty."—Illinois heavy-equipment operator.

"Factory refers owner to dealer; dealer refers owner to factory. Owner gets first-class runaround."—Florida court reporter.

"I attribute 75 percent of my mechanical trouble to little or no dealer preparation of my car before delivery. They also seemed

(Continued to page 248)

The second most important tool...  
for every  
woodworking shop

A VERSATILE

## W&H MOLDER-PLANER

is second only  
to a saw... it  
molds, planes and rabbets.

Models from \$89.95  
From \$27.50 down & \$6.00/mo.

SEND FOR  
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WILLIAMS & HUSSEY MACHINE CORP.  
CLINTON ST., MILFORD, NEW HAMPSHIRE



OUTPERFORMS ANY WELDER IN ITS PRICE RANGE

## NEW ARC-WELDER



Weld-Brace  
or Cut. Ter-  
rific heat for  
bending, solder-  
& working all  
metals up to 1/4"  
thick. Includes,  
Approved hood, car-  
bon & rod holders,  
Welding leads, welding, brazing  
rods, carbon & flux.

No Motor Needed  
Complete Only  
**\$14.95**

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Guaranteed

110 V. A-C

I.D.E. ELECTRIC MFGS., Dept. M-4 2833 McNair, St. Louis 18, Mo.

## PAGE FOR TILLING PLOWING MOWING

A FULL LINE — 2 to 9 HP  
with complete gear drive and reverse  
FREE CATALOG • LOW PRICES • EASY TERMS  
Over 40 years experience  
OVER 60 ATTACHMENTS AVAILABLE!



**PAGE** Richfield 4  
Wisconsin

DEALERS  
WANTED

**Animated Easter Egg.** Turn the crank  
and watch the rabbits chase each other  
in and out of their house. You'll find the  
plans for this project in the April PM.

## HEART DISEASE #1 Enemy



Give  
**HEART FUND**  
#1 Defense

MARCH 1962



## grime & punishment

If this oil filter hadn't been so efficient, it wouldn't look this way. The reason it's so loaded with grime is because it's a Fram "Wear-Guard" Oil Filter. Fram Filters remove up to 40% more sludge, and keep it from punishing the moving parts in your engine. But even a Fram gets its fill of sludge, and needs to be replaced. Protect your engine. Ask for a fresh Fram "Wear-Guard" Filter the next time you change your oil. Fram Corporation, Providence 16, R. I.

**FRAM**  
"WEAR-GUARD" FILTERS



247



## What's New in High Fidelity

by Fred Honig

Former Editor of Hi-Fi Guide, well-known writer and authority on high fidelity

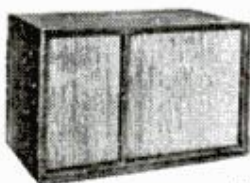
### High Fidelity Outdoors

It is common knowledge — or it should be — that a single high fidelity component music system can provide you with stereo or monaural music throughout your home. Not so well known—is that the same set of components (FM stereo tuner, record-playing unit, tape machine, pre-amplifier and amplifier) can also let you listen to music outdoors: on the patio, at the pool, in your greenhouse, garden, garage or central workshop. Simply run as many leads as you need from your central music system in the house, and you can switch the sound to any of these outdoor spots. Then, when you want to listen, just connect a pair of loudspeakers to the wires — in a few seconds you're all set. Some people install plug-in sockets at various spots throughout the grounds. It's simple. You'll find a wide choice of fine speaker systems ideal for the purpose. Many are so compact and light-weight they can easily be carried from place to place.

Wherever you listen, you'll find that your stereo records require precise tracking provided by the fine playback components available ... single play or automatic. Today's highly engineered turntables, and balanced tone arms provide superb listening, without distortion or mechanical interference. Choose units separately or already integrated (as illustrated).



**EMPIRE TROUBADOUR**  
Record Playback System  
Turntable with  
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Mono-Stereo Cartridge \$200



**WHARFEDALE**  
W60, Achromatic Compact  
2-Speaker System.  
True wood, \$116.50  
Unfinished, \$101.50

Whatever the source of your listening pleasure, your speaker system is the fine instrument you depend upon, indoors or outdoors. It must be capable of handling a dynamic range of natural sound. You'll find many types and sizes available for all your purposes, including highly versatile compact speaker systems (as shown)

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#### QUOTE:

*"Man has in his head the best computer ever made. With it, he can communicate much better than any machine. On our first moon shots, we'll send instruments for preliminary investigations. But not to send a man later on is illogical."*

MAJ. GEN. LEIGHTON I. DAVIS  
Commander, Air Force  
Missile Test Center  
Cape Canaveral, Fla.

reluctant to help when the car was returned."—Colorado engineer.

**Many Rambler dealer's are not giving the car the support it deserves.**

"Gearshift is noisy,"—North Carolina utility manager.

"It takes too many turns of the wheel to turn."—Illinois postal worker.

"Lousy steering ratio—you have to crank the wheel for ten minutes before turning a corner."—Rhode Island dispatcher.

"Fuel tank was not properly made and it collapsed."—Pennsylvania engineer.

**PM's test car had blocked air vent in tank which caused car to stop. Factory says this has now been remedied.**

"Condensation forms in the fuel system apparently caused by position of the tank."

—Delaware foreman. ★★★

### Machine Exchanges Currencies

International air travelers who need foreign currency in exchange for American money can now get francs, lire, marks or pounds from a machine that accepts U. S. \$5 bills. The machine examines the bill electronically, then, if it's acceptable, dispenses a small box containing the equivalent in the desired currency.

Not designed to put exchange banks and agencies out of business, the machines are intended to supply the traveler with pocket money for small expenditures until he arrives at his overseas destination. The machines are made by National Rejectors, Inc., St. Louis, Mo.

### North Pole Has Come Far

Six-hundred million years ago the North Pole began wandering from its cozy location in the South Pacific, and it is still on the move.

Geologist George W. Bain, Amherst College, Mass., says the main reason the Poles continue to shift is that the rivers of the world wear down mountainous land, transferring large masses of weight from one area to another. During a period of millions of years, the transplanted weight causes the poles to slip. The spinning Earth, acting like a gyroscope, shifts position when it becomes top-heavy in certain areas.

The erosion process going on in southern Asia, where the Indus, Ganges and other rivers are wearing away the Himalaya Mountains, is dumping sediment into nearby seas. This shifting weight will eventually shift the North Pole deeper into Canada, bringing Arctic weather to Montreal.

That is, in a few million years .





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Balanced tilt-back unit trucks easily on 2 back wheels. Four roomy drawers and lower storage compartment. Entire unit can be locked. 32 x 26 x 12" reinforced welded heavy gauge steel construction. Red enamel finish.

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Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

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440-50 N. Oakley Blvd., CHICAGO 12, ILL.

**KRYLON**

You have a use for

**SPRAY PAINT**

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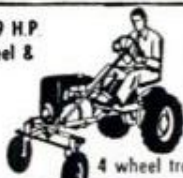
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Full line of attachments for  
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2-3-4 H.P. TILLERS 12"-16" CUT

FREE CATALOG  
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5-6-7-9 H.P.  
2 wheel 8



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RICHFIELD, WISCONSIN



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Print for Others. Good Profit. Have home shop. Junior press \$15; Senior \$35 up. We supply everything. Easy rules. Pays for itself in short time. Write now for free details.  
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## Fill Flaws In Plywood

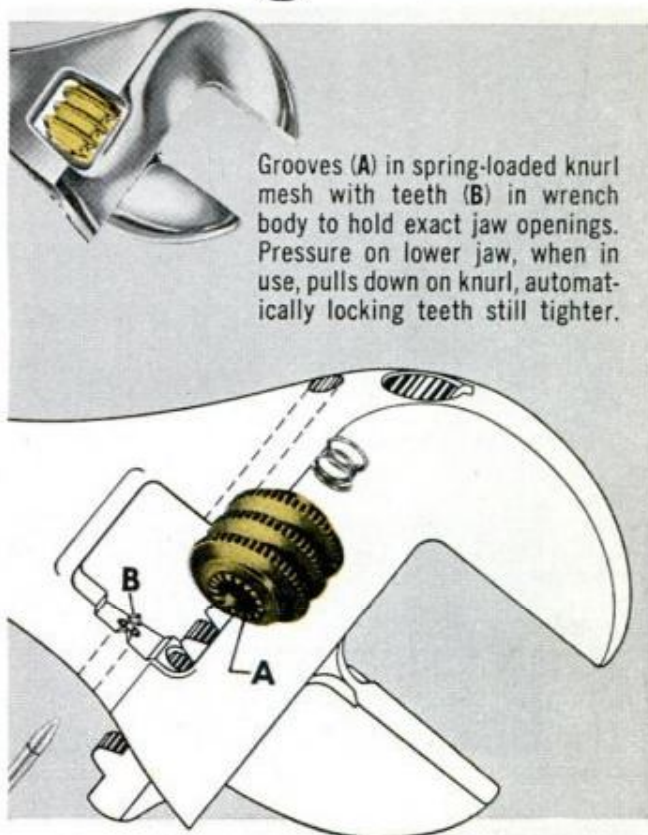
Handles like putty. Hardens like wood.

## PLASTIC WOOD®

The *Genuine* - Accept No Substitute.

MARCH 1962

# New Proto locking feature



Grooves (A) in spring-loaded knurl mesh with teeth (B) in wrench body to hold exact jaw openings. Pressure on lower jaw, when in use, pulls down on knurl, automatically locking teeth still tighter.

**CLIK-STOP**

ADJUSTABLE WRENCHES  
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## Chrysler's 1963 Gas Turbines

(Continued from page 91)

In jet aircraft variable nozzles are uncommon but not unknown. The Convair 880 employs the device on the compressor. But to locate it at the driving turbine, in 1700 degrees plus pressure, is unusual.

### Driver's-Eye View

Despite the turbine under the hood, driving the Turbo Dart or Fury is similar to driving a car with a reciprocating engine. Dash instruments are unchanged. The console between the bucket seats of the Dart and Fury contained engineering equipment to register temperatures, position of variable nozzles, and length of time the turbine has been operating. The only prototype you might expect on the 1963 production car is the tachometer which indicates r.p.m. in the gas generator.

Controls are standard, with one exception. No neutral button is used on the TorqueFlite transmission, so gears are always in forward or reverse. The TorqueFlite is minus its torque converter. The driving turbine performs a comparable function. Power from the turbine is relayed through an 8.53 reduction gear directly to the transmission gear trains in a range of 4570 to 5360 r.p.m. The 1963 production cars will have a special transmission, probably with a "park" position. A manual gear box is most unlikely.

The ignition key is turned to start the turbine. The starter motor winds the compressor to 20,000 r.p.m. Then the plug ignites the fuel. At this point the starter becomes a generator and the compressor is idling.

Throttle response is startling. Within 1½ seconds the compressor can whirl up to 44,000 r.p.m. But it's only after accelerator pressure is applied that the driving turbine begins to spin upward from near-zero r.p.m. It is red-lined at 45,730 r.p.m., with the 140 hp. coming in at 39,000.

### Is the Turbine Ready?

A few years ago materials of low cost with high temperature strength and corrosion resistance were a barrier to turbine designers. Chrysler says it has developed the alloys needed to overcome these problems, that in fact, no major problems remain unsolved and their CR2A turbine is ready for passenger car production. Cost of gas turbines when they have reached some volume production will be comparable to piston types. Eventually, the turbines should be cheaper.

More improvements will come. The

(Continued to page 252)

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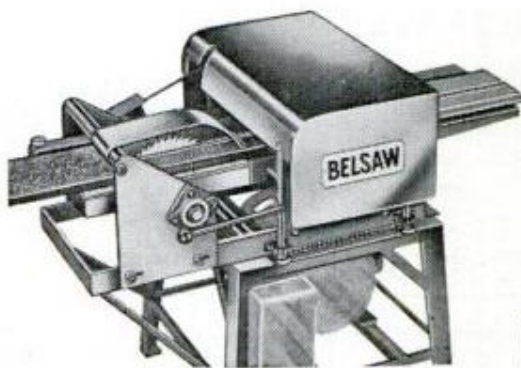


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Turbo Dart and Fury turbines weigh 450 pounds, complete with starter-generator and reduction gear, 250 pounds less than an average cast-iron V8. The maximum temperature burner alloys can now withstand is about 1700 degrees. Since turbine efficiency increases with heat, if Chrysler's turbine could be brought up to 2100 degrees, engine weight could be cut to 300 pounds and fuel mileage would increase three or four miles per gallon. This will not be easy, but it probably will be done.

In addition to the Turbo Dart and Turbo Fury which we met, a third experimental gas-turbine prototype is reported to be running on the test track. And Chrysler engineers and stylists are currently hard at work perfecting the forthcoming 1963 turbo car. The objective is to get these turbine cars out next year in quantity and distribution that will demonstrate their superiority.

The configuration of a turbine car could be quite different. The design could be influenced by the smaller engine, no radiator, smaller transmission, plus the value of a functional air scoop. It depends upon how radical Chrysler feels it can safely be—and be acceptable. And, as one executive said, don't overlook the possibility of the turbine at the rear. **★ ★ ★**

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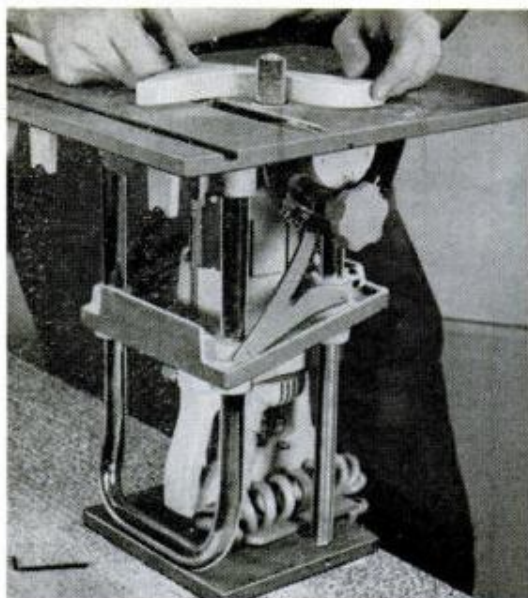
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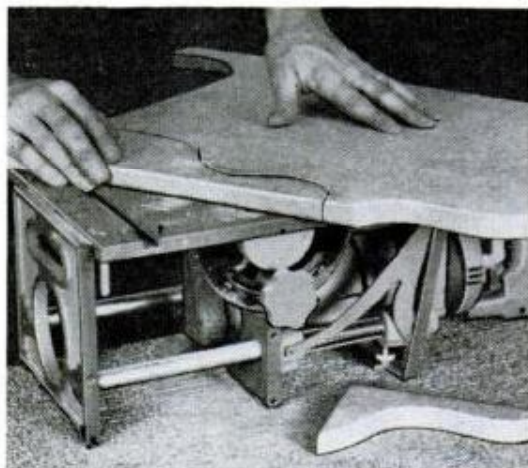
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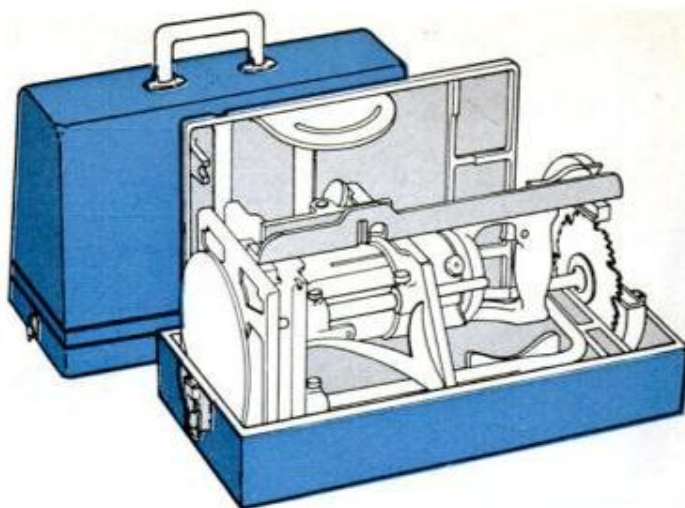
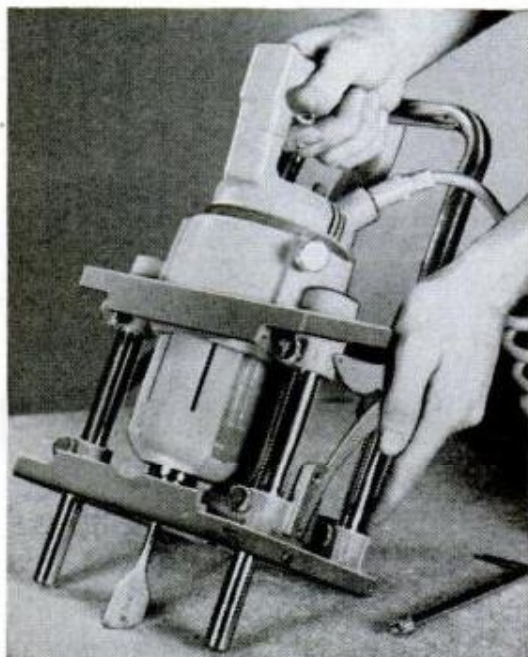


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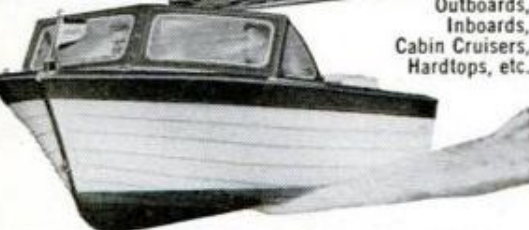
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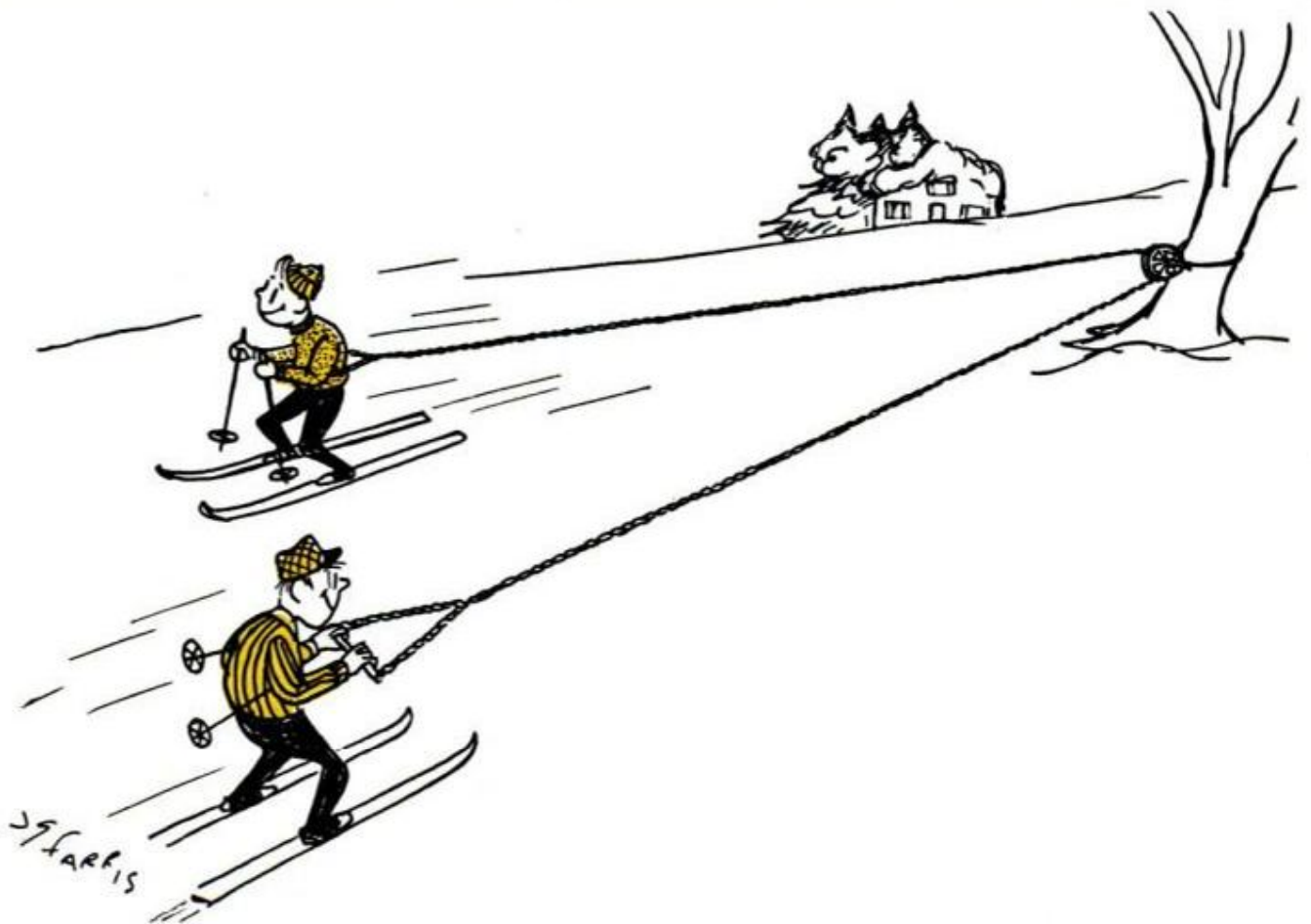


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MARCH 1962

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## Books for the Farmer

- to reduce work
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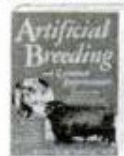
### New Ed. Veterinary Guide for Farmers

Written by farm expert, G. W. Stamm, this amazing book has sold more than a quarter million copies, now completely revised with most modern discoveries and methods fully discussed. Adopted by the U. S. Government for farm training. Used by farmers everywhere to diagnose and treat livestock diseases. Covers virtually every farm animal ailment and tells how to tell one from another; explains treatment or best procedure until the vet arrives. Includes a special, invaluable 12-page diagnostic chart that helps you locate symptoms in short order. A special chapter is devoted to artificial insemination and tells how this breeding method can improve the quality of your herd as well as increase your profits. Noted authorities proclaim this book the finest and most complete guide of its kind. Available to the farmer and stock raiser. . . . **\$3.95**



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Helps you step up farm efficiency, improve property appearance and values, increase farm production and income. Every member of the farm family will find something in this book he or she can use to great advantage in farm operation, maintenance and improvement . . . from the building and care of equipment to painting the farm home and fast freezing of fruit and vegetables. Covers every aspect of farm machinery maintenance . . . includes detailed plans for building essential equipment from scrap and discarded materials. Even suggests how to mix and pour concrete that will last longer! Here is a book brimming with short cuts, labor-saving ideas and methods that will simplify farm chores and save you money as well. Adopted by State Farm Training Programs. Hundreds of pictures and clearly drawn diagrams. . . . **\$3.00**



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Now—the secrets of the key to better livestock revealed by farm editor, G. W. Stamm! The first book in ten years to cover the up-to-date principles and practices of Artificial Breeding . . . and written in words every farmer and stockman can understand easily and follow surely. This astonishing book presents the true, approved facts on inbreeding, linebreeding and crossbreeding, plus sections on timing, heat periods, how to pick a good dairy cow, how to choose a herd sire, what to do when a bull fails to perform, what's ahead in the field of frozen semen and many other topics of equal interest. Included is a 13-page directory of semen producers, the areas they serve and the breeds of bulls in their studs. If you are a modern livestock producer interested in the best methods and top profits, you simply cannot afford to be without this book for regular reference. . . . **\$3.95**



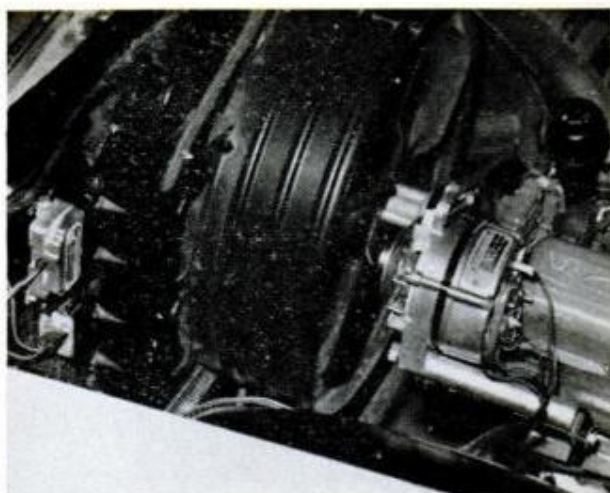
### Developing a Profitable Dairy Herd

Here, in a single, practically written book is everything you want and need to know about profitable dairy herd management. Written by Carnation Farms' Merton L. Moore and E. M. Gildow, D.V.M., there is complete information on feeding values, fertilization of pastures, silo practices, breeding, production, pedigrees, management problems and operating economies, vitamins and many other vitally important subjects. A most interesting chapter covers the showing and selling of cattle. Hundreds of charts, photos, drawings and diagrams leave nothing to the imagination. Whether you raise just a few cows or maintain a huge operation involving hundreds of animals—you'll profit from using this book. . . . **\$3.50**



### Hog Profits for Farmers

Hog raising can be highly profitable for the farmer . . . if proper management and feeding methods are employed. Even if you raise only a few hogs you can make a much bigger profit by applying the suggestions and ideas contained in this outstanding Popular Mechanics book. Written by Dr. W. N. McMillen, it offers down-to-earth, practical money-making information on care and management, feeds and feeding, equipment, marketing, breeds and breeding, judging, showing and sales tips. Contributors include many well-known agricultural experts and renowned college instructors. Only a mere 15 minutes of reading time will show you how to apply the six high points of profitable hog raising to improve your profits immediately. . . . **\$3.00**



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System makes battery maintenance easier for vehicles with power accessories or air conditioning, or for taxis and fleet cars that start and stop continuously. Available in 30-amp (\$59.50) or 45-amp (\$79.50) units to fit most 12-volt, post '59 cars. Sold by Motorola distributors and jobbers of automotive equipment.



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- 3000-w AC generator 60-c ..... 139.50

### GOV'T AIR COMPRESSOR

- Item #453. Expensive Gov't Compressor. G.E. motor 115-v, 60-c. Built-in air filter, relief valve, etc. Very compact and efficient.
- For paint spraying, insecticides, air brush, etc. A "Super Buy." Wt. 55 lbs. Gov't cost over \$250. SALE ..... **\$29.88 FOB**
- Many other bargains in Compressors, Tanks.

### HYDRAULIC SURPLUS BARGAINS

- Great savings. Build loaders, diggers, presses, etc. Brand new equipment.
- 895 Pump, 1000 lb., 14 gpm. .... \$41.60
- 12-v Battery Hyd. Pump ..... 18.49
- Hand Hyd. Pump and Cylinder ..... 27.95
- 839 Hyd. Cyl. 3/8" 2-way ..... 19.70
- Hyd. 2-way 1000-lb. Valve ..... 18.00

### HYDRAULIC SPEED REDUCER

- Item #1304. 1 hp transmission. Variable 0 to 350 rpm. Instantly reversible. Ideal for lathes, midget cars, etc. Roller bearings, and complete with 3-phase 220-v AC ball bearing motor. Size 21"x9"x20". Wt. 200 lbs. Gov't cost over \$900. SALE..... **\$89.50 FOB**

### DIAL TELEPHONE

- Item #716. Std. phone, same used on all phone systems. Use as extension to main phone and on private systems. Directions furnished. Wt. 8 lbs. Cost \$25.00. SALE... **\$7.95**

### SPECIAL OF THE MONTH!

#### SELF PRIMING A-C PUMP

- Item #209. Brand new Gov't expensive self-priming centrifugal pump. Consists of 1/2 hp 115-v AC motor, driving self-priming pump.
- Has 3/4" garden hose connections. Capacity about 900 gph. Good pressure characteristics.
- Use for swimming pools, basement draining, small irrigation, boats, industry. 4-Star Buy! Size 12"x10"x5". Wt. 21 lbs. Gov't cost \$98.75. SALE..... **\$33.60 FOB**

### EXAMPLE BARGAINS IN 1962 CATALOG

- \$325 Battery 12-v Hoist, 1250 lbs. \$68.25
- \$35 Colored Dial Phone ..... 11.95
- \$30 75-Amp 20-v Transformer ..... 15.91
- \$90 Pair 115-v Selsyn Motors ..... 6.95
- \$60 Fuel Oil Pump, 12-v ..... 14.97
- \$75 Centrifugal Pump, 1 1/2" size ..... 19.95
- \$300 Welding Generator, 200 A ..... 14.95
- \$20 Geliger Experimental Tube ..... 6.9
- \$110 Automatic Stepping Switch ..... 12.91

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Address.....





### Kiddie Safety Belt

Freedom of movement and the security of a seat belt are combined in a new automobile safety belt for children.

The adjustable belt will protect a child up to six years of age. The child is free to stand, sit or sleep while wearing it. The belt, which has a quick-release metal buckle, attaches to the car floor.

It's a product of Rose Manufacturing Co., 2700 West Barberry Place, Denver 4, Colo.



### Fold-Away Diver Warning Flag

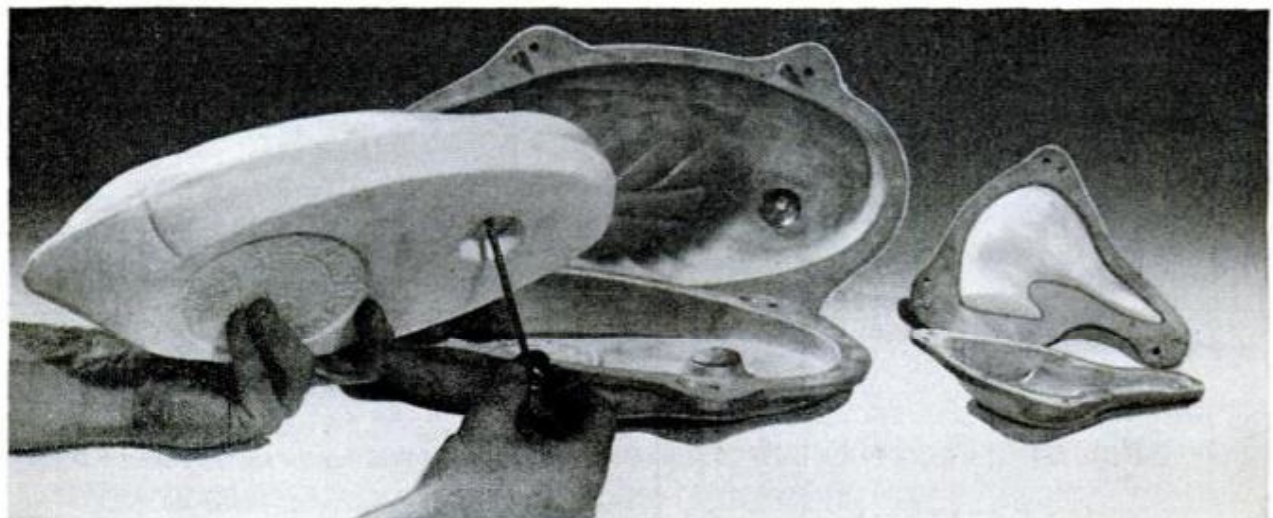
Red with a white diagonal stripe and the words "diver below," a regulation skin-diver's warning flag is now available in a neat package that disappears into its own 6-inch plastic buoy for traveling. Both the 36-inch mast and a 12-inch pendulum counterweight telescope into the buoy. A built-in handle serves for carrying or as an eye for an anchor line. Made by Safety Float Corp., 35 S. 5th St., Waterbury, Conn.

### Mold-It-Yourself Plastic Waterfowl Decoys

Easy-to-use expandable plastics, combined with a new aluminum molding outfit, make it possible for waterfowl hunters or shooting clubs to mold their own solid-foam decoys for as little as 50 cents each.

To mold, you place a measure of granulated plastic in the mold, bolt the two halves together, then bake in an oven or

place in boiling water to expand the plastic. Surface details for painting are built into the mold to simplify painting. Molds are available for mallard duck or Canadian goose at \$35 and \$55 per set; 10 pounds of expandable plastic costs \$6.50 and makes 15 ducks or 5½ geese. Made by Decoys Unlimited, Box 69, Clinton, Iowa.





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## challenges you to...


Before you invest in any outboard boat, compare them all... feature-by-feature... fact-by-fact. Be sure you are buying the boat that's best for you. You'll want the "Challenge Test," a side-by-side comparison guide to outboard boat buying. Ask your MFG dealer for a free copy or write direct. See for yourself how MFG meets the challenge of quality.

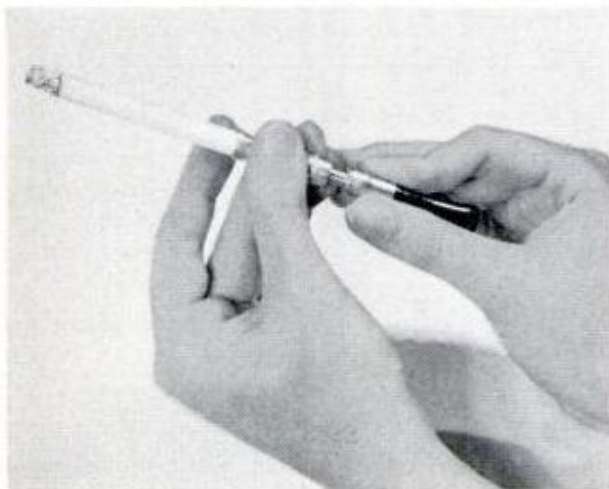


# COMPARE THEM ALL!

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In Canada: Canadian Locomotive Limited, Kingston, Ont.

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Smokers may select the amount of smoke they wish to receive from a cigarette by using a new holder with a built-in meter. The holder is made of aluminum with a mouthpiece made of black styrene.

There is a 10-notch micrometer adjustment which will allow more (or less) smoke to flow through the holder.

It is designed for those who wish to ease back on smoking or who desire to make their smoke milder. The holder costs \$4.75. It is available from Bonacraft Machine Co., 2312 Boone St., Baltimore 18, Md.

MARCH 1962

### WAR SURPLUS AND OTHER **SAVE UP TO 90%**



**CORNELIUS AIR COMPRESSOR** Ideal for filling underwater diving tanks, air horn tanks, etc. Three stage USAF air compressor. Has built-in 1/2 HP, 27 V. DC electric motor and adjustable cut-out switch. Develops 1500 PSI or may be reset to 2000 PSI. Delivers .4 CFM. Approx. GOVT. COST \$375. Like NEW. **\$29.95.**



**U. S. NAVY SEXTANT (AN 5851)** The finest navigational aid on land, sea or air. Adjustable bubble and nite lite, built-in averaging device. Both artificial and natural horizon. Can be used with or without bubble. Excellent for marine use. Used by many power squadrons. Comes complete with filters, astigmatizer, batteries, carrying case & instruction book. Approx. GOVT. COST \$586. Like NEW. **\$16.50.**



**SOUTH WIND HEATER & ACCESSORIES** Manufactured for govt. antarctic expeditions for jeeps and half-tracks. Heating unit puts out over 20,000 B.T.U.'s. Late recirculating type. Burns any type gas, 12 volt system. Fuel consumption extremely low, 1 gal. per 8 hrs. Terrific for trucks, etc. With service & installation manuals & many components. Approx. GOVT. COST \$550. Shpg. wt. 50 lbs. NEW. **\$39.95.** Limited quantity.

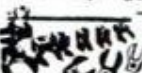


**ELECTRIC STORAGE BATTERY WINCH** New, improved model contains heavy-duty, 2-way drum switch. Fully reversible heavy-duty, two-speed motor, 160 to 1 gear reduction. Ball bearing construction throughout. Drum will handle 70' of 1/4" cable. Can be used on 6, 12, 24 V. battery. Lift cap. 2000 lbs. plus. Ready to install & operate. 19" long x 9" wide x 8" high. For jeeps, trailers, boats, trucks, etc. Complete with mounting flange, safety load locking brake and leads. Shpg. Wt. 60 lbs. Approx. GOVT. COST \$400. NEW. Model E. **\$49.50.**

**DELUXE MODEL ED** Same as above but with extra heavy base & outrigger support bearing. 200' 1/4" cable spool capacity. NEW. **\$69.50.**



**BUILD YOUR OWN ARC WELDER, LIGHT PLANT OR BATTERY CHARGER \$39.50**  
Kit incl. 1 Navy NEA-5 Gen. combination AC-DC type. AC 115 V. DC 24 V., 200-300 Amps. 2 complete generators in 1, yet no larger than gen. Ideal for home, shop and farm lighting plants. Delivers 1200 Watts AC, DC side for charging batteries, welding and operating war surplus motors. Also in kit: 1 DC Voltage Reg., Reverse Current Relay, 1 Voltmeter, Rheostat, Electrode Holder, Toggle Switch, Welder's Shield, Wiring Diagram for kit. Wt. under 100 lbs. Approx. GOVT. COST \$650. Kit—**\$39.50.** Navy NEA-5 Gen. as above, purchased separately, **\$23.50**



**11 PIECE CROWFOOT WRENCH SETS**  
Wrenches snap onto T-bar in 3 different positions. The only wrenches for hard-to-get-to places. Mfd. by Plomb Tool Co. for U.S. Armed Forces. Finest case hardened tool steel. No shop mechanic should be without this set. Approx. GOVT. COST \$47. NEW. **\$5.95 pd.**



**FRESH WATER SYSTEM PUMP**—For boats, campers & trailers. Output 10 to 200 gal. an hr. Variable rheostat controls output. 1/2" pipe thread into bronze impeller housing. 12 V.D.C. Radio noise filter. 5.2 amp. draw. Explosion-proof const. Shpg. wt. 11 lbs. Complete with mounting instructions & wiring diagram. Approx. GOVT. COST, \$200. NEW. **\$10.95.**



**225-1 REDUCTION GEAR** For beaching boats, winches, hoists. Ideal motor in golf or boy's electric car. DC motor and clutch. Easily reversible wiring diagram furnished. Hi torque. 105 RPM. Runs on 6-12 or 24-32 V. 65 lbs. gross. Approx. GOVT. COST \$300. **\$13.50.** Matched splined gear—**\$3.00 ea.**

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# PLASTIC WOOD®

The *Genuine*—Accept No Substitute.

# Owners Report on the Chevy II

(Continued from page 97)

## SUMMARY OF OWNERS REPORT:

EXCELLENT  
52.1%



GOOD  
38.4%



FAIR  
7.1%



POOR  
2.4%



<b>Satisfied with automatic economy?</b>	
About as expected.....	45.9%
Better .....	13.9
Not as good.....	40.2
<b>Satisfied with manual economy?</b>	
About as expected.....	40.4
Better .....	16.0
Not as good.....	43.6
<b>Best-liked features</b>	
Handling ease .....	62.1
Size .....	26.0
Roominess .....	25.5
Power, performance .....	22.9
Economy .....	21.1
Parks with ease.....	19.6
Riding comfort .....	10.9
Styling .....	13.7
Visibility .....	11.6
Ease of entry/exit.....	7.7
<b>Most-frequent complaints</b>	
Poor gas economy.....	11.1
Inferior paint job.....	5.0
Poor workmanship.....	5.4
Noisy engine.....	4.4
Inadequate heater.....	3.1
Rattles and squeaks.....	2.8
<b>Had mechanical trouble?</b>	
No trouble .....	69.1
Some trouble .....	27.3
Considerable trouble .....	3.6
<b>What was trouble?</b>	
Carburetor .....	6.2
Automatic transmission .....	5.4
Lights, turn signals.....	2.8

<b>Best-liked exterior features</b>	
Straight, simple lines.....	10.8%
Trim, neat styling.....	4.1
Front-end styling.....	4.1
No excess chrome.....	3.9
Colors .....	2.6
Single headlights .....	2.1
Absence of fins.....	2.1
Rear-end styling .....	1.3
Windshield wipers .....	1.0
<b>Least-liked exterior features</b>	
13-inch wheels too small.....	10.0
Rear-end styling .....	3.9
Single headlights .....	3.6
Gas filler spout and cap.....	3.6
Grille design .....	2.1
<b>Best-liked interior features</b>	
Comfortable seats .....	12.9
Upholstery .....	12.9
Dashboard, instruments .....	12.1
Headroom .....	8.0
Colors .....	3.4
Legroom .....	2.8
<b>Least-liked interior features</b>	
Heater controls .....	7.2
Indicator lights .....	5.2
<b>Did consider another car in Chevy II's price range?</b>	
Falcon .....	31.2
Ford .....	5.9
Comet .....	16.8
Rambler .....	16.3
Corvair .....	6.9
Chevrolet .....	4.5
Tempest .....	6.4

<b>Is Chevy II only car in family?</b>	
Yes, it is.....	61.1%
No, it isn't.....	38.9
<b>Make of other car?</b>	
Chevrolet .....	21.9
Other GM make.....	8.2
Ford .....	2.6
Other Ford Motor make.....	1.3
Plymouth .....	2.3
Other Chrysler Corp. make.....	2.6
Other U.S. make.....	1.8
<b>Decision to buy Chevy II based on:</b>	
Size .....	71.6
Economy .....	60.6
Price .....	36.1
Styling .....	23.7
<b>How is dealer service?</b>	
Excellent .....	61.3
Average .....	31.4
Poor .....	7.3
<b>Make of car traded in:</b>	
Chevrolet .....	44.5
Other GM make.....	15.4
Ford .....	8.0
Other Ford Motor make.....	4.1
Plymouth .....	5.2
Other Chrysler Corp. make.....	2.6
Other U.S. make.....	4.6
Foreign make .....	2.5
<b>Would buy another Chevy II?</b>	
Yes, would buy.....	76.3
No, would not buy.....	9.5
Undecided, don't know.....	14.2

"My motor tends to be noisy."—Ohio salesman.

"Engine is very noisy in high gear when accelerating and hill climbing. Mechanics have worked on it twice and think a new drive shaft may be needed."—Missouri retiree.

"The heater does not warm the car or make it comfortable."—Iowa carpenter.

**This winter's been a rough one, especially in Iowa, but PM found test-car heater just about adequate at 10° above. Today's heaters need a way to block off fresh air intake, recirculate air that's already in the car.**

"The heater does not compare with those in other cars I've had. Have had it checked and nothing's wrong they said—but I freeze."—Michigan clerk.

*In order of mention, the second group of best-liked features, numbers six through ten, look like this:*

"Like the easy parking in small or limited areas."—Pennsylvania railroader.

"I like the flexibility, easy parking."—Pennsylvania broker.

"A very firm ride but a comfortable one."—New Jersey salesman.

**This Jerseyite just voiced a little-known fact: Most people are not truly comfortable in a car with sloppy, marshmallow-soft riding qualities.**

"It is as comfortable as the '59 Mercury we traded in on it."—New Mexico warehouseman.

"I like the absence of extravagant, non-utilitarian ornamentation which for a few years seemed to be Detroit's substitute for good taste."—Tennessee budget analyst.

"Like the neat, plain styling."—Colorado public health nurse.

"The body design has no folds, fins or other unnecessary sheet metal."—Michigan educator.

"All-around vision, able to see over the hood close-up."—California marine.

**Vision is good, it's true, but would be even better if hood were more sharply sloped toward front of car.**

"Easy to get in and out of."—Oklahoma carpenter.

(Continued to page 270)

# BONDS INSTANTLY!



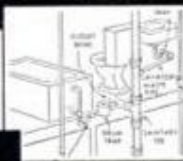
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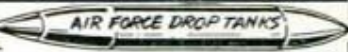


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**87 Mounted Wheels & Miniature Cutters.** Regular \$11.00 value  
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 For cutting and grinding on wood, metal or plastic. Includes 26 mtd. wheels and points on 3/32" shanks; 24 miniature cutters on 3/32" shanks; 25 short shank min. cutters. 12 Bristle Brushes on 3/32" shank. Will fit all electric drills and hand grinders.

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Fits all electric drills & hand power tools 35/64" long. Oilite bearings. Core of specially wound, high carbon steel wire in flexible steel casing. Will accommodate tool shafts up to 1 1/8" dia. For lathes, electric drills, etc.

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 With 12 Bands in Assorted Grits, 1 1/2" dia. x 1" long on 1/4" arbor with 12 bands... **\$1.50 P.P.**  
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"Very easy to get in and out of; comfortable to sit in."—Illinois steel foreman.

The gripers ask to be heard again: In order of frequency of mention, here are the next group of complaints—six through ten.

"Car was not put together very well. It has a lot of squeakes and some rattles."—Michigan dental technician.

"Rough-riding over small bumps."—Missouri mine operator.

"It leans too much on curves; 'bottoms' on bumps when fully loaded."—Ohio banker.

"Too light! Doesn't ride as well as a Corvair."—New Jersey salesman.

**Chevy II is at least 75 pounds heavier than Corvair. The latter's slightly better ride is due to softer springing and independent rear suspension, not weight.**

"A very bad clutch vibration at about 60 m.p.h. (4-cylinder)."—North Carolina farmer.

"You cannot go slow in high gear (4-cylinder) without a tremble."—North Carolina government worker.

"Vibration at 15-25 m.p.h. in high gear (4-cylinder)." — Pennsylvania insurance adjuster.

**That's what we found in tests of Chevy II Fours. Numerically higher rear axle ratio (see above) will do a lot to cure this low-speed shake.**

"There is a vibration or rumble in low gear before shifting to second."—New Jersey housewife.

"There's a leak in the roof over the driver's seat."—New Jersey housewife.

"Windows are too hard to roll up and down."—Michigan butcher.

"Windows on the two-door model don't operate easily and have a tendency to lower themselves while driving."—Illinois park custodian.

**Winding up the survey of best-liked features, here's the last group—11 through 15—listed in order of mention.**

"Can be steered with only one finger."—Ohio welder.

"It handles just as though it has power steering."—Michigan tool and die maker.

"It was surprising how this car would get out and go through snow drifts and on ice."—Iowa farmer.

**Perhaps he had Positraction (limited slip differential). PM's Chevy II (without chains) got stuck like everybody else this winter.**

"Like the way it handles, especially on snow and ice."—Illinois cab driver.

(Continued to page 272)

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World's Largest Manufacturer of Shears, Scissors, Pinking Shears, Skalloping Shears, Metal Cutting Snips and Garden Shears

"I like the quick, easy starts."—Kentucky teacher.

"Good trunk room."—Missouri sales manager.

"I like neatness of the inside features and the convenience of accessories."—Kentucky government employee.

Getting down to the wire on complaints, here's the final five in their order of frequency of mention, numbers 11-15.

"It could be better insulated."—Ohio die maker.

He's right. Even PM's Deluxe Nova 400 was, we thought, too noisy at 65 m.p.h. A free-wheeling fan that idles until engine gets hot would quiet things down. So would better insulation around automatic transmission.

"The sound insulation of the road running gear is inadequate."—Virginia engineer.

"Add soundproofing under the hood and thicker floor mats."—Ohio engineer.

"Tie rods are too low to the ground."—West Virginia service station operator.

"Undercarriage, tie rods stand out—to be knocked off!"—Kentucky radio station executive.

This is just an out-and-out design goof. Surely Chevy II engineers can find a better location for these vital organs.

"Wind noise is excessive because rear windows aren't tight."—Ohio steelworker.

"Climbs hills too slowly."—Colorado barber.

"No pep after reaching 55-60 m.p.h., poor passing qualities."—New Jersey engineer.

★★★

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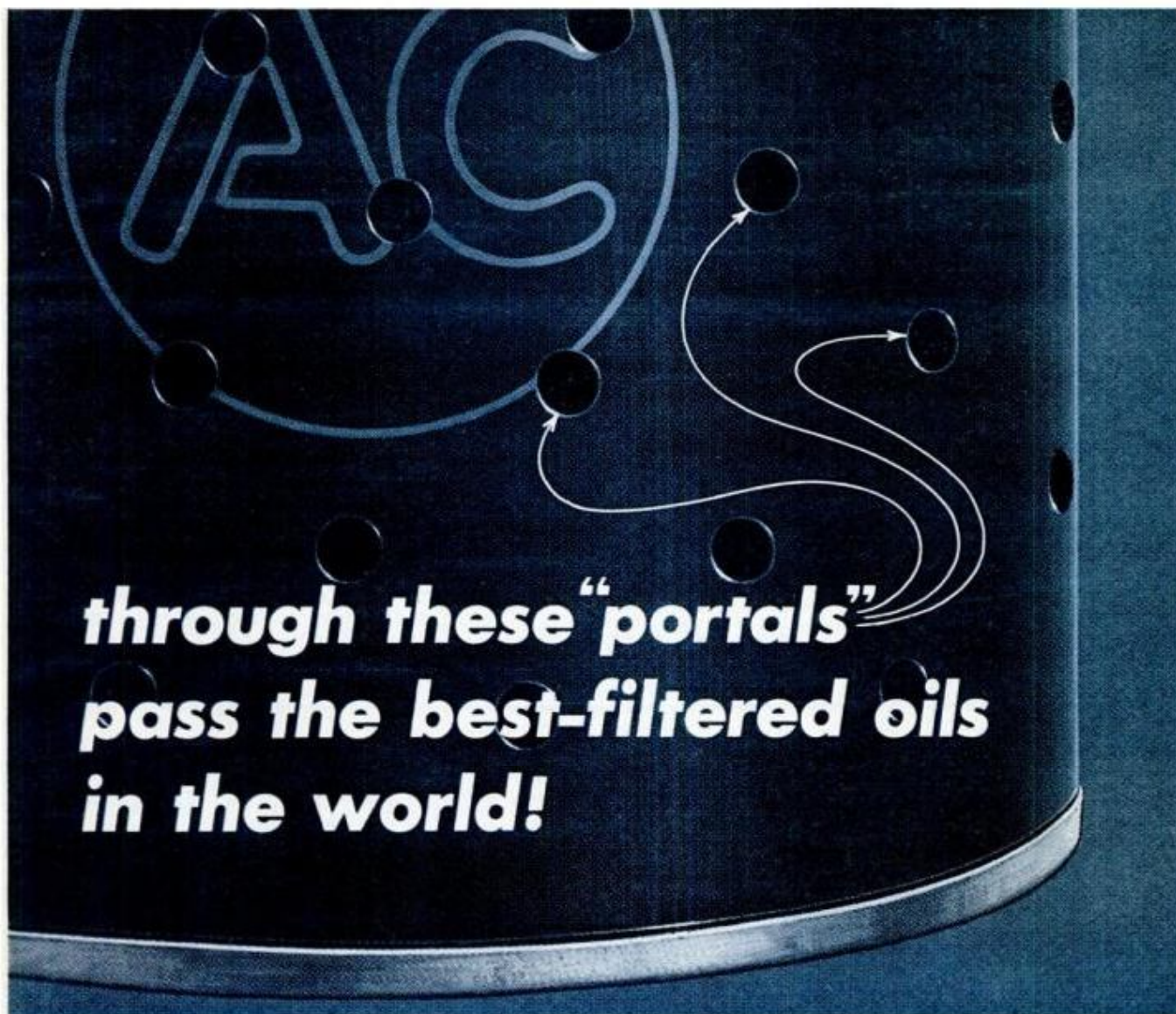
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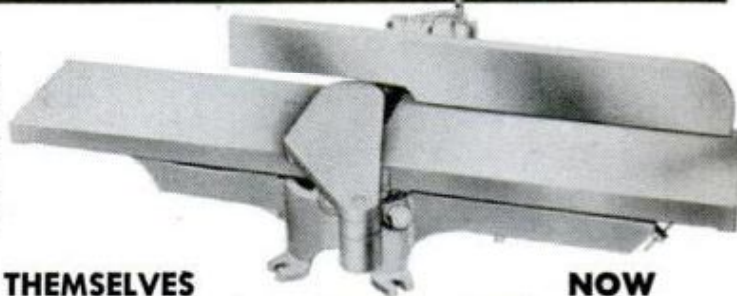
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**DOES THE WORK OF \$40 UNITS**—This sturdy all cast iron power tool will turn wood or plastics with the precision and speed of machines selling for 4 times as much. Has tubular steel bed, ball thrust cup center, spur center. T-Rest assembly, lever action tail stock, 2 speed pulley. Fits any motor. Perfect for the home or professional workshop, garage or farm. UNCONDITIONAL 10 YEAR GUARANTEE.

Optional Faceplate for turning bowls, trays, lamp bases, rosettes, etc. **\$250**

**Deluxe WOOD SHAPER KIT**

Ball Bearing  
**DOES THE WORK OF \$100 UNITS** Makes decorator edges on furniture, forms beads and coves, fashions many types of moldings. You do finished cabinet work with tongue-in-groove joints, turn out 1001 projects like an expert. Easy-to-follow plans make assembly a breeze. Everything included but a few pieces of plywood for table and skirt. Has greased-for-life ball bearings in sealed cast iron housing; fully adjustable, easily accessible cutter height control and fence assembly. Precision-machined for smooth, accurate cuts at high speed. Takes 1/4 h.p. or larger motor; standard cutters available at Sears and other retailers. Sensational value! UNCONDITIONAL 10-YR. GUARANTEE.

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