

AUGUST 1955

35 CENTS

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P54
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No. 2

POPULAR MECHANICS

MAGAZINE

WRITTEN SO YOU CAN UNDERSTAND IT

REG. U.S. PAT. OFF. TRADE MARK GREAT BRITAIN, No. 40428

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Navy Hideout—Page 105

REPORT on the **DE SOTO**

For the Craftsman

BUILD A PLAYHOUSE
your children can live in

No wonder it's called
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MATICO ARISTOFLEX

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INSTALL IT YOURSELF AND SAVE!



It's easy! Just mark a straight line through the center of your room in both directions, using a chalk and line. Be careful not to cover up your guide lines.



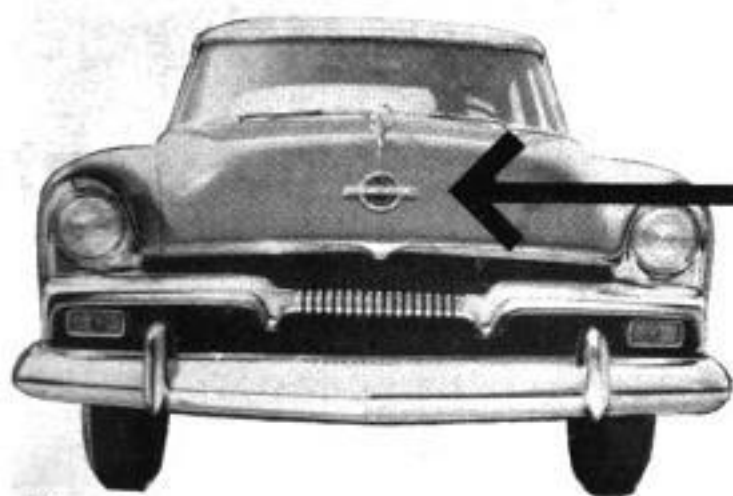
With a notched trowel, spread adhesive over one-half of your room at a time. Leave only a thin coat of adhesive on the floor.



After adhesive becomes tacky, snap the tiles into place. Do not slide tiles or adhesive will push up between the tiles.



Here's the best part! Show your wife your handiwork. (Don't tell her what a cinch it is with MATICO's easy-to-follow instructions).



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What's different about this Plymouth?

Two things are different. First, this is the one you can't buy. Second, it has a radically different kind of engine—the Chrysler Corporation *gas turbine* engine! This experimental car runs with no carburetor, no piston rings, no radiator, one spark plug and on ordinary fuel. Although there are years of research and testing ahead before it could be mass-produced, this prototype is in operation *now!*

This is one of many continuing research projects of **THE FORWARD LOOK***. As each new advance is perfected, it will be made

*Engineers interested in this kind of advanced research & development, write to Chrysler Engineering, Box 1118, Detroit 31, Mich.

available to you . . . for it is the thesis of **THE FORWARD LOOK** to keep you ahead in car performance, in safety, and in styling.

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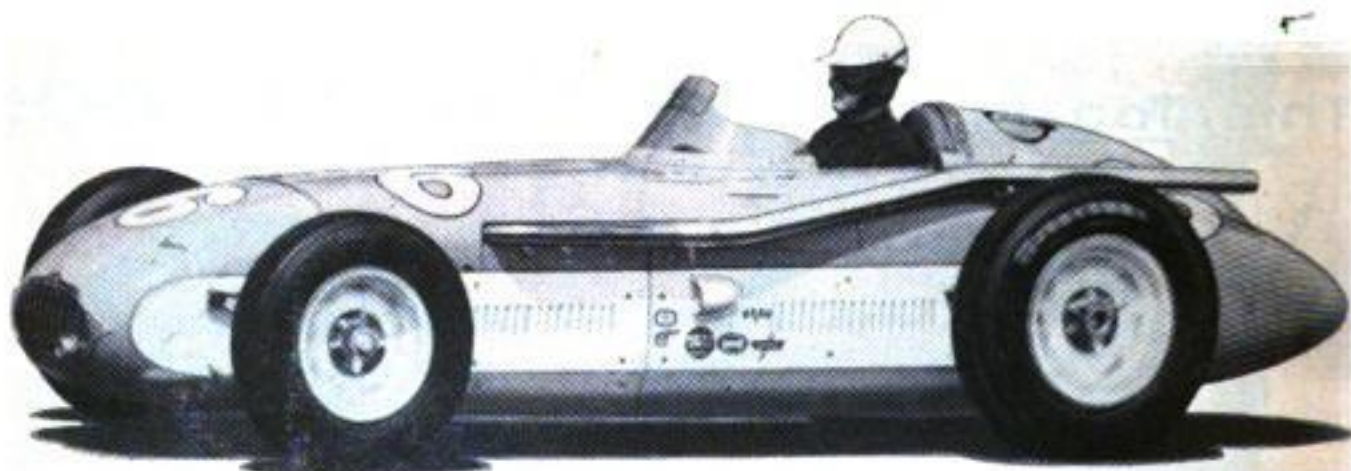
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Tops in TV Drama—"Climax!"—CBS-TV, Thursdays

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Champions score twenty-fifth victory in Indianapolis "500"! Bob Sweikert, with a winning average of 128.209 m.p.h., and *all other finishers* used Champions!



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Popular Mechanics Magazine

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Next Month

SEVERAL MONTHS AGO PM heard rumors of a new passenger train so unique in conception and so inexpensive to build that it could well set the pattern for rail travel in the future. We finally pinned down the train on drawing boards at Electro-Motive in La Grange, Ill. Sure enough, the idea was a big departure from anything in existence. Electro-Motive is floating bus bodies on rail trucks and pulling the resulting train with a locomotive of a new breed. The train promises a luxury ride at the price of a bus fare. While Electro-Motive was building the train, we were building an article around it. Above you see an artist starting an illustration for next month's significant feature, "Ten Buses Grow Into a Train"

Information not listed on articles in the index, starting on page 58, frequently is listed in the WHERE-TO-FIND-IT LIST, which is available to readers without charge. A copy may be obtained by writing to the Bureau of Information, Popular Mechanics, 200 E. Ontario, Chicago 11, Ill.

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Other items, and manufacturers of available products described, are listed on pages 58, 60 and 62

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1. It's easy and economical to turn unused attic, basement, and porch areas into extra living space with Armstrong Temlok® Tile and Plank. These do-it-yourself materials save you money because they build, decorate, and insulate in one simple operation. After the room is framed, nail up and level 1" x 3" furring on 12" centers.

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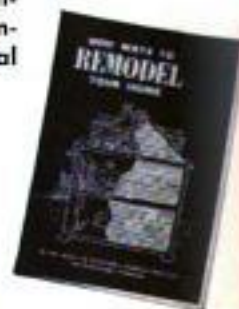
3. Easy-to-handle Temlok Planks are quickly nailed or stapled to the wood furring. The Lok-Bevel joint assures correct fit and easy installation. Once Temlok is installed, the job is done. There is no painting to do because Temlok Plank comes factory-finished in a handsome Suntan Blend that harmonizes with almost any color scheme.

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ACROSS THE DESK



To the Editor:

New Zealand is only a small country enjoying good sporting facilities. There is ample opportunity for boating and fishing. We started building boats as a hobby and now market a line of 15-foot outboard cabin cruisers and runabouts. Your several articles on outboard cabin cruisers interested us so much that we drew up plans



similar to the designs of the craft you illustrated (*PM*, April 1954). The photo shows our light 15-foot marine ply craft doing 20 m.p.h. powered with a 14-horsepower Evinrude outboard motor. What started out as an interesting hobby is now quite a thriving sideline. Wishing your magazine *Popular Mechanics* all success for the future.

D. Wrigley,
Douglas Wrigley & Co. Ltd.,
239b Queen Street,
Onehunga, Auckland, N. Z.

To the Editor:

My attention has just been called to an item on page 85 of your March issue describing equipment to "rejuvenate" burned-out fluorescent lamps. Although, on the surface, this is indeed a very ingenious device, we felt that perhaps it might mislead enough of your readers to cause them some embarrassment, and that you might like to have us give you a true interpretation of this product from an engineering standpoint.

Basically, the most important factor controlling the life of a fluorescent lamp is the emission material placed on the electrode at the time of manufacture. Once this material has wasted away during use, the electrode can supply no more electrons

(Continued to page 8)

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BALKY Power Mower?



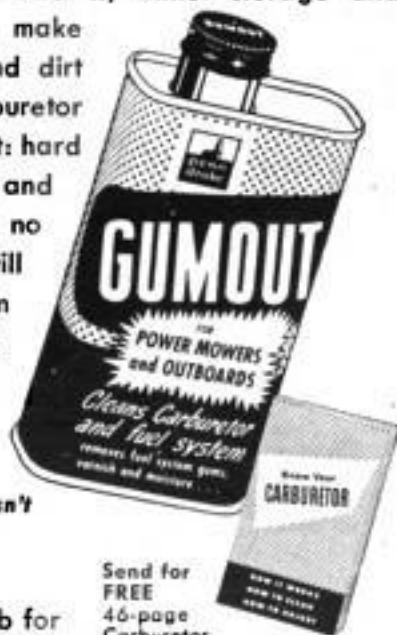
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carburetor
with...



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(Continued from page 6)

and the lamp "burns out." Short of dismantling it and replacing the initial material, there is nothing that can restore its life.

E. W. Beggs,
Manager, Fluorescent and Vapor Lamps,
Commercial Engineering Dept.,
Westinghouse Electric Corp.,
Bloomfield, N. J.

To the Editor:

Dallas' famous steel "turntable" bridge, built across the Trinity River in 1912 to let river boats pass, is being wrecked. During all the years of its existence it turned only 10 times.

The bridge was firmly built and extensively used but never had to be turned for



boats as there were no boats. A recent bond issue called for a new road and the erection of a new bridge. The old turntable bridge was sold by county officials to a wrecking company that wanted the steel. So on Sunday, April 10, the old bridge was turned for its last time—turned so the bridge would be in a better position for wreckers.

William Allen Ward,
Dallas, Tex.

To the Editor:

Your letter and pictures on Chinook winds, published in the June 1955 *Popular Mechanics*, pages 6-10, immediately excited my interest, then my irritation. The letter is full of misinformation.

(Continued to page 10)

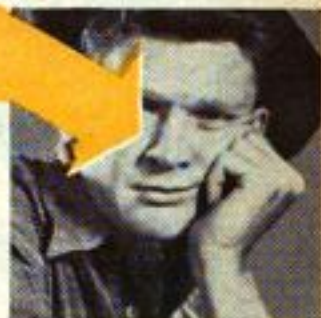
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- Short Story Writing
- Telephony

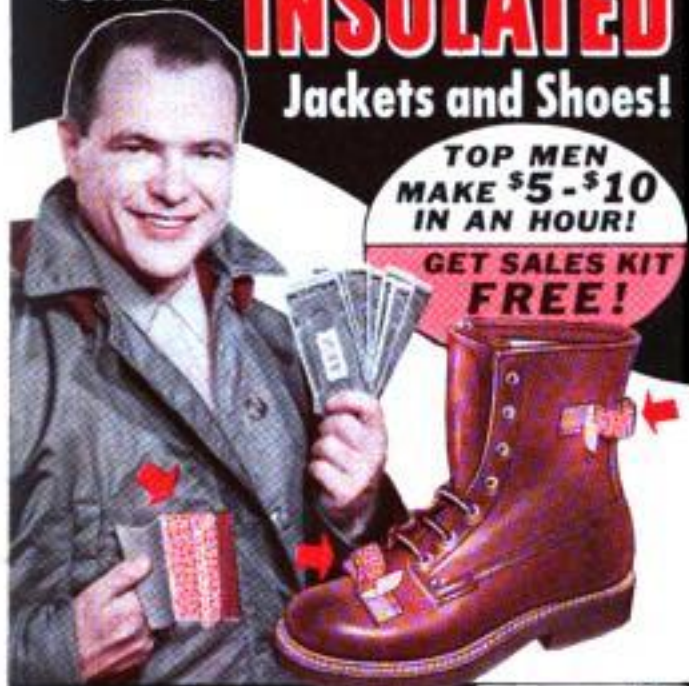
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(Continued from page 8)

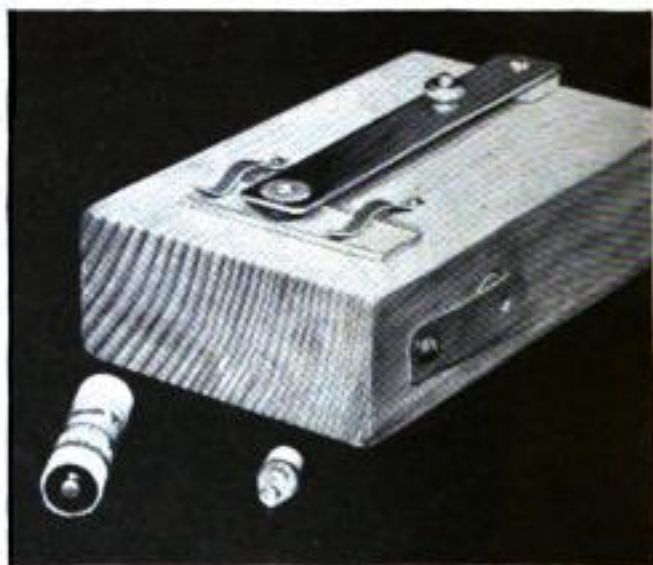
Chinook winds, known in Europe as Foehn winds, occur on the lee sides of all high mountain ranges in all parts of the world, with no known exceptions.

Ronald L. Ives,
Williamsville, N. Y.

To the Editor:

This spring I entered a microscope in a district Junior Academy Science contest at DeKalb (Ill.), won first place and won second place in the state contest. I thought you might be interested as I got my idea from the book *Boy Mechanic* published for you by Simon and Schuster.

The microscope in the book showed the



battery as a separate unit. I talked it over with dad and he suggested I use my own ideas and make a more compact model. I knew what I wanted so I proceeded, using the trial-and-error method.

Materials used: 2 pen-light bulbs, pen-light flashlight battery, light socket from an old flashlight, bell wire, block of wood 2 by 4 by 6 inches, strip of steel $\frac{1}{16}$ by $\frac{3}{4}$ by 5 inches, scrap-brass shim stock, 2 brass washers, 2 brads, 3 miscellaneous screws, a plastic pie container.

Method: The lens was made by breaking the magnifying tip off a flashlight bulb (I broke three before I had one that was satisfactory). A center punch was used to countersink the brass washers to fit the contour of the edge of the lens.

The hole on one end of the strip of steel was drilled about $\frac{1}{16}$ inch larger than the diameter of the lens. A washer was glued to the lens and strip of steel. Another washer was put on the opposite side of the steel strip to cover the sharp edge of the lens. Two holes were drilled on the end opposite the lens for the adjusting screw and hold-down.

(Continued to page 242)



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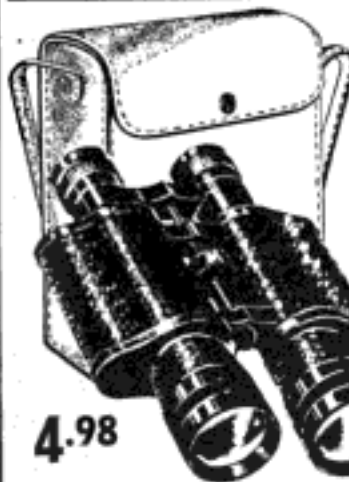
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Blueprints <input type="checkbox"/> Sanitary Engineering <input type="checkbox"/> Structural Engineering <input type="checkbox"/> Surveying and Mapping <p>DRAFTING</p> <ul style="list-style-type: none"> <input type="checkbox"/> Aircraft Drafting <input type="checkbox"/> Architectural Drafting <input type="checkbox"/> Electrical Drafting <input type="checkbox"/> Mechanical Drafting <input type="checkbox"/> Mine Surveying and Mapping <input type="checkbox"/> Plumbing Drawing and Estimating <input type="checkbox"/> Structural Drafting <p>ELECTRICAL</p> <ul style="list-style-type: none"> <input type="checkbox"/> Electrical Engineering <input type="checkbox"/> Electrical Maintenance <input type="checkbox"/> Electrician <input type="checkbox"/> Contracting <input type="checkbox"/> Lineman <p>HIGH SCHOOL</p> <ul style="list-style-type: none"> <input type="checkbox"/> Commercial <input type="checkbox"/> Good English <input type="checkbox"/> High School Subjects <input type="checkbox"/> Mathematics | <p>LEADERSHIP</p> <ul style="list-style-type: none"> <input type="checkbox"/> Foremanship <input type="checkbox"/> Industrial Supervision <input type="checkbox"/> Leadership and Organization <input type="checkbox"/> Personnel-Labor Relations <p>MECHANICAL AND SHOP</p> <ul style="list-style-type: none"> <input type="checkbox"/> Gas—Electric Welding <input type="checkbox"/> Heat Treatment <input type="checkbox"/> Metallurgy <input type="checkbox"/> Industrial Engineering <input type="checkbox"/> Industrial Instrumentation <input type="checkbox"/> Industrial Supervision <input type="checkbox"/> Internal Combustion Engines <input type="checkbox"/> Machine Design-Drafting <input type="checkbox"/> Machine Shop Inspection <input type="checkbox"/> Machine Shop Practice <input type="checkbox"/> Mechanical Engineering <input type="checkbox"/> Quality Control <input type="checkbox"/> Reading Shop Blueprints <input type="checkbox"/> Refrigeration <input type="checkbox"/> Sheet Metal Worker <input type="checkbox"/> Tool Design <input type="checkbox"/> Toolmaking <p>RADIO, TELEVISION</p> <ul style="list-style-type: none"> <input type="checkbox"/> Industrial Electronics <input type="checkbox"/> Practical Radio TV Eng'ing <input type="checkbox"/> Radio and TV Servicing <input type="checkbox"/> Radio Operating | <ul style="list-style-type: none"> <input type="checkbox"/> Television Technician <p>RAILROAD</p> <ul style="list-style-type: none"> <input type="checkbox"/> Air Brakes <input type="checkbox"/> Car Inspector <input type="checkbox"/> Diesel Locomotive <input type="checkbox"/> Locomotive Engineer <input type="checkbox"/> Section Foreman <p>STEAM AND DIESEL POWER</p> <ul style="list-style-type: none"> <input type="checkbox"/> Combustion Engineering <input type="checkbox"/> Diesel—Elec. <input type="checkbox"/> Diesel Eng'g <input type="checkbox"/> Electric Light and Power <input type="checkbox"/> Stationary Fireman <input type="checkbox"/> Stationary Steam Engineering <p>TEXTILE</p> <ul style="list-style-type: none"> <input type="checkbox"/> Carding and Spinning <input type="checkbox"/> Cotton, Rayon, Woolen Mfg. <input type="checkbox"/> Finishing and Dyeing <input type="checkbox"/> Loom Fix'g <input type="checkbox"/> Textile Des'ing <input type="checkbox"/> Textile Eng'g <input type="checkbox"/> Throwing <input type="checkbox"/> Warping and Weaving <p>MISCELLANEOUS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Domestic Refrigeration <input type="checkbox"/> Marine Engineering <input type="checkbox"/> Ocean Navigation <input type="checkbox"/> Professional Engineering <input type="checkbox"/> Short Story Writing <input type="checkbox"/> Telephony |
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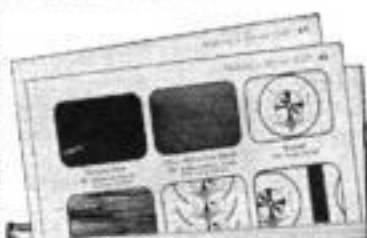
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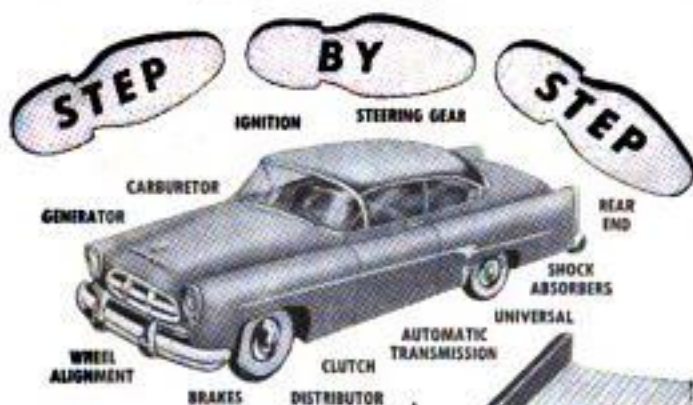
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850-16	4.52	820-15	5.92	650-20	9.82	1100-20	19.92
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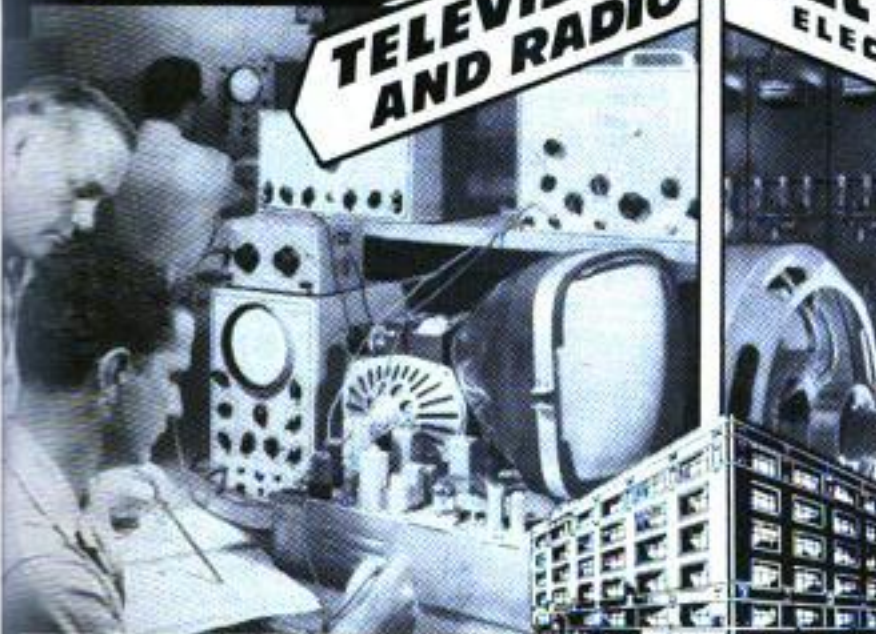
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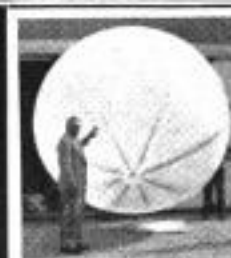
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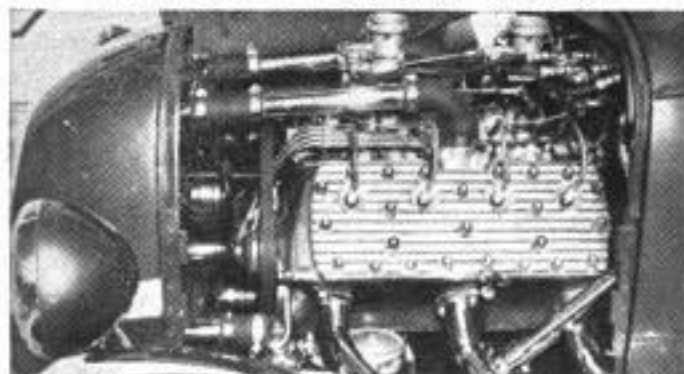
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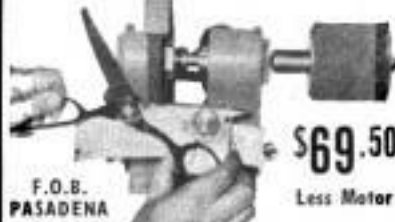
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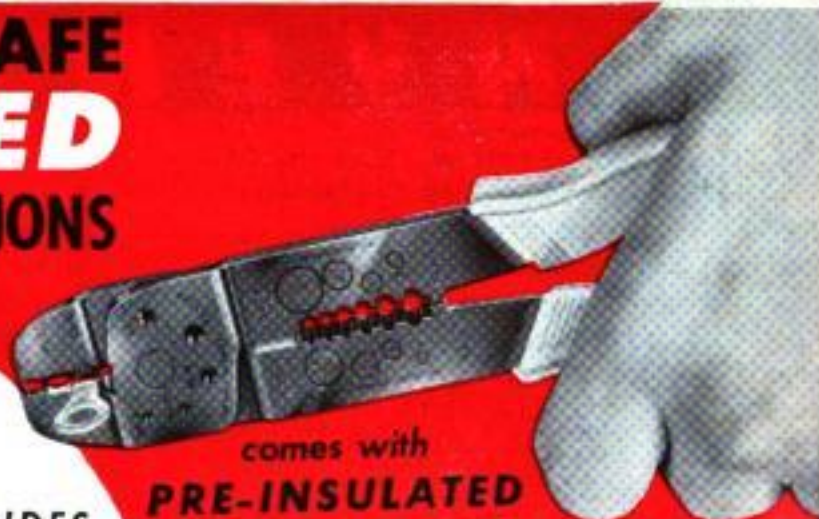
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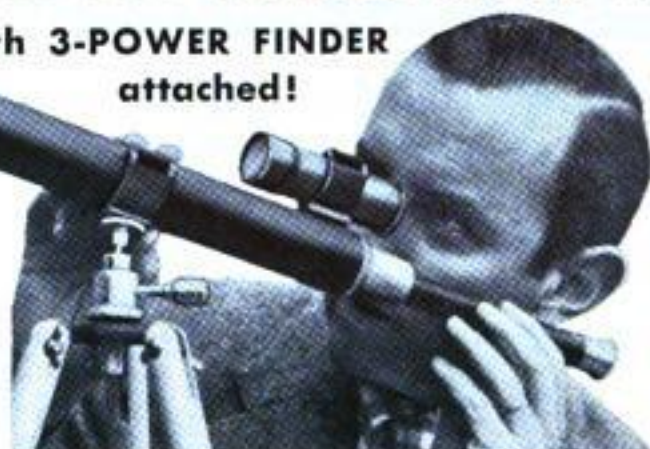
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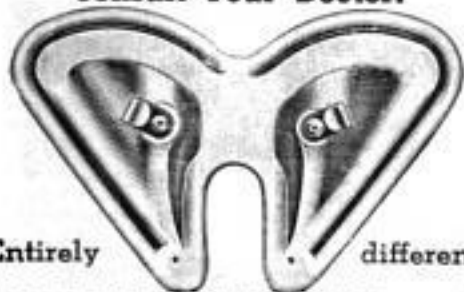
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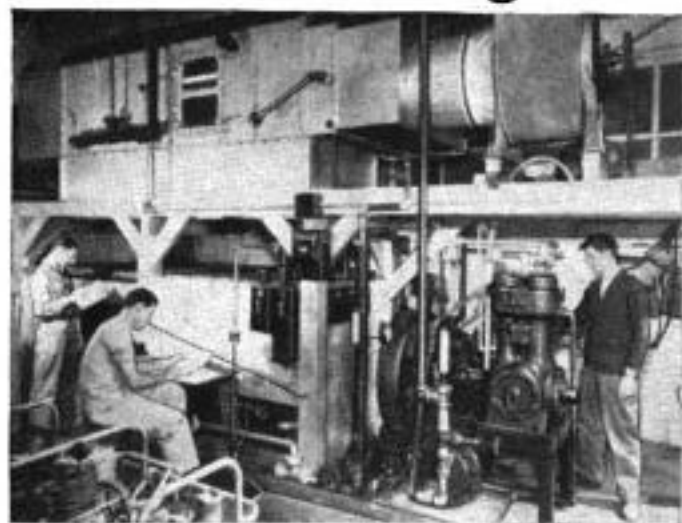
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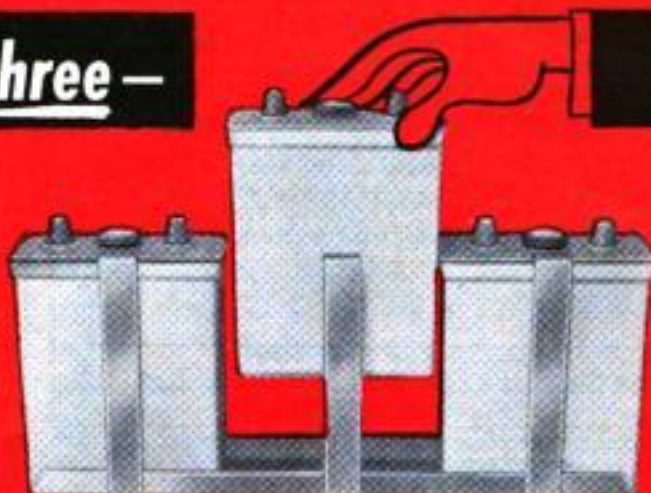
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DOLLARS: Baby record books. Kitty Kat shoes, My Baby albums, eleven thousand new prospects daily. Sold by mail, use our literature. No-Co-Ro, Oakland 6, Calif.

EARN \$35.00 Daily! Sell Liqui-Moly, new wonder lubricant for cars, trucks, buses, tractors. Used in jet engine, atomic energy plants. Nationally advertised magazines, newspapers, radio, television. Over 3,000,000 cans sold. Territories available. Write Moly Products, 314 Scholes Street, Brooklyn 6, N. Y.

NEW, Different home business. Earn \$8.00 per hour. No shop or equipment needed. Everything supplied. Free details. Lopez Press, Lopez, Penna.

TELEVISION Can sell your product faster for less money. Free information. Telesales, Box 34A, New York City 19.

NEW Compound fireproofs, waterproofs fabrics. Nylife lengthens hosiery life. 12 other processes. \$1.00. Dr. Teycer, Box 1287P, Chicago 90.

WANTED! Home producers, by manufacturers in our clearing house service. Become subcontractor, casting plastic products for these companies. Thousands of easy-to-make items required for consumer-industrial use. Cash in at home, without previous experience. Plastic Service Associates, Dept. 8-PM, East Boston 28, Mass.

LIQUID Marble—Brushed, sprayed! Mold novelties, tile. Particulars free. Marbleizing Service, Edwardsville, Illinois.

HOT Promotional items! Free catalog. Metropolitan Wholesalers, 4143-3 Ave., New York City.

WANT Up to \$100.00 weekly deposited in your mail box? Details free! Smith, 2708-P Ladera, San Bernardino, Calif.

FREE Literature! 301 successful home businesses. Eugene Davis, 750C Tilden, Flint 5, Mich.

YOUR Own wholesale hosiery-underwear business pays you up to 40% profit. No investment, no inventory. Sensational new stretch nylons direct from mill. Guaranteed runproof. Offer free-trial pair. Catalog, money-making plans free. American Mills, Dept. 469, Indianapolis 7.

MAKE Tough, attractive building plastic, easily 88½% waste—101 uses—800% profit. Exclusive district. Grab it. Bays Laboratory, Oklahoma City 9.

START Prosperous buying service. Buy wholesale thousands nationally advertised products. Make big profits selling at substantial discounts. Catalog-directory \$1.00. Johnson's, 3262X Medina, Fort Worth 15.

START Home business, sparetime, opportunities unlimited. Write, Heam, Box 8892, Richmond 25, Va.

HANDY Scribe. 100% profits; 8 tools in 1, 101 uses. Sample \$2.00. Scriber Gauge Mfg., P. O. Box 1946, Hartford 1, Conn.

SELL Printed stationery, business cards, by mail! Free catalog, samples. Sutton Printing, Box 853-M, Waycross, Georgia.

SAWDUST. Turn it into cash. Twenty methods. Instructions 50c. Charles Company, 12-DEF, Norwood, Ohio.

MAKE Money helping others get out of debt, stop garnishments, save jobs, re-establish credit. Details, Borum 86, 411 West Walnut Street, Kalamazoo, Michigan.

BUY it wholesale! Manufacturers, distributors offer 850,000 items. Literature free. Olsen, 1231-A East Third, Duluth 5, Minnesota.

EARN \$2.00 Hourly, making and selling sandals! Youngs, 1308-PM, South First, Arcadia, California.

ADVERTISING Business—City, country. Low overhead, substantial income. Experienced advertising company offers complete setup. Harold, 69-S Bennett, New York City 33.

WHOLESALE Catalog of tools, sporting goods, jewelry, toys, etc. available free. Open your own business. No investment. J. M. Arnoff Company, Dept. X, 24470 Lakeland Blvd., Cleveland 23, Ohio.

AMBITIOUS? We establish you in your own business, supply catalogues, circulars etc., ship orders under your name, paid or c.o.d., show you exactly what to do. Household items needed in every home. Sell direct, by mail or through agents. Complete details absolutely free. Write Topval Corp., Lindenhurst 518, New York.

FREE, Home business plan. Samples & tails. Fender, Box 448-ACF, Kalamazoo, Michigan.

COIN Radios and coin television for installation in hotels and motels. Operate 4 route in your area and earn amazing profits. Send for details. Dept. PM, Corada, Inc., 196 Albion Ave., Paterson 2, N. J.

LIST Of ten firms who manufacture cosmetics, perfumes, etc., wholesale. Label as your name, \$1.00. Fortunes have been made, selling direct, by agents, by mail. Centry, 79 Massachusetts, Detroit, Mich.

ELECTROPLATE Auto parts, novelty mirrors, baby shoes. Easy, inexpensive home processes. Free booklet. Tyco Metals, Box 13231-MM, Houston 19, Texas.

\$70 WEEKLY Guaranteed—Home, sparetime. Simplified mail bookkeeping. Immediate income; easy! Auditax 34751AQ, Los Angeles 34.

COPUBLISHERS Make 3400% profit! Sample, details, 25c. Gerald Watt, 2117 Tripp, Chicago.

I Average \$180.00 weekly with new fabulous mail-order idea! Receive \$10.00 orders every mail—pocket \$8.00! I supply everything! Start sparetime! Hurry, limited! Donn's, Box 128-P, Miami 1, Fla.

BARGAIN. 20 Ways each to make money from sawdust and tin-cans. Nine ways for glass-bottles. 50c each. 3 for \$1.00. Fender, Box 448-ACE, Kalamazoo, Mich.

WHOLESALE, Thousands items. Supply source list, 10c. Idealar, Park Ridge, Ill.

LEARN Sewing machine repair. How to make big money at home sparetime. New machines. Everything supplied. Write Taylor Service, Box 2126, San Bernardino, California.

\$5 TO \$10 An hour. I've did it. I'm disabled now. Real genuine offer. Complete information only \$1. Lucas, 2200 Carson St., Pittsburgh 3, Penna.

IMPORT-Export opportunity, profitable, world-wide, mail-order business from home, without capital; or travel abroad. Established world trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger E701, Los Angeles 24.

REBUILD Batteries; repair dolls; make rubber stamps; silk screen printing. Catalogue "60 Ideas" free. Universal, Box 1076-A, Peoria, Ill.

700% PROFIT Earned with a PDQ camera. No experience needed. Simple instructions teach you how to take photos of individuals, groups, etc. and finish them on the spot in two minutes. No darkroom. Get details. PDQ Camera Co., 1161 N. Cleveland Ave., Dept. PM, Chicago 10, Ill.

BREED Rare tropical fish at home. Earn big money! Learn secrets! Help fill huge demand. Amazing opportunity! Free plan. Tropical Fish Breeders, Los Angeles 61, Calif.

HOW And where to obtain capital. Particulars free. Star Service, Wapakoneta, Ohio.

TO \$50.00 Weekly. Sparetime, home-operated mailorder business. Successful beginner's plan. Everything supplied. Lynn, 10420-M National, Los Angeles 34, Calif.

BE Appointed state notary public now. Write, Stationers, Helotes, Texas.

I Want to send you proof of the wonderful pulling power of Popular Mechanics classified pages. What's your proposition? Write me today. Include literature if possible. F. W. Johnson, Manager Classified Advertising, Popular Mechanics Magazine, 200 E. Ontario St., Chicago 11, Ill.

FORTUNES Made raising crickets and fishworms. Write for free information. Carter Farms, Plains, Ga.

MAKE Money growing miniature trees on your window sill. Free seed and plan. National Nursery, Dept. FC, Inglewood 4, Calif.

FREE Folio "Up to \$45,000; Unlimited Vacations." No merchandise, equipment. Unknown! Work home, sparetime! Haylings, Carlsbad, Calif.

FREE Electroplating information. Money making plans. (Formula included). Send postcard for your copy. Highly paid, interesting, uncrowded field. Plater D. Hyde, 327 West 120th Street, Los Angeles 61, California.

MONEY In sparetime fixit shop at home. Repeat cash business. Experience unnecessary. No selling. Free booklet explains. Victor Foley Company, Columbia Heights, Minnesota.

RESILVERING Mirrors, formula 50c; two-way look-out mirrors, (No one sees you), 50c; coppered mirrors, 50c. All \$1.00. Neiko-Mir. Box 3462-J, Chicago 54.

WE Love our mailman—He leaves over \$1000.00 monthly in our rural mailbox. My college professor husband drafted a scientific home mailorder method. We bought a Texas ranch, live as we always wanted. Now we sell the Ranch Mailorder Method. Operates anywhere. Inquire: Eveningshade Ranch, Helotes, Texas.

POPCORN And potato chip equipment. Eakins, Box 933-A5, Springfield, Ohio.

MEN—Income from local information. No selling. Neherco, LaVerne, California.

RUBBER Molds for casting plaques, figurines, novelties. Catalog illustrating over 100 fast sellers, 10c. Castcraft Studios, 508-PM Marion Street, Brooklyn 33, N. Y.

NEWEST Spare, full-time home business, \$5 to \$10 hour possible. Paint with suede—The finish with touch and eye-appeal. Beautify auto dashboards, signs, radios, toys, figurines, lamps—1001 others. Complete, step-by-step instructions sent for no-risk examination. Free details. Coast, Los Angeles 61.

START Home manufacturing business. Make cleaners, soaps, polishes, cosmetics. Free literature. Kemix, Park Ridge, Ill.

IMPORT-Export mailorder opportunities! Details. Warner, Box 6, Fort Scott, Kansas.

NATURAL Molding rubber, extra thick. Free sample. Flock, W. Wooley, 115-A Donald, Peoria, Ill.

BOOKKEEPERS, Keep books, small firms spare time. Manual latest technique by C.P.A., \$3.00. Modern Business, Box 406, Youngstown 1, Ohio.

MAKE Money at home—Mail cards, circulars feature real merchandise. Everything furnished. Big earnings. Philip's, Box 3-P, Boston 22, Mass.

COPUBLISH Mail Sale Advertiser, leading mail order paper. Details, latest copy, dime. Vanroy Shirk, Lebanon, Penna.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay \$3.50 lb. We paid Babbitt \$4,168.00 in few weeks. Free book. Washington Mushroom Ind., Dept. 172, 2954 Admiral Way, Seattle, Washington.

\$25 WEEKLY Working two hours daily at home. Lycke, Box 2471-A, Cleveland 12, Ohio.

OPERATE Profitable mail order business. Write Walter Service, 4159-A East 112th, Cleveland 5, Ohio.

COLORGLAZED Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries Company, Grand Rapids, Minnesota.

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

FREE Book "505 Odd, Successful Businesses." Work home. Expect something odd! Pacific, Oceanide, Calif.

MONEY In new greaseless doughnuts. Start in kitchen. No smoke. Sell stores. Free recipes. M. Ray Company, 3605 South 15th Ave., Minneapolis 7, Minn.

VENDING Machines—No selling. Operate a route of coin machines and earn amazing profits. 32-page catalog free. Parkway Machine Corporation, Dept. 72, 715 Ensor St., Baltimore 2, Md.

BRONZE Baby shoes. Instructions, equipment and mountings for genuine electroplated process. Free catalog. Hollywood Bronze Supply, Dept. B-3, 1624 East First Street, Los Angeles 33, Calif.

YOUR Own name brand business. No investment; no inventory. Part time or full time. Sell famous brands of appliances, housewares, silverware, radios, vacuum cleaners, lamps, tools, clocks, watches, jewelry, etc., etc., over 1000 items. Join thousands of successful independent dealers. Send for free catalog and dealer price list. H. B. Davis Corp., Dept. W, 145 W. 15 St., New York City.

UNUSUAL Opportunity. Spinning at home. Supplies, market, furnished. Angora House, PM, Springfield, Illinois.

LIQUID Rubber. Make flexible molds. Free sample. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

MAKE Best doughnuts, yeast raised. Start in kitchen. Sell retail and wholesale. Formula and full instructions \$1.00. Another valuable pastry receipt free. Write Lyon, 1605 W. 17th St., Davenport, Iowa.

STEADY Profits, home-operated business. Simply add water to concentrates. Make waterless hand cleaner, chrome renewer, etc. Free samples. Western B Aircraft, Los Angeles 19.

GOOD Paying business silvering mirrors, plating articles in the shop and home by late method. No tanks or shop required. Free booklet. Gunmetal Co., Ave. H, Decatur, Illinois.

WHOLESALE Catalog! 30-80% discounts! Typewriters, appliances, housewares, watches, jewelry, etc. Consolidated Distributors, 21-11 Lafayette, Paterson 15, New Jersey.

GROW Orchids at home—Profitable, fascinating. Year 'round, Maine to California. No greenhouse. Gorgeous cattleyas, cymbidiums, etc. Successful home grower shows you how. Full details free. Flowerland, 4623 Wilshire, Los Angeles 5.

FIX Typewriters. Inexpensive home course teaches factory secrets. Free booklet. Write, Typewriter, Tarentum 1, Penna.

\$200 WEEKLY Cleaning Venetian blinds. Free book. Burt, 2434A, Wichita 13, Kansas.

\$1,000 MONTHLY, Home, mailorder, free advertising method. Revealing information. Seidel, 6000-AG Sunset, Los Angeles 28.

WANT To make big money at home? \$5 profit in an hour possible with invisible reweaving. Make tears, holes disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details free. Fabricon, 8334-S Prairie, Chicago 18, Ill.

IMPORT Precision 17 jewels watches from Switzerland. Profitable. Little capital. Copyrighted course \$2.00. Robert Celaya, Brownsville, Texas.

PRINT Without a printing press! Amazing new method! Print colorful signs, banners, cards, posters, glassware; anything at home. Big profits. Money-making opportunity! We supply everything. Beautiful sample, home-business plan free! Write Screen-Print Company, PM-8, Los Angeles 61, California.

MONEYMAKING OPPORTUNITIES

NEWLY Found money in Whitehall's fascinating photo line of Christmas and everyday cards, jewelry, gift items. Personalized stationery, napkins. Send for free samples. You, too, can make big money with Whitehall's photo line. Whitehall Studios, 15 Main Street, Elmira, New York.

\$30.00 DAY Profits easy. Sell and install iron railings for porches and steps. Every new home needs and buys. Ideal for full or part time business. We sell you at wholesale and ship direct to your customers. Write for details. K. Jerome Co., 740 W. Superior Ave., Cleveland 13, Ohio.

COST Of things going up faster than your income? You can make more full or part time as a Rawleigh dealer. Write for full particulars. Rawleigh's, Dept. H-RR-PPM, Freeport, Ill.

"**MONEY** Getter's Bulletin." Prints helpful money-making ideas, plans, tips. Sample 25c; details free. Distributors, Box 831-D, Monessen, Penna.

FREE Literature! 301 successful home businesses. Eugene Davis, 759C Tilden, Flint 5, Mich.

\$9.00 RETURNS \$100.00 repeats. Make us prove it. Ezee, Bayport 7, Mich.

SELL Titania gems; far more brilliant than diamonds. Catalog free. Diamonite, 1404-M Mitchell, Oakland 1, California.

START A buying service, buy wholesale thousands nationally advertised products. Make big profits selling at sizable discounts. Postcard brings details. American Buyers, Hertel Station, Buffalo 16-D1, N. Y.

FREE! "301 Profitable Small Businesses!" Amazing shoestring plans! Work home! Start sparetime. Deumant Surveys, Kenmore 23-R, N. Y.

NEW Comedy, religious, general "T"x11" signs. 7c, retail 50c, 15 samples, \$1.00. Lowy, 812 Broadway, Dept. 888, New York 3.

YOU Cast metal products. Free literature. Box 124, Lynwood, California.

STUCCO Paint, joint cement, etc., exclusive formula, easy money. Larstone, 3419-9-East, Salt Lake City 6, Utah.

LEARN Technical metaphysics and insure your future. Easy, inexpensive correspondence course. Simplest method known. Diploma. Write: Premier College of Technical Metaphysics, 2532 McKenzie St., Vancouver, B. C., Canada.

INTERESTED Contacting model-maker. Must be able to work out details, produce workable model in wood, plastic. Terms to be worked out. Write facilities available. Claudia Oipa, 505 East 82 Street, New York, N. Y.

LEARN Mailorder fundamentals. Plans, Opportunities. Will Kell Company, 5255 Wilshire, Beaumont, Texas.

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

\$1,000 MONTHLY Possible raising earthworms! Backyard, garage, basement. Complete illustrated booklet explains raising, feeding, packing, marketing. 25c postpaid! Ozark Worm Farm-J, Willow Springs, Missouri.

BIG Income at home! \$1.00 brings literature describing two amazing new plans. Melco, 2099 Cornell, Cleveland 6, Ohio.

START Your own toy business. Assemble, finish and sell wooden toys. Milled parts and kits available. Write Fulton Mfg. Co., Box 707, Blowing Rock, North Carolina.

BUY Wholesale! Save 66½%! Appliances, furniture, jewelry, toys, sporting goods, tools. Free catalogs. National Buyers Service, Box 426EB, Oakland, California.

WANT To go in business for yourself without capital? We show you how. Start part time your own home. Postcard brings details absolutely free. Topval Corp., Lindenhurst 518, New York.

21 USES For old newspapers. Turn them into cash, \$1.00. Money back guarantee. Crawford, Anthony, Kans.

BOOKKEEPERS Wanted your locality. \$100 weekly. Free details. Grady, Box 2191, Ft. Worth, Texas.

\$5-\$10 AN Hour teaching driver training in your own car. Complete detailed information \$1.00. Driving School Services, Box 42BP, Goleta, Calif.

SCHEMER Magazine, Canfield 1, Ohio, monthly mailorder ideas, plans. Year \$2.00. Sample 25c.

DO You want your own business? For money-making opportunities. Write: Central Sales Outlet, Robbins, N. C.

IF You need more income. Start a home business in spare time. Make extra money. Experience not necessary. Literature free. World Sales Co., P.O. Box 179 PM, Ripley, Miss.

WINNING Prize contests is fabulous, confidential, home opportunity! Send stamp! National Contest Bulletin, Box 2685-P, Miami 16, Florida.

EARN \$50.00 Daily making mats, shoes and mud guards from old tires. S and S Patents Inc., 1307 North Clark St., Chicago 10, Ill.

\$5 TO \$10 An hour. I've did it. I'm disabled now. Real genuine offer. Complete information only \$1. Lucas, 2200 Carson St., Pittsburgh 3, Penna.

MAKE To \$300 extra. New! Different! No selling! No mailorder! Details free. J-M Enterprises, 801½-A North Marsalis, Dallas 3, Texas.

DOLLARS In baby record books, baby shoe kits. Liebig Industries, Beaver Dam 2, Wisconsin.

FREE Literature describing money-making mailorder plans. Lewis Barlett, Richland, Georgia.

BUILD Sales by recruiting productive distributors selling direct or to retail outlets. Secure most concentrated circulation through classified columns of Salesman's Opportunity. Write for facts. Gilbert, Salesman's Opportunity, Room 1700, 850 N. Dearborn, Chicago 40.

FREE Folio "Up to \$45,000; Unlimited Vacations!" No merchandise, equipment. Unknown! Work home, sparetime! Haylings, Carlsbad, Calif.

SPARETIME Profits taking subscriptions all magazines. Wholesale catalog free. Cassell Publishers, Westfield, New Jersey.

GENERAL Contest Bulletin. Issued monthly. Sample, 25c. 1609½ East 5th, Duluth, Minn.

GROW Mushrooms. Cellar, shed, and outdoors. Spare, full time, year round. We pay \$3.50 lb. We paid Babbitt! \$4,165.00 in few weeks. Free book. Washington Mushroom Ind., Dept. 173, 2954 Admiral Way, Seattle, Washington.

50,000 ARTICLES Wholesale. Source directory, dime, Nelko, Box 3462-DR, Chicago 64.

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

FREE Book "505 Odd, Successful Businesses." Work home. Expect something odd! Pacific, Oceanside, Calif.

MONEYMAKING Opportunities with inexpensive portable sawshop equipment. Zapart, 586-PM Manhattan, Brooklyn 22, N. Y.

ATTENTION: Typewriter owners. Make handsome profits. Write today. Groves Company, 682, Hastings 8, Nebraska.

WHOLESALE Catalog! 30-80% discounts! Typewriters, appliances, housewares, watches, jewelry, etc. Consolidated Distributors, 21-12 Lafayette, Paterson 15, New Jersey.

START A profitable subscription business in spare time! We need men and women (young or old) as representatives for all leading national magazines. Liberal commissions paid for new and renewal subscriptions. Start earning money in this pleasant work at once! Clip this ad and send with your name and address to: Agency Bureau, Dept. PM, Hearst Magazines, 250 West 55th St., New York 19, N. Y.

FORMULAS, PLANS, ETC.

FREE Formula catalog. Anything analyzed \$35.00. Western Chemical, Salem, Oregon.

ONE Commercial formula and catalog \$1.00. Milici-P.M.-Chemist, 1709 W. 7th St., Los Angeles 17, Calif.

MODERN Formulas for today's fastest selling big-profit products. Literature free! Miller, Chemist, 1517-N, Tampa, Florida.

FORMULAS: All kinds, latest, best. Literature free. Kemixal, Park Ridge, Ill.

REAL Manufacturing formulas. Lists free. Cummings, Chemist, Gordon Ave., Syracuse 4, N. Y.

PLASTICS

PLASTICS Home-craft course for men and women. Tells and shows how to make hundreds of fast selling plastics products. All plastics and materials for 23 projects included in course. No special tools needed. Course pays for itself. Write for free booklet. Interstate Training Service, Dept. D-3-H, Portland 13, Oregon.

PLEXIGLAS, Lucite. Square foot cost 1/16", \$1.15; 1/8", \$1.52; 3/16", \$1.86; 1/4", \$2.21; 3/8", \$3.25; 1/2", \$4.38. Colors add 10%. Send 15¢ for postage. Aristocrat Plastics, 55 Clarkson St., New York City.

LAMINATING Supplies. Free price list. Solomonson, 46 Cornhill, Boston 8, Mass.

PLEXIGLAS. Cut to size. Clear. Any thickness. Colors. Rods. Tubing. McClarin Plastics, P.O. Box 168H, Hanover, Penna.

PLEXIGLAS, Fiberglas, polyester, acetate, vinylite. Fast service. Wholesale-retail. Catalog 15c. Gem-O'-Lite, Box 6861P, North Hollywood, California.

CHEMISTRY

AMAZING New book of science. Experiments, formulas and catalogue of laboratory supplies. Only 25c. National Scientific Co., Dept. PM-8, 2204 W. North Ave., Chicago 47, Illinois.

CHEMICAL Consultant. M. S. graduate, highly experienced. Box 747, Evanston, Illinois.

NEW Idea chemical and apparatus outfits for home experimenting. photo-scales, microscopes, chemicals, biologicals and laboratory supplies in small quantities. Catalog 25c. Established 1931. John H. Winn, 124A West 23rd St., New York, N. Y.

ILLUSTRATED Catalog: Chemistry, mineralogy, biology 20c. Tracey Laboratories, Evanston, Illinois.

CHEMICALS And apparatus for industrial, analytical, and private laboratories. Catalog 25c. Dept. M-50, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

AGENTS WANTED

CHRISTMAS Cards—Unique gallery of personalized greetings for those who want something different. No other line like it. Selection of 132 exclusive designs, including 36 especially for business firms, all with customer's name. Wide price range. Up to \$5 to \$75 commission on each sale. Full or part time. For elaborate sample outfit from famous old-established firm, write Process Corp., 1950 S. Troy, Dept. FD, Chicago 23, Ill.

AMAZING Tall-Glow, Kodachrome Christmas cards sell swiftly. Free samples. \$52.50 profit on 50 boxes easy! Many cards, stationery, novelties. Profits to 100%, gift bonuses. Samples on approval. Hurry—Get sensational mail minder free. Creative, 4401 Cermak, Dept. 516-B, Chicago 23.

WANTED: Men interested in making up to \$15,000 a year. Exclusive line of personalized articles. No investment. Free information and sales kit. Write Hook-Fast, Box 480 (PM), Roanoke, Virginia.

MAKE Extra money—Selling \$1.00 and \$1.25 Christmas and all occasion card assortments, "slim" cards, gift wrappings, gifts, gadgets. Experience unnecessary. Bonus! Free imprinted Christmas card and stationery samples, selling plan, catalog. Write for samples on approval. Free \$1.00 gift for promptness. Hedenkamp, 361 Broadway, Dept. PM-38, New York.

TREMENDOUS Profits! Every man, woman and child a customer. Suits \$1.50, pants 35c, dresses 20c, shoes 20c. Operate from store, home, car. Free catalog. Superior, 1250-A Jefferson, Chicago 7.

179 EASY Ways to make extra money! Sell new tall style Christmas, all occasion greeting card assortments. Unusual novelties. Make up to \$1.00 per box plus bonus. Write for feature boxes on approval. 77 free samples personal Christmas cards, stationery. New England Art Publishers, North Abington 833-M, Mass.

NEED More money to live on? Increase your weekly income \$20 to \$25 or more in spare time. Supply Rawleigh Products to consumers. Also openings for full time dealers. Write Rawleigh's, Dept. H-DD-PPM, Freeport, Ill.

SELL Sunshine cards, the name quality has made famous. No investment or experience necessary. 21 card deluxe tall slim assortment sells on sight! Imprints, Carrier-Ives, religious, gift wraps, many others. Samples on approval, write: Sunshine Art Studios, Inc., Dept. PM-8, Springfield 1, Mass., Pasadena 1, Calif. (Note: East of Rockies address Springfield office.)

AT Last! Something new and sensational in latest tall Christmas cards. Make extra money fast! Show satins, velours, metallics. Gets easy orders. Pays up to 100% profit. 30 free samples. With name 50 for \$1.50. Big line. Amazing convertible pen-pencil, napkins, gifts, stationery. Several \$1.00 boxes on approval. Puro Greetings, 2801 Locust, Dept. 540-K, St. Louis, Mo.

BIGGER Profits selling greeting cards. Get list of sensational factory surplus bargains. \$1.25 boxes for 50c, \$1 boxes for 35c—while they last! Big line new 1955 Christmas cards, stationery, gifts. Assortments on approval. Personalized samples free! Midwest Cards, 1113 Washington, Dept. 557-C, St. Louis 1, Mo.

LOWEST Wholesale prices. Thousands of name brand items. Free literature. Parker Distributors, Box 55 (Dept. C) Williamsbridge Sta., New York City 67.

EASY Handwork makes fast-selling articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

150¢ PROFIT Selling 50¢ name and address labels—\$1.00 retail. You keep 60¢ profit. Free selling kit. Bruce, Box 71-Y, Boston 1, Mass.

BEAUTIFUL Feather pictures. 200% profit! Free sample. Apartado 9036, Mexico 1, D. F.

MAKE Money introducing world's cutest children's dresses. Big selection, adorable styles. Low prices. Complete display free. Rush name. Harford, Dept. P-3341, Cincinnati 25, Ohio.

SHINE Shoes without polish. New invention. Lightning seller. Shoes gleam like mirror. Samples sent on trial. Kristee 74, Akron, Ohio.

FREE Color catalog of religious jewelry. 100% profit. Virgin Mary heart necklace, sample \$1.00 (value \$2.50). Money back guarantee. Stephen-New York Inc., 1947 Broadway, New York 23.

CHRISTMAS—All occasion cards, novelties and gift items. Largest selection. Highest profits. Satisfaction guaranteed. Send for sample offer coupon now! Klotz Distributing Co., Dept. 89A, 1012 Western Ave., Toledo, Ohio.

PRINTING! Sell quality letterpress—Offset printing. Free wholesale pricelist, supplies, details. Napco, 2337-A Bath Avenue, Brooklyn 14.

BUY Wholesale thousands nationally advertised products at big discount. Free "Wholesale Plan." American Buyers, Herchel Station, Buffalo 16-A1, N. Y.

MAKE More money showing Elmira greeting cards this Christmas! Why more? Because Elmira offers more variety; beautiful cards for every taste, every purse. You get heart-warming, old-fashioned favorites and smartly simple ones for today's tastes. No matter who you sell, Elmira has a style to please everybody from grandmother to young Mrs. Executive. Send today for free personalized samples, catalog and sparkling assortments on approval with personalized stationery, imprinted napkins and lovely gift wrappings! Elmira Greeting Card Co., Elmira 199, N. Y.

USED And new watches. \$2.00 up. Free list. Southern Watches, Gray, Georgia.

NEW Tall Christmas cards pay 75c profit on \$1.25 assortment. 40 exclusive name-imprints \$1.25; gift wraps by-the-yard; 30 for \$1 assortment; 250 new fast sellers. 5 assortments on approval. \$1.95 gift for promptness. Cardinal, 1400 State, Dept. 79-S, Cincinnati 14.

\$15.20 AN Hour is what W. F. Wydallis reports he earns with amazing Presto fire extinguisher. Sells itself. No experience needed. Free sales kit. Merlite Industries, 114 E. 32nd St., Dept. 58A, New York 16.

TURN Your spare time into profits! Friends, neighbors, relatives buy these unusual gifts, gadgets, toys, jewelry, gift wraps, and greeting cards on sight. Over 600 terrific new items—Up to 100% profit! Send for sensational money-making free catalog now. Start to make big money immediately on Christmas sales! Samples on approval. Write Greetings Unlimited, 3604 Park Square, St. Paul, Minnesota.

EXCITING Razor blade deal. Free sample, details. Nucleus Trading, 2440 Amsterdam Ave., New York City 33.

EARN \$35.00 Daily! Sell Liqui-Moly, new wonder lubricant for cars, trucks, buses, tractors. Used in jet engine, atomic energy plants. Nationally advertised magazines, newspapers, radio, television. Over 3,000,000 cans sold. Territories available. Write Moly, 314 Scholes Street, Brooklyn 6, N. Y.

EARN Extra dollars selling cameras, film, projectors, recorders, typewriters, etc. Write: Gladrose Gift Co., 150-M Broadway, New York 38, N. Y.

NAMEPLATES, Desk signs. Free samples. Biggest profits. Whitney Signs, West Springfield, Massachusetts.

HOME Agency. "Pa-Ma" deal. Power mowers 40% off. Delivered. Rotacut-PM, Excelsior Springs, Mo.

MEN, Students, girls, housewives, of Catholic faith, earn \$50 weekly, spare time. Foreign Treasures, Box 224, Kansas City 41, Missouri.

NEW Way to make money! Sell nothing yourself. Just offer free item to women for every two they sell for you. Household wares needed in every home. Postcard brings catalogue and details of amazing new kind of money-making plan. Absolutely no obligation. Topval Corp., Lindenhurst 11, New York.

WE Put you into big mail order business. drop shipping orders, no investment, no minimum. Catalogues supplied. Terrific new sellers, tremendous profits. Turner Company, 1170 Broadway, New York 1, New York.

"STARLIGHT" Name markers. Every home a prospect. Embossed name plates, nationally advertised. Affix to mailbox, lawn or post. Sales agents wanted, high profits, fast sellers. Write: Starmetal Co., R.D. 3, Box 380, Plainfield 9, N. J.

AGENTS: Sell Mexican feather cards. Good profit. Free sample. Apartado 7118, Mexico City.

EARN \$200 A week and up! Amazing profits are yours selling Seal-Tite, miracle puncture-proofing discovery! \$1.98 tube stops flats forever. Sure-fire appeal to America's 50,000,000 motorists! Complete sales kit free on request. M & M, Dept. M-2, 842 Third Ave., New York City 22.

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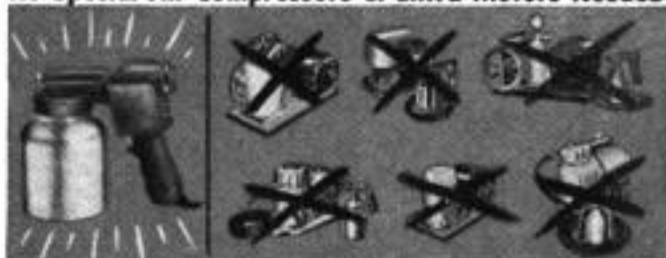
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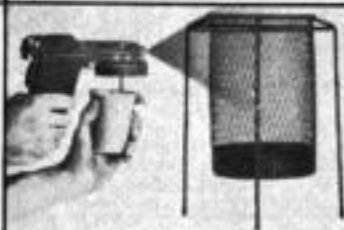
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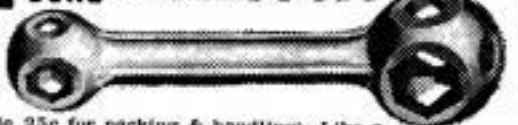
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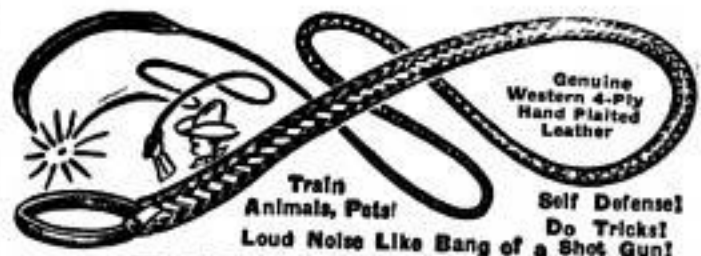
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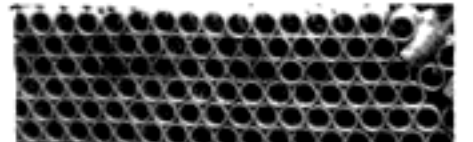
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4.71	5.21	4.71	5.11	5.11	5.11	5.11	5.11	5.11	5.11	5.11
640-15	700-15	750-15	800-15	850-15	900-15	950-15	1000-15	1100-15	1200-15	1300-15
4.81	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51	4.51
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AC's thin-tip design allows combustion left-overs to be cleared away by a cyclone of hot, swirling gases.

AC Insulator Tips Cool Fast to Avoid Pre-ignition!

Intake stroke . . .

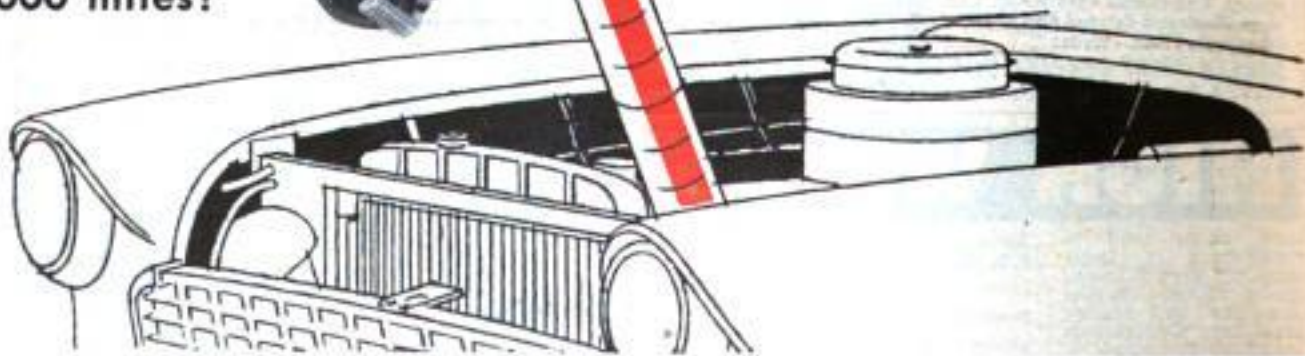
The rushing intake of cooling gas drops tip temperature of thin-tip ACs faster and farther than is possible with thick-tip plugs.

Compression stroke . . .

AC Spark Plugs, with low insulator-tip temperature at this point, vastly lessen chances of pre-ignition—a common problem with ordinary plugs.

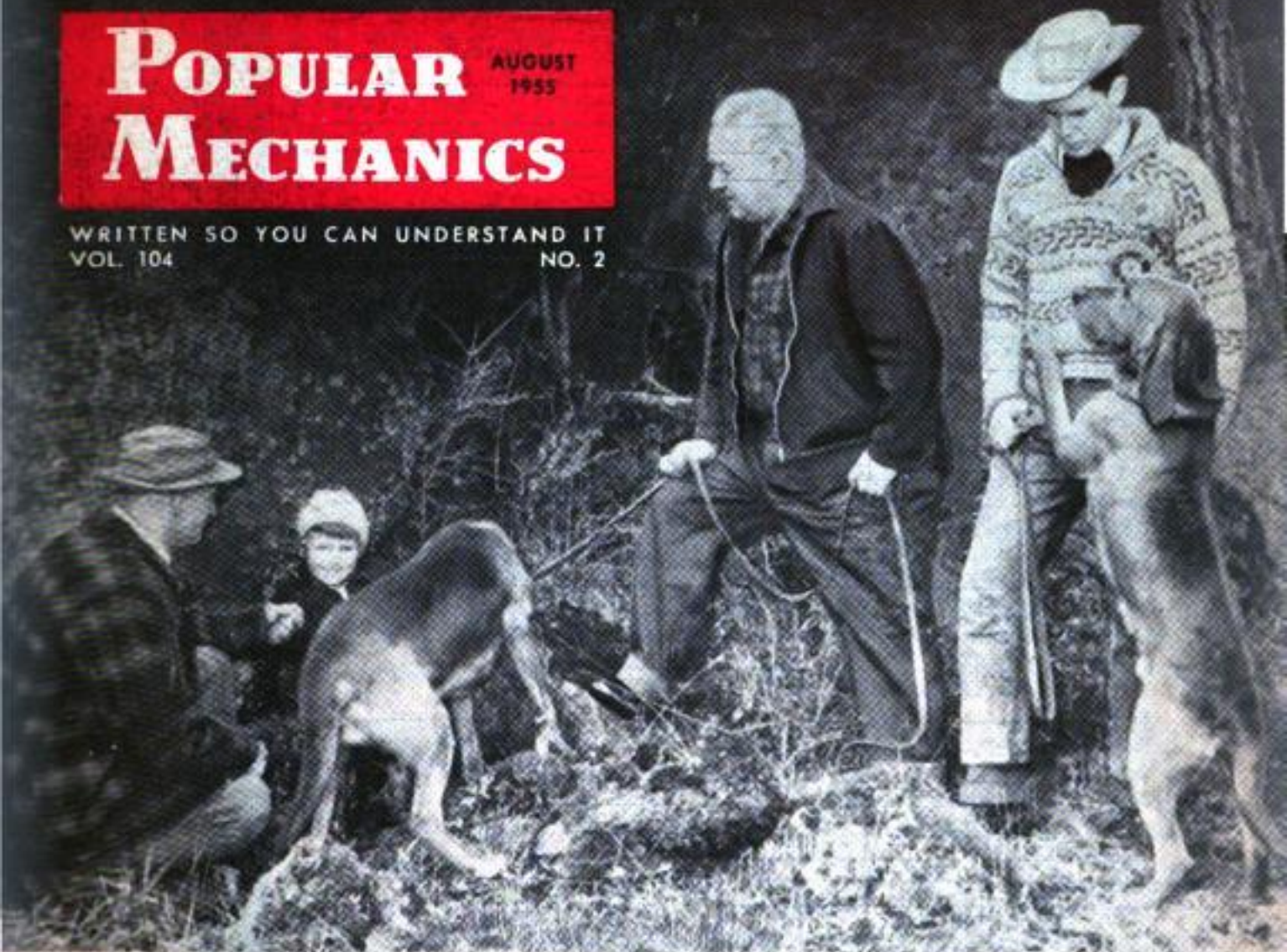


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POPULAR AUGUST 1955 MECHANICS

WRITTEN SO YOU CAN UNDERSTAND IT
VOL. 104 NO. 2



South Vancouver Island Rangers with the help of their bloodhounds find a little girl lost in the woods

Rangers on the Trail of the Lost

By Carson Kerr

FIVE O'CLOCK in the afternoon of Thursday, Nov. 11, 1949, was a momentous time for William Reader. As dusk rapidly descended and rain began to fall he realized that, for the first time in his life, he was hopelessly lost in the woods. An hour earlier, he had separated from his son, William, Jr., and headed for the spot where the younger man's motorcycle had been parked, intending to rest and wait for him there. However, after leaving a logging trail to take what he thought would be a short cut, he had twice traveled in a complete circle. Now, the only thing that seemed familiar to him was a large, lightning-blasted Douglas fir that he had just sighted for the second time.

The Readers had left their home in Victoria, British Columbia, that morning to go deer hunting in the rugged Vancouver Island mountains north of the city. By nightfall the pangs of hunger were gnawing at the 49-year-old father and he managed to make a meal of berries from spiny salal vines but was unable to find any dry wood for a fire. Cold and tired, he took refuge under a big cedar tree, where he spent a sleepless night.

Shouts and shots having brought no response from his father, young Reader had returned home and enlisted the aid of a friend. The two searched without success through the night and were joined by a dozen neighbors in the morning. That

INFORMATION

Submitted by WM. READER JR.
 State Relationship SON

Name WM. READER SR.
 Age If Minor, State age in Years and Months 49
 Sex M
 Address COLWOOD
 Height 5'10" Weight 160 Color Eyes BLUE Color Hair GRAY
 Physical Description GOOD
 Mentality SOUND
 Disposition CHEERFUL
 Habits and Hobbies FISHING - SPORT & COMMERCIAL
 Time of Last Meal THURSDAY NOON
 When Last Seen 4 P.M. THURSDAY (LOST 2 DAYS)
 Where Last Seen APP. 2 MI. WEST OF MILE 34 - C.N.E.

By Whom Last Seen SON, WHO HAD BEEN HUNTING WITH HIM.
 Direction of Travel GENERALLY S.E.

Customary Playground X
 Clothing Worn, Describe Color BRN. JACKET, RED SHIRT, DARK TROUSERS, CHECK CAP.

Shoes in Detail BOOTS, LEATHER SOLE & HEEL

Food and Equipment Carried (Ammo in rds.) NO FOOD
CIG. LIGHTER - 25 ROUNDS.

Woodsmanship Ability CONSIDERABLE EXPERIENCE

Knowledge of Area SLIGHT

Knowledge of Firearms GOOD

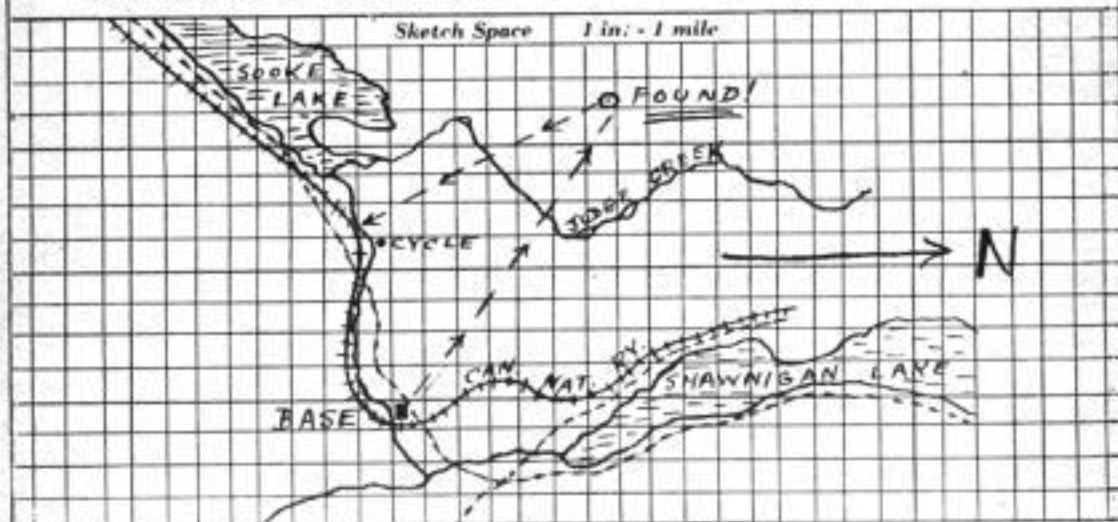
Swimming Ability "

Special Remarks LEFT SON AT R.R. TO GO TO MOTORCYCLE AT POINT SHOWN. NOT CARRYING COMPASS.

Recorded by

R.C.M.P. Signature

Capacity



Rangers' file on rescue of William Reader (see text) includes detailed questionnaire

Panel truck that converts to field ambulance is used by rangers to rush emergency cases to hospital





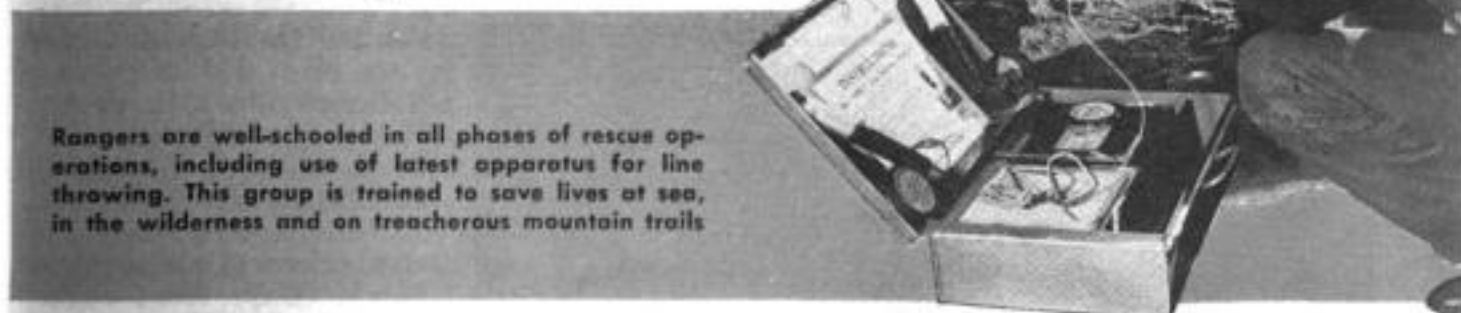
This seagoing diesel-powered craft is owned by the ranger organization and saves lives of fishermen

afternoon, Reader repeatedly responded to their calls but the searchers were so confused by echoes that they came no closer to finding him than the night before. Twenty-four hours after his father's disappearance, Bill, Jr., notified the police and almost immediately a call went out for assistance from the South Vancouver Island Rangers. The members of this sportsman's service club had won local laurels for locating lost persons and been recognized for their vast knowledge of Vancouver Island. Their emergency squad set up a search base that evening and, at 7:30 Saturday morning, 27 experienced woodsmen wearing the luminous hat badges of the SVIR started combing the heavily wooded area where Reader's gunfire had been heard:

Friday afternoon, the harried hunter had finally started a fire, which he kept alive through the night despite continuing rain, but not before a thorough chill had reduced his voice to a whisper. Unable to answer the calls he heard on Saturday, he fired 27 shots to guide the searchers, keeping his remaining three cartridges in case he should see something he could kill for

food. Oddly enough, if he had fired them, he might have been located a lot sooner. The rangers had gradually separated the echoes from the real thing and were rapidly approaching him when his rifle fell silent. Weak and hungry, Reader saw his fire go out. He began to lose heart and soon lapsed into semiconsciousness.

At nearby Shawnigan Lake, rangers remaining at the search base debated the advisability of using the bloodhound they'd flown in to the area. They decided against it. The combination of the tramped-over



Rangers are well-schooled in all phases of rescue operations, including use of latest apparatus for line throwing. This group is trained to save lives at sea, in the wilderness and on treacherous mountain trails



One of the group's bloodhounds arrives by ranger plane for tracking duty near lake in remote wooded area

trails, rain and the wearing of some of Reader's clothing by members of his family engaged in the search would make the dog detective's work extremely difficult. They were on the point of contacting SVIR headquarters in Victoria to give the green light to the stand-by searchers when they received a call from a walkie-talkie in the field.

"We've found him!" an exultant ranger's voice crackled. "He's in bad shape. We'll do what we can for him here and then take him out to the logging road. It's going to

be a slow tug, though, so don't expect us for at least an hour."

Although they traveled only three miles to reach the ranger ambulance (a converted panel truck), it took the stretcher bearers more than two hours because of the ruggedness of the terrain. Given oxygen en route, Reader was rushed to his home, to which his family physician had been summoned. The doctor pronounced him out of danger, but expressed his belief that a few more hours in the woods would have meant death from exposure. Apart

Tired rangers carry a rescued hunter on stretcher over rough terrain. It took the rangers two hours to travel three miles to the ambulance



from the time element, the big storm that broke the following day would have hampered search efforts to such a degree that it is doubtful whether even the rangers could have succeeded. As it was, they found him less than four hours after taking up the search.

The Reader rescue marked the first time the SVIR were credited beyond all doubt with spelling the difference between life and death. However, they've cheated the Grim Reaper on several occasions since then.

More recently, they rescued Peter Davidson of Maple Bay, Vancouver Island, a man in his

seventies who was in no condition to survive even a single night outdoors. Wandering into the woods while out for a walk, he was lost for 36 hours and was close to death when discovered by rangers and rushed to a hospital. He had disappeared during late afternoon and a volunteer search party had failed to find him that night and the following day. Called in on the case the second night, SVIR searchers used their bloodhound, Sir Roderick of Ogden. Working on a cold scent, he caused some concern when he led them far from the area where it was expected that the elderly man would be found. Encouraged by finding where Davidson had obviously spent the night, they pushed on until midnight, when their elation changed to dejection and doubt. Sir Roderick had led them from a well-traveled trail into timber thick with undergrowth, which seemed an unlikely course for the missing man to follow. Nevertheless, the search was successfully concluded soon afterward.

"Our hound was nose to the ground," reads the official ranger report of the incident, "when we heard the old gentleman call feebly from the bushes, about 15 feet to one side. While some of the men cut through in the direction of the sound, the dog circled the bushes and came upon him a minute later. The spot where he was picked up was approximately six miles from the original area of intensive investigation. Several authorities have assured us, and we ourselves have every reason to believe, that a life would have been lost if at least a few of us hadn't persisted in believing that Sir Roderick knew his business."

The headquarters of the SVIR, in the basement of a centrally located service station, boasts a fat file of successful search case histories, totaling more than a hundred. The rangers have engaged in almost every type of emergency work, in cooperation with the Royal Canadian Mounted Police and military, game and forestry officials, and haven't yet chalked up a failure. Their peacetime service to British Columbia communities, combined with the wartime record of their charter

(Continued to page 238)

AUGUST 1955



Rangers are using walkie-talkie equipment to coordinate the efforts of search party. Below, rescued man receives oxygen



Army Troop-Cargo Carrier Rolls on Rubber Pillows



Eight giant air pillows take the place of tires on the experimental "Teracruz," a cargo and personnel carrier built for Army Ordnance. The tire bags, inflated to a pressure of three to five pounds, swallow up surface irregularities to give the springless 20-ton vehicle a safe and comfortable ride over all types of terrain. The four trucks on which the carrier rests can be tilted forward or backward 10 degrees so that half of the bags act as compactors in

snow and soft terrain. Air pressure in any or all of the bags can be changed by the driver while the carrier is in motion. The Teracruz is propelled at speeds up to 25 miles per hour by rubber-coated steel rollers resting on top of the bags. The machined rollers mesh with the tread of the bags to turn the pillow wheels. A driver and an observer-navigator man the vehicle, which is powered by an air-cooled, 8-cylinder, 340-horsepower engine.

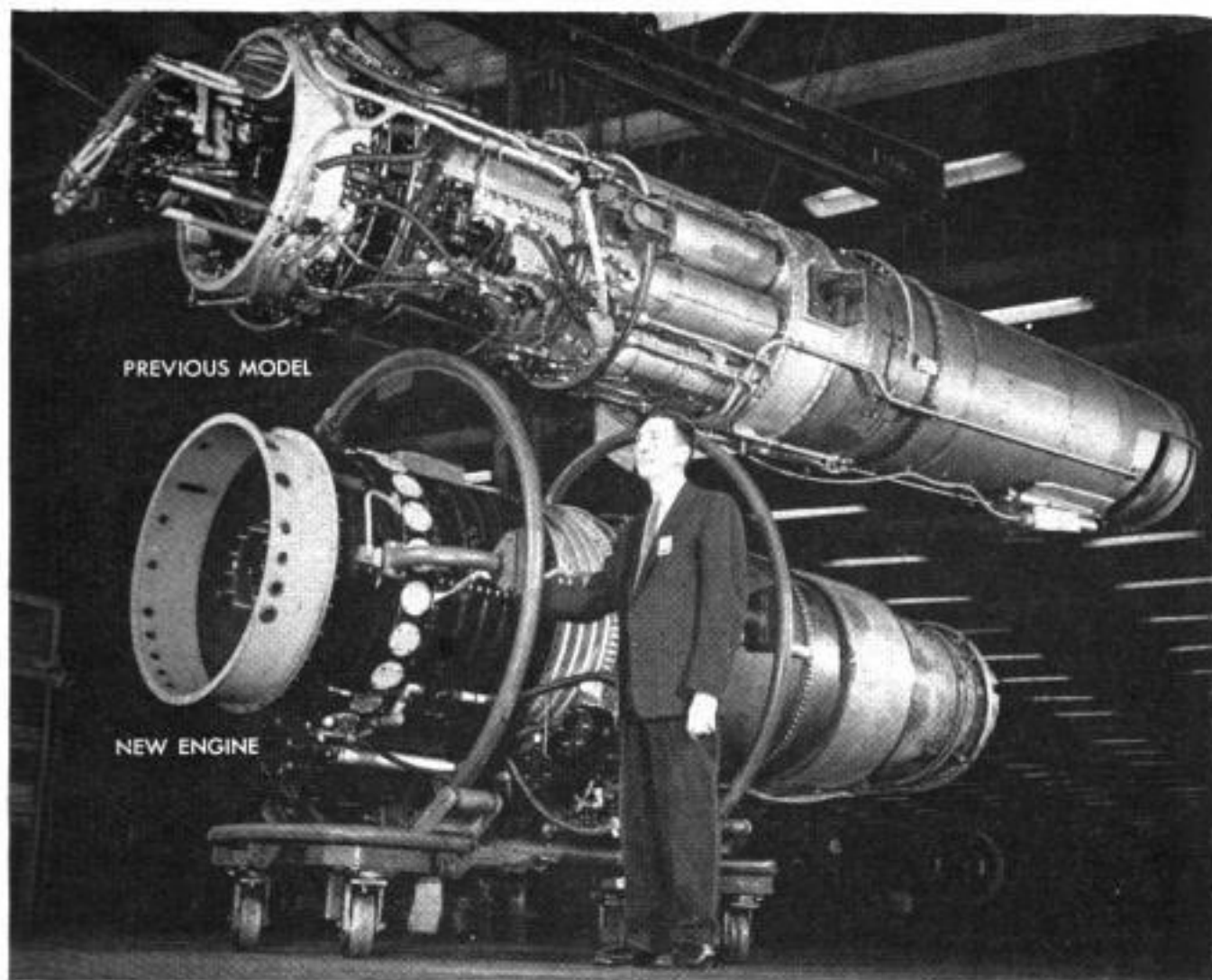


Net Clamped to Side of Boat Holds Fish and Two Rods

Performing double duty, a new net not only holds the angler's catch but also supports two fishing rods. The net is clamped to the side of the boat with one of its two 12-inch supporting rings under water. The angler drops his catch into the net to keep the fish alive. He also can slip the two fishing rods through steel rings, which hold the rods in fishing position.

"Perfect" Iron Crystals Produced in Laboratory

Slivers of iron so pure they can be considered "perfect" have been produced in the laboratory. Scientists at Westinghouse Research Laboratories have made the pure iron in crystals up to two inches long and $\frac{1}{1000}$ inch thick. Tests show that the crystals have a breaking strength of almost 1,000,000 pounds per square inch—10 times the strength of ordinary iron which has been drawn into wire.



Turbojet Engine Is 50 Percent More Powerful Than Famed J47

Out of wraps is General Electric's J73 turbojet engine, which has the same diameter but is 50 percent more powerful than the company's battle-tested J47 jet. The J73, which powers the F-86H Sabre Jet, is in the 9000-pound-thrust class and has a lower specific fuel consumption than the

J47. The "cannular" combustion system of the J73 has a single combustion space containing 10 individual "cans." A two-stage turbine is connected to the 12-stage compressor, which forces air in great quantities to the combustion section. Warm air forced into the hollow nose combats icing.

Floor-Tile Adhesive Applied With Brush

You can apply a new adhesive for floor tile with an ordinary paint or whitewash brush. The adhesive, designed for use by the homeowner, requires no troweling. It is used to bond vinyl-asbestos tile to concrete latex underlayment and plywood. Resistant to water, heat and alkali, it can safely be used over concrete on or below grade. One gallon covers 250 square feet.



Sources of available products described in this issue are listed on pages 58, 60 and 62. Sources of further information on other articles are listed in our free WHERE-TO-FIND-IT LIST. For your copy just write to the Bureau of Information, Popular Mechanics, 200 East Ontario Street, Chicago 11



Prospectors depart for the wastelands at dawn. The equipment atop the lead Jeep detects radioactivity

OLD-TIME PROSPECTORS in the rugged wastelands of the Rio Grande Valley are somewhat startled when they see the latest uranium-hunting equipment whiz by. Francis K. Campbell of Houston, Tex., has fitted out a two-Jeep caravan with everything he needs for fast but thorough prospecting of the desolate terrain.

Campbell believes he has the answer to many problems unique to the task of seeking out precious uranium ore. He's testing his belief across 100,000 acres of barren land where his own airborne explorations have revealed promising radioactivity.

The big problem is to pinpoint the source of radioactivity and determine whether it indicates uranium. Atop the cab of his pilot Jeep, Campbell has installed a detecting device that not only reports radioactivity but whether the rays are of the type produced by uranium. The findings are recorded on a moving graph beside the driver's seat, so Campbell has a continuous check as he drives across the hills and through rocky gullies. A direction finder enables him to follow a charted course across desolate terrain without missing any sector of the area.

Through his radio Campbell maintains constant communication

Uranium Hunt by Jeep

Even the modern prospector must use some shoe leather to check hot spots with a geiger counter and to pick up rock samples



with Henri P. Kaseoru, his assistant in the second Jeep. This eliminates stops for instructions or course changes. The second Jeep is the work horse that goes into action when explorations on foot with a geiger counter have confirmed location of a hot spot first indicated by the detecting device on the lead Jeep. The second Jeep has a diamond-bit drill, operated by the power take-off, which brings up deep rock samples. It also has a plow attachment to turn up rock beneath the topsoil.

Campbell points out that the clicking of the geiger counter frequently means nothing more than false hopes and wasted time, as radioactivity doesn't necessarily mean uranium. In the pilot Jeep Campbell carries such equipment as a microscope, a fluoroscope and a chemical assay kit for on-the-spot analysis of the hot spot.

Prospector Campbell estimates that with his Jeep caravan he will be able to conduct a thorough search of 100,000 acres in a little more than three months. He figures the same job would take years with the prospecting methods of yesterday, and even then there would be no assurance the uranium hunters had not passed up valuable deposits tucked away in some nook or cranny of the vast terrain. ★ ★ ★

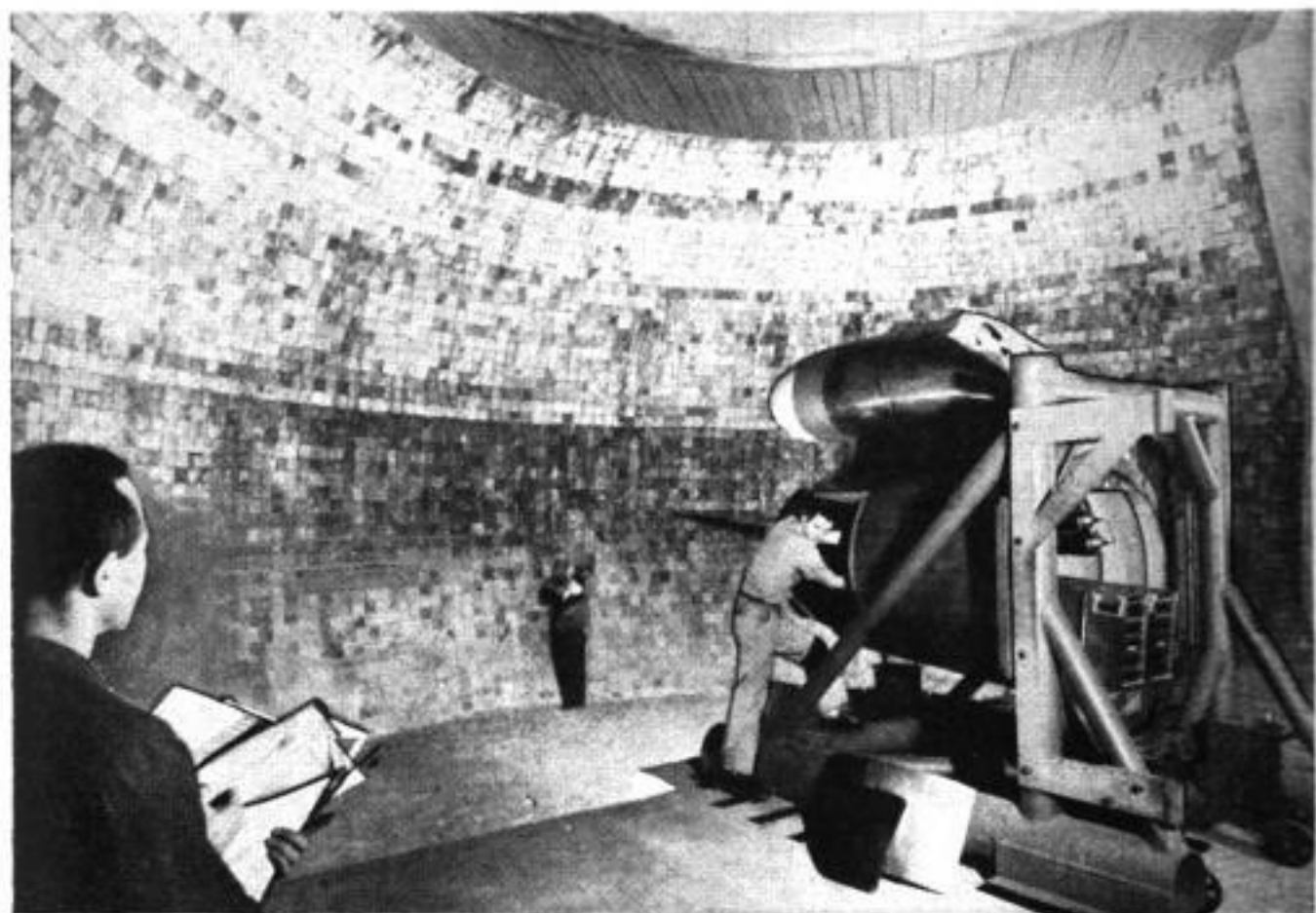


Jeep's interior is packed with instruments. Beside the driver is a moving graph that continuously records the radioactivity. ↓ Campbell subjects a rock sample to a check with a fluoroscope. Jeep also carries a microscope and chemical assay kit



Plow on second Jeep is used to turn up rock samples. Prospectors use diamond drill to bring up deeper samples





Eight-Foot Timbers Line Air Force All-Angle Firing Range

What look like tiles in a new close-quarter firing range are actually the ends of 8000 eight-foot timbers. The all-angle firing range, as it's called, will be used

to test fire-control mechanisms made for the tail "stingers" of long-range bombers. An operator in an observation room controls the firing system electronically.

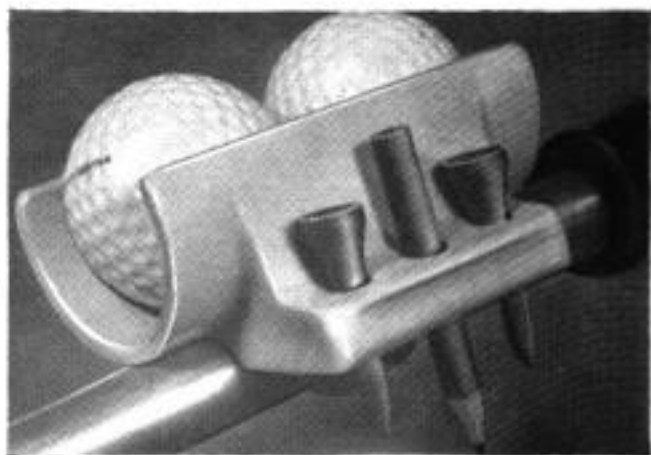
Rake Attachment Helps Seed


Attached to an ordinary rake, a new tool harrows, rakes and rolls the earth to help in seeding new lawns. The attachment has a crossbar with 14 wooden teeth and a roller. After fertilizer and seed are spread on the lawn bed, the user pulls the rake toward him. The teeth furrow the ground, depositing the seed and fertilizer at the proper depth, the roller completes the job.



Clip for Golf Cart Holds Extra Tees and Balls

Bulging pockets are a thing of the past with golfers who employ a clip to carry extra balls, tees and a pencil. The clip clamps to the handle of any caddy cart and holds two balls and five tees. Made of durable plastic and available in three colors, it can be attached quickly to handles of various sizes. No provision has been made for a score card, since this is flat and easily carried in a pocket.





At start of high-altitude flight, little rocket plane is dropped from bomb bay of B-29 at 30,000 feet. Below, author gets help in shedding his "space" suit

Maj. Arthur Murray has flown a rocket plane higher than any other man. This is the story of his record flight in the X-1A

IT'S LONESOME UP IN SPACE

By Maj. Arthur Murray, USAF

I HAVE BEEN farther from the earth than any other human, out where the blazing sun is almost blinding and you see the ground through a haze that turns the mountains a dark, olive drab and makes brown fields appear a brilliant straw color.

I'm one of the rocket pilots at the Air Force's flight test center at Edwards Air Force Base in California.

Our job is to find the safest ways of flying the new supersonic aircraft that are powered with rocket motors. The planes are shaped like bullets with tiny wings. You get the feeling that you are actually riding an artillery shell during a flight. Because of their tremendous speeds, brand-new flight problems have been encountered.

One of these problems involves the loss of controllability at higher flight speeds.

One of the first men to encounter this problem was Maj. Chuck Yeager. He was

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90,000 FEET
STRATOSPHERE

POINT OF MAXIMUM ALTITUDE

45,000 FEET
TROPOSPHERE

BEGIN DESCENT, POWER OFF

COURSE OF HIGH-ESCORT CHASE PLANE

SLOW TO
SUBSONIC SPEED

SEA LEVEL

SANTA BARBARA

riding the X-1A at about 1650 miles per hour when the plane began a violent fish-tailing that slammed him around in the cockpit, finally knocking him out. Still traveling like a bullet, the plane plunged 50,000 feet while Yeager was regaining consciousness and getting control again.

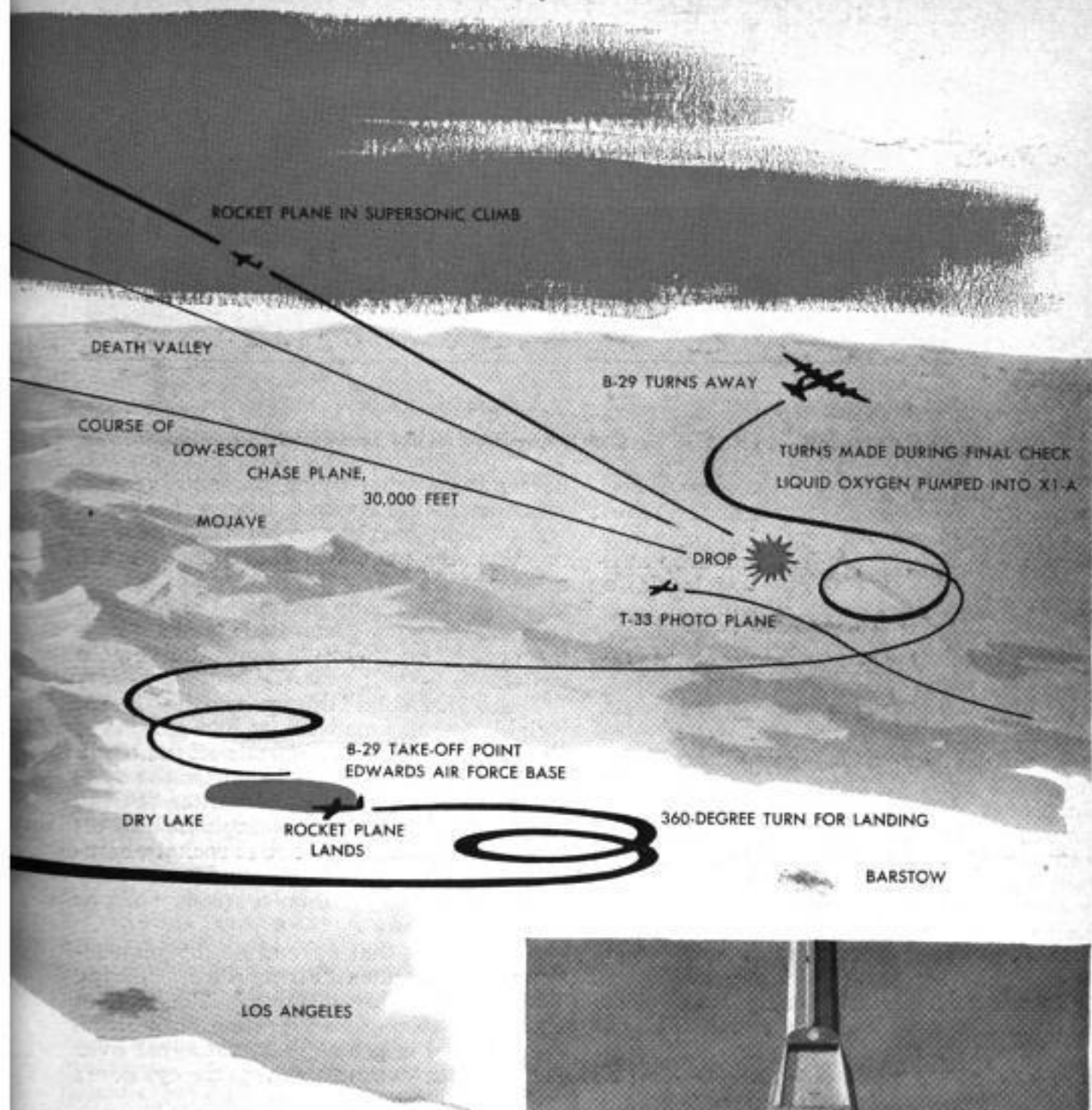
I have flown faster than 1400 miles per hour myself, and I too have flown into the region of uncontrollability. But with the slight modifications to the plane that Yeager recommended and the changed flight technique I worked out, I was never

in what could be called real trouble.

Another problem I've encountered arises from the sensation of weightlessness that occurs when "going over the top" in a ballistics-type flight path. This is very confusing. You find it hard to tell up from down, you have a feeling you are in an uncontrolled fall, you tend to clutch at

Band of frost on plane shows that fueling with liquid oxygen is complete. Plane is hanging under B-29

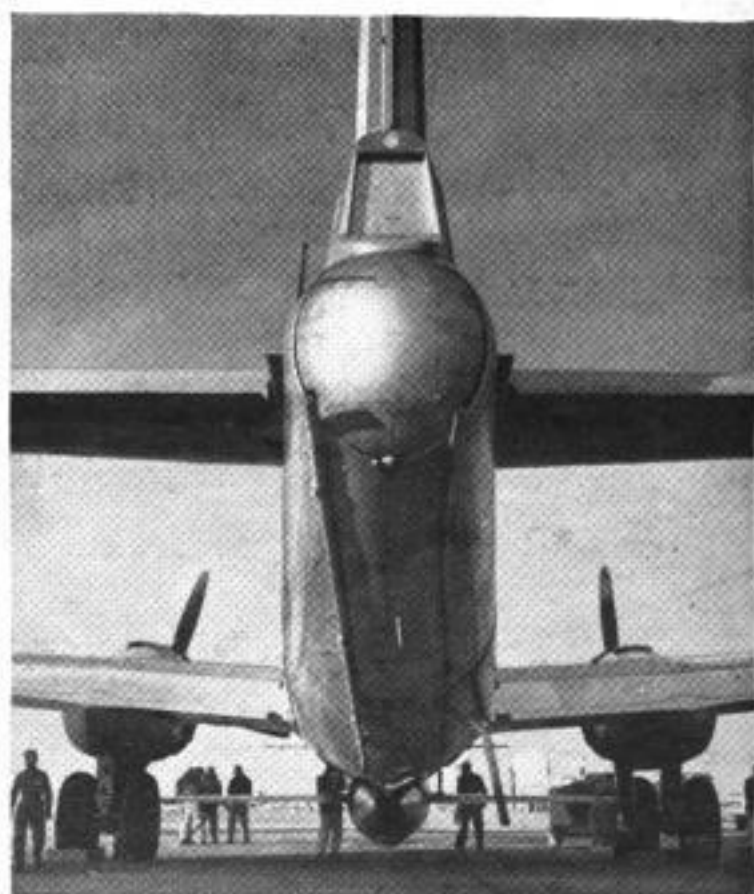




things and make jerky motions. That's the last thing you should do, actually, for the plane also is affected by weightlessness and you can lose stability if you give the controls a quick jerk. We try to stay away from completely weightless situations.

No official figure on the altitude I've reached has been announced though newspapers have estimated that I've been higher than 90,000 feet, some 17 miles above sea level. But without discussing classified information I can give you a good idea of what a high flight is like.

X-15 barely clears the ground when both planes are fueled and ready for take-off





Cloud of frosty vapor rises from the X-1B as the B-29 is towed out to the runway just before the take-off

At the start, I'm sitting in the pressurized cockpit of the Bell X-1A research rocket plane while it is being carried in the bomb bay of a B-29 to 30,000 feet, our drop altitude. I'm wearing a G-suit that is also a space suit complete with pressure helmet and face plate. Strapped to my chute is an oxygen bottle that will inflate the suit and thus pressurize my body if I have to bail out. Without this pressure my blood would boil in the thin upper air.

The X-1A and its sister ship, the X-1B, are each some 35 feet long with a wing span of 28 feet. Each plane has a skin of polished duralumin and has the general contour of a .50-caliber bullet. Each is powered by a Reaction Motors rocket motor with four firing chambers. The chambers may be operated singly or simultaneously. The motor burns a mixture of water and alcohol, using liquid oxygen as an oxidizer. The motor develops some 6000 pounds of thrust, which is equal to 12,000

Author has climbed into the cockpit from inside the B-29, and an airman slides the cockpit canopy forward onto the rocket plane



horsepower when flying at sonic speeds.

Sitting in the cockpit, I keep the green "drop" light burning on my panel and on the repeater panels in the B-29 carrying me aloft. The light indicates that all my pressures are steady and that I'm ready to go. Suddenly my green light winks out as the copilot on the B-29 pulls the release switch.

There's a solid thump as the X-1A, weighing eight tons with its 2000 gallons of fuel and oxidizer aboard, rolls off the bomb shackles and falls away. I'm out in the open now, under the B-29, and I mutter "Firing Number One" into the microphone and hit the firing switch for the first rocket chamber. There's a grinding sound caused by the turbine pumps, then a steady roar as the fuel ignites.

At intervals that depend on my instructions I'll announce "Firing Two," "Firing Three" and "Firing Four." The rocket plane will keep on accelerating until all its fuel is gone. This takes just over four minutes when all cylinders are blasting.

There's a slight buffeting and jarring as the plane accelerates through the speed of sound and then, quite suddenly, the noise of the rocket motor dies out. I'm traveling too fast for the sound of the motor to reach me. I can still hear the fuel pumps at work. The radio seems quite loud in my ear-phones. It will be quieter still when I turn off the fuel pumps for then I'll hear only the whine of the instrument inverter, a small motor in the cockpit.

By now I am well up into the stratosphere. Visibility is unlimited but I'm nevertheless flying on instruments. The nose is at too high an angle for lining up with any features on the ground, and

there's too much to do inside the cockpit to spend much time sightseeing through the canopy. Most of the impressions of the sky and the earth that I have were gathered inadvertently during moments before the onset of the controllability problems.

I know that the sky seems black at, say, 15 miles up but I'm principally aware of the blinding sun. It lights up the cockpit so brightly that I can't read the climb schedule on my white knee pad. On my record altitude flight, instead of white paper I used a sheet of gray cardboard cut from a shoebox for the knee pad. It looked blue in the upper air.

Probably we will tint the upper portions of our face plates in the future to reduce this solar glare. Dark goggles would be better but it could be dangerous to wear them. They are apt to be thrown around if the plane gets into violent buffeting and you can't reach inside the face plate to adjust them.

Traveling out away from the earth, there's a feeling of lonesomeness that's easy to understand. You are very much aware that you are exploring a new region of space and that you are completely on your own. There isn't a chance of outside help in case of trouble. Yet everything that is possible is done to protect the research pilot.

I can still communicate by radio, for instance, and other aircraft are standing by at lower altitudes. A T-33 photo plane and an F-86 low escort were right beside me when I dropped from the B-29. The F-86 pilot chased me as well as he could. A second F-86 was already on station higher

up to provide high escort and was moving at top speed toward my point of maximum altitude.

Both F-86 pilots watch my vapor trail while the rockets are blasting; afterward they follow me by radar. Both meet me at the descent area. Watching me as closely as possible, either might be able to give advice if something seemed wrong.

On the test flight that I made to learn the plane's maximum altitude I stole a little time from the instruments for a look around outside. The horizon seemed to be bent, and, of course, it was, for I could see the gentle curvature of the earth.

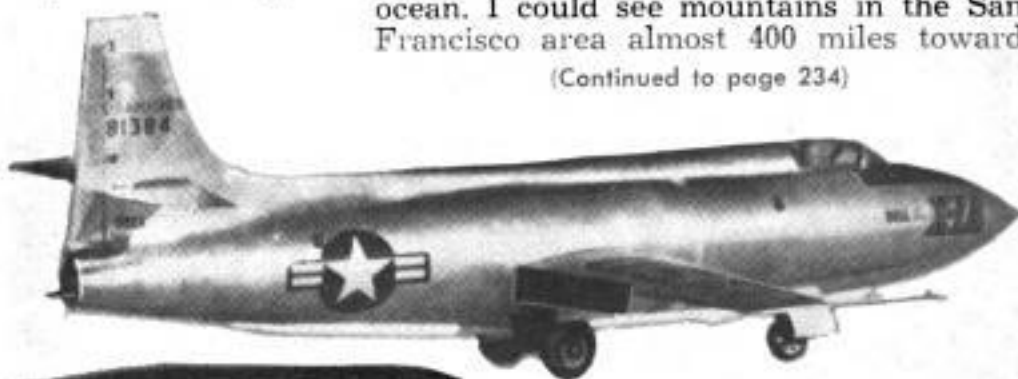
There was a low band of haze over the ocean. I could see mountains in the San Francisco area almost 400 miles toward

(Continued to page 234)



Major Murray examines the exhaust nozzles of the four rocket motors after a flight. The four motors can be fired one at a time or simultaneously

Dead-stick landing is a ticklish job. Pilot of escort "talks down" author by judging distance of X-1A from its shadow



You can swap shoes for shells,
stamps for stones at Milwaukee's

TRADING POST FOR JUNIORS



On an average trading day the museum plays host to 300 youngsters who come to swap everything from rock specimens to football uniforms. Below, an assistant trader dickers with customer over a sale of stamps



By Benn Ollman

OLD-FASHIONED THRIFT, modern merchandising and 20th-century educational ideas mingle at a trading post that lures hundreds of boys and girls to the Milwaukee Museum.

Transactions are handled on a barter basis, in a modification of the method followed in the trading post set up many years ago by Solomon Juneau, Milwaukee's first white settler. Juneau, in his log-cabin store, made handsome profits by exchanging rifles, cloth and trinkets for the red man's furs.

The patrons of the new trading post, who range in age from 8 to 16 years, conduct their commerce along more modern lines.

Youngsters are paid for their wares in trading-post money (this is a dollar), use it to buy other items



Counter of the trading post is lined with customers on the first Saturday of every month. Boy in plaid shirt is exchanging unwanted rock for a fistful of trading cash

They bring in their possessions for appraisal and receive payment in trading-post dollars, or "tepee money." With this currency they can buy items on display in the trading post's showcases. The post is open only the first Saturday of each month, but then it is jammed with youngsters eager to trade their wares.

The post was started in 1951 by Donn Brazier, scientific assistant on the staff of the Milwaukee Museum. Brazier hated to see duplicate material and museum discards tossed out, for he knew that a foreign stamp or a fossil rock worthless to the museum could start a child on a valuable lifelong hobby.

He opened the post in October of 1951. Attendance the first day totaled eight, but now it averages 300, with about 900 trading-post dollars changing hands in a typical day. Six boys and girls, under Brazier's supervision, act as assistant traders in appraising, selling and making inventory.

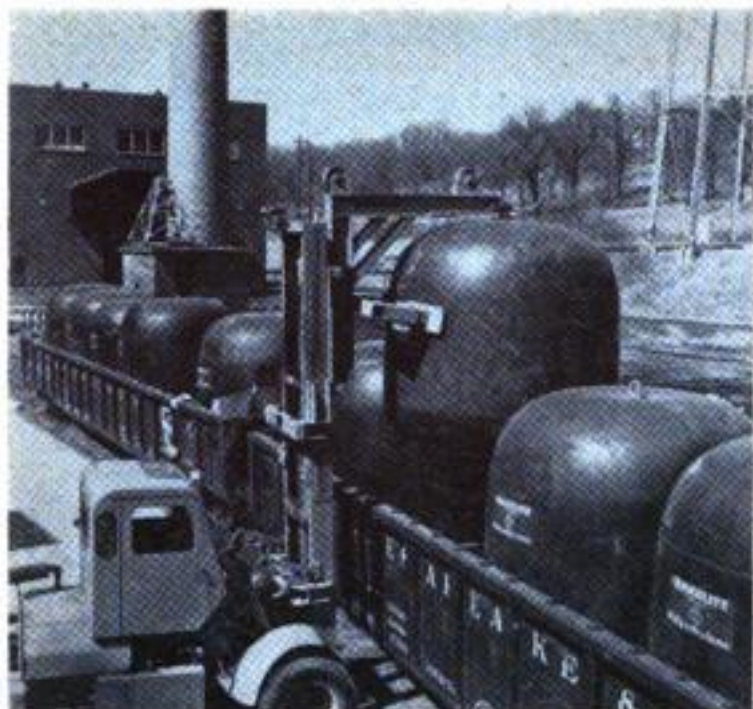
Stamps and coins are the items most traded. Youngsters are also encouraged to bring in sea shells, insects, minerals, fossils, American Indian curios, foreign items and scientific objects. The highest price ever paid for an article was \$45 in tepee money for a stuffed partridge. The only toys accepted for trade are educational ones like Erector sets, word games, magic tricks, model airplanes and handcraft sets.

"We frequently take in trade a lot of stuff we can't use," says Donn Brazier, "because we hate to disappoint any of our customers." But comic books and weapons are banned.

An exception to the rule occurred not long ago when some moppets tried to cash in on a loaded hand grenade that had been lying around the house. It was quickly exchanged for a nonexplosive toy. ★ ★ ★

Sea shell, right center, is traded by a boy who will use trading money received to buy a new item. Crowd of customers, right, includes a boy with a set of football shoulder pads. Athletic gear is in demand





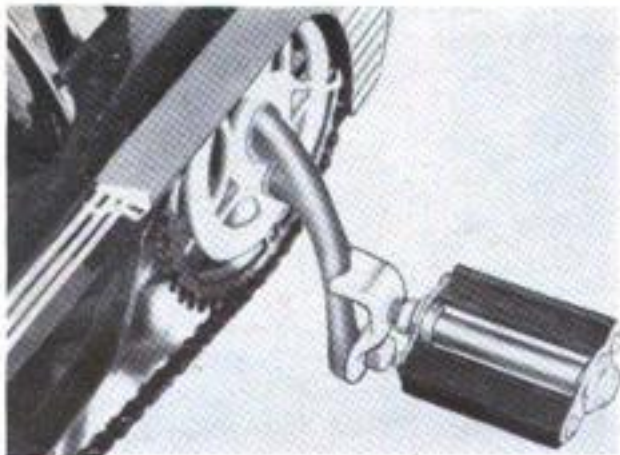
Rubber Tanks for Shipping Save Labor, Protect Materials

Huge rubber shipping tanks handled by lift trucks are speeding the transportation of materials. Loading a gondola freight car with the collapsible tanks takes only half a man-hour instead of the 16 man-hours required to load an equal volume of materials packed in paper bags. Each 300-cubic-foot

container holds the equivalent of 190 paper bags. The units withstand high pressures, resist puncture and protect the enclosed materials against air, water and contaminants. When the tanks are empty, they can be collapsed and stored outside, thus saving storage costs.

Italian Motorcyclist Sets Records Lying Down

Looking more like Superman than a cyclist, Orlando Ghiro rode his tiny 75-cubic-centimeter motorcycle at 84.151 miles per hour for a new record in Rome, Italy. Once the ride begins, Ghiro lies prone atop a shell that covers everything except the front wheel. He covered the one-mile standing start in 56.01 seconds for an average of 64.277 miles per hour. The 84-mile-per-hour figure is for the flying mile.



Adjuster for Bicycle Pedals

Bicycle-pedal level is easily adjusted with a device that raises the pedal socket. The adjuster fits into the threaded socket of any American or foreign bicycle, and can be installed quickly without special tools. Use of the adjuster eliminates bulky rubber blocks.

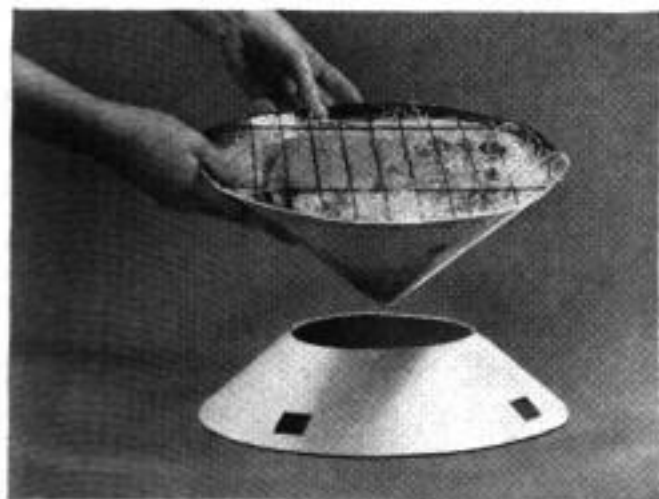
Consumption of butane and propane gases as motor fuels rose to 625,000,000 gallons in 1954, powering 200,000 tractors, 2500 buses and 9200 highway trucks, stationary engines and lift trucks.

Portable Television Set Weighs Only 34 Pounds

You can easily carry a 34-pound TV set designed for use in hotels, school dormitories, trailers and hospital rooms. The set has a 14-inch screen, is 17 inches deep and 10½ inches high. It has a vertical chassis and over half of the circuit is printed. A folding antenna attached to the back of the case pulls in nearby stations.

Rubber "Concrete"

"Concrete" made with rubber by a new process is so flexible that a long thin slab can be bent in a circle by hand. Yet it carries heavy loads without cracking or showing wear, is waterproof and slip-proof. Designed for industrial flooring, the mixture comes in two parts, the cement powder and a liquid rubber, and is prepared like ordinary concrete. It can also be used for patching damaged concrete and in waterproofing the interiors of storage tanks.



Disposable Barbecue Grill Comes Equipped With Fuel

Asbestos coated with aluminum foil forms a portable barbecue grill (left and below) that is thrown away after it's used. The unit comes complete with excelsior for easy starting and enough charcoal to burn for over an hour. It consists of a cone resting on a circular holder and a rack for several frankfurters or ribs.



Robot Train Announcers Take Over in England

Human train announcers at Stratford Station in London have been superseded by an automatic address system. Announcements for various trains are recorded on a continuous loop of magnetic tape. The right announcement for an incoming train is pre-selected by a member of the station staff, and when the train approaches the station it closes a track circuit connected with the signaling system, which switches on the tape recording heard over a public-address unit. This gives the platform number at which the train stops. When the train stops at a platform, it operates an adjustable delay relay to stop the tape for a specific lapse of time. Then the automatic address system reproduces another section of tape which tells the stations at which the train will stop.



TRAILER KIT includes all parts needed to build unit. Buyer supplies tires and makes built-in furniture



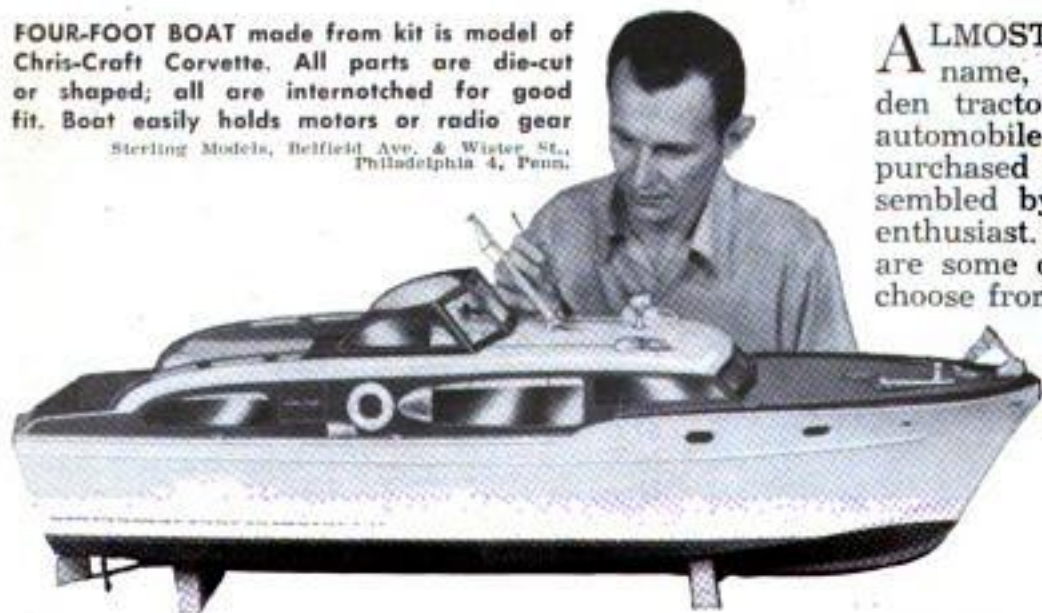
Land Cruiser Division, Chris-Craft Corp., Algonac, Mich.

The two-wheeled trailer is covered with aluminum sheeting, weighs 1070 pounds, is 12 by 6½ feet in size

Kit and Caboodle

FOUR-FOOT BOAT made from kit is model of Chris-Craft Corvette. All parts are die-cut or shaped; all are internotched for good fit. Boat easily holds motors or radio gear

Sterling Models, Belfield Ave. & Wister St., Philadelphia 4, Penn.



ALMOST any item you can name, whether it's a garden tractor, a garage or an automobile trailer, can now be purchased in kit form and assembled by the do-it-yourself enthusiast. On these four pages are some of the kits you can choose from.



GLASS-FIBER repair kit patches auto fenders, boats, downspouts or toys. It includes Fiberglas cloth plus a resin and a setting agent
 Fiberglas Evercoat Co., 7008 Reading Rd., Cincinnati 37, Ohio

TRACTOR assembled from kit powers lawn mower, pulls various yard and garden tools. Tractor and mower are assembled from package that includes all parts down to the last bolt

Belsaw Machinery Co., 315 Westport Rd., Kansas City 11, Mo.



LAWN SPRINKLER system is installed underground in a few hours. Fittings, pop-up spray heads and 80 feet of flexible plastic pipe are included in the package

Anesite Co., 3575 Touhy Ave., Chicago 45

LOCKS are installed with a kit loaned by hardware stores to home craftsmen. It includes all the tools used by professional locksmiths

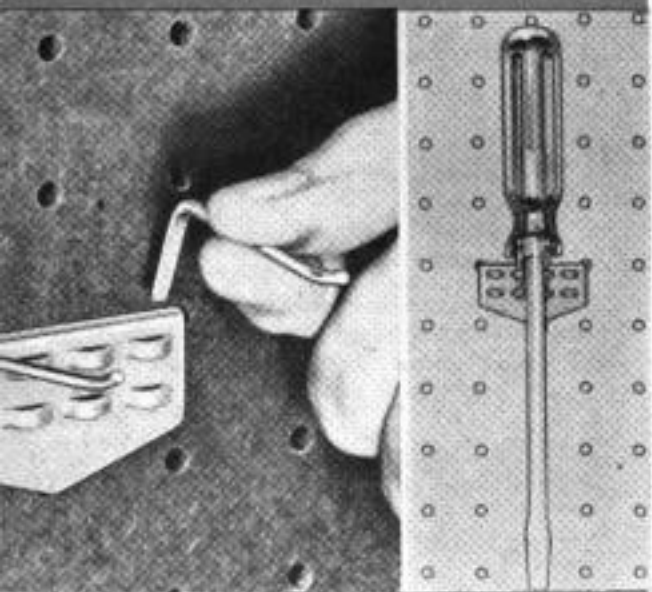
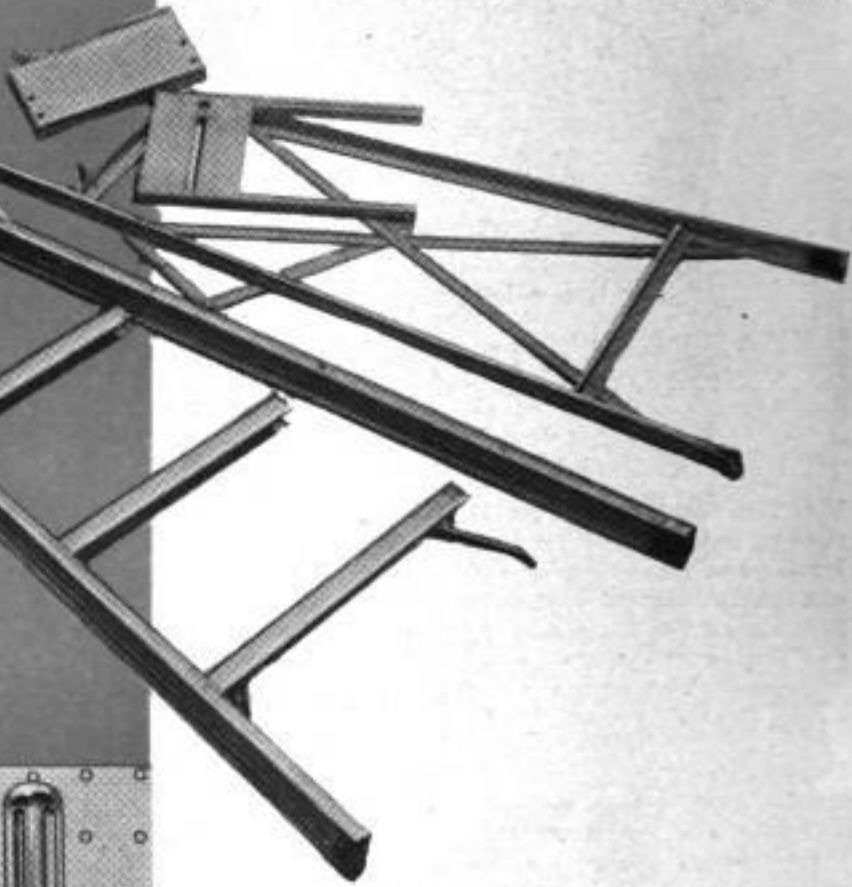
The Yale & Towne Mfg. Co., Chrysler Bldg., New York City 17





STEPLADDER made of aluminum is put together with a screwdriver. The ladder is lightweight and sturdy, designed to outlast wooden counterpart. The top step of ladder is handy tray for nails and tools

sky Service Corp., Highway 57 at Municipal Airport, Evansville, Ind.

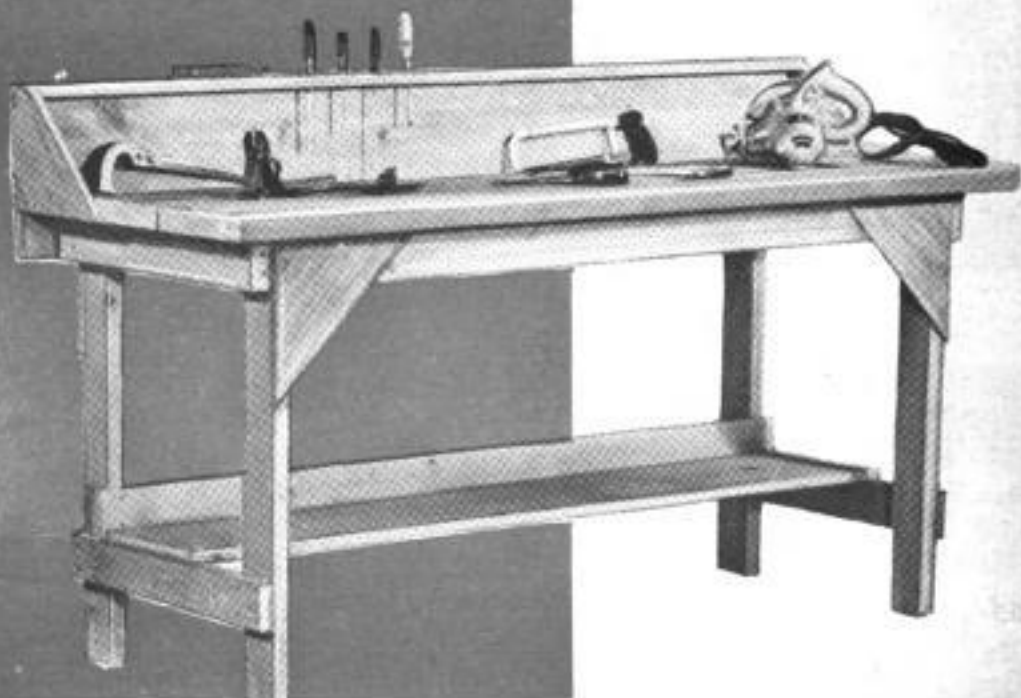


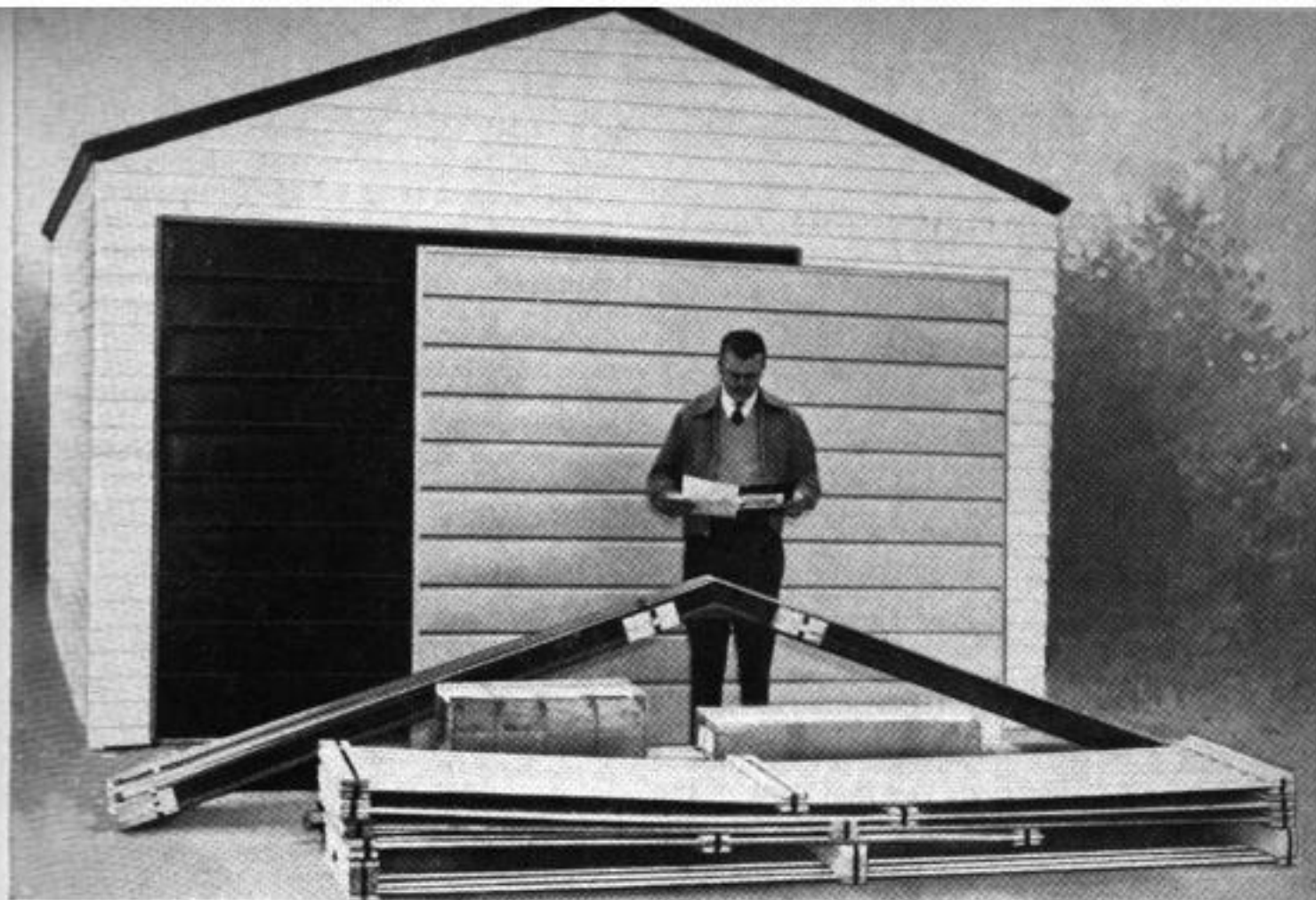
SCREWDRIVER set includes six screwdrivers of various kinds, a perforated tool board, and eight brackets from which tools can be hung. The tools rest on hanger hooks which slip into bracket slots

Vaco Products Co., 317 E. Ontario St., Chicago 11

PRECUT WORK BENCH is put together with just a hammer, a screwdriver and a simple blueprint. The six-foot bench is made of select wood and contains special racks and shelves to hold the various tools

Atlantic Engineered Products, Inc., 1041 Dixwell Ave., Hamden, Conn.





STEEL GARAGE can be erected in a few hours. Roof and the clapboard-style siding are simply nailed to the special steel framework. Package includes all parts

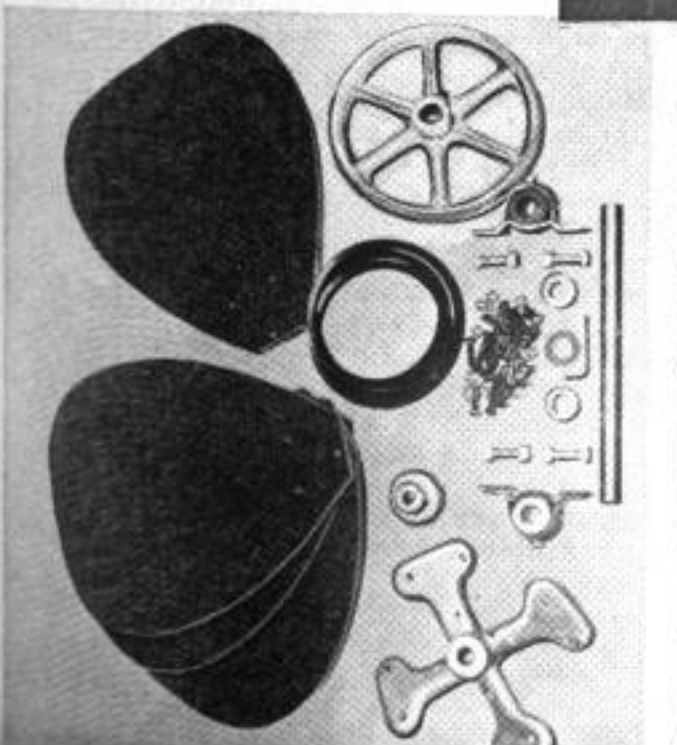
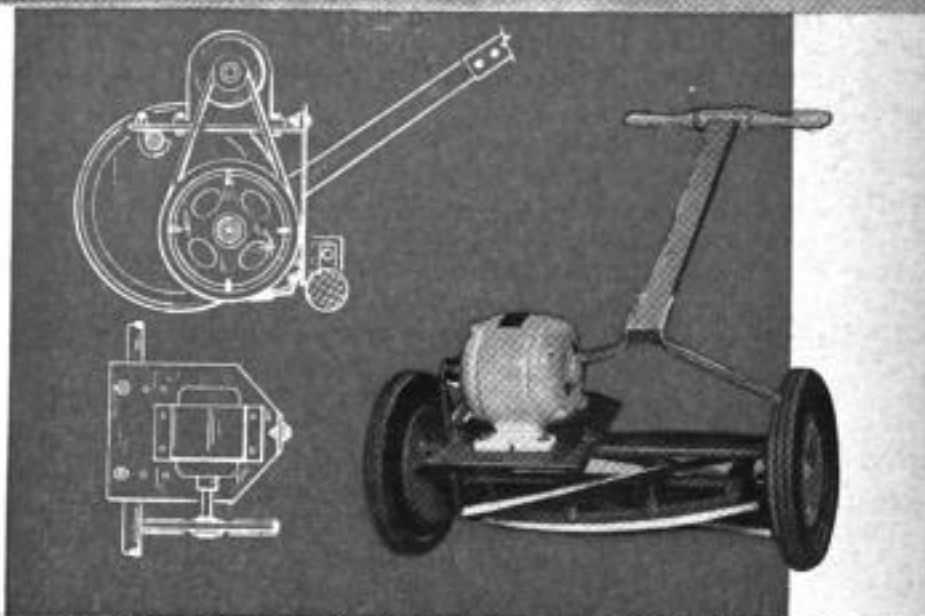
The Steelcraft Mfg. Co., Rossinoyne, Ohio

LAWN MOWERS are converted to electric power with a simple kit that includes a motor platform, pulleys and a belt system. Any $\frac{1}{4}$ -horsepower electric motor is used

Motron, 5212 Foothill Blvd., Oakland 1, Calif.

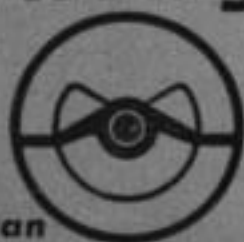
ATTIC FAN big enough to cool average house is built from furnished parts and powered by small electric motor. The 30-inch horizontal fan has hardboard blades

Fan Kit Co., Box 5842N, Memphis 4, Tenn.



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Detroit Listening Post



By Leo Donovan

ROLLING AT A HIGH but controlled pace, the automobile-engine race will continue. You can expect engine performance to improve with each year's new models. The industry's engineers can be expected to chart a step-by-step course in their planning for higher and higher compression ratios in engines of the future.

Your memory tells you that none of the passenger-car engines have declined in compression ratios, and few have remained static. The 1956 models will follow the same upward pattern. Engines will have faster acceleration throughout the entire speed range. But it's all carefully plotted and measured.

The Ford Motor Co., for instance, isn't likely to provide better performance in its Ford cars than in its Lincolns in 1956, any more than GM would offer a Chevrolet that would outperform a Cadillac.

Automotive engineers, working with petroleum-industry engineers, see no sudden jump to 10-to-1 compression ratios because the necessary higher octane fuel won't be available. Some refiners already have begun marketing 98-octane gasoline, a development that wasn't expected until 1960. But the 10-to-1 compression engine will require a fuel of about 100 octane.

Automotive engineers are learning a lot about "building higher octane numbers" into the engines themselves—designing combustion chambers so that higher compression ratios may be had without boosting octane requirements of the gasoline very much.

In experimental engines, combustion chambers have had their shapes altered to resemble pots of many different forms and contours in order to produce more efficient combustion. A combination of more efficient combustion chambers and higher-octane gasolines by 1960 may reach the goal of 12-to-1 compression ratios and a savings of billions of dollars in the nation's annual gasoline bill.

When is the transition to gas-turbine engines coming? Most automotive engineers

tell you the switch is unlikely for at least 10 years—and not then unless cheaper steel alloys able to withstand the terrific temperatures of gas-turbine engines are developed.

Although most 1956-model cars won't be displayed until October and November, the preview season in the industry already is under way. The new Lincoln has been privately displayed, and sneak pictures of prototype models of most cars are circulating in Detroit.

Tool-and-die-shop schedules indicate the following introduction times for the new models: Chrysler, Plymouth, Dodge and De Soto, plus Lincoln and Continental, Studebaker-Packard and American Motors cars in September and October; Buick, Cadillac, Chevrolet, Oldsmobile and Pontiac in October-November, with Ford and Mercury in the same period; the Rambler probably in November or December.

Many old-time dealers tell you that now is the best time of the year to get the most transportation for your money. Factories are slowing down output to give dealers time to clear out stocks of unsold new cars.

All manufacturers agree that the intense competition of 1955 will continue throughout 1956. And by 1957, they say, it will be the fiercest in history. All car makers are preparing for the most extensive changes in their products in the history of the industry, insiders report. There will be completely new body and engine changes in many models, with a wide variety of mechanical innovations, probably including an automatic lubrication system and a centralized hydraulic-power system for operating power options such as power brakes, seats, window lifts, etc.

The cumulative effect of the modified guaranteed annual wage in labor contracts, plus higher wages generally, is expected to be passed on to the customer in the prices of 1956 models. There will be more "face liftings" in the 1956 models, despite the all-time-high investment in tooling costs for current cars.

Having regained much of its lost ground in the sales contest so far this year, Chrysler will press for an even greater share of the market in 1956. Industry speculation has it that eventually Plymouth may become an independent car line instead of being dualed with Chrysler, Dodge and De Soto.

Although the trend toward multicolored cars is expected to be lessened in next year's models, you can expect General Motors to provide an even wider variety of body styles as one result of their expansion program. Cadillac and Chevrolet are likely to have their own versions of the four-door hardtop.

Cone Lays Ribbon of Mortar

Amateur masons can lay a smooth ribbon of mortar along the top of concrete blocks with a new mechanical dispenser. The mortar feeds from a cone-shaped reservoir that rolls along on a guide wheel. The device is said to cut waste by 50 percent and increase block-laying capacity up to three times. Any standard mortar mix is used. The instrument, which largely replaces a trowel, is said to require fewer mortar boards, less scaffolding and cleanup.



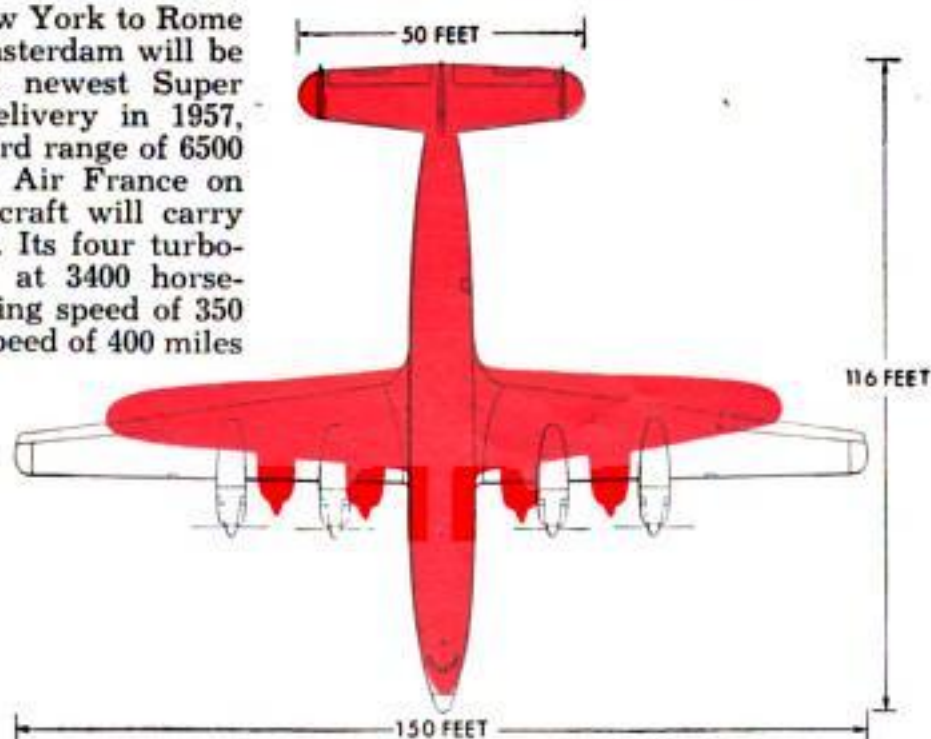
Lightweight Plastic Oar Stores Fly Rod in Handle

Oars made of glass fiber won't warp, check or split and never require painting. The handgrip of each oar can be removed for access to a built-in compartment that can be used to store a fly rod. The lightweight oars float and will never become waterlogged. They are available in three sizes and five colors.

Fly rod is inserted in the hollow handle after handgrip is removed. Plastic holder keeps equipment dry

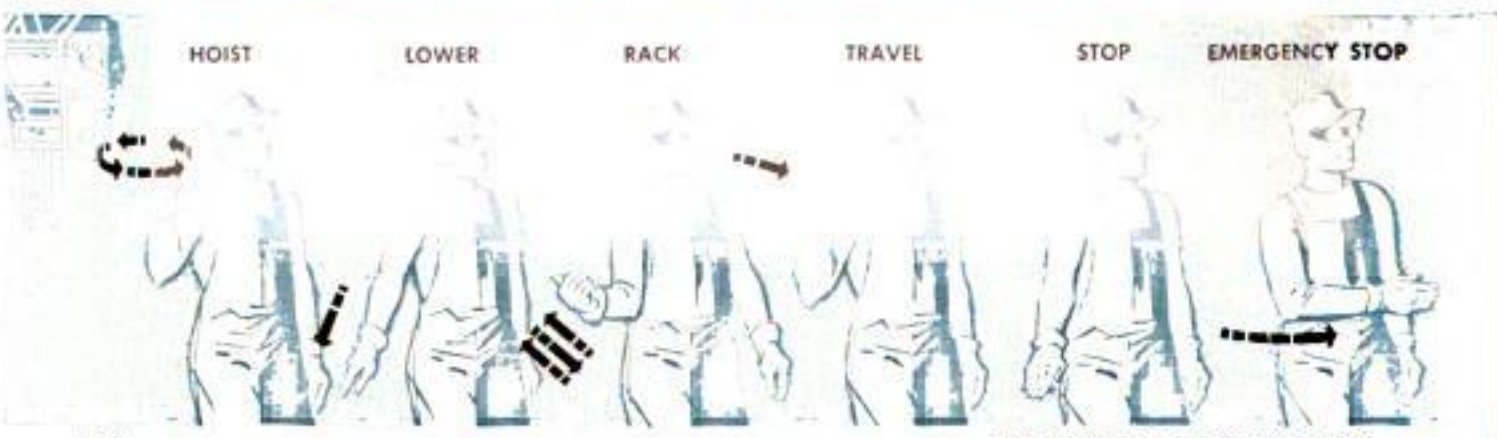
Long-Winged 1957 Constellation Will Fly 6500 Miles Nonstop

Nonstop flights from New York to Rome or from Vancouver to Amsterdam will be possible with Lockheed's newest Super Constellation. Due for delivery in 1957, the 1649A will have a record range of 6500 miles. Serving TWA and Air France on long-distance flights, the craft will carry up to 9600 gallons of fuel. Its four turbo-compound engines, rated at 3400 horsepower, will give it a cruising speed of 350 miles per hour and a top speed of 400 miles per hour. The plane will have the basic fuselage and triple-finned tail of its predecessor. The wing, however, will be longer and more tapering. Sound and vibration will be reduced by larger propellers revolving at slower speeds, and placement of the engines five feet farther out on the wings.





Shop foreman signals to crane operator in suspended cab as 122-ton locomotive in Santa Fe shop is lifted by two giant cranes. Below are signals used by floor men to tell crane operator what he should do





Standard radio-studio signals mean: 1. Program is on schedule; 2. One minute to go; 3. Performance was "OK"

The Sign Language of Industry

By Robert H. Forbes

I'VE BEEN WATCHING Bill's hands for my instructions for 25 years now," says Jasper Hogweide, setter on the No. 2 log carriage at the Northwest Timber Company sawmill, Coeur d'Alene, Idaho.

Nimble fingers of Bill Harris, sawyer sitting beside the mill's No. 2 bandsaw, direct Jasper's shifts of the log-carriage setworks. This machine advances a log a little at a time on the rapidly moving carriage; thus a board of precise thickness is cut on each "shotgun feed" carriage trip to the bandsaw.

Sawyers' hand signals have been a part of American lumbering almost from the first 17th century water-wheel sawmill in Maine. Ever since, the same number and combinations of fingers have meant just about the same things.

An index finger sticking up out of a sawyer's fist means a one-inch cut. Add a protruding thumb to the one-inch signal for "six quarter inches," the sawmiller's way of saying 1½ inches." All five fingers tell the log setter to flip the setworks to five inches.

"Jasper and I have stuck together so long," says Bill, "because it's hard to get into the rhythm for good sawing with a strange partner." Sawyer-setter teams see that each log is cut to its best advantage. They also control lumber flow in the rest of the sawmill, so the two jobs based on hand signals are the most important in a lumber-manufacturing plant.

The continual racket of a whining head saw and a noisy log carriage makes sign-language talk between sawyer and setter necessary. Instruction relay is needed because only the sawyer can see the face of a partly sawed log and know how to make the best cuts.

Various-sized timber in different parts of the country and the number of remanufacturing machines in an individual sawmill have varied the traditional pattern of signals, however. Large logs on the West Coast give a sawyer a real workout. He may have to use his arms as well as the fingers of both hands to tell his partner what to do.

Forefinger and little finger of a sawyer's hand mean a 6¼-inch bite of a log in the big-timber country beside the Pacific Ocean. In Idaho, it signifies a five-quarter-inch-thick chunk of a log.

Crane operator in the Armco steel mill at Middletown, Ohio, is Al West, who watches the hands and fingers of floor-crew men beneath him to know what to do. He then lifts and lowers loads and moves his rumbling giant back and forth 75 feet above its mill-bay floor according to the number and crook of fingers he sees.

Hand signals fly thick and fast at Al's mill, which has 117 different cranes scattered around 50 acres of floor space. There are big ladle cranes to tap furnaces, little ones like the five-tonners in a small bar mill, short ones, fat ones; steam, electric



1. "Cut the coolant!" signals a mill operator at Kaiser's Trentwood aluminum rolling plant. 2. Half a load is signaled by remelt trucker who slashes arm

across waist. 3. Scratching his cheek is operator's way of saying "Adjust scratch brushes." 4. Cupped hand means "Adjust to align rolled edge of sheet"

and diesel cranes that must be directed.

It takes a lot of lifting to make each ton of steel, but directions shouted to a crane man can get mixed up in the din of a busy steel mill. "A floor man sticks his index finger straight up and waves it in a circle, when he has fastened a load under the latticework 'spider' on my rig," says Al. "That means 'lift 'er up.'"

"Floor men have more than a dozen other sign-language motions. A wide circle made with fingers of both hands tells me to go to a rolling mill. Three fingers of one hand in the air indicate the No. 3 machine."

Some of these signal directions are standard throughout the steel industry and elsewhere where large hoists, great distances and interfering noises combine. Other signals are peculiar to the Middletown mill and its crew of helpers.

George Fisher, a Union Pacific railroad brakeman in eastern Washington state, signals with his hands by day and with a lantern by night. Main-line railroad signals are usually made from the rear of a train

toward the locomotive, between train conductor and engineer or between "brakie" and conductor. The motions of all United States railroad men have been codified for operating safety by the Association of American Railroads.

Main-line signals are relatively few, simple and easy to use with a lantern, but hand signals in switchyards are many and varied. "All over this division of the U.P.," says George, "a trainman's hands waved in front of him, thumbs raised, means 'Tie her up. Let's go eat.'" The same signal meaning the same thing might have been used by stagecoach drivers of the Old West.

Since the days when Indians had the continent to themselves, sign language has been an important means of communication in America. The red men had an elaborate system of talking with their hands, which permitted members of strange tribes to converse on their first meeting. A Chipewa buck made the sign for "big" by parting his outstretched hands from a

palm-together position. This was understood by his Dakota neighbors, who intently watched the next sign—which might be for a herd of deer—and then where the buck pointed.

Modern radio and television broadcasters use the Chippewa's sign for "big" to tell an announcer to "stretch it out"—make his part of a program longer than planned. The studio signal for "lower the volume" is actually "kill part of the sound." It is a gesture because spoken words might be heard on the air and is made by a program director dropping his hands before him. The Indian sign for "kill" was to drop a nearly closed hand from the shoulder.

Broadcasters borrowed heavily from the Indians for signals, but they also used other sources. Horse racing furnished the inspiration for "on the nose," which TV and radio people act out and interpret as "the program is on schedule." One, two or three fingers of a broadcast engineer's hand, to let actors know the remaining minutes of a program, just came naturally.

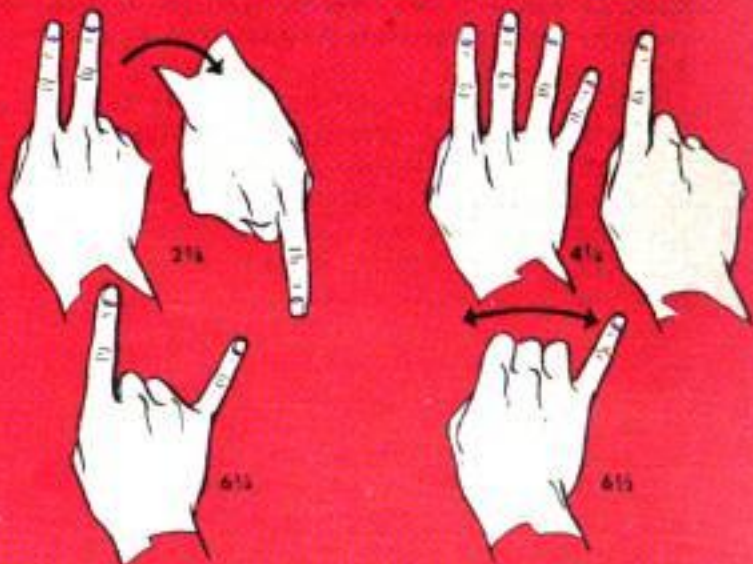
The well-known studio "OK" sign, made by circling the thumb and index finger and more or less separating other fingers, was first used in advertising by a brewing company. A radio director of long ago thought the finger circle was good for an "O" and remaining fingers weren't too bad for a "K". At least, this is the sign that every performer hopes to get from his director.

In a studio, the boss draws his index finger across his throat to cut a program off the air. The same motion in many railroad switchyards means to "bleed" the compressed air out of a car and so release its brakes.

Motor truckers once transferred information between approaching vehicles by finger signals. But as trucks and highways became faster, the point was reached where trucks traveling in opposite directions were in close range for only seconds. "Our underwriters do not like the distraction of that type of signal, either," says Roy Bloss, West Coast Fast Freight, Inc., Los Angeles.



Sawyer at West Coast sawmill makes signal for 1½-inch cut



Hand signals used by sawyers in Pacific Northwest indicate inches of cut to be made. Below, George Crouch, head sawyer in Weyerhaeuser sawmill, tells setter he wants 6½-inch cut





Thumbs to his ears, Union Pacific brakeman George Fisher makes the sign for "stockyards track," to indicate that track is right one to take for livestock unloading. Right, he tells engineer, "Tie 'er up. Let's go eat."

Now truckers just give a friendly wave of the hand when passing each other, or at night "talk" by flashing the small identification lights above their cabs.

Auction bidders and stock-market traders often work their fingers instead of their jaws. They've reached the point where different bends in fingers have meanings in dollars and cents. Many wealthy Texans sit in cattle or oil-land exchanges all day long and make deals in the millions, yet never open their mouths.

Steel workers on skyscraper-construction jobs, cargo handlers on ships, motion-picture directors on sets and plane handlers at airports and on aircraft carriers wig-wag messages with their hands and arms.

Walkie-talkie and mobile radios and intercom systems have cut drastically into the use of hand signals where distance is the difficulty in getting orders across.

Strides were taken in this direction over 10 years ago, with the allocation of wave lengths to many industrial radio users by the Federal Communications Commission. Since then, industry has clamored for more and more radio frequencies—more than were available a couple of years ago. One of the latest moves is the development of microwave equipment which uses radio waves approaching the length of light waves.

The use of radio has replaced much of the sign-language vocabulary once used at open-pit mines.

Radios are being installed on freight trains for communication between caboose and engine.

"Walkie-talkies will not take the place of hand signals in switchyards," states H. W. Logan, Union Pacific engineer. "Switchers, who are always dashing around and hitching rides on moving cars can't bother with a bulky radio pack."

Now, walkie-talkies in switchyards are used only by car inspectors, who can thus call in freight-car numbers to the office quickly.

The importance of hand and arm signals by infantry troops has also suffered because of radio, but the method has not been dropped altogether. Army recruits now have to learn both communication systems, in case one is not usable at a given time. Air Force pilots flying in formation once had a number of hand signals to use between planes, but extensive outfitting with radio has boiled these down to one. A pilot's hand placed on the side of his flying helmet means, "My radio is not working."

Some modern sawmills are doubling their sawyers' output and eliminating the need for log setters and the use of signals. The mills are rigging up automatic, electric or compressed-air-operated setworks controlled by the sawyer. But, even at these mills, hand signals will continue in use between sawyer, foreman, edgerman, trimmerman and others. ★ ★ ★



Helicopter Carries Prospector in Search for Uranium



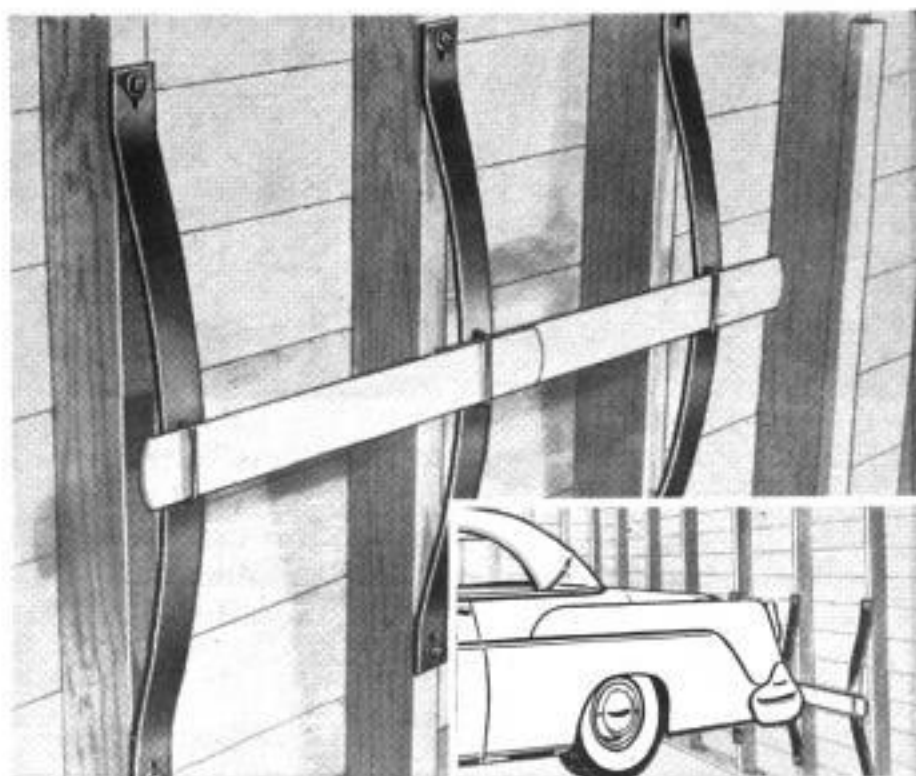
Graph paper rolls out of a recorder in the helicopter. Peaks in graph line indicate increased radioactivity

Far removed from the traditional bearded prospector and his burro is the modern geologist who hovers above the earth in a bubble of Plexiglas while he searches for uranium. Bell Aircraft Corporation has equipped a helicopter with the instruments needed for aerial uranium prospecting. A scintillation counter and recording instrument in the cabin measure the amount of radioactivity radiating from the earth's surface. The helicopter is superior to the airplane for this purpose because the instrument is most effective when operated at less than 100 feet altitude while traveling about 30 miles per hour. Broken down and packed on the helicopter's landing gear is a portable diamond-core drill which can be set up at any promising spot and used to drill holes as deep as 300 feet.

Buffer Protects Garage Wall

Bolted to the studs on the back wall of the garage, a spring buffer prevents the car bumper from pushing a hole through the wall if the driver misjudges stopping distance slightly. Three steel-spring leaves fasten to the studding and a steel crossbar attaches to them at a height that matches that of the bumper. The springs are painted black and the crossbar is painted bright aluminum.

☐ Aluminum yarn may soon be used in automobile tires to disperse heat caused by road friction.





Frances Poe, the "big-game sculptress" of the story beginning on the opposite page, stumbled into her art while caring for sick and orphaned wildlife. Today animals and birds, like this wounded heron, share a studio with this self-taught artist



Antelope with three feet in air and bear teasing a pack rat are caught in porcelain by Frances Poe, who uses air brush (left) to color a half-finished animal

BIG-GAME SCULPTRESS

By Elliott H. McCleary

Photographs by Dan Honick

A FRIGHTENED little rabbit started it all. You might say the chloroformed rattlesnake helped too, along with the wounded possum. But not as much.

Frances Poe had found the orphan rabbit nestled in some brush along a railroad track and brought him back to the wild-animal "hospital" she'd established in her basement.

Now she was busy making a duplicate of the tiny foundling—in clay.

It was a casual beginning for a person whose specialized art today is not matched

by any other artist in the entire world.

Miss Poe makes porcelain figurines of North American game animals, and they're not the kind of work you'll pick up in a ten-cent store. There's a glint in the eye of each handmade statuette, a poise in the stance, a spark of life that makes you want to grasp it to prevent it from running off the table.

The reason the little ceramic animals are so different may be that their maker is a self-taught sculptress. If she'd gone to the proper authorities she would have learned,



Polar bear with authentically sharp teeth and caribou with finely shaped antlers share display with a bison

first of all, that you can't make porcelain deer and moose with antlers, because the prongs warp and shatter in the fiery heat of the kiln.

That's exactly what happened the first time she tried it. But today the finely shaped antlers of her elk, deer and moose are a trademark of her work, for she's the

Everything in this piece is made of porcelain, even shrub, stump and geese beneath meditating moose



only one in the field who hasn't yet learned that it can't be done.

"Impossible" tasks have always been a challenge for the pretty Wilmette, Ill., woman. Once, as a staff artist for an encyclopedia, she had to sketch the interior of a rattlesnake's mouth—while the snake was striking. The trick was accomplished by chloroforming a deadly timber rattler. As the snake awoke from his stupor, the mouth gradually opened and he began to strike—in slow motion. There was plenty of time for the artist to sketch an excellent picture of fangs, throat and tongue.

Actually, Miss Poe doesn't care much for snakes. Her best friends, next to some humans, are the birds and burrowing animals that make their temporary home in her basement sanctuary. Some, like an amiable possum who poses frequently for her sculptures, decide to stay on after their injuries have mended. There are usually several grounded pigeons, a sea gull and a squirrel or a raccoon around the cellar studio to lend encouragement. And always, roosting nearby with a critical air, is a rare and doleful-looking black-crowned night heron.

She has a good many acquaintances in Chicago's Lincoln Park Zoo, too. There's a buffalo named Moco, a grizzly bear and a mountain lion who help her out now and then by acting as models. The zoo is usu-



Slinking jaguar, mountain goat, two playful deer and a belligerent walrus were individually modeled. Molds are never used

ally her first stop when she's starting a new sculpture. Equipped with her drawing board and a folding campstool, she'll capture the tilt of an antelope's head or the gait of a hungry puma in fine, detailed sketches. Then she's off to the city's natural-history museum for sketches of skeletons and mounted animals. The last stop is likely to be the library, where she'll dig up such details as the girth of bears after hibernation or the capacity of a possum's pouch.

Back in her basement studio, she'll begin the preparation of the basic stuff which gives porcelain its amazing qualities. It's a mixture of almost one half English china clay, one fourth flint, one fourth feldspar and three percent ball clay. Good porcelain is actually harder than steel, for you can't scratch it with a knife blade. Neither can you harm it with most acids. It's highly translucent and sounds a clear, bell-like ring when struck.

Is it strong? Frances Poe answers the question by placing a delicate little deer only five inches high on the floor and standing on it with her full weight.

Rolling a lump of the clay mixture between her palms, she shapes a rough pedestal to support the weight of her sculpture. Another lump is placed on top of that, like the cross of a "T." It will become the body.



Next come the rough legs, the neck and the head.

Pressing little lumps of clay into the rough form, she builds up the body of the animal. Then, with knives and wire tools, she starts to carve and cut fine details in the soft mass. Now and then she pauses to transfer anatomical measurements from her data to the clay with an ordinary foot ruler.

Within hours, details start to emerge—legs bent as if in running, an arched neck, the stub of a tail. But you're not exactly certain whether it's going to be a caribou or a deer until she begins to shape the delicate antlers, building them up with bits of pressed clay. Often, she shapes the antlers separately and then sticks them to the head, for they are easily marred.

Two other tiny blobs of clay become wild ducks, wings spread in a take-off flight, for this is to be a group of figures affixed to a common base.

Suddenly it seems that she is deliberately destroying the half-finished animal. With a



Model of a deer begins as a single lump of clay on a rough pedestal. Rolled lumps for legs, neck and head are added. Smaller lumps add other details to body



Deer is decapitated and section of back removed so interior can be hollowed out. This assures even firing. Air passage goes from nostrils to interior



After the body is built up with bits of pressed clay, fine details are cut away with a knife. Antlers are often formed separately and then affixed to head



Color is applied and deer is placed in gas kiln for firing. Upside-down position helps prevent antlers from warping. This firing takes seven to nine hours



Finished piece is the result of several firings. The main firing changes the clay into porcelain and brightens and fuses the coloring. Later, the piece is glazed and fired again

slice of her knife she lops off the half-formed head and cuts a healthy segment from the back of the figurine. But it's only so that she may hollow out the body to insure even firing in the kiln. Using a slender stick, she gouges out air passages from the nostrils to the hollow interior, then reassembles the parts and smooths over the division lines.

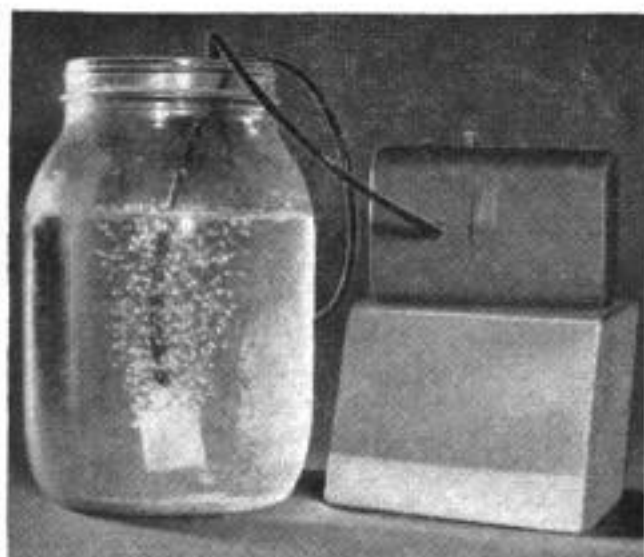
The next morning, after the animal has had time to dry, she adds final details preparatory to "toasting."

Baking for four hours in a gas-fired kiln heated to a temperature of 1800 degrees Fahrenheit hardens the objects so they can be handled without breaking.

Except for its stark-white color, the animal now looks as it will when finished. Tiny ribs and lumps of muscle duplicate the features of a deer in motion.

Using metallic oxides—uranium for yellow, cobalt for blue, iron for black—mixed with glaze and some of the basic body material, she fills her air brush and sprays colors onto the white figurine.

(Continued to page 218)



Battery-Operated Aerator Keeps Minnows Alive

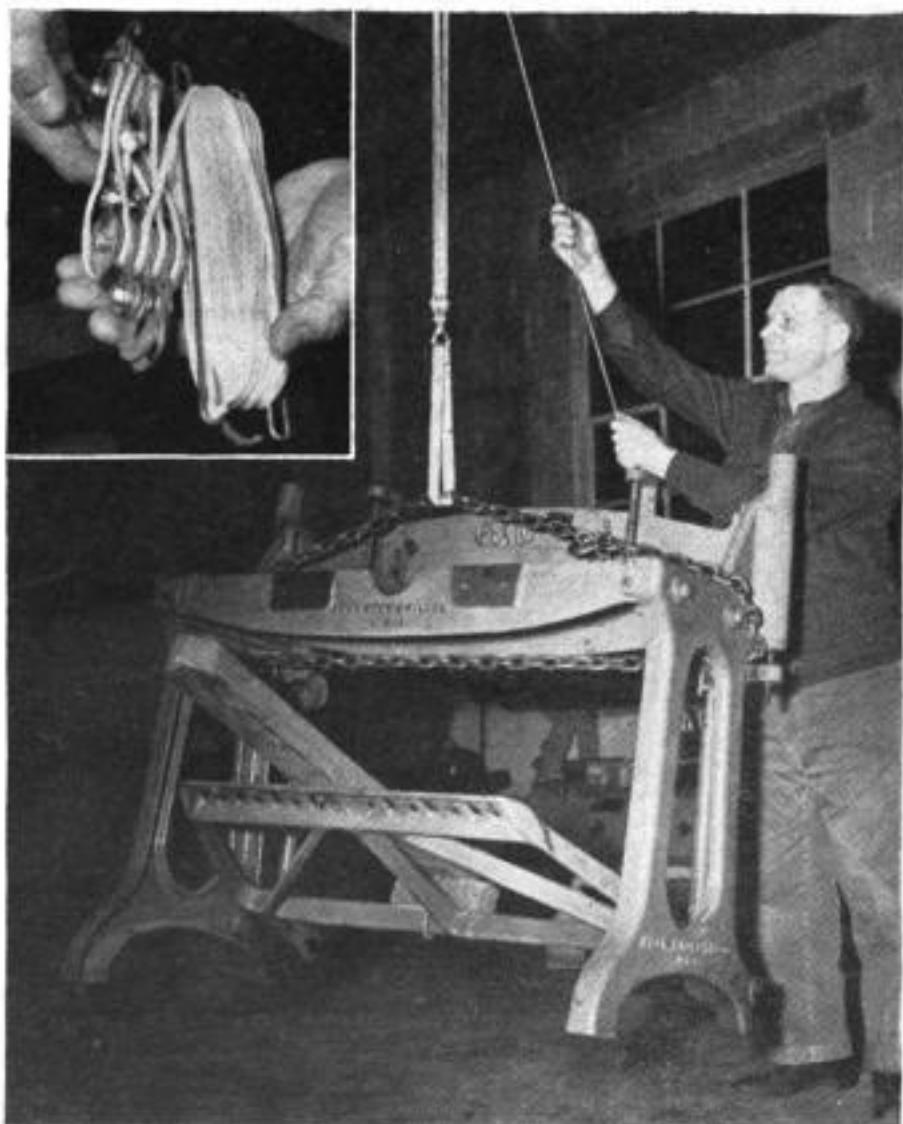
Oxygen supplied by a new aerator will keep minnows alive in the same water indefinitely. The aerator is powered by four flashlight batteries, and uses only half as much current as a flashlight bulb. The batteries will run the pump continuously for about 30 hours. The aerator also is supplied with a lead which can be plugged into a

car's cigarette lighter. A large dry-cell battery of the type used for electric farm fences will operate the aerator through the entire season for most fishermen. An aluminum-oxide aerating stone breaks the air into thousands of tiny bubbles per minute. As many as four minnow buckets can be aerated at once.

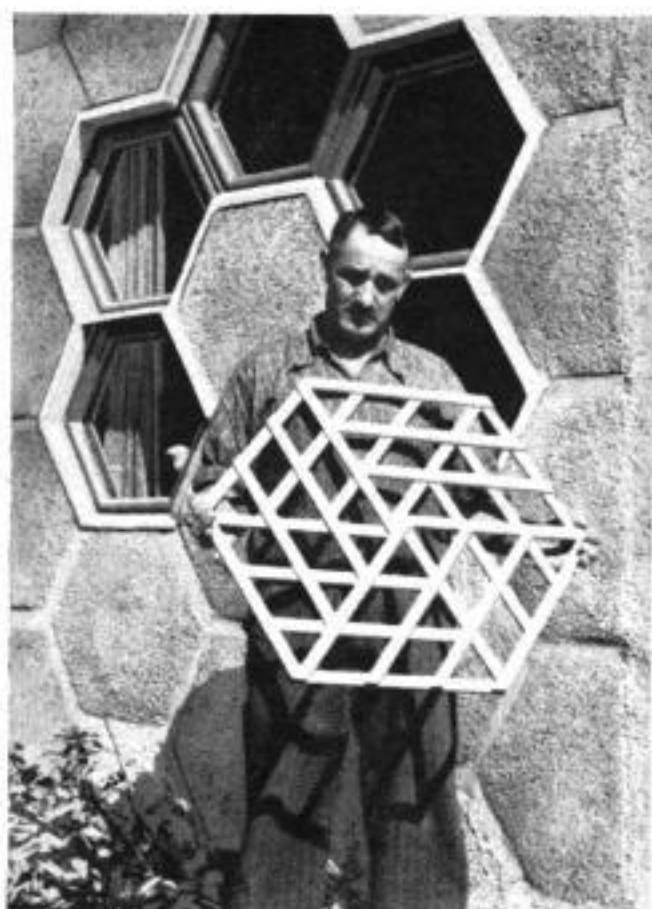
Midget Hoist Lifts Half Ton

You can pull your car out of a ditch, hang a deer, or raise heavy machinery with a little hoist that fits in your glove compartment. The outfit weighs about a pound and will raise half a ton of weight a height of 12 feet. Blocks and sheaves are of heat-treated aluminum and the pulley wheels are mounted on roller bearings, pre-lubricated and sealed. The line consists of 100 feet of rotproof nylon cord. For lifting heavier loads, the nylon cord can be replaced with steel cable. Two canvas straps with welded steel eyes are used for attaching the hoist to the load and to the support.

☐ In 1939 about 30,000 tons of mail and 45,000 tons of express were shipped by air. In 1954 air cargo was estimated at 800,000,000 ton miles and mail at 190,000,000 ton miles.



HONEYCOMB



E. R. Brewster, New Zealand beekeeper, displays the basic hexagonal unit made of laths with which he constructed his house using honeycomb principles

By J. M. D. Hardwick

IF YOU WANT TO BUILD a house of your own, take a lesson from the bees," says beekeeper E. R. Brewster of New Plymouth, New Zealand. "They've been building for thousands of years."

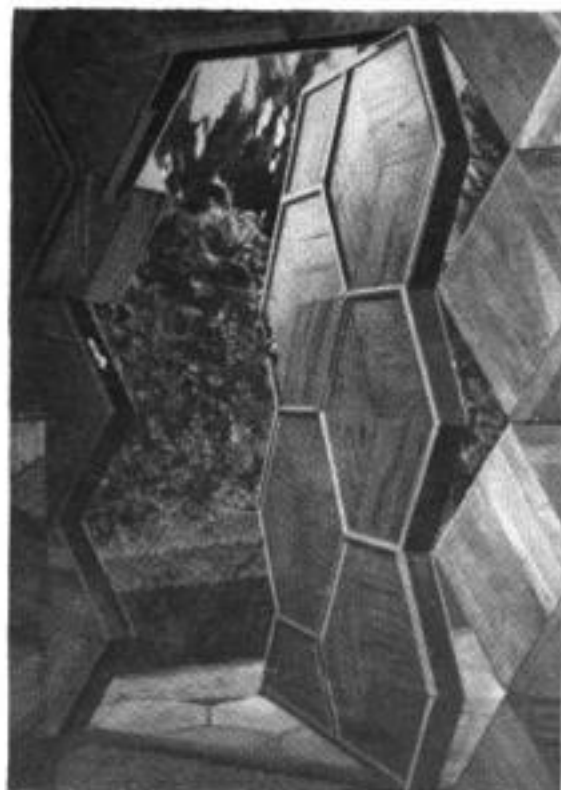
Brewster claims to have solved the problem of how to build a durable house at low cost and without experience. To prove his point he built such a house for himself and is now living in it with his family.

Pondering on the hexagonal cells that make up every honeycomb, it occurred to Brewster that a similar method could be used for precut houses with a gain in strength and reduction of expenses. Long ago the bees worked out the greatest economy in regard to space and material for the cells of a honeycomb, he explains.

"These cells are set at an angle that never varies," says Brewster. "This accords perfectly with the angle determined by calculus which will give the cell the greatest strength for the amount of materials used. Nature often uses the hexagon in her work, but never the square."

Commercially developed for a precut house, Brewster believes his method would enable an amateur builder to construct a seven-unit house of 1176 square feet in less than 4000 hours of work. The cost would be considerably less than conventional construction, he reports. With a precut kit,

Even the front door of Brewster's house is made of hexagonal sections; hall walls are polished hexagons



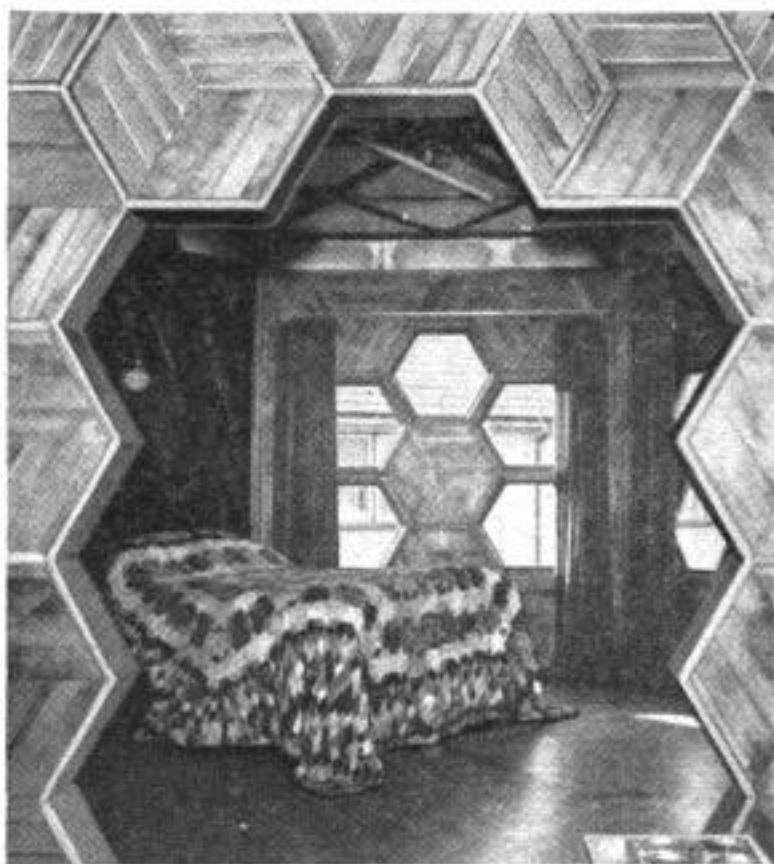
HOUSE

more than three fifths of the work would be in assembling the pieces into sections, and less than two fifths in actual construction. The precut kit would consist of as few as 16 items, out of which everything, including cupboards, doors and windows, could be made.

The hexagonal sections are made of short lengths of lumber and used for wall-lining panels and the lath frame for plaster. No jigs are required for the lath frame.

Much of the work on this house can be done indoors working at a small bench. Brewster advises a builder to construct the first three units, move into them and build the rest of the house around him.

The floors are built in three laminations of half-inch timber. Bottom layers are pine and the top layer of any selected wood. All walls are 10 feet high by 8 feet wide and have a laminated outer frame of pine. The ceilings are of triangular framework and each is composed of 42 sections. Brewster's house has a roof made of triangular sections, but a cheaper dome-shaped roof would serve as well. His home consists of seven units: Two for bedrooms, one kitchen and breakfast unit, three as a triple-hall and main-lounge unit with no dividing walls, and the remaining rear unit

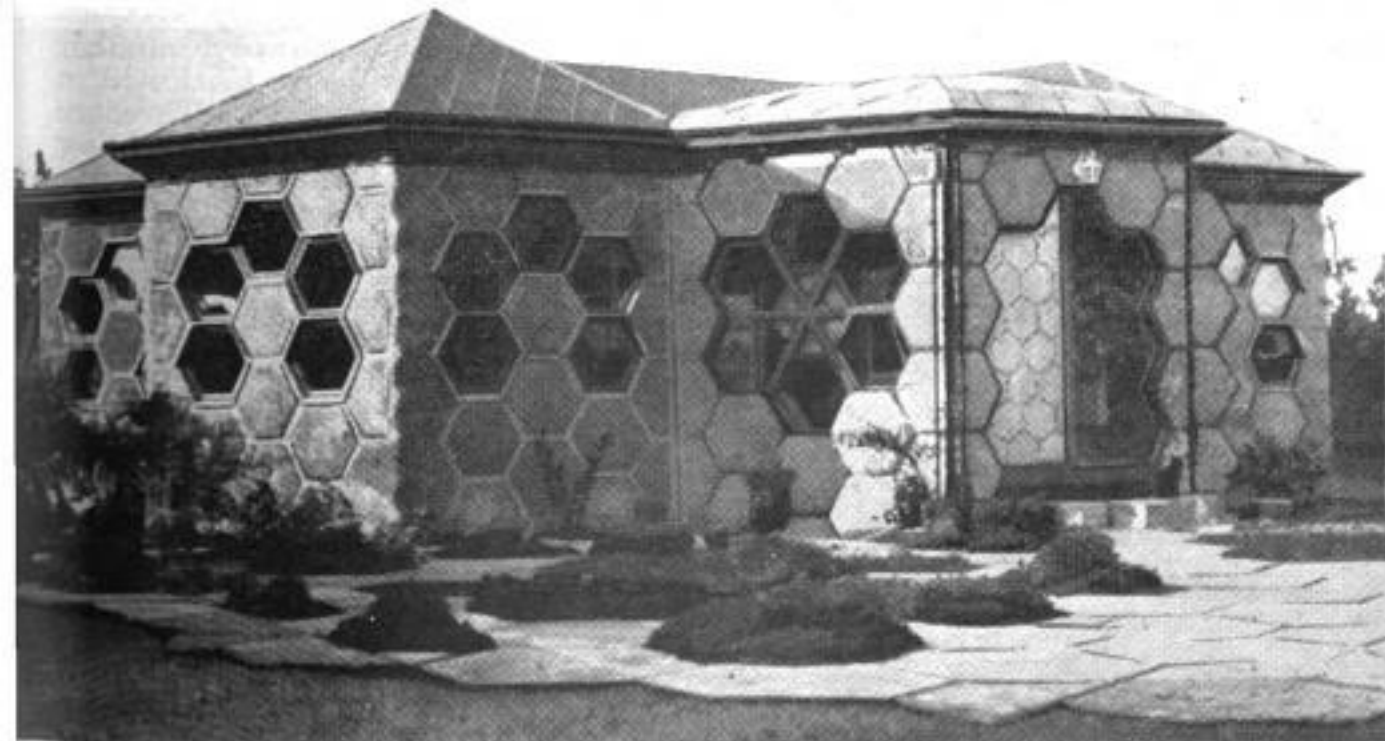


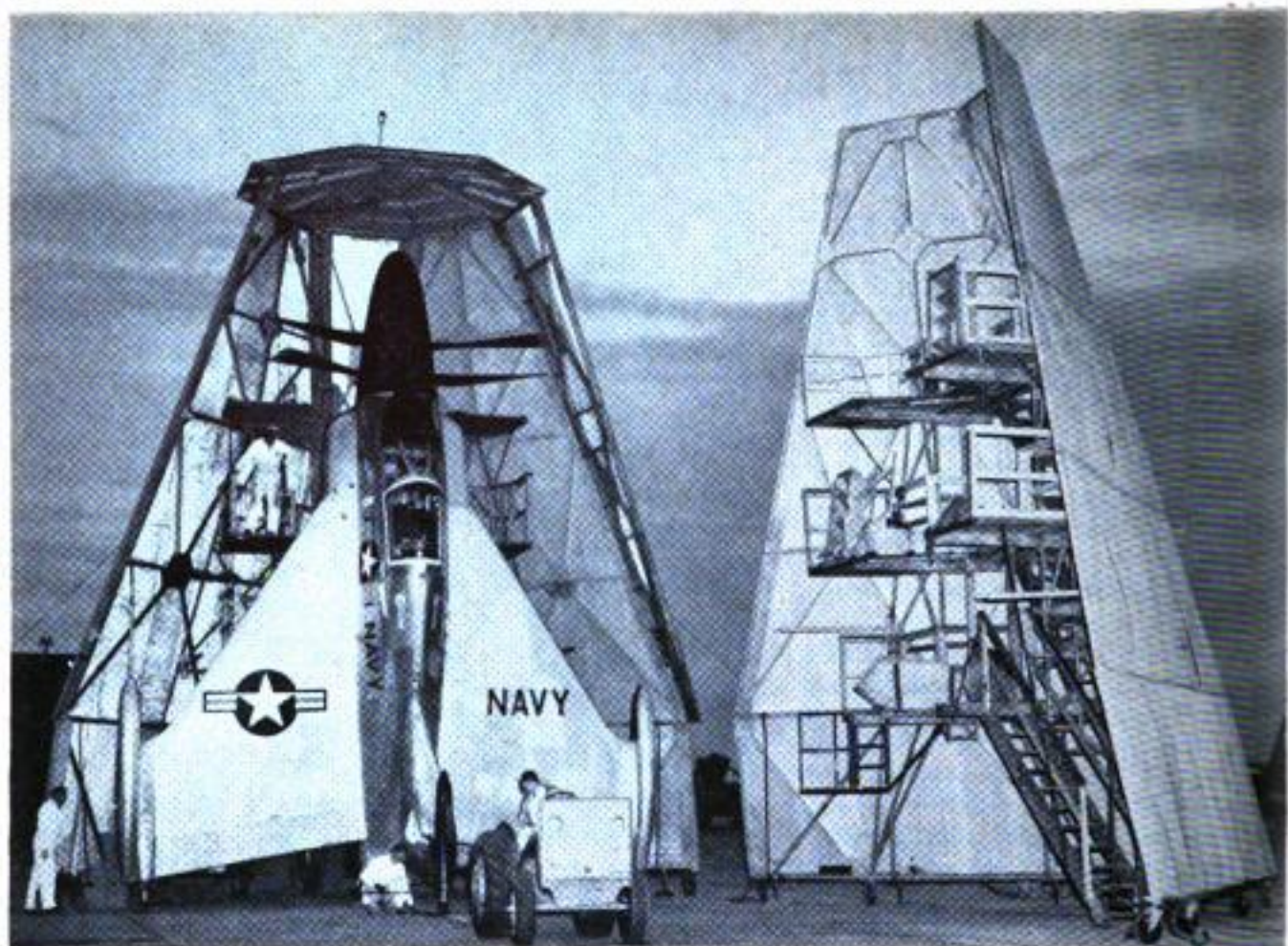
Wall sections around door show how pieces of wood are applied to make six-sided panels. All the windows, too, are hexagonal. Builder, like Nature, avoids all right angles in construction

subdivided into bathroom and laundry. Any number and combination of additional 168-square-foot units can be built on.

Among the points listed by the building beekeeper in favor of his system are: Economy of wall area for floor space, use of short lengths of lumber often wasted, standardization of parts and assembly and low cost for a do-it-yourself builder. ★★

The honeycomb house is built in seven 168-square-foot units to which any additional number could be added

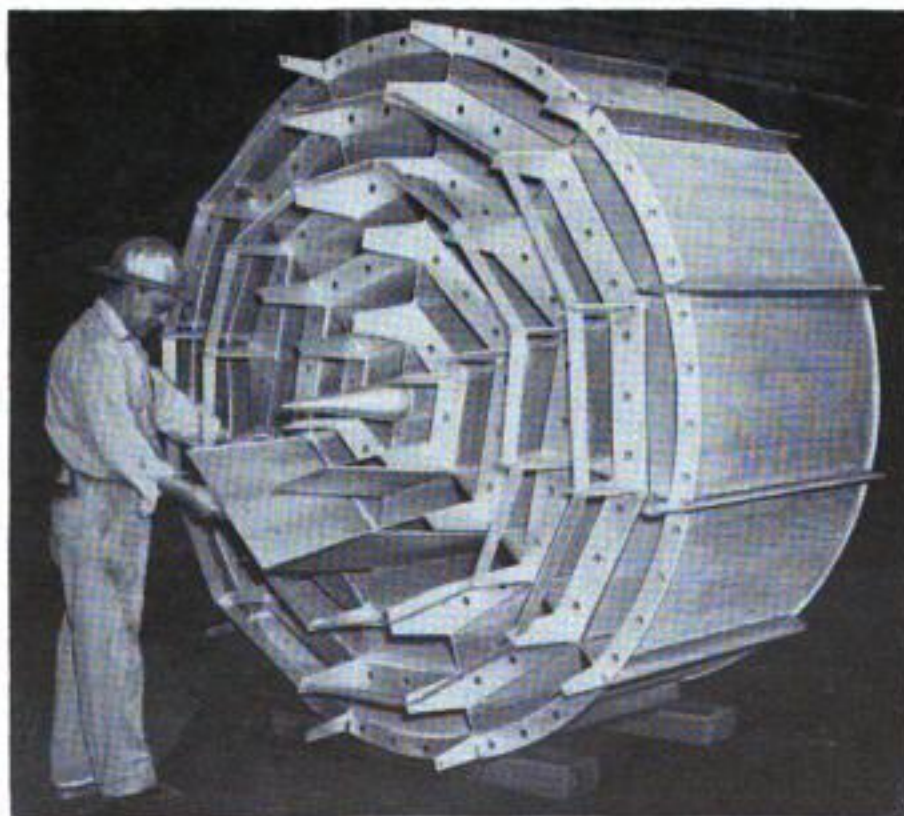




"Wigwam" Hangar for Vertical-Take-Off Fighter

Shaped like a flat-topped wigwam and opening like a clamshell, a form-fitting hangar has been built to house the Navy's vertical-take-off fighter, the Convair Pogo XFY-1. The hangar contains three levels

of mechanics' scaffolding, and is lighted and heated for round-the-clock maintenance. The hangar can be disassembled and transported by air to any new location where this type of plane is based.



Mufflers Cut Roar In Wind Tunnels

Odd-shaped mufflers now being fabricated in Los Angeles will reduce the roar of three new wind tunnels. The tunnels, under construction by U. S. Steel, will be used to test aircraft, missiles and engines at air speeds well over five times the speed of sound. When completed, they will be installed at the Arnold Engineering Development Center, Tullahoma, Tenn. The mufflers consist of vanes arranged in compartments, with alternate compartments filled with acoustic pillows. When installed, they will absorb the wind's roar.

SWEDEN'S NAVY JOINS THE UNDERGROUND



American Swedish News Exchange photo

Top, tunnel is blasted through solid rock to join other tunnels in a network of underground shelters

By G. Alison Raymond

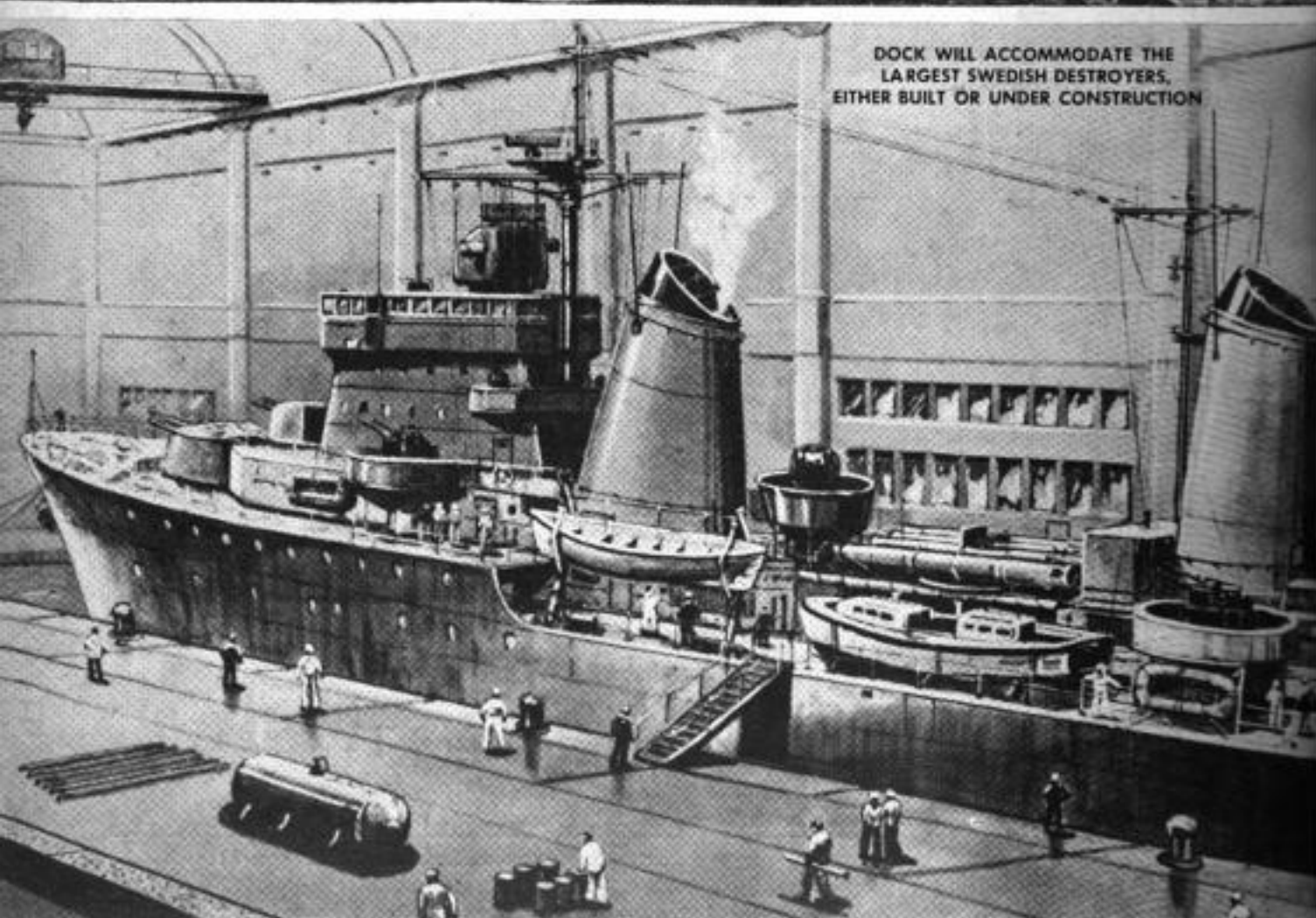
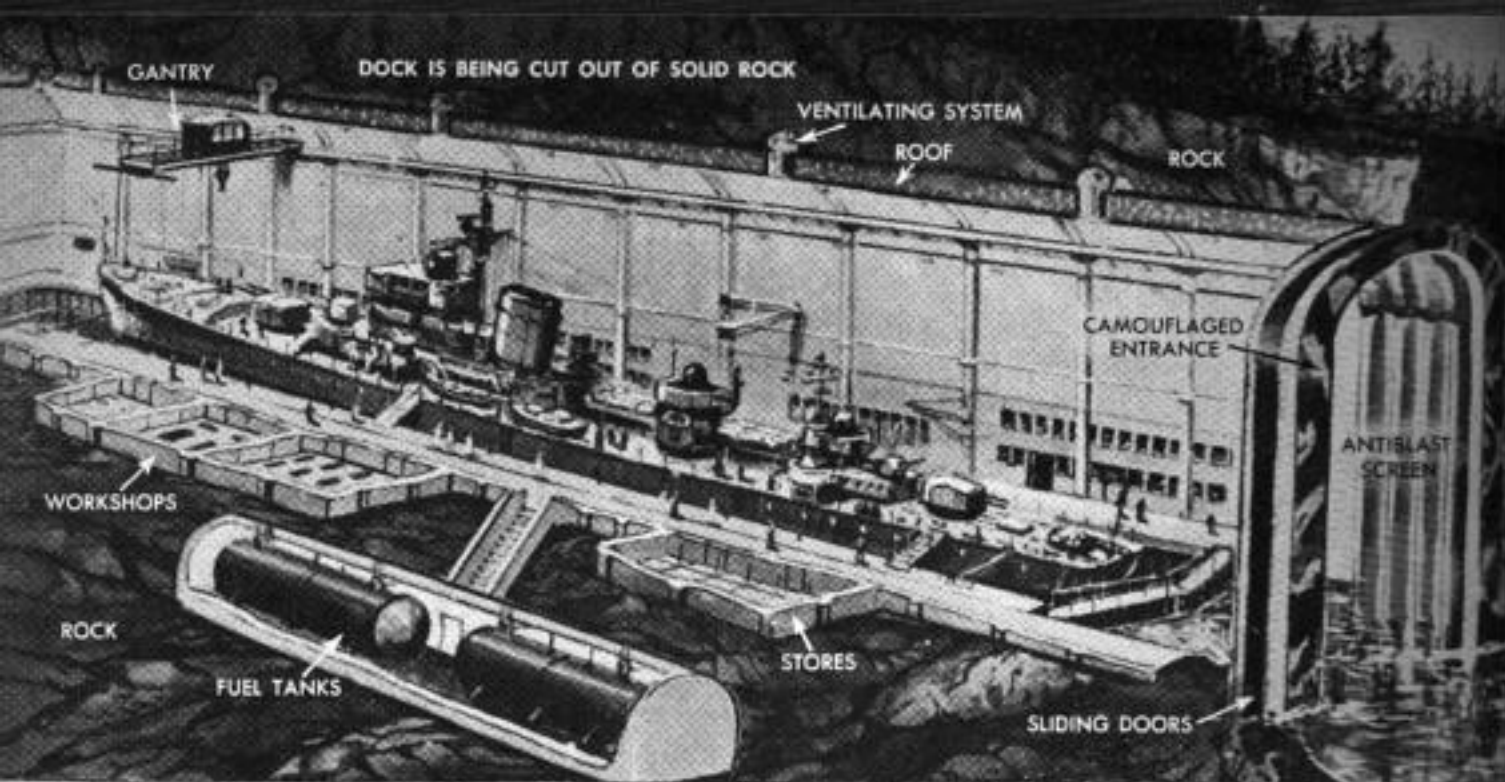
TUNNELS ARE not new; but structures excavated from solid rock that are cheaper than equivalent structures on the surface—that indeed is news. In this age of atomic and hydrogen weapons, developments along these lines are of substantial interest to industrial, military and government officials throughout the world.

Less than 10 years ago no engineer would willingly accept that tedious, tremendously expensive undertaking of tunneling except as a last resort. Since then, however, new equipment and new techniques have inspired a new concept of underground engineering design.

Sweden has been the leading pioneer in

developing methods which rip rock from the depths of the earth quickly and easily, prompting one Swedish engineer to say, "We have lost our respect for hard rock."

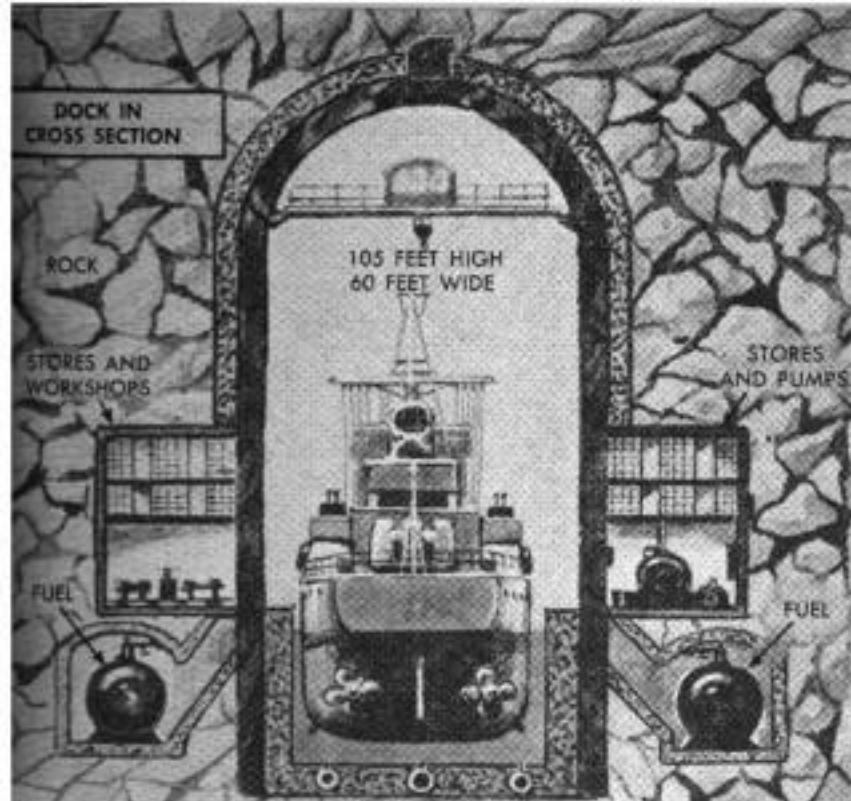
Sweden has already put several power stations and a considerable number of her factories underground; even her armed forces are based deep beneath hundreds of feet of solid granite. Sweden's navy, for example, is housed in huge, coastal, rock tunnels which disappear straight into the mountains directly from the sea. These tunnels can house destroyers of 2600 tons as well as submarines and other units, providing adequate docks for them all. Heavy gateways and pockets have been blasted at



oblique angles into the rock to protect the tunnels against the impact of air and water pressure in case of enemy attack. So far, the largest tunnel is 96 feet high and 57 feet wide. Not only docks, but also repair depots, workshops, storage areas and living quarters for personnel have already been built deep in the granite. Gradually Sweden plans to house more and more of her combat strength in similar tunnels.

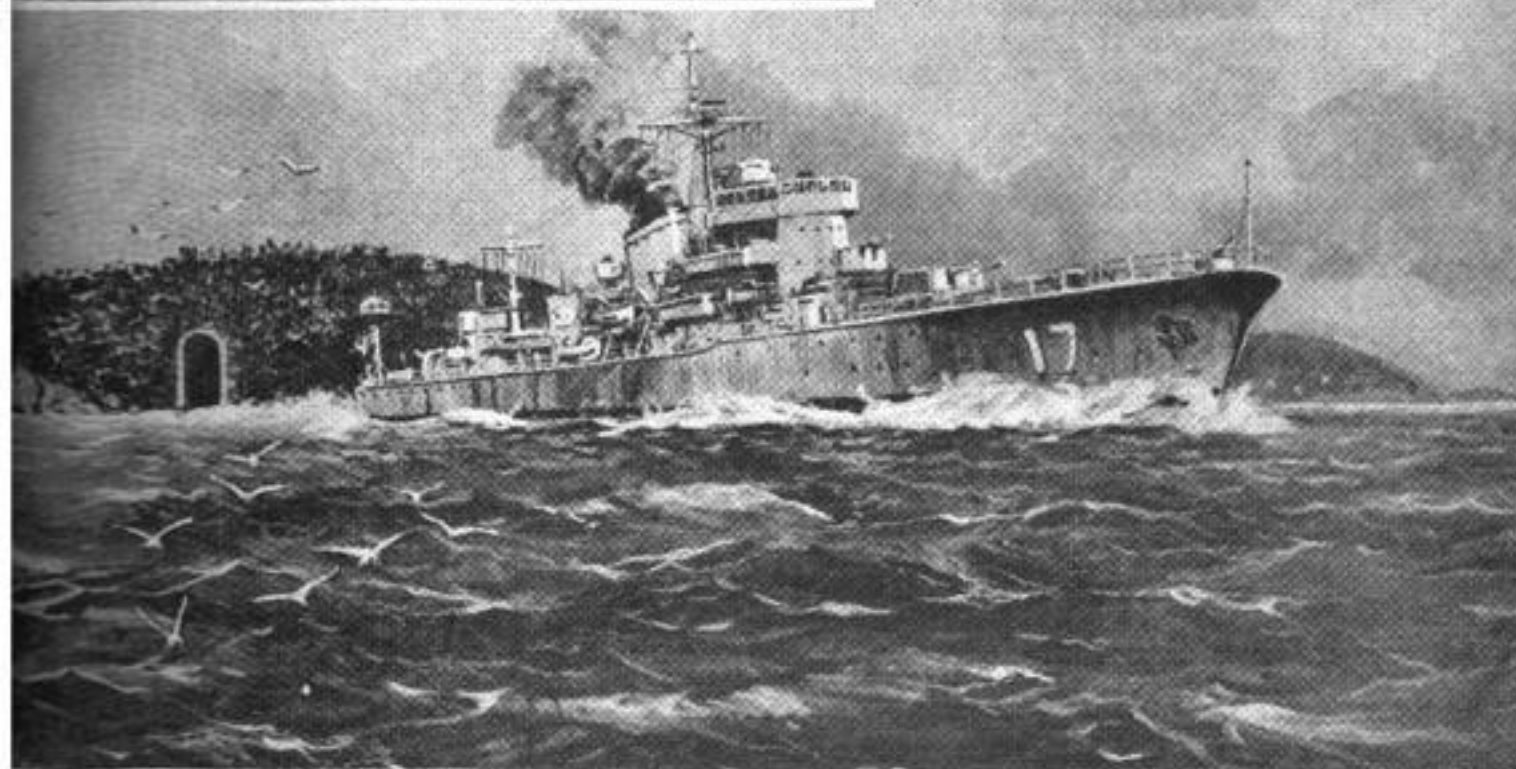
The air force also is well protected with

underground hangars for an estimated 1500 planes. There are permanent installations for the coast artillery. A control center for high military and civil authorities has been buried far below the earth's surface, as well as radar controls, workshops, supply depots, fortifications and military rock shelters. About 500 underground shelters are either completed or well underway. Millions of cubic feet of granite have been steadily blasted away since the end of



ROCKY, PINE-CLAD ISLANDS OF SOUTHEASTERN SWEDEN ARE WELL SUITED FOR THE CONSTRUCTION OF SUBTERRANEAN DOCKS

SWEDISH DESTROYER LEAVES THE UNDERGROUND DOCK. DARKENED DOCK AND CAMOUFLAGED ENTRANCE WILL MAKE THE DOOR ALMOST INVISIBLE AGAINST THE PINE-COVERED ISLAND



World War II, making a close network of hidden chambers along the entire Swedish coast and at certain strategic inland centers. Near the Arctic Circle one of the world's largest power plants has been buried far beneath the surface. With its generator as large as a cathedral, 380,000-volt Haespranget lies, as do power plants in Canada and the western part of the United States, so deep within the bowels of the earth that even a direct hit would not de-

stroy it. In this age of rapid oil consumption it is exceedingly difficult to store enough fuel to keep a nation going, but Sweden has gone a long way in this direction. Enormous underground cement tanks, lined with metal, have been built in scattered locations. In some areas it has been possible to take over abandoned mines, converting them into almost bottomless storage tanks where increasing supplies of fuel are being hidden away.



American Swedish News Exchange photo

Two mechanics of Sweden's air force work on a jet plane deep in an underground cavern carved from granite

Well aware that its military forces would not survive long if the nation's skilled workers were lost, Sweden also is protecting its civilians with installations in the mountain fastnesses. Schools, an 1100-bed hospital and several smaller hospitals, sanitation facilities, food supplies, key factories and mines, large stockpiles of rubber, oil, tungsten and chemicals—all these and more are already established far within the granite protection. In one place a city of over 1000 rooms has been laid out in several stories. Here large numbers of people could live for a considerable time, if necessary, fully equipped with the basic necessities. Deep shelters in Stockholm, already completed, can accommodate 80,000 persons; in five to seven years, authorities expect, there will be enough deep space to hold 400,000. This is half the capital's population. The situation is similar in other Swedish cities. Threading like a spiderweb under much of Sweden is a giant network of shelters to protect the cities' workers and keep Sweden's production in full swing. That part of the population which could not be productive, such as children, old people and the sick, would be evacuated to rural areas under detailed and extensive plans, including transportation by every means from planes to skis.

In all-out war, the utmost productive ability would have to be maintained and protected in every country of the free world. Skilled workers, once lost, cannot easily be replaced. As Gen. Walter Bedell

Smith remarked, "Wars are fought by men, but they are won by production." If a country loses its ability to produce, it cannot long maintain its fighting force; once that is gone, there is no choice but to surrender to the enemy.

Far-reaching efforts such as these are, of course, enormously costly. Ten years ago they would have appeared prohibitively expensive, but new discoveries based on cementing tungsten and titanium carbides, using cobalt as a binder, have revolutionized the processes. Now, as a result of new tunnel-cutting techniques, mining costs have been so substantially decreased that the change is being reflected throughout the world. The change is apparent on the west coast of this country and in the rich silver mines in Ontario. Helped by EDC financing from America, huge new power stations have been built by both French and Italian workers deep within the Alps.

What is the big new difference?

It lies in the development of so-called "hard metal," a tungsten carbide cemented with cobalt, which has a hardness unsurpassed by anything but diamonds and a melting point of about 2800 degrees C. At temperatures in which other cutting tools would melt and soften like jelly, carbide-tipped tools continue to cut at high speeds. To achieve this, all sorts of manufacturing problems have been studied and finally overcome in the laboratories and workshops of many engineering firms. Such

(Continued to page 214)

Covers Shield Rifle Scope

New lens covers for rifle telescopes snap open at the push of a button. The button is mounted on a rod which connects the front and rear lens covers and is pulled back to close the covers. Small neoprene bumpers eliminate any clicking sound. The neoprene seals have a 10-degree taper and shut out moisture and snow. Lens scratches caused by wiping are ended.

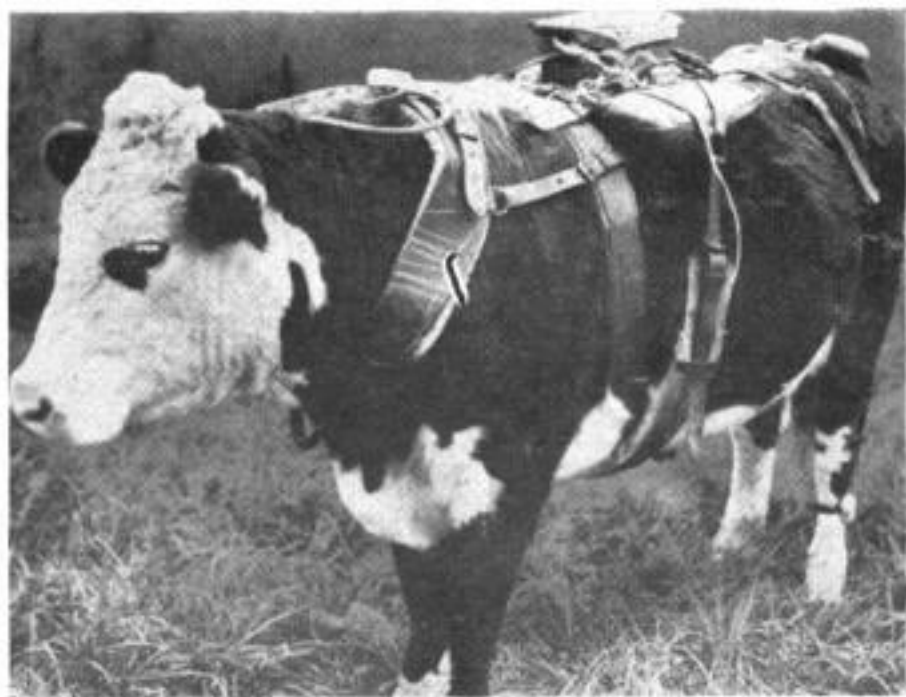


Powered Glider Takes to Highway

There's a motor used to power a glider built by Gerhard Blessing of Hamburg, Germany. The engine is strictly within the rules of gliding, however, for Blessing uses it to move the craft from place to place on the ground. With the glider's wings folded, Blessing sits in the cockpit and heads down the highway. The three wheels, one mounting the small motor, are removable. When Blessing takes to the air, he leaves wheels and engine on the ground.

Scientific Steer

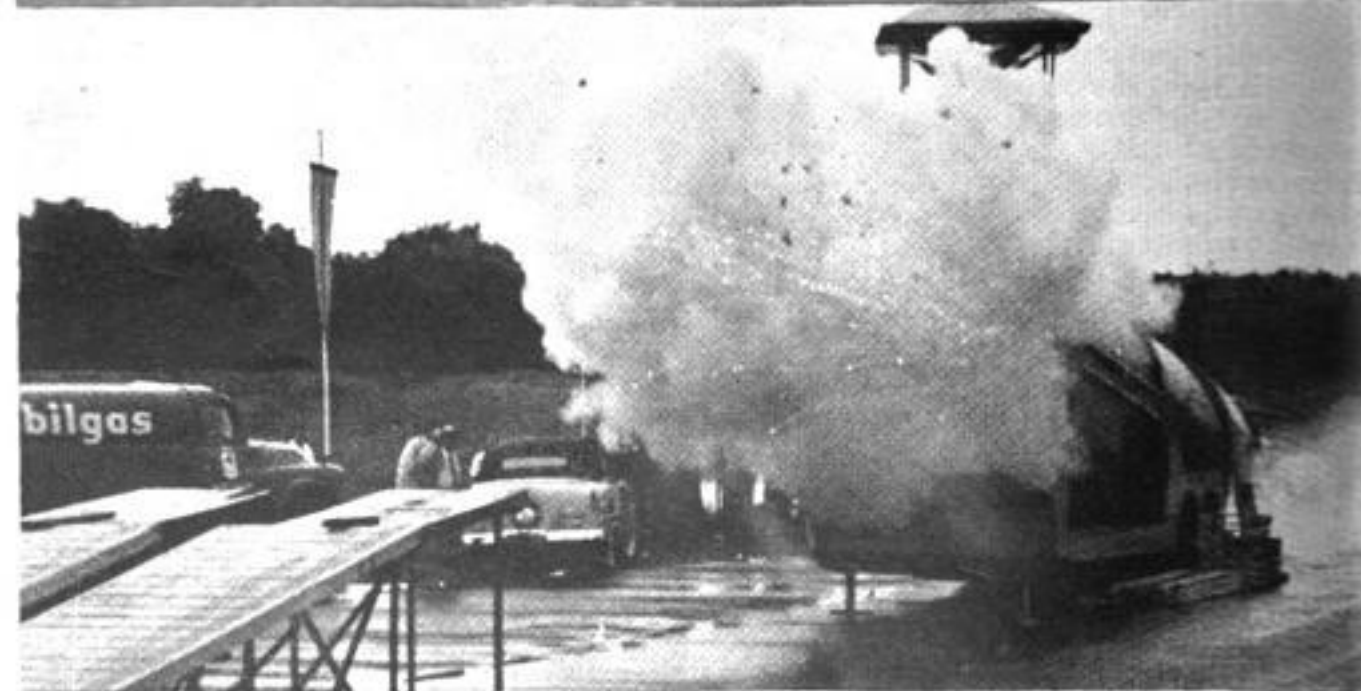
Serving science in England is a steer that wears an electronic harness. The harness records every movement the animal makes as a series of wavy lines on a moving paper tape. The tape registers how many times a day the steer stretches its neck to chew grass, how many times it lies down and even the number of switches of its tail. The results show which grasses cattle like best, how many mouthfuls go into each pound the steer gains and which grasses increase the animal's weight most.

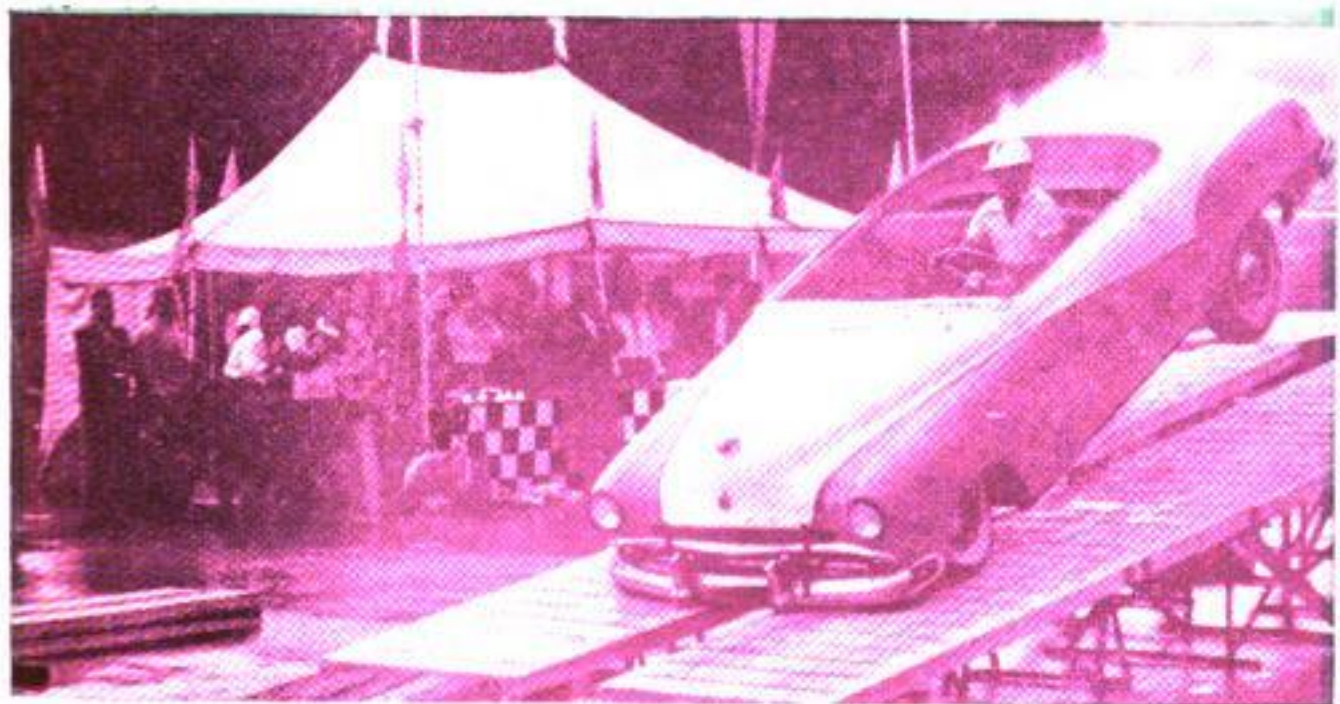
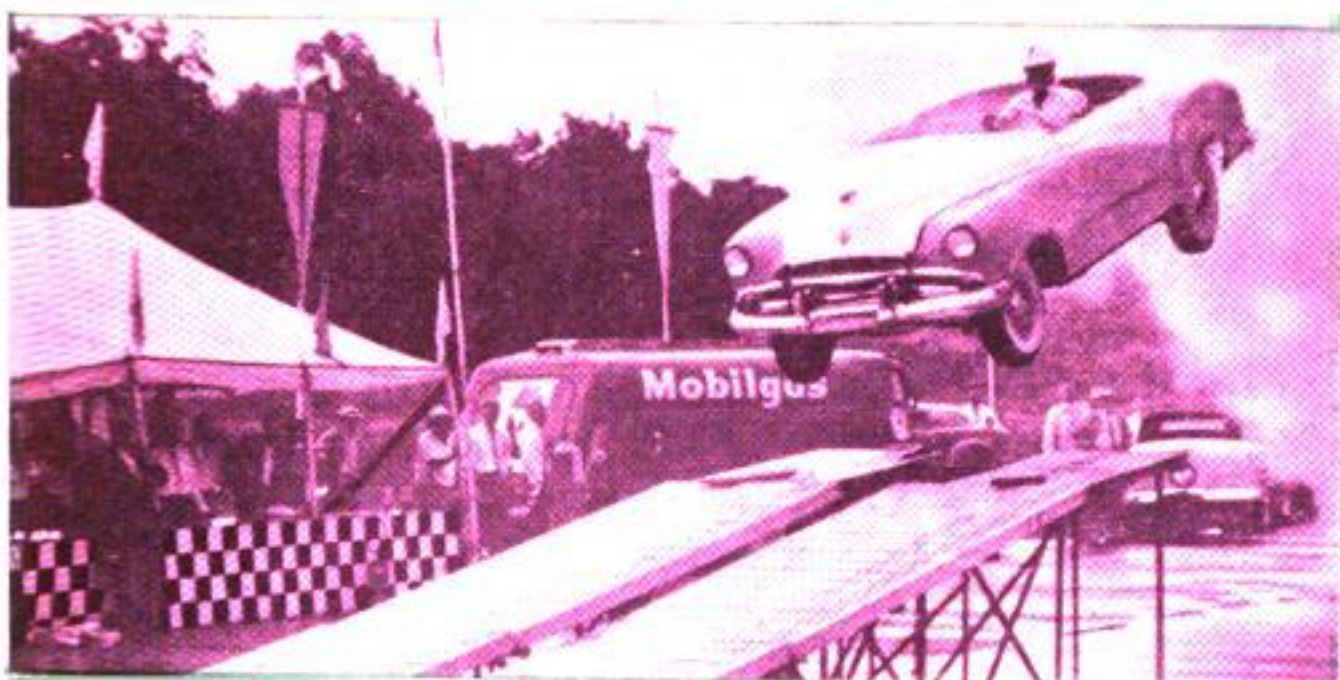


One Way to Earn a Living



BEING SHOT out of a cannon was an old stunt until it was modernized by Bill Horton of the Irish Horan Lucky Hell Drivers Troupe. In a burst of smoke, Horton hurtles out of a cannon's breech driving a Dodge convertible. The car arcs down to a two-point landing on a sturdy ramp, only slightly damaged. The cannon is open on both ends. Horton speeds into the lower end at 55 miles per hour. A jet-assisted-take-off unit on the car pushes its speed up to 75, and a small explosive smoke bomb heightens the realistic effect. ★ ★ ★







Convertiplane With Pusher Propeller May Go 175 Miles Per Hour

Recent entrant in the convertiplane race is the Jacobs Aircraft Engine Corporation, of Pottstown, Pa., producer of a helicopter with stub wings, a pusher propeller and a top speed expected to be 175 miles per

hour. Powered by a 350-horsepower Jacobs engine, the aircraft has flown as a helicopter, but without its pusher propeller or wings. In horizontal flight, 30 percent of the lift should come from the stub wings.

First Men on the Moon Need Not Fear Radioactivity

Explorers of the moon won't be harmed by radioactivity. The moon's surface, according to Dr. S. F. Singer, physics professor at the University of Maryland, is not dangerously radioactive. Cosmic rays bombard the moon to produce tritium, the triple-weight hydrogen that goes into the H-bomb, but the amount, says the earth-bound Doctor Singer, is too small to have any biological effects on humans.

Fleet of Surplus Ships Stores USDA Grain

Surplus ships and surplus grain account for the fact that the Department of Agriculture now has a "navy" of 422 ships borrowed from the Maritime Commission. The stand-by ships are used to store 69,000,000 bushels of CCC grain. The fleet is composed of 162 ships at Astoria, Ore.; 73 at Olympia, Wash.; 112 in the James River, Va.; and 75 in Hudson River, N. Y. Storage damage is under one percent.



Toll-Collecting Robot Photographs Chiselers

Motorists on the Garden State Parkway in New Jersey pay the 25-cent toll by tossing 25 cents into a hopper at the tollgate. There is no attendant to watch or check the amount paid. But the motorist had better pay the right amount because if he doesn't, a camera mounted above the collecting station photographs his license plate as he drives away. After the film is developed, the gate-crashing driver gets a letter from the police asking for an explanation and the 25 cents.

Mounted on an automobile steering wheel so that its face is always right side up, a clock recently patented by a Swiss watchmaker is wound by the turning of the steering wheel.

Power Handle Runs Many Tools

NOW, INSTEAD OF INVESTING in separate garden power tools, you can obtain a motorized handle that clips to any one of several units. The 39-pound power unit mounts a 2 $\frac{3}{4}$ -horsepower gasoline engine, and is attached or detached in 20 seconds. This is done by fastening a wing bolt and connecting a drive belt to the powerless garden tool. Five engineless garden tools designed for use with the motorized handle are now being produced. Eventually, some 30 types will be made.

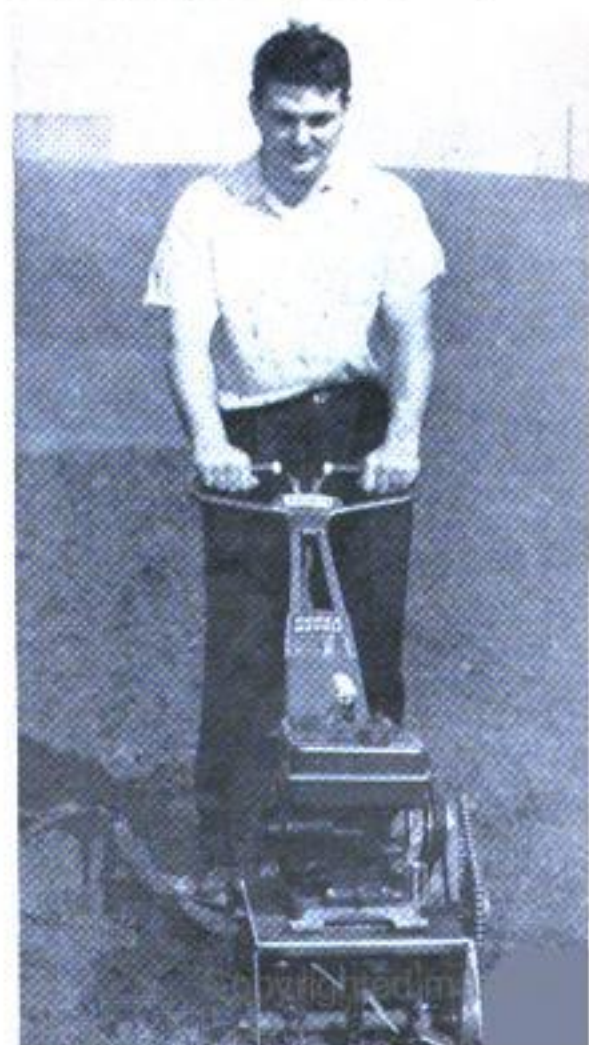


Power handle mounts a 2 $\frac{3}{4}$ -horsepower gasoline engine, is quickly fitted to powerless tool. It weighs 39 pounds and is easily lifted

Edger-trimmer is turned sidewise for fast edging of bank around flower bed

Tools that attach to the power unit include an edger-trimmer, a 21-inch reel mower, a 20-inch rotary mower and a sidewalk snowplow

Tiller can chop up lawn for reseeding or pulverize garden soil for planting





LOOK IN
A LUMBERMAN'S CRYSTAL BALL AT
Forestry in A.D. 2005

By L. J. Carr

The author, president of the Forest Products Research Society and a committee chairman of the Western Pine Association, is a widely known authority in the lumber industry

LIKE A GIANT EAGLE spotting supper from the air, the helicopter hovers over the densely timbered mountainside. As the pilot checks instruments, the logger member of the two-man crew refers to a memorandum dated that day—August 12, 2005.

"Move over to the trees near that big rock . . . see it—shaped like a frying pan," says the logger. "Now, what do you get on the counter?"

"Action," replies the pilot. Watching every flick of the helicopter's supersensitive geiger counter, the pilot begins to "zero in" on a big pine. The tree is one that had been radioactively marked by a ground crew.

With the helicopter over the

marked pine, the pilot nods, and says, "Hooks away!"

The logger quickly flicks switches, starting the mechanism which lowers two steel cables with hooks and chokers. Electronically controlled, one cable is connected to the pine near the top and the other near the base.

"Okay on the TV?" queries the pilot.

The logger studies one hookup on the television screen at his side, then shifts the scene to the other connection.

"Yep. Snugged up tight," replies the logger. "You'd better give this air buggy everything it's got. The roots of that pine will be deep."

"Betsy here has yanked out bigger trees than this one," says the pilot. "Easy does it."

First the pull on the tree is to the north, then the south, east and west. This is known in lumbering jargon of the period as "root rattling." Then comes the "dentist's big yank."

The ground crew, which had marked the tree, had also given it a shot of "root juice." This substance caused the roots to contract and shrivel, loosening them in the earth. But the pull is still heavy. The helicopter strains. Five seconds . . . ten . . . Crew members brace themselves. Eighteen seconds . . . The helicopter jerks, then steadies. The big tree is airborne.

The logger adjusts the cables to bring the tree into a horizontal position beneath the helicopter. Again he checks connections on the television screen and gives the hand signal for "Home, James."

Fantastic? Not at all. The above imaginary incident is a glimpse of logging operations a half century in the future that many experts will tell you is not only possible, but probable.

Some persons will say, "Yes, the tree-



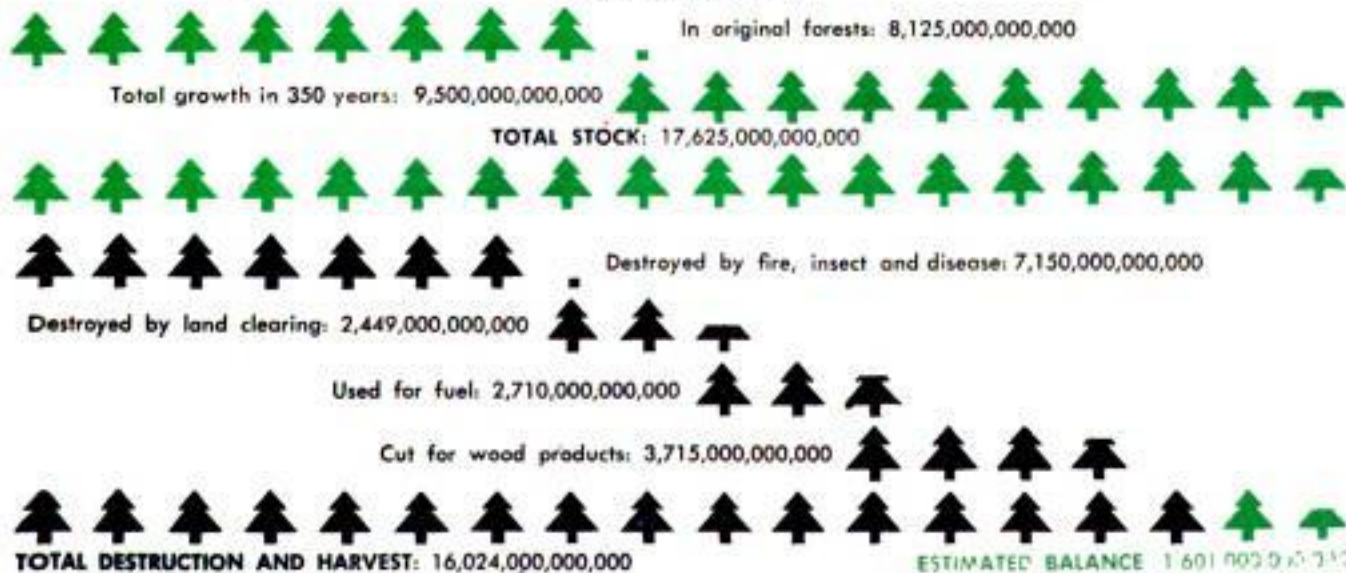
Future forester will pack hypodermic needle to stain lumber as it grows. Outer wood can be stained today

pulling helicopters may be there, but they will have few trees to pull."

As a natural resource which is particularly significant because it is renewable, trees should be in plentiful supply in 2005—an estimated two trillion board feet. Tree farming by private industry and advances in forestry in other managed lands are expected to expand tree production greatly. In 1955, farmers in 35 states are cooperating in the formalized tree-farm movement under the sponsorship of the American Forest Products Industries, Inc. The goal of

WHAT'S HAPPENED TO OUR SAW TIMBER IN 350 YEARS?

(Figures in board feet)





Artist's idea of future lumber mill: Helicopter delivers trees, combing machine strips needles from limbs

balancing forest growth with forest withdrawal should not only have been reached long before the 21st century, but surpassed.

A recent forestry report put it this way:

"The man who reads only the obituary column in his newspaper may come to the conclusion that the human race is dying out. But for the true picture, he should also look to the birth column. Each year, new growth of trees is now adding 35,000,000,000 board feet of lumber."

During the last 350 years, twice as much wood has been removed from America's forests as was growing here when the Pilgrims started clearing land for corn planting. Only one third of the wood was used for man's needs — from homes to railroad ties. The rest? Destroyed by fire, insects and disease. And here is where modern science will do much for the timber supply of 2005.

By that year, whole forests should be going through fire seasons without significant loss. "Smokey," the Forest Service's famed bear, may have gray whiskers by that time, but he will be grinning happily. Radar tracking of fires, utilization of television by

forest lookouts, use of helicopters in getting to the scene of a fire quickly and chemical fire suppression should have our forests' greatest enemy stopped cold.

Since cloud formations are already traceable by radar, improved apparatus of the future should be able to trace smoke by its density difference from fog and clouds, which might otherwise block a view. Experiments utilizing television for forest lookouts are already under way (see *PM*, July 1954).

Science has done much in the last decade to curb timber diseases and will do much more in the decades to come. By 2005, there should be complete control of tree diseases as well as of the insects which attack the trees.

Pulling out trees by helicopter instead of felling them will eliminate much damage to other trees and plants. Hazards of fire and insect and disease breeding grounds left by slash will be eliminated. After the tree is removed the ground will be fertilized and made ready for new growth to supply future generations.

But even more important, through genetics the trees of 2005 will be stronger and healthier. Howling winds will not mean tumbling trees.

Tree growth will be greatly speeded up. Scientific breeding will expedite growth of new trees from seed to maturity so that saw timber will be produced perhaps three times as fast as it is today.

But now let's take a look at the lumber mill of 2005. It holds even more intriguing possibilities than the forest.

Foresters of future will harvest trees from seedlings planted today by modern machinery. The goal is to balance forest growth and withdrawal

American Forest Products Industries photo





Rays may be used to knock branches and roots from trunk. Powerful debarker might scrape bark off log

The helicopter bearing the big pine from the frying-pan-rock site has just reached the mill, which is powered by atomic energy.

Gently the tree is lowered beside a row of others in the storage yard, which looks like Paul Bunyan's Christmas-tree lot. Again the logger in the helicopter flicks switches. The tree hooks are released and the cables drawn back into the helicopter.

"Just time to pick up another before lunch," says the logger, and the helicopter whirs back to the forest.

Meanwhile, a complete tree is being carried by remote control from the yard into the plant. First it travels through a machine where brushes and suction strip off all needles, leaving the tree looking somewhat like a plucked chicken. The needles move to laboratories for processing into chemical products.

Next, all limbs of the tree are bumped off, and these are sent for resin extraction and eventually to the pulping or hardboard departments. Roots are cut off and follow the trail of the limbs.

Now the debarking machine goes to work on the tree. The bark drops onto a moving belt, which carries it to the fertilizer-processing department.

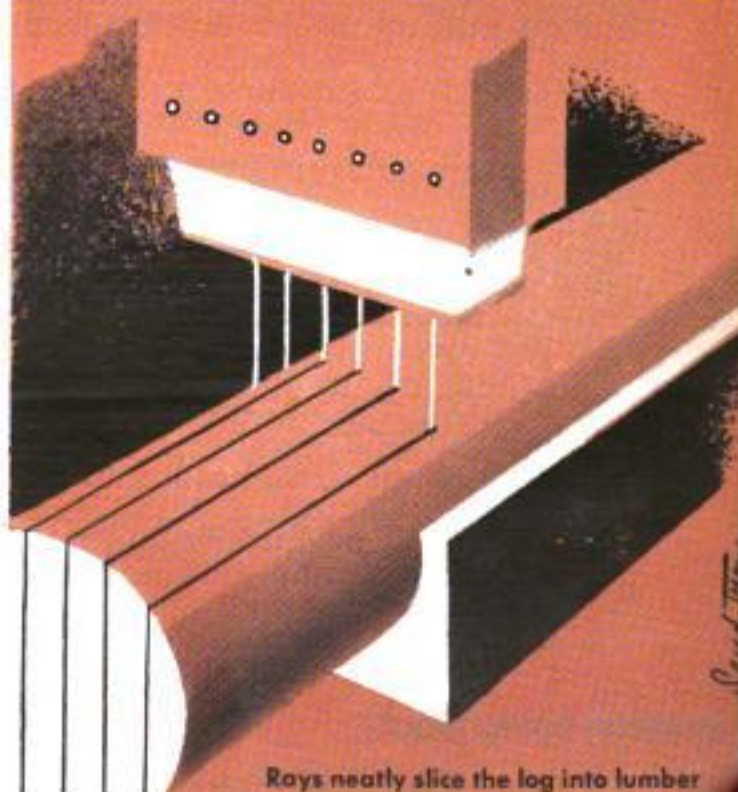
The sawyer, perched high in his control room, has a lot of log to work with—one complete tree, in fact—but he gets an assist from the latest in scientific lumbering aids. Through television he studies the exterior of the log from end to end and, through X ray, the interior.

With the diagnosis completed, the sawyer is ready for the cutting—with powerful, superheated rays. Bandsaws of the 20th century have long since gone the way of the scrap heap.

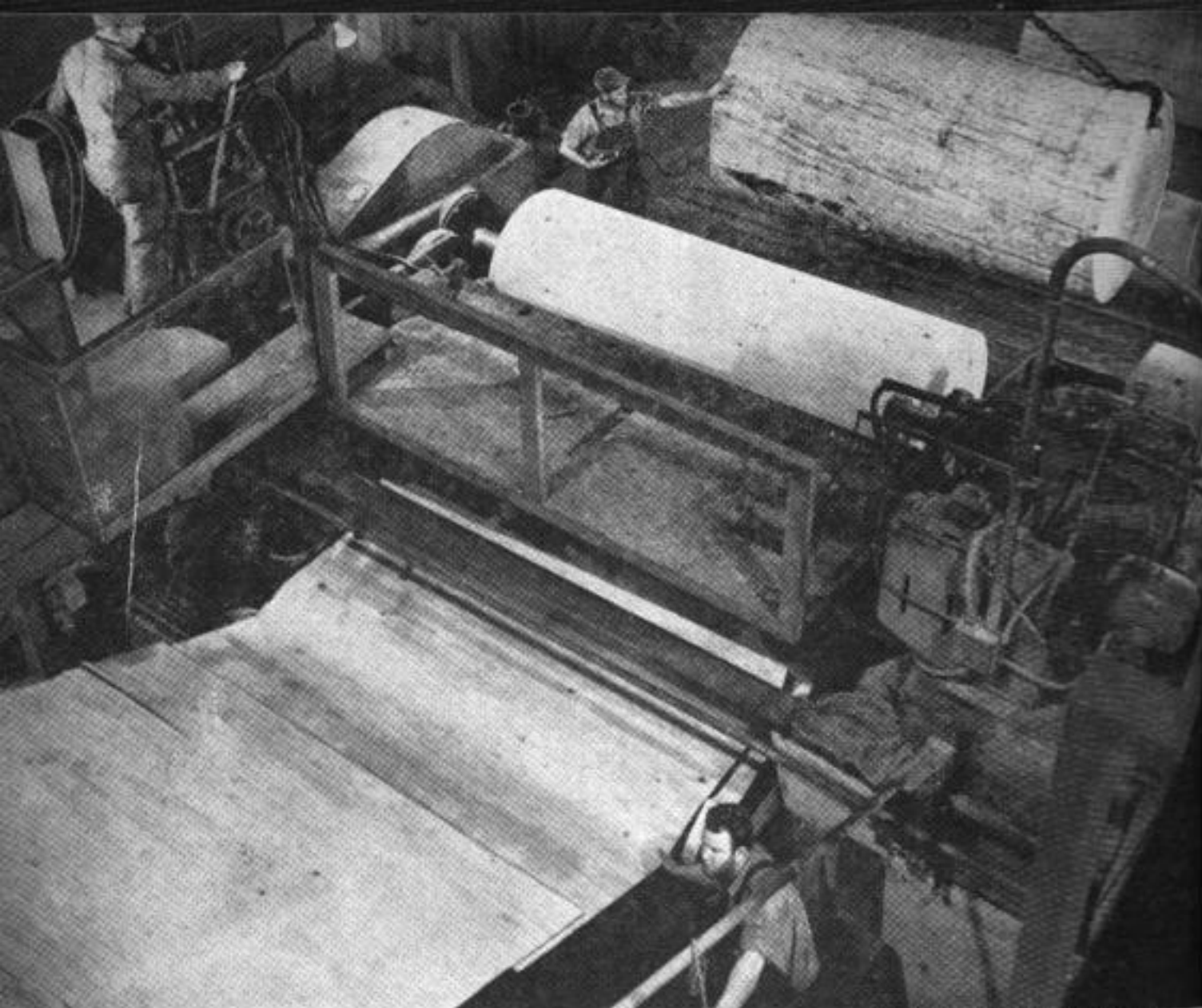
No diamond was ever cut more precisely than the log as the rays move



Author suggests that X rays will spot flaws in logs



Rays neatly slice the log into lumber



Douglas Fir Plywood—AFPI photo

Example of the mechanization of today's mills is this huge lathe that peels off ribbon of wood for plywood

down it. There is no loss to saw kerf—no sawdust.

In this single operation the boards are not only cut, but planed to mirror smoothness. The particular boards being cut are a maroon shade, which has gained wide popularity among East Coast homebuilders. A hypo-packing forester had previously stained the tree in the forest.

As far back as 1955, scientists were able to stain the outer wood of a tree, but now radiation has made possible the staining of the entire tree.

What happens in the dry kiln of 2005? There is none. Trees are seasoned in the woods before the helicopter cables ever reach down to pluck them out.

But the skeptic may say, "Okay, so in 2005 there will be helicopter loggers, ray cutting machines and plenty of trees, but with synthetic products all over the place, what has happened to the lumber market?"

Conservative estimates place the demand for lumber and lumber products in 2005 at three times that of today, or about 100,000,000,000 board feet per year.

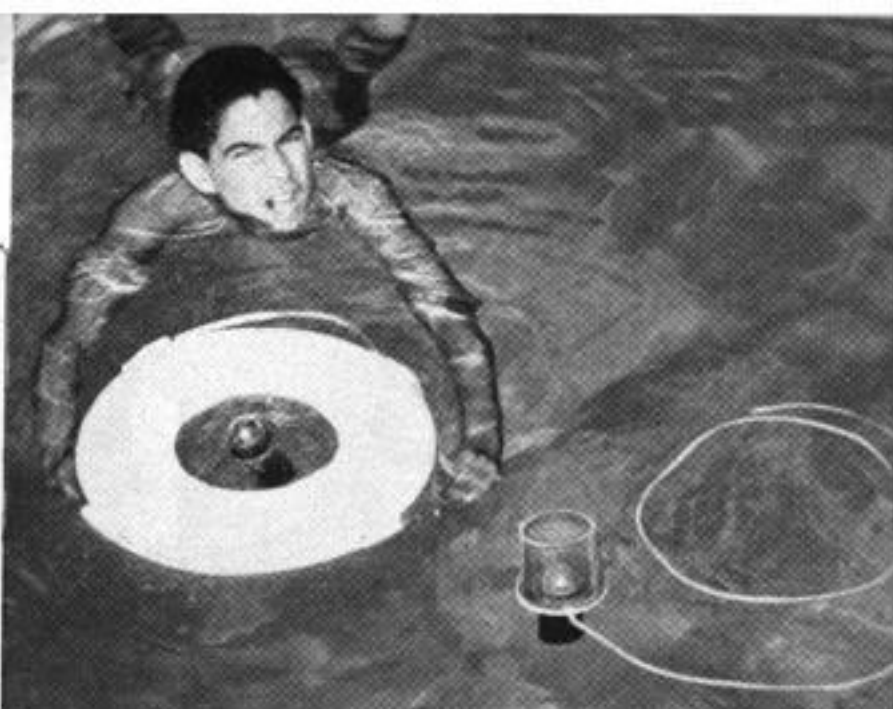
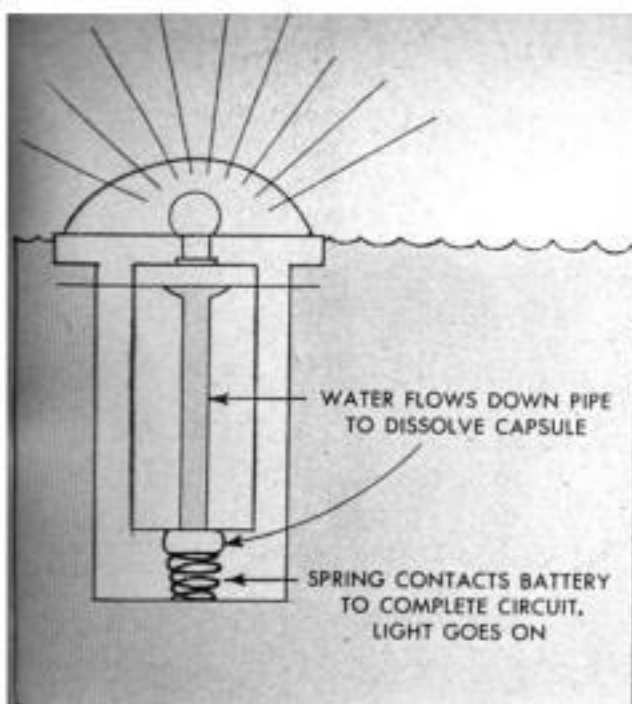
Prefabrication is expected to be funda-

mental to virtually all building in the next century. Even storage and cabinet fixtures for homes will be part of prefab construction. Readjustment of wall panels will be all that is necessary to meet the desires of a new tenant.

Studies of fire-resistant treatments for wood are expected to give lumber a great advantage over steel and other metals, which even today are falling short in supply. Where metals become brittle, snapping and buckling under extreme heat, wood will stand firm.

Densified wood, which has gone through a compression process, will have hardness that will add both to its strength and wearability. The Western Pine Association Laboratory in Portland, Ore., for instance, has already developed a densified hardwood by compressing white fir and other woods. Wood can be expected to get harder with further advancement on such processes.

What effect will all this have on the carpenter of 2005? He will still be needed, but he may be seen driving a nail made from superhardwood with a hammer head of the same stuff! ★ ★ ★



Aids to Sea Rescues

A FLOATING flashlight, a life preserver for small children, and a tent-covered life raft are among the latest safety equipment on transoceanic planes.

The flashlight turns itself on when it hits the water. Sea water enters a hole in the side of the unit and flows down to a soluble capsule that separates the spring and the battery. In a few seconds the water dissolves the capsule and the spring contacts the battery to complete the circuit and turn on the light.

The flashlight, attached to life buoys, life preservers and life rafts, aids the round-up of survivors after an air-sea crash. At night, the bobbing light can be seen for many miles by searching planes.

The midget life preserver, unlike standard preservers, will keep an eight-year-old child or an infant afloat. The life raft holds seven and has a tent to protect survivors.

Diagram shows how water turns on flashlight. It can be mounted on a life buoy or attached by a floating plastic rope to a life raft. Below, it aids night rescue of child wearing special small life preserver



Below, stewardesses of South America's Tan Airlines test life raft. Raft is equipped with hand pump and sturdy steel oars, one of which serves as a tent pole for canopy. Special "sea anchors" prevent capsizing



Copyrighted



Junior-Size Umbrella

Sun and rain can be kept from the new hat or from the hair with a new small-size umbrella that straps to a man's hat or around his head. Termed the Sunbrella, the colorful head protector has an adjustable band that can be fitted to hat or head. It is fine for fishing, golfing, beach wear or baseball bleachers, its makers claim.

Campstove Burns 2½ Hours On ¼ Pint of Fuel

Designed for hikers and campers, a tiny gasoline cookstove will burn for 2½ hours on a quarter of a pint of fuel. The stove has a collapsible grill for holding a pan or coffee pot, weighs one pound and fits into a 3½ by 5-inch container. It generates its own pressure without priming or pumping and is equipped with a chimney-type windshield for use in strong winds.

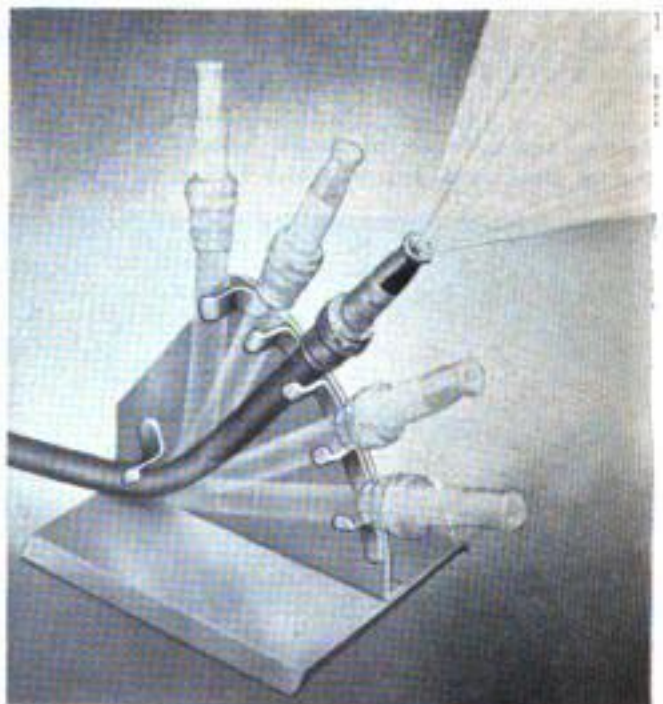


Leveling Jack for Docks

With a pair of crank-operated jacks, you can level a tilting dock without wading in icy water. The jack is designed for use with support clamps fastened to dock legs made of hollow pipe. The jack hooks into the top of the dock post and a chain sling supports one side of the dock. The operator stands on the dock, operates the crank to raise or lower it, then locks the support bracket to the pipe at the new level.

Hose Holder

Flexibility in sprinkling lawns and gardens is afforded by a stand that holds a garden hose in any of five positions. The hose can be placed to spray at angles from 15 to 90 degrees. The base is wide and tip-proof, providing stability even when the holder is placed on a slope.





Experimental Craft Converts From Helicopter to Plane in Mid-Air

Recently an experimental craft changed from a helicopter to a conventional plane in mid-air. This is said to be the first successful flight of this type ever made. The craft is the McDonnell XV-1 Convertiplane, developed for the Army. It combines the vertical-flight characteristics of a helicopter with the speed and range of a conventional fixed-wing aircraft. The pilot uses an overhead rotor to take off and fly forward until he exceeds the stall speed of the plane

wings. He then shifts the power from the rotor to a pusher propeller and uses conventional aircraft flight controls. The overhead rotor is allowed to "windmill" during airplane flight. The plane is powered by a reciprocating engine. It drives the propeller and also drives the compressors which supply air to the pressure jets at the tips of the rotor blades. The plane was developed for possible liaison-reconnaissance missions by the Army.

Sickle Bar on Front of Reel Mower Trims Weeds and Tall Grass

Grass is "pre-mowed" by a little sickle bar mounted on the front of a new reel mower. The bar cuts off stem-type weeds and long, tough grasses so that the reel can do a clean job of mowing. The problem of uncut weeds and grasses that mat down under the mower only to pop up afterwards is eliminated. Because weeds are never given a chance to seed, weed control is made easier.

Glass-Fiber Golf Shafts Are Lighter Than Steel

Golf clubs with shafts made of glass fiber are lighter than their steel counterparts. The shafts are made by laminating glass-fiber cloth to a thin steel core. They are said to absorb shock, minimize vibration and impart a "softer" feel throughout the swing of the golf club.





It's not unusual for an angler to walk away with a big string of perch and catfish. Many lakes have an admission price of \$1, which entitles the angler to four fish. More fish, extra pay. Below, some lucky angler will catch this 41-pound catfish which was trucked in from Lake Erie



THEY PAY TO FISH

By George Laycock



MORE AND MORE followers of Izaak Walton are paying admission for the privilege of plunking a dry fly, a bait-casting lure or a plain earthworm into waters filled with fish.

The newest angle in fishing is the "pay lake" where the angler is virtually assured of a catch. Pay lakes are privately owned and are stocked by the owner. In the area around Cincinnati alone, pay lakes do an estimated business of \$2,000,000 annually. Fishermen try for a variety of game fish caught in the nets of Lake Erie's commercial fishermen. Just trucking fish into lakes and ponds has become a big business.

One of the largest pay lakes near Cincinnati is owned by Paul Muller. As many as 300 people fish his 18-acre lake in a single day, catching bass, walleyes, pike, perch, channel catfish and crappies. Muller has his own fish-hauling trucks which can haul up to two tons of fish in a load. Each truck has equipment to maintain the temperature of the water and supply the fish with oxygen.

Pay lakes have one big appeal to the angler: He's almost certain to catch some fish! ★ ★ ★



Holding pool near Muller's pay lake serves as a showcase for the whoppers which will be released later



Pay-lake operator weighs fish so he'll know how many pounds to replace, and whether he is making money



Some owners raise their own fish. Here owner fertilizes water to produce more plant life on which fish feed



Box holds up to a ton of fish for a few hours. Truck dumps fish into box, from which they are soon released



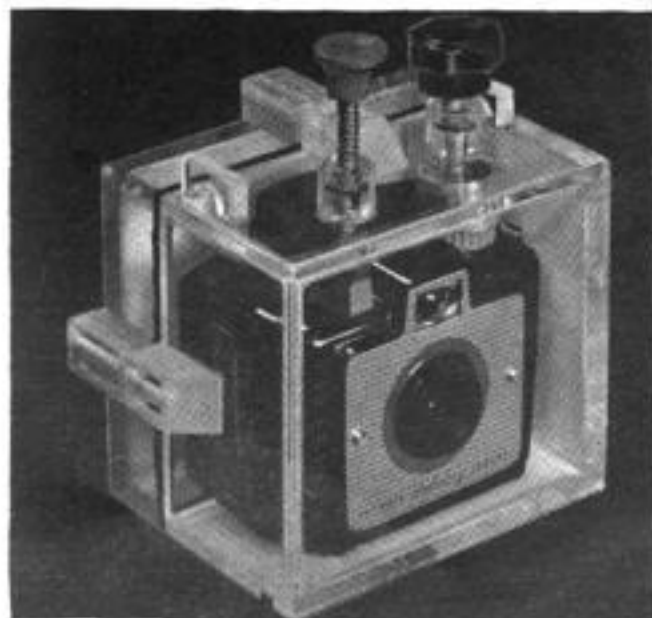
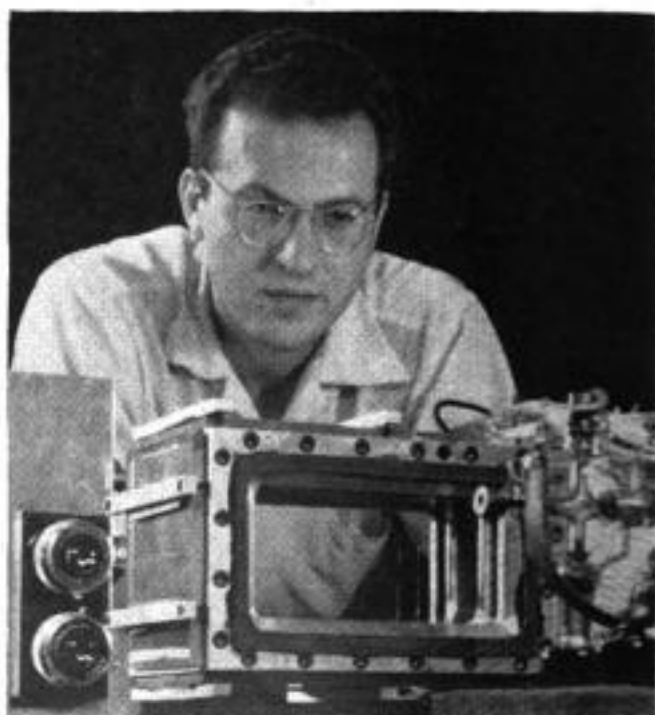
Plastic "Ceiling" Replaces Fabric in Plymouth Station Wagon

Plymouth station wagons are wearing one-piece plastic "ceilings." Available in various colors, the ribbed plastic headlining (as it is known to the trade) wipes clean with a wet sponge. Other advantages are: It fits closer to the roof to give more head-

room; it's durable and won't tear if caught by a crate or other bulky object; it has an insulating value against heat and cold. The single-piece plastic molding has another feature that body shops will like: It is easily removed for roof repairs.

"Bubble Chamber" Charts Paths Of Atomic Particles

Trails of tiny bubbles chart the paths of high-speed atomic particles in a new research instrument (see photo, right). The instrument is called a "bubble chamber" by its inventor, Prof. Donald A. Glaser of the University of Michigan. It consists of a glass container in which a clear, superheated liquid is held under pressure to delay its boiling. When particles from a nuclear accelerator pass through the chamber, their paths appear as trails of tiny bubbles. This occurs for a few thousandths of a second between the release of the pressure and the boiling of the superheated liquid.



← Underwater Camera Case

Beginning skin divers now can take underwater pictures with a Brownie camera. An inexpensive, transparent plastic case for the little camera allows a full roll of film to be shot in one dive. A spring-back button that projects through the case is pushed to snap a picture. A projecting dial is revolved to turn the film. A carrying strap loops through two eyelets on top of the waterproof case.

☞ Paint said to make objects "invisible" to radar has been developed in Canada.

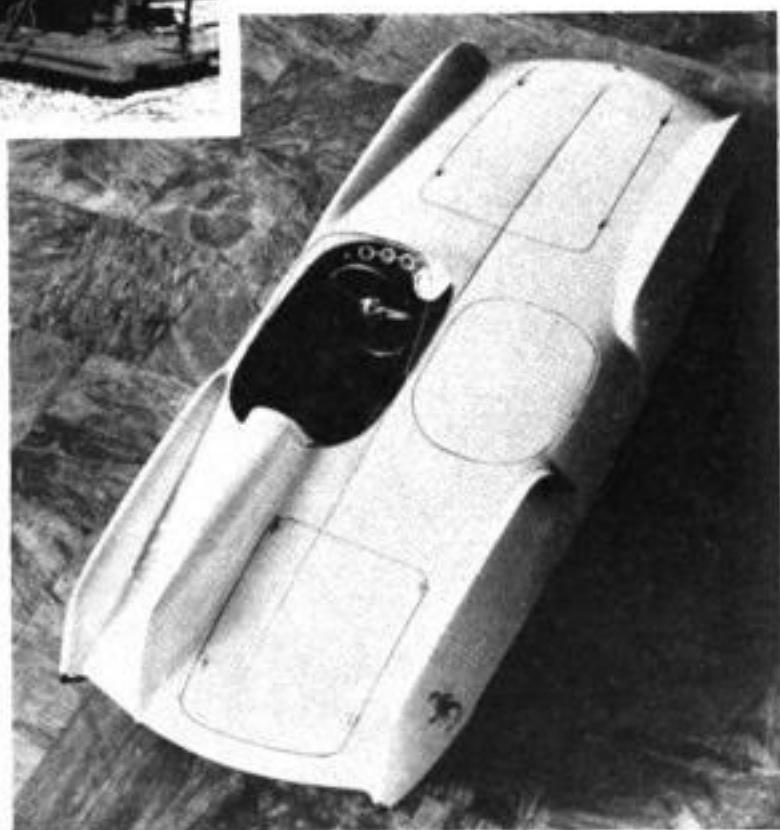
Pilot Seated on Ground Flies Drone Helicopter

More than a year's flight testing of a remote-control helicopter is being evaluated at the Kaman Aircraft Corporation plant at Bloomfield, Conn. The helicopter is a Kaman HTK-1, with an automatic pilot and radio controls, so that it can be flown by an operator on the ground. To date it has been flown forward, backward and sideways, has taken off, landed and hovered. A stand-by safety pilot has occupied the aircraft on flights.



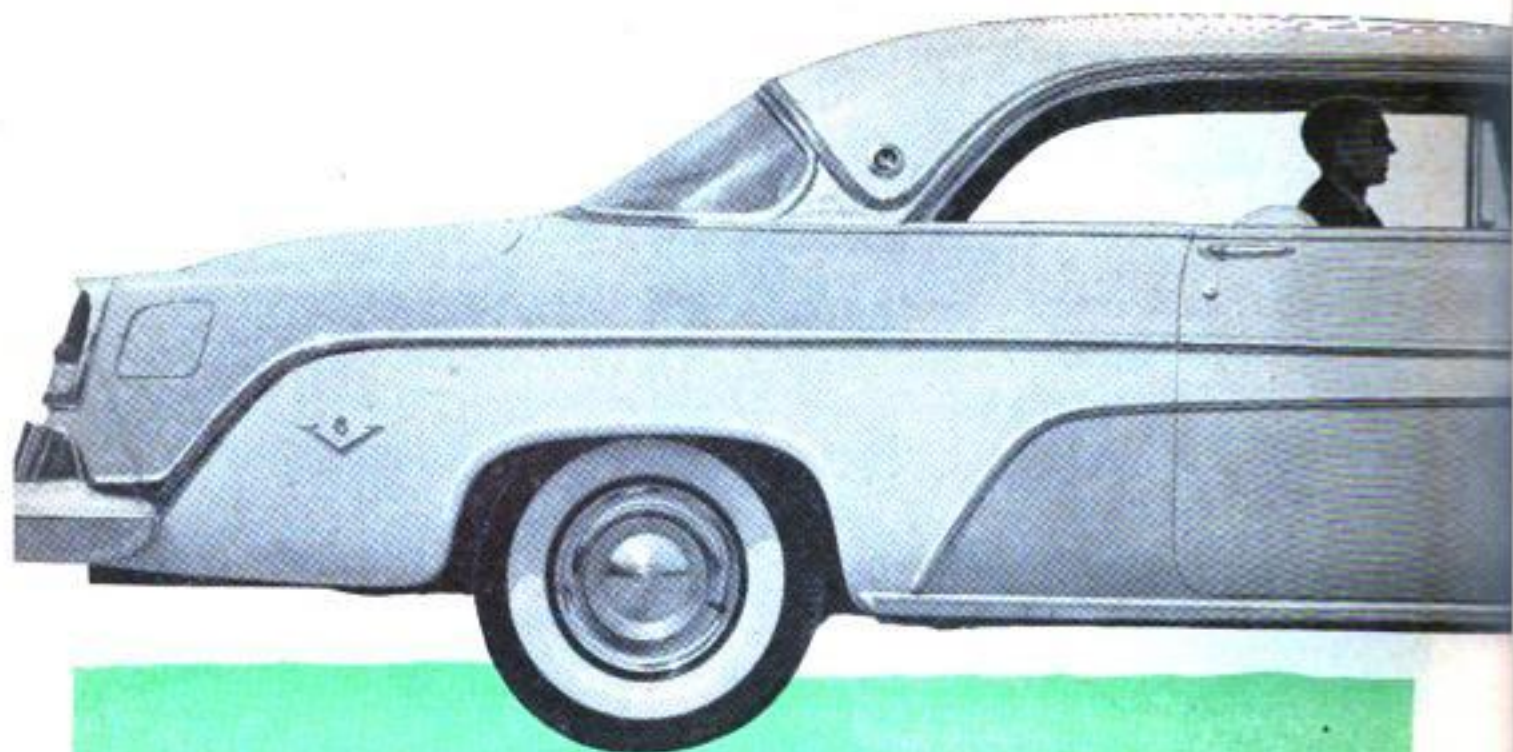
Four-Cylinder Sportster Goes 116 Miles per Hour

With a four-cylinder engine that develops only 66 horsepower, an Italian sports car has a top speed of 116 miles per hour. Designed for competition, the completely streamlined car has a flush-fitting lid that covers the passenger seat and a fin behind the driver's headrest. The chassis was designed by Boano of Turin, Italy, and the manufacturer is the Arbath Company, also of Turin.



Hand Truck Climbs Stairs On Power-Driven Wheels

Heavy loads can be moved up and down steps on a new stair-climbing hand truck. The truck is equipped with a hand-operated power drive. The operator pulls on a drive cable, which transmits additional power to the two wheels through ratchet gears. According to the manufacturer, the power drive doubles the amount of load that can be rolled up steps. Two-wheel brakes permit heavy loads to be moved down stairways or steep ramps safely. The hand truck is made in a variety of models and sizes for handling barrels, castings, hardware, machinery and other heavy items.



De Soto Owners Like . . .

Handling

"Best handling car I ever owned. Remarkable road hugging at all speeds."

Tennessee busdriver operator

Riding comfort

"I like the seats. I never get tired riding in this car."

North Dakota farmer

Styling

"My hardtop gets raves for its styling every day."

Michigan bacteriologist

But They Don't Like . . .

Body leaks

"Doors very poorly fitted. Water leaks during rain or wash jobs."

Rhode Island teacher

Poor assembly

"Very poor assembly. Improper fit of components."

Texas naval officer

Rattles

"It rattles and has quite a lot of squeaks."

Ohio glass worker



CLYMER TESTS DE SOTO V8

By Floyd Clymer

THE TEST CAR was the 1955 De Soto Fireflite four-door sedan, with 4-barrel carburetor, 200-horsepower V8 engine and PowerFlite transmission. The test was from Los Angeles to Yuma, Ariz., via Riverside, the Salton Sea (246 feet below sea level), and returning via Needles, over the desert to Barstow and back to Los Angeles for a total of 697 miles, which in-

cluded some unpaved back-road testing. De Soto's new model has more power, acceleration and higher top speed than last year's. Although the big car is 200 pounds heavier than the 1954 model, its wheelbase is only ½ inch longer.

I found better cornering, roadability, an improved ride over rough roads and a

(Continued to page 224)



OWNERS REPORT: 1955 DE SOTO V8

By De Soto Owners

THERE'S A WHOPPING amount of agreement among De Soto owners on the best-liked feature. More than half (57 percent, to be statistical) of the owners rate handling ease as the thing they like most about their new cars.

"Handling is excellent. I can drive it all day and it does not tire me at all."—North Carolina bookkeeper.

"Easy to steer. I drive relaxed. There is no wandering on the road at any speed and no driving fatigue on long trips."—Kansas cafe owner.

Second and third on the best-liked list are riding comfort and exterior styling. Only a single percentage point separates these two. Comfortable ride was mentioned by 38 percent and the new body styling by 37 percent of the De Soto owners.

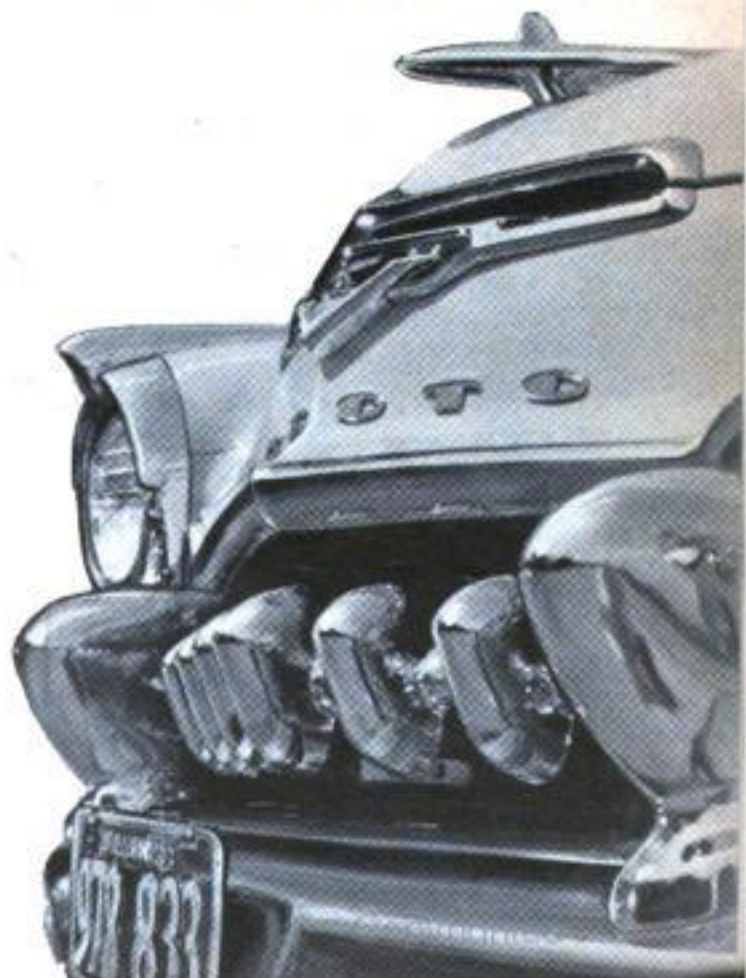
"I like the riding comfort. It's built so you don't get the jolts. My friends keep telling me it's like riding on a cloud."—Arkansas saleslady.

"My hardtop model gets raves for its styling every day in the week."—Michigan bacteriologist.

"It looks neat without being flashy. The long, low body has a sleek appearance that others don't have. There are no bulging taillights. I especially like the headlight design with the chrome frame instead of the fender metal extending over the light."—Louisiana housewife.

And There are Complaints

What do De Soto owners complain about? Well, 20 percent of them made no complaints at all when asked to list them on the PM questionnaire. Among those who did complain, the most frequent complaint





Although the De Soto is a big car (over 18 feet long), owners praise its maneuverability and handling ease

mentioned is dust and water leaks in the body. There are 24 percent who mention this. Another 22 percent list poor body assembly as their big complaint and 16 percent more list the related complaint of body rattles.

"Both front doors leak during heavy rains. So far the dealer has not been able to correct this."—Kansas Army officer.

"Sloppy, careless assembly of the body. The engineers did a fine job on this car and then the fabricators and assemblers loused it up. Driving over very rough roads there is a sensation of looseness as if there were a number of places where bolts and screws should be tightened in the frame and body."—Delaware engineer.

"Unable to get the rattles out of the body,

especially the doors."—Nebraska factory representative.

We asked the De Soto owners if they had any trouble with the V8 engine. The great majority of them had absolutely no trouble to report (68 percent). Another 29 percent had some trouble and only 3 percent state that they had considerable trouble with the power plant.

Of the owners who had trouble, 9 percent list the power-steering system (almost always the trouble involved leaks in the hose couplings or leaks due to hoses breaking). Another 5 percent had carburetor trouble, 3 percent had trouble with the water pump, another 3 percent had trouble with the automatic choke.

"Power-steering hose broke four times.

Clymer says De Soto's shock absorbers provide good rebound control even on severe bumps like this water hole





This month's survey just about blanketed the nation. De Soto owners from 43 states (in color) took part

Percentages from *PM* Poll of 1955 De Soto Owners

Miles per gallon

City driving 13.5 m.p.g.
On trips 16.1 m.p.g.

Oil consumption

None 58%
Some 36%
Considerable 6%

Had trouble with the engine?

None 68%
Some 29%
Considerable 3%

What was the engine trouble?

Power steering 9%
Carburetor 5%
Water pump 3%
Automatic choke 3%
Stalls frequently 2%
Noisy 2%

Do you want more horsepower?

No 87%
Want less 2%
Want more 11%

What did you trade in?

De Soto 58%
Other Chrysler make 17%
Other Big Three make 16%
Independent make 4%
No trade 5%

OVER-ALL RATING OF THE DE SOTO	
Excellent	67%
Average	28%
Poor	5%

How was your trade-in allowance?

De Soto traders
Above average 32%
Average 60%
Below average 8%

Other Chrysler traders
Above average 44%
Average 50%
Below average 6%

Other Big Three traders
Above average 43%
Average 57%
Below average 0%

Independent traders
Above average 37%
Average 63%
Below average 0%

Would buy another De Soto?

Yes 70%
Might 21%
No 9%

What convinced you to buy De Soto?

Previous ownership 23%
New styling 16%
Chrysler engineering 4%
Trade-in allowance 4%
Handling ease 4%

What Should Be Changed?

Needs no changes 43%
Improve dashboard 10%
Outside door handles 5%
Better body work 5%
Improve gas mileage 3%
More headroom 2%

Most-Frequent Complaints

Dust and water leaks 24%
Poor assembly 22%
Rattles 16%
Dash design, assembly 14%
Poor gas economy 11%
Power steering leaks 8%
Trunk hard to operate 6%

20% of the De Soto owners made no complaints at all

Best-Liked Features

Handling ease 57%
Riding comfort 38%
Exterior styling 37%
Power, performance 28%
Roadability 12%
Roominess 9%
Brakes 9%

Carburetor gave trouble but corrected now."—South Dakota salesman.

"Power-steering hose parted at coupling."—Michigan labor-relations director.

"Water pump and fan had bad vibration."—Mississippi sales engineer.

"Automatic choke keeps giving trouble."—Montana farmer.

"Thumping water pumps. Control of engine idle for PowerFlite gave trouble."—Massachusetts sales representative.

What Would They Change?

In each survey we ask owners what single thing they would like changed in their cars. The De Soto owners don't agree on any one thing to any great extent. However, there is one large area of agreement: 43 percent of the owners say the De Soto is all right as it is and needs no changes.

But another 10 percent want something done to the dashboard. De Soto has what it calls a "gull wing" design and some of the owners are not impressed with it.

"Dash panel is a little childish. I would

like a smarter-looking panel."—New York chemical engineer.

Second on the list of features to be changed are the unusual flush-fitted exterior door handles. These handles remain flush with the door until you want to use them. Then you push in one end of the handle with your thumb and the main portion of the handle swings out so you can grab it to pull open the door. There are 5 percent of the owners who would like these handles changed.

"I wish they would change the door handles. I don't think they will last too long."—Massachusetts baker.

Within a fraction of a percentage point of second place among the most-wanted changes is improved body workmanship (5 percent mentioned this).

"More care should be the goal for manufacturers in such work as window trim, dashboard trim, glove-compartment door, trunk-lid fits, and other small details."—North Dakota salesman.

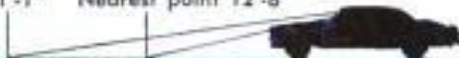
De Soto owners, like most other owners,

TEST DATA

1955 DE SOTO FIREFLITE SEDAN
with PowerFlite Transmission

Driver's Blind Spot

Farthest point 21'-1" Nearest point 12'-8"



Acceleration Test

¼ mile from zero	21.2 seconds
½ mile from zero	31.8 seconds
0 to 30 m.p.h.	4.9 seconds
0 to 60 m.p.h.	15.1 seconds
Top speed by speedometer	112 miles per hour
Actual top speed	about 106 miles per hour

Economy Test

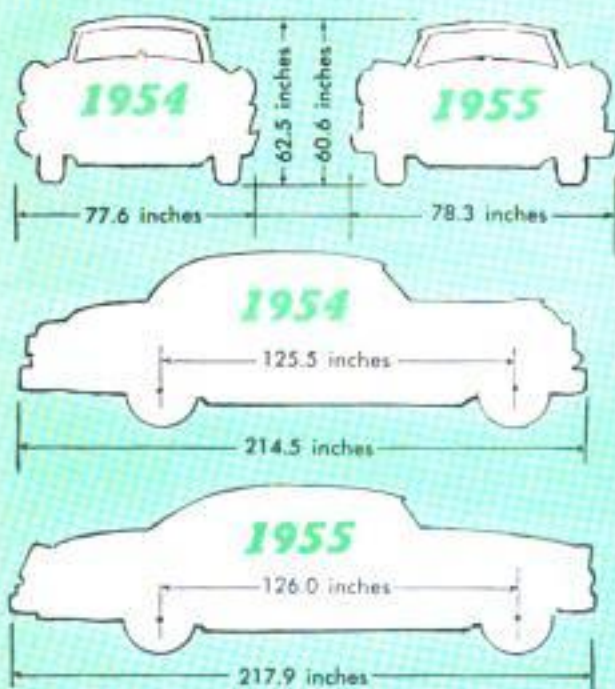
Constant-Speed Mileage

At constant 30 m.p.h.	20.3 miles per gallon
At constant 50 m.p.h.	17.4 miles per gallon
At constant 60 m.p.h.	15.8 miles per gallon
At constant 75 m.p.h.	13.1 miles per gallon

Cross-Country Mileage

Los Angeles, Calif., to Yuma, Ariz. (via Salton Sea)	16.5 miles per gallon
Yuma, Ariz., to Needles, Calif. (very little traffic)	17.1 miles per gallon
Needles to Los Angeles (considerable traffic)	15.2 miles per gallon
(Regular and premium gasoline used)	

Comparison with 1954 De Soto



Popular Mechanics' Owners Reports are prepared this way: 1000 questionnaires are mailed to a random selection of new-car owners each month. Names of owners polled are provided by an independent organization and are taken from state registration lists. The owners' names are kept confidential. Their opinions are carefully tabulated. Sample quotations are then selected for publication in the monthly articles



Operation of front-seat adjustment is difficult, says Clymer. The piano-wire linkage (arrow) works poorly

would like to go more miles per gallon. "Manufacturer should stress better gas mileage."—Iowa locomotive engineer.

Other most-wanted changes are more headroom in front and rear, a better rear-view mirror, easier entry and exit to the back seat of hardtop models and more-durable belts for driving the power-steering pump.

The Horsepower Race

Everybody seems to be concerned about the so-called horsepower race. The 1955 models, more than any others in history, offer greatly increased power ratings. What does the buying public think of this? We asked the De Soto owners.

(Continued to page 228)

De Soto's flush door handles should be changed, say five percent of the owners, but Clymer likes them





In a test flight, T2V-1 in foreground is paced by its predecessor, a Shooting Star type of training plane

Compressed-Air Slots in Wing Enable Jet to Land at Low Speed

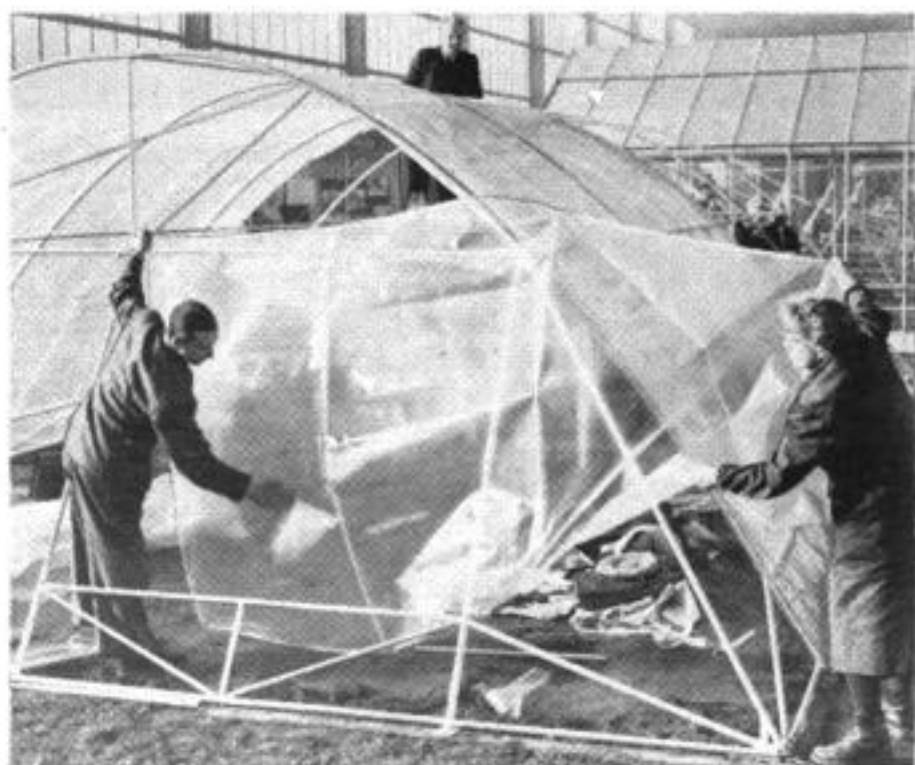
Fast in the air, Lockheed's new T2V-1 Navy jet trainer exceeds 600 miles per hour in flight but slows to 97 miles per hour for landing. The first two-place jet trainer designed for carrier as well as land use, it features a "boundary-layer control system." In this, compressed air from the jet engine is channeled into the wing and blown through tiny slots out over the

wing flap and aileron. This effect makes the normal flow of air over the wing hug the skin surface, increasing lift and delaying the approach to stall. The 38-foot plane has a height of 13 feet, a span of 42 feet, carries 760 gallons of fuel and has a range of 900 miles. The craft is powered by a 6100-pound-thrust Allison engine and contains a simplified cockpit-instrument panel.

Folding Hothouse Made of Plastic

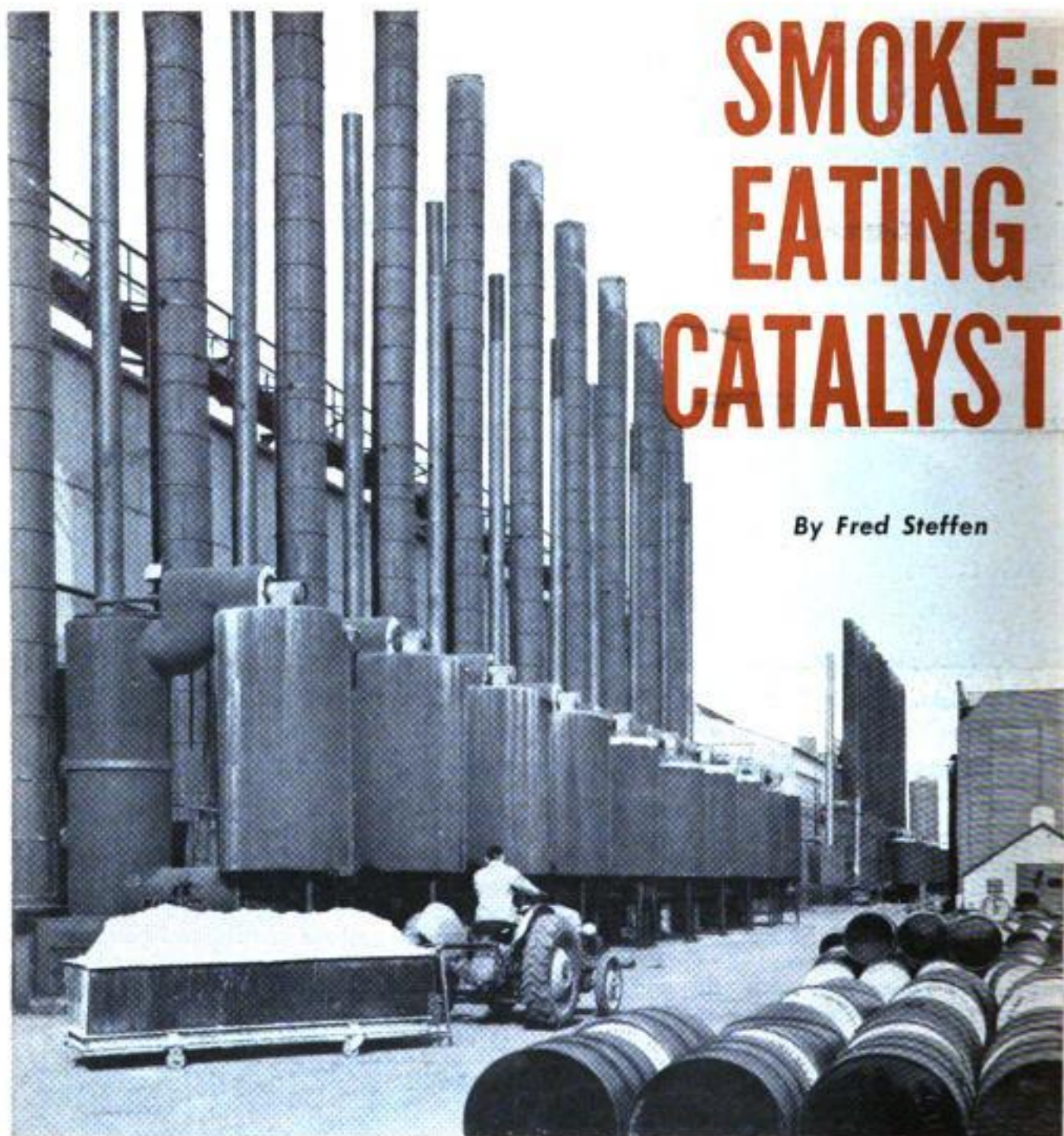
Plastic covering over an easily assembled frame of light metal tubing makes a folding hothouse developed in Germany. The hothouse, which can be set up in a short time, weighs but 80 pounds and covers 190 square feet.

By strengthening the walls of the capillaries, preventing their being penetrated by virus, a compound made from the peel and pulp of oranges has produced dramatic results in treating head colds, influenza, tonsillitis and bursitis.



SMOKE-EATING CATALYST

By Fred Steffen



Reichold Chemical plant in Detroit, first to use the fume-killers, now has 28 catalytic units on stacks

THREE FARM BOYS turned engineer have fashioned a fume killer that's taking the bite from smog wherever it's used.

Catalytic Combustion Corporation devices, small enough to fit into the palm of your hand and big enough to fill two flat-cars, are wiping out dangerous and annoying gases and fumes from Pennsylvania to California.

A Brazilian paint manufacturer has ordered one. Italian, English and Australian firms are interested. Delighted owners of units are discovering important allied uses. Heat formed in "burning up" the objectionable fumes is returned to warm the building or to dry paints or perform a

dozen other uses including preheating the fumes themselves.

Graphing the temperatures of the burning wastes shows when the industrial process is at its best and worst and the process can be adjusted accordingly.

Thermometers hooked to the units can sound an alarm when mine shafts or plants with explosive potential reach the danger point.

An adaptation for the mufflers of lift trucks turns deadly carbon monoxide into harmless carbon dioxide.

All this began when three farm boys who later became engineers in Detroit decided to do something about destroying end-product fumes and gases that embarrass



Norbert Ruff holds a catalyst element. It is made of resistance wire coated with platinum and palladium derivatives in bottle

and harass many industrialists throughout the world.

They are Richard J. Ruff, president of the Catalytic Combustion Corp.; his brother Norbert, and Russell Suter. The Ruffs, natives of Bloomer, Wis., met Suter, a native of Ohio, at Detroit Tech. Richard Ruff and Suter invented the process and the younger Ruff built the first units. At a plant in Bloomer, he's still building the catalytic filter elements that are the heart of the system.

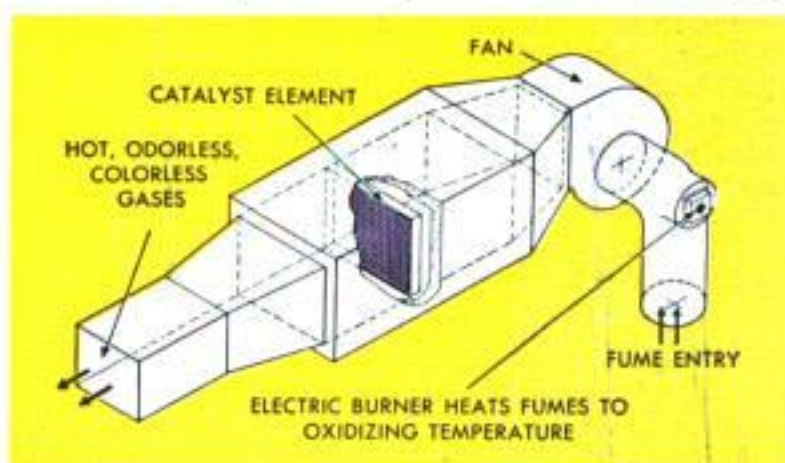
Ingenious application of a simple truth of chemistry is the foundation of the process which nullifies deadly fumes like those that killed people at Donora, Pa., and make Los Angeles eyes smart.

Smoke-abatement devices are in two general categories: Mechanical methods that use water sprays, turbulence, charcoal or other actual filters to remove solids; chemical or burner units which destroy objectionable fumes by burning them up and turning them into harmless wastes. Some actually use flames from tiny gas jets to do the work.

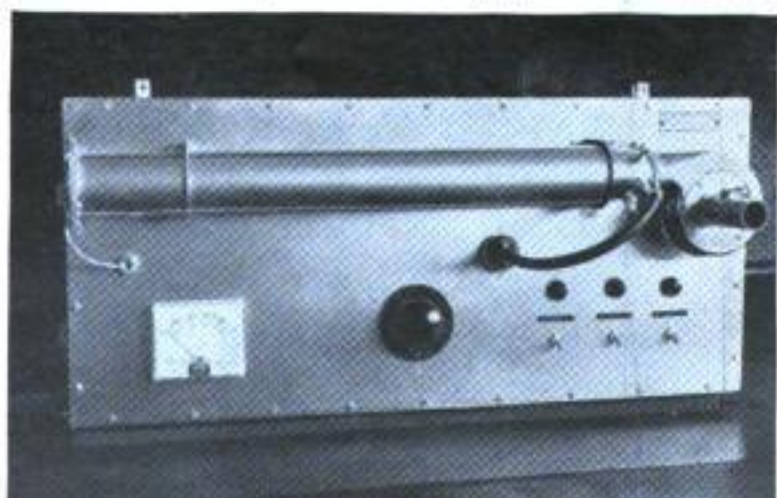
The Ruff-Suter unit, which is housed in a sheet-steel container that looks like a piece of heating equipment, is of the chemical type.

The catalyst element resembles

(Continued to page 212)



Preheated fumes are forced through catalyst element, which speeds oxidation of objectionable hydrocarbons. Waste gases are "burned up." Heat from the combustion is sometimes used to preheat fumes. Below, lab unit destroys gases used in rat tests





Portable Boat Assembled in Seven Minutes From Small Package

Completely portable is a 56-pound, 8½-foot boat that is assembled in seven minutes from a compact package. After its wooden parts are assembled, the flat-bottom boat is made waterproof by a nylon and vinyl

skin fitted around the hull. Aluminum oars or a 3½-horsepower outboard motor can be used to propel the craft, which can be carried in a car trunk or divided into two 28-pound back packs for easy portaging.

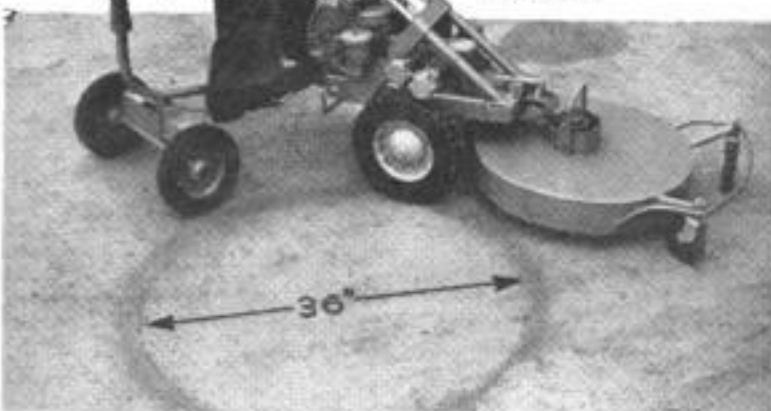
Camera Uses Aircraft Lamps

Two aircraft landing lamps and some small motorcycle batteries allow newsreel and TV cameramen to carry all the light they need for covering after-dark events. The batteries are carried in a knapsack strapped to the back of the operator. With the outfit a cameraman can walk anywhere without an external power source and can even parachute to a remote disaster scene. The landing lamps are mounted at the ends of a short aluminum rod to which the movie camera and gun-type trigger are also attached.



Riding Sulky for Rotary Mower

Behind a new rotary mower is a riding sulky. You sit on a swivel seat and ride as you mow. The mower can be steered with hand controls, foot controls or both, and has a turning radius of only 36 inches. It can be operated in forward and reverse, and has a power take-off. The sulky is available separately and can be adapted to fit most self-propelled lawn mowers.



Long-Extinct Element Made by Scientists

Element 101, which existed at the birth of the earth but soon became extinct, has been regenerated by University of California scientists. The element was produced by bombarding element 99 with alpha particles. Intensely radioactive, it has a half-life of a half hour to three hours and chemical properties similar to thulium. The 101 isotope discovered by the scientists has a mass of 256 and is thus the heaviest matter ever found on earth. Named mendelevium, it was found by the same scientific team that discovered plutonium. Only 17 atoms of 101 were identified in the experiments.

☛ Songs of more than 80 insect species have been captured in the field by portable tape-recording equipment in an Ohio State research project.



Pressure-Can Fuel For Lamps or Torches

Fuel for mantle lamps, torches or portable stoves is instantly available without pumping through use of fuel contained in an aerosol-type container. The fuel feeds through a valve that vaporizes it while drawing in air to facilitate combustion. A mixture of two flammable hydrocarbons, the fuel provides its own pressure because its boiling point is so low that it builds up pressure at 35 degrees Fahrenheit. Each container delivers at least 8500 B.T.U.



Mixer Blends Farm Feeds In Desired Proportions

All the farmer has to do to produce a daily ration of feed for his livestock is turn a series of dials on a new electric mixer. The machine measures the correct amounts of up to four different feeds, mixes them and turns itself off. The feeds, which can include grains, dry molasses, cob-mix, concentrates and ground alfalfa, are piped into the mixing hopper. An automatic timer shuts off the machine when the right amount of feed is produced.

Gas Engine Pushes Lawn Roller and Fertilizer

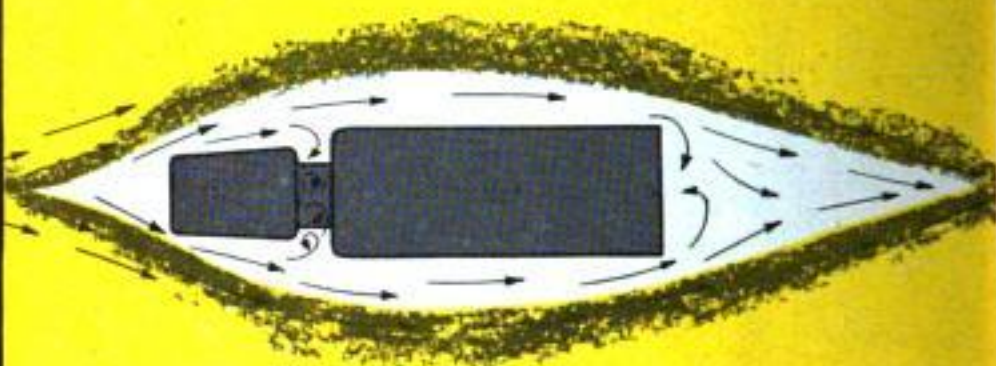
All the heavy work is taken out of rolling a lawn by a new roller powered by a gasoline engine. With optional attachments the roller also can be used to aerate, fertilize and seed the lawn. The aerator can be adjusted to a depth of 1½ inches, and the fertilizing and seeding equipment can be set to the quantities desired. The operator can use the attachments separately or combine them to do all the jobs at once. A small trailer is available for transporting the machine.

Telephone Trouble Spotter

Telephone repairmen use a new instrument to find trouble spots in lines before an actual break occurs. The device sends electronic impulses along a line and measures the received signal to determine how far away the spot is and how big a break is present to cause power loss. The electronic impulses activate a machine which punches out information to indicate the line number and the trouble-spot location. It can check 900 lines per hour.

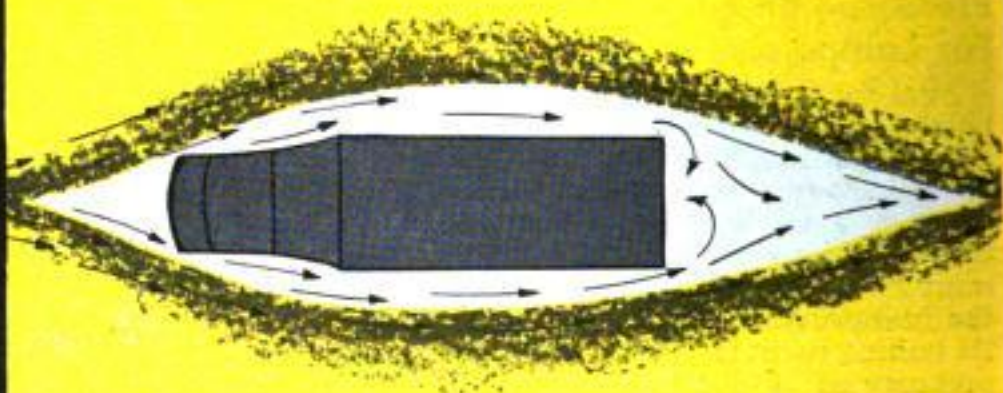


ARROWS SHOW AIR FLOW
AROUND CONVENTIONAL
TRACTOR-TRAILER



***Conventional Tractor-Trailer:
Fuel Costs \$3600 Per Year***

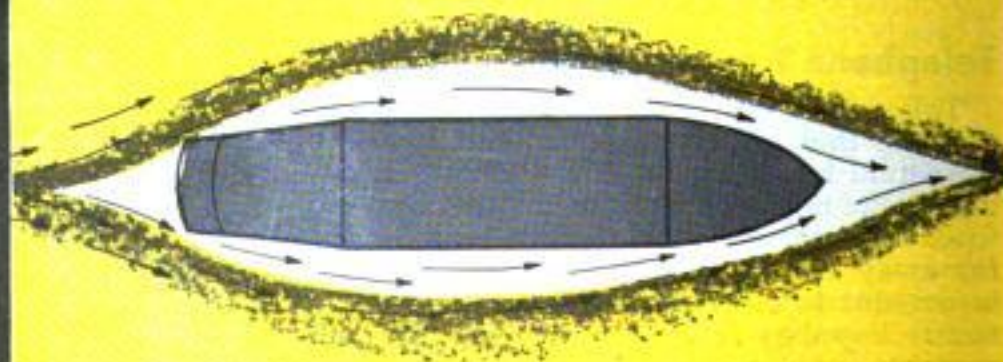
WIND RESISTANCE
CUT 56%
FUEL COSTS CUT 19.3%



Partial Streamlining Saves \$700 Per Year

Radical Streamlining Saves \$1080 Per Year

WIND RESISTANCE
CUT 86%
FUEL COSTS CUT 30%



Streamlining the Highway Freighter Would Save Gas

THERE'S NOTHING new about streamlining. In recent years, it has even changed the shape of such unlike items as vacuum cleaners and safety-razor travel cases.

Yet the biggest, noisiest and, some motorists suspect, fastest machine on the highway, the tractor-trailer, gets bigger, noisier and faster without streamlining.

But changes may be coming. Wind-tunnel experiments by the University of Maryland and Trailmobile, Inc., show that truckers can cut as much as \$1000 a year from fuel bills by streamlining trucks.

Here are some facts the wind-tunnel tests disclose:

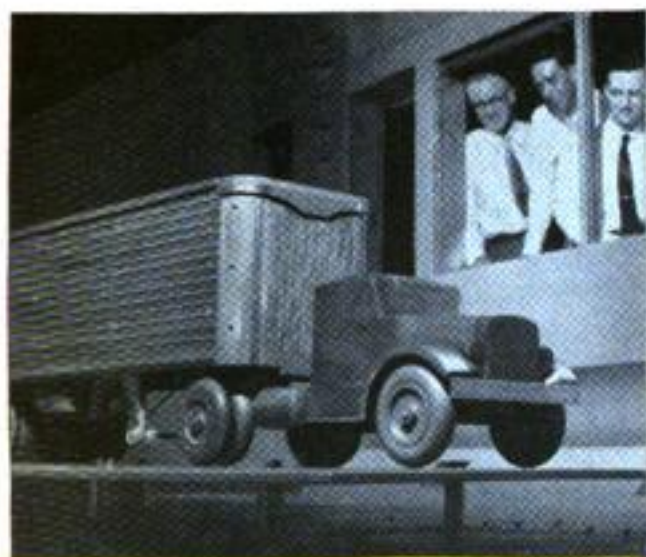
- At 50 miles per hour, it takes 58.3 horsepower to overcome the wind resistance of a boxy trailer. Radical (and impracticable) streamlining would cut this to 8.1 horsepower and save 30 percent on fuel costs or \$1080 a year.

- It takes 6.5 more horsepower to pull a trailer with exposed vertical posts 50 miles per hour than a smooth-sided trailer.

- Simply rounding the front end of the trailer saves about 9 horsepower or \$200 a year in fuel costs.

- Biggest drag is the gap between the tractor and trailer. Closing it would cut resistance 25 percent; adding skirts to the trailer wheels cuts another 20 percent.

- A long, streamlined tail on the trailer cuts drag 12 percent, but legal-length limitations and loading problems make this impracticable. ★ ★ ★

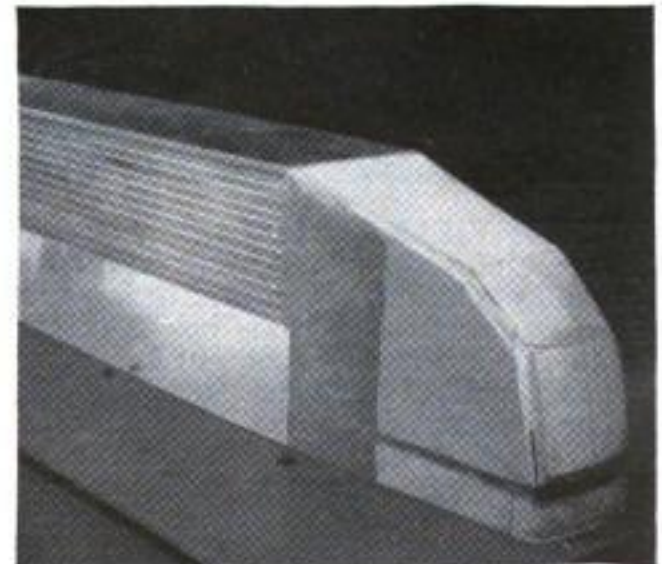
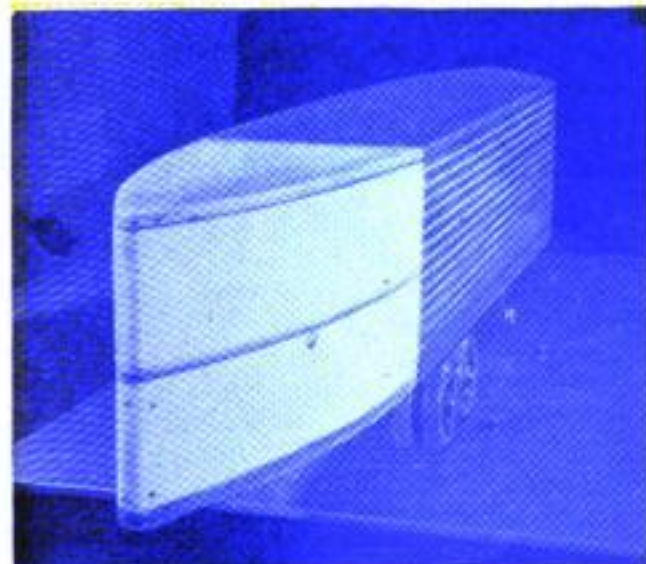


Above, truck-trailer in the wind tunnel. The rounded front end and horizontal corrugations cut fuel costs \$270 a year below gas bill of trailer with square front and vertical posts

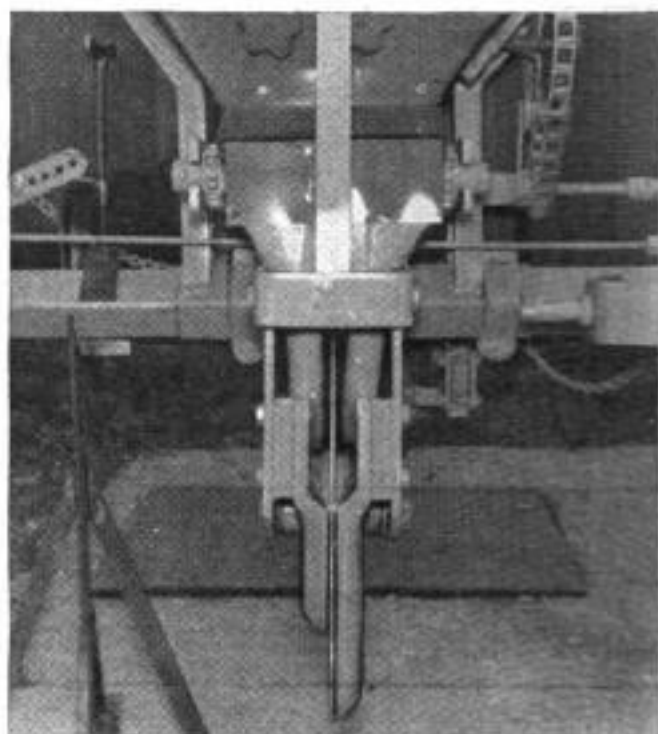
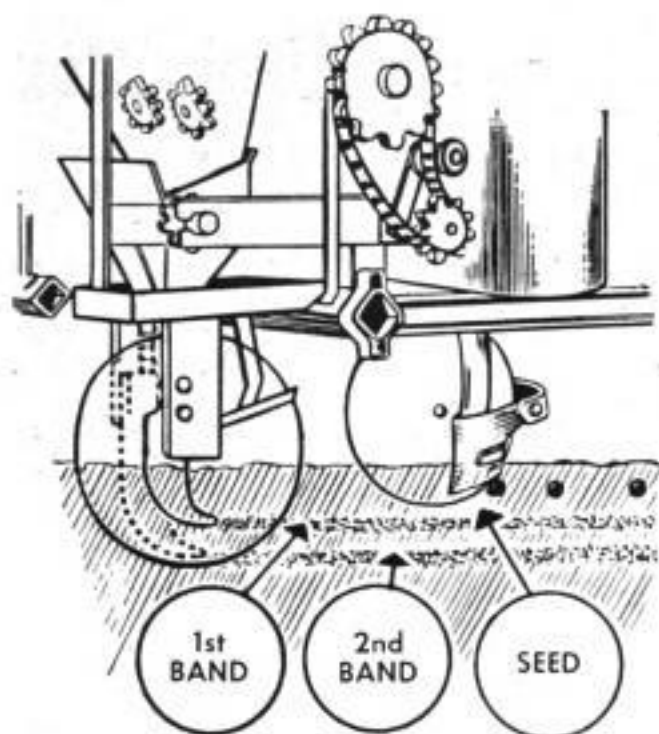


Partial streamlining (mostly closing the gap between tractor and trailer) would save \$700

Radical streamlining, below and right, would save \$1080, but it is obviously impracticable



Planter Distributes Two Bands of Fertilizer



Four-inch saber and eight-inch saber on opposite sides of rolling colter lay fertilizers at different depths



BETTER YIELDS and less work result from use of a seed planter that distributes two different kinds of fertilizer as it plants. Seed is placed two inches below ground level, one fertilizer band at four inches and another band at eight inches.

The shallow band of fertilizer starts the crop, and the second band becomes effective as the plant matures and the roots reach down to the deep layer. A second "side dressing" is unnecessary. As much as

1000 pounds of fertilizer per acre can be distributed without danger of "burning" the seed. Deep root growth, valuable in droughts, is promoted.

In operation, a fertilizer saber descends on each side of a rolling colter to the proper level. The seed colter follows by some 18 inches. In each seed hopper are two seed metering plates, which drop seeds alternately and make a planting speed of five miles per hour possible.



Bracket Holds Boat Lantern

You can mount a gasoline lantern on your boat with a bracket that clamps to any surface up to $3\frac{3}{4}$ inches thick. The bracket, which needs no tools to install, holds lanterns upright or in a tilted position on boats, wagons, tractors, trailers, tent poles or fence posts.



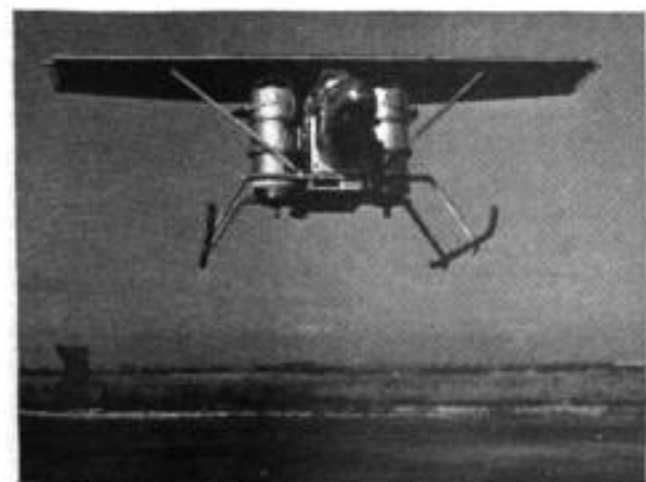
Six-Wheeled Hand Truck Built for Stair-Climbing

You can pull a heavy load up stairs with a hand truck that mounts six wheels. The rubber-tired wheels—three on each side—always have a two-point contact with the treads and risers to prevent unbalancing of the load. The truck climbs steps with risers up to nine inches high. Several models for different-size loads are made.

Vertical-Take-Off Turbojet Has No Propeller

Twin turbojet engines provide all the thrust to lift and propel an experimental vertical-take-off aircraft made by Bell Aircraft Corporation. Unlike other VTO planes, the Bell VTOL (vertical take-off and landing) has no propeller to lift it from the ground. Its jet engines blast it

straight up into the air and then rotate 90 degrees to provide forward thrust. Low-speed control is by compressed-air jets at tail and wing tips, flying control by conventional tail and ailerons. The VTOL has the wing of a light plane, a glider fuselage and a helicopter landing gear.

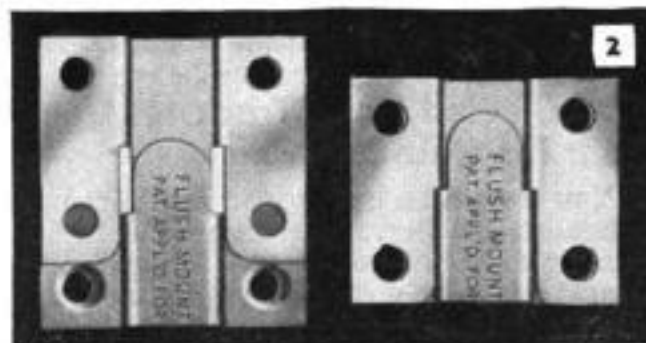


WHAT'S NEW FOR Your Home



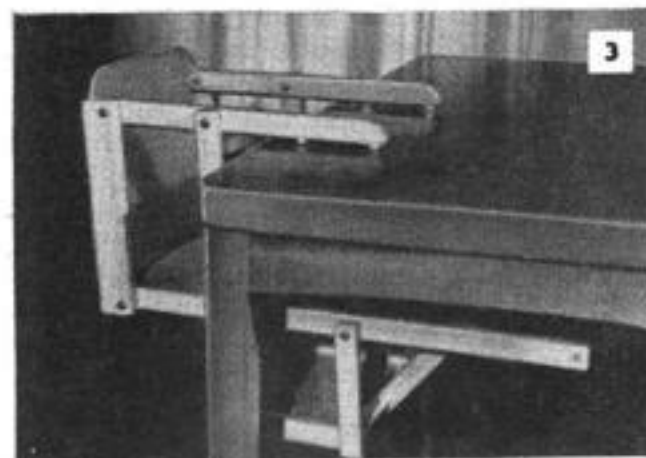
1. WATER SOFTENER styled for the kitchen is regenerated by pushing two buttons. Salt is easily added to the 36-inch-high unit, and an electric timer returns the unit to service at end of cycle. Table top hides all controls, furnishes work space
Culligan, Inc., Northbrook, Ill.

2. HANGER enables you to hang pictures and mirrors flush with wall. Two interlocking metal plates, one of which fastens to the wall, the other to the object to be hung, comprise the unit. Heavy objects like flower boxes, cabinets and shutters can be hung
Design Craft, 504 Interurban Building, Dallas, Tex.



3. LEGLESS HIGH CHAIR adapts itself to any table. Arms rest on top of table while section below presses upward on underside of table top. The unit folds for carrying, eliminates the tipover danger and is said to prevent the youngster from standing
Luger Products, 12 E. 25th St., Minneapolis 4, Minn.

4. FOOD HOLDER speeds the slicing, dicing and shredding of fruits, vegetables and meats. Chrome-plated prongs hold the food in cutting position until the last bit is utilized. There's no danger to fingers. The wooden unit is also a knife holder
Roblex Products Co., 1525 Griffith Park Blvd., Los Angeles, Calif.



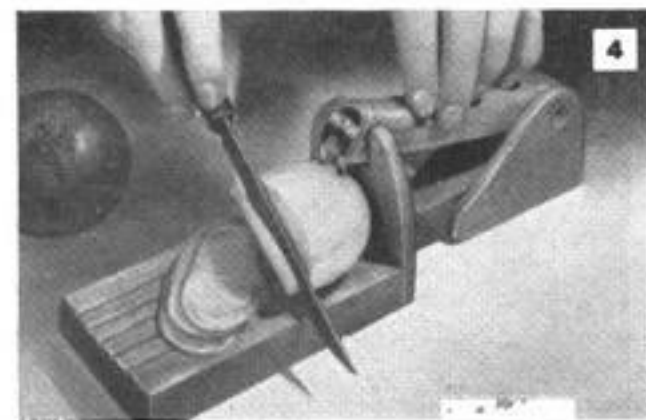
5. ELECTRIC BROILER with rotisserie employs radiant-heating panel made of glass. Embedded in the glass is a film of conductive material. The glass helps to produce long heat waves which sear the food to seal in the juices, odors and flavors
Electrigras Corp., Bergenfield, N. J.

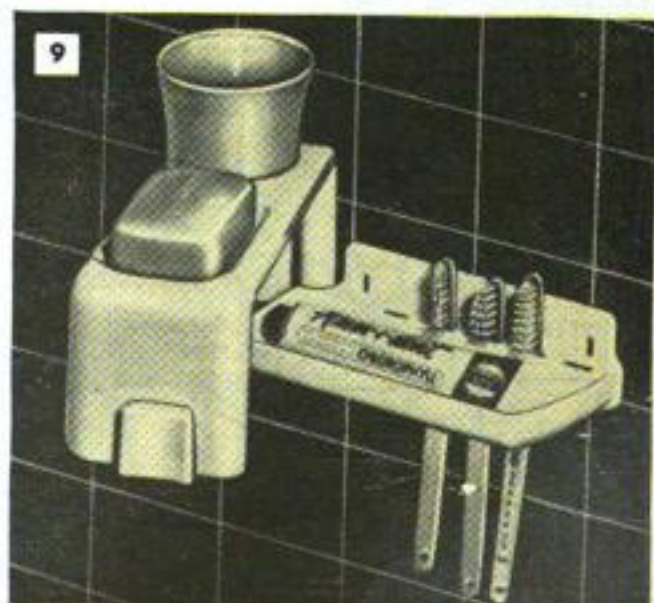
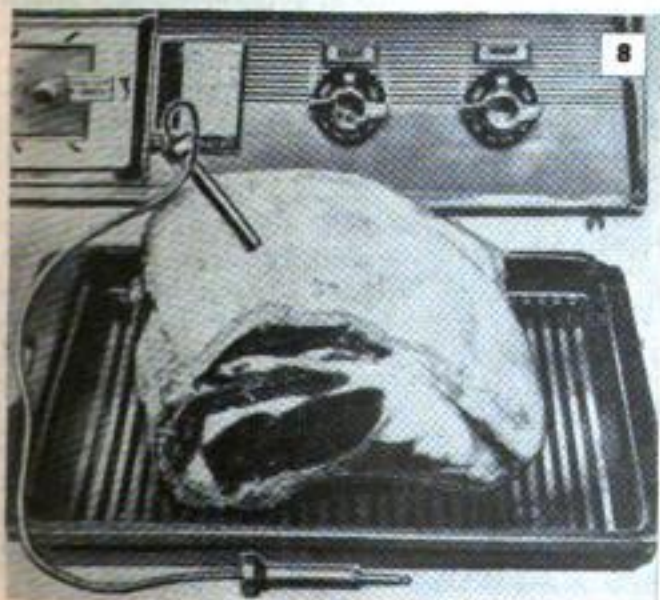
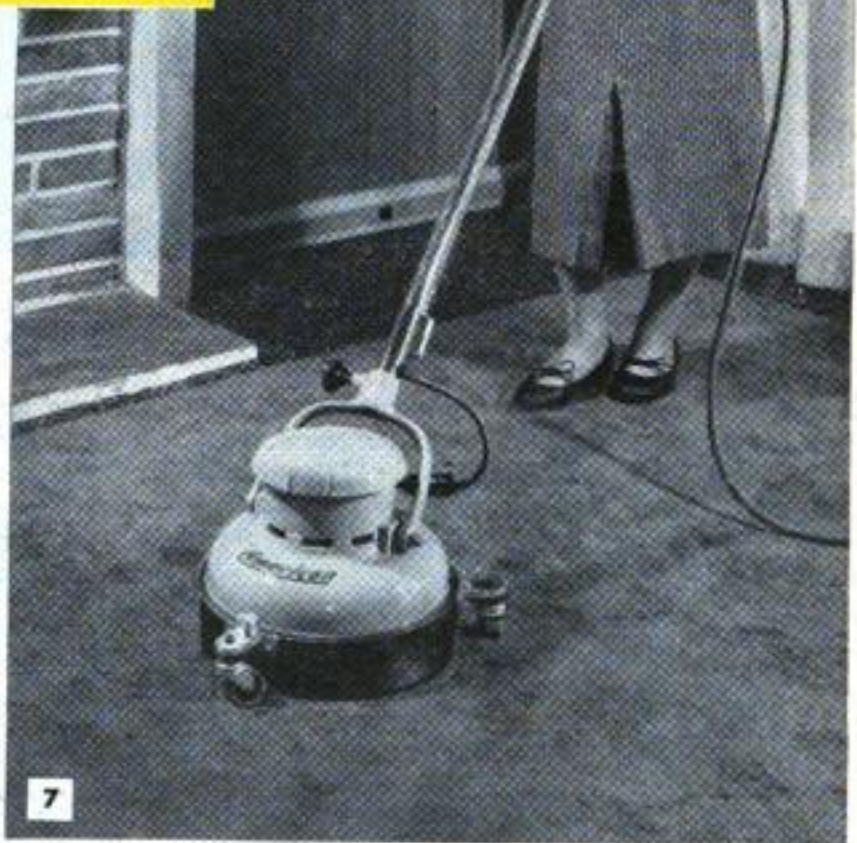
6. "PEG-BOARD" CLIP grips tools and utensils firmly. A screw is adjusted to give correct spring tension for holding light or heavy objects. The clip is quickly inserted in kitchen or workshop "Peg-Board" and it is easily moved. Various sizes are made
Newhart Products, P. O. Box 157, Devon, Conn.

7. CARPET CLEANER scrubs rug-cleaning powder into rug by whirling action of a circular brush. The dirt-filled cleaner material is then picked up by any vacuum. The rented unit can also be used as a floor scrubber, polisher, sander, buffer or waxer
American Floor Surfacing Machine Co., Toledo 3, Ohio

8. MEAT THERMOMETER in new range tells when a roast or fowl is cooked enough. Probe is placed in center of meat and the jack plugged into outlet in oven. A window on the control panel indicates the progress of the cooking from rare to well-done
Phileo Corporation, Philadelphia, Pa.

9. PLASTIC HOLDER for glass, soap, toothbrushes and toothpaste has hideaway feature. Glass and soap tray swing out to reveal a lower shelf. Designed for use in kitchen or bathroom, the easily cleaned unit is glued to the wall with a special cement
J. & S. Mfg. Co., 2045 S. State St., Chicago 16





KEEPING UP WITH THE ATOM

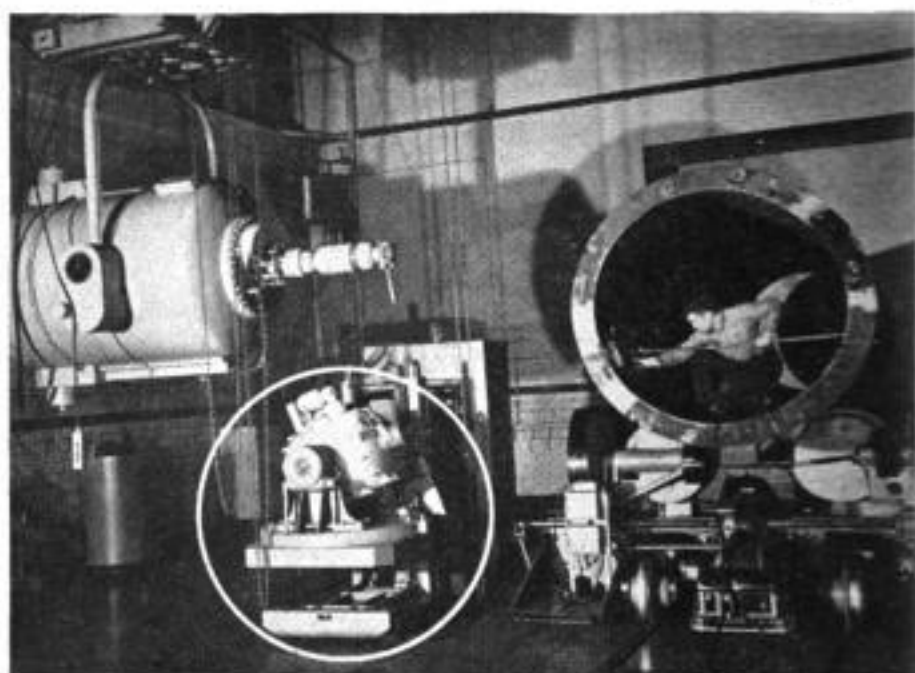
RADIOACTIVE cobalt is put to work in a new inspection tool (in circle, right) that can "see through" steel up to a thickness of seven inches. The new "Isoscope," developed by the Babcock and Wilcox Company, requires only one third the exposure time of a 1,000,000-volt X-ray unit used in similar radiography.

☆☆☆

Atomic-powered airplanes will cross the Atlantic in 30 minutes, within the lifetime of some persons now living, it is predicted by industrialist John Jay Hopkins, president of the General Dynamics Corporation.

☆☆☆

The Atomic Energy Commission has some heat for sale in the Los Angeles area. The heat will be a disposable by-product of the sodium-graphite reactor now under



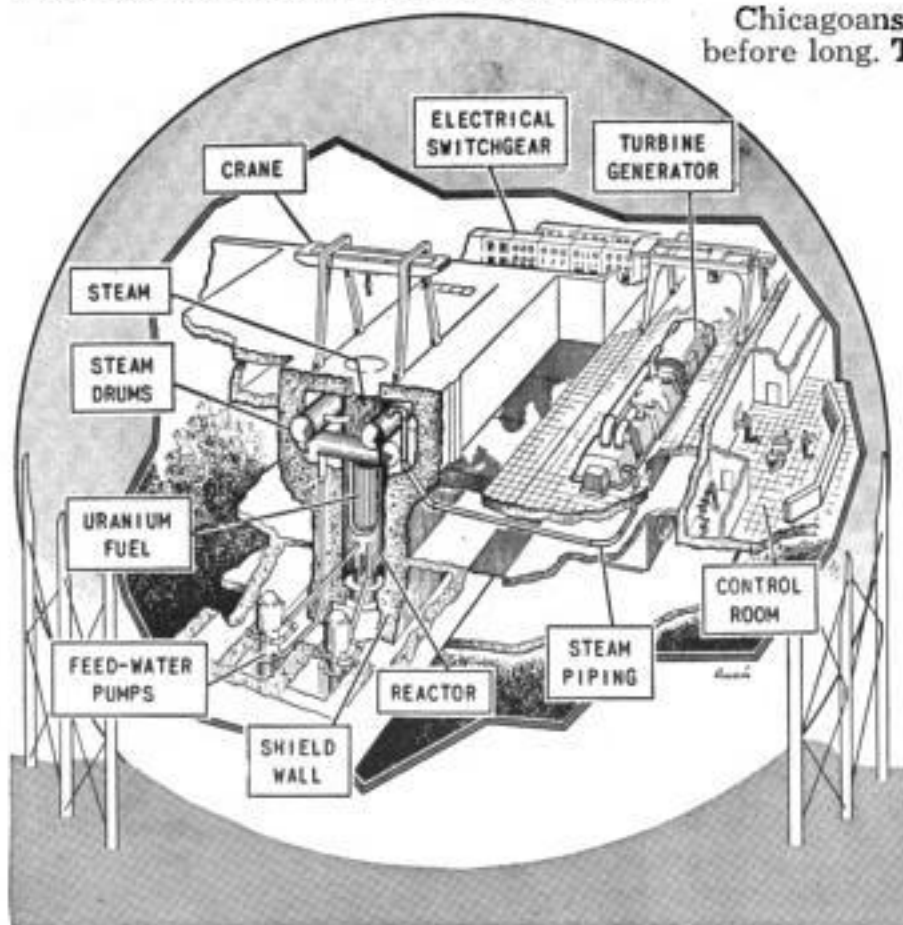
construction for the AEC some 30 miles northwest of Los Angeles, whose peak heat load will be about 20,000 kilowatts, permitting generation of about 7500 kilowatts of salable electricity.

☆☆☆

Chicagoans may be using atomic power before long. The city's electric utility company, Commonwealth Edison, has proposed a 180,000-kilowatt power plant (see drawing) of the "boiling water" reactor type originated at Argonne National Laboratory. In this plant fissioning uranium produces heat which boils the water in the reactor and develops steam, which is piped to the turbine to create electricity.

☆☆☆

The shock of an H-bomb explosion is sufficient to cause an earthquake detectable on distant seismographs. Dr. Edward Teller, physicist of the University of California, reported he watched the earthquake recorder at the university jump when the Nov. 1, 1952, H-bomb explosion occurred.





Hydraulics Raise or Lower Truck Bed for Loading and Unloading

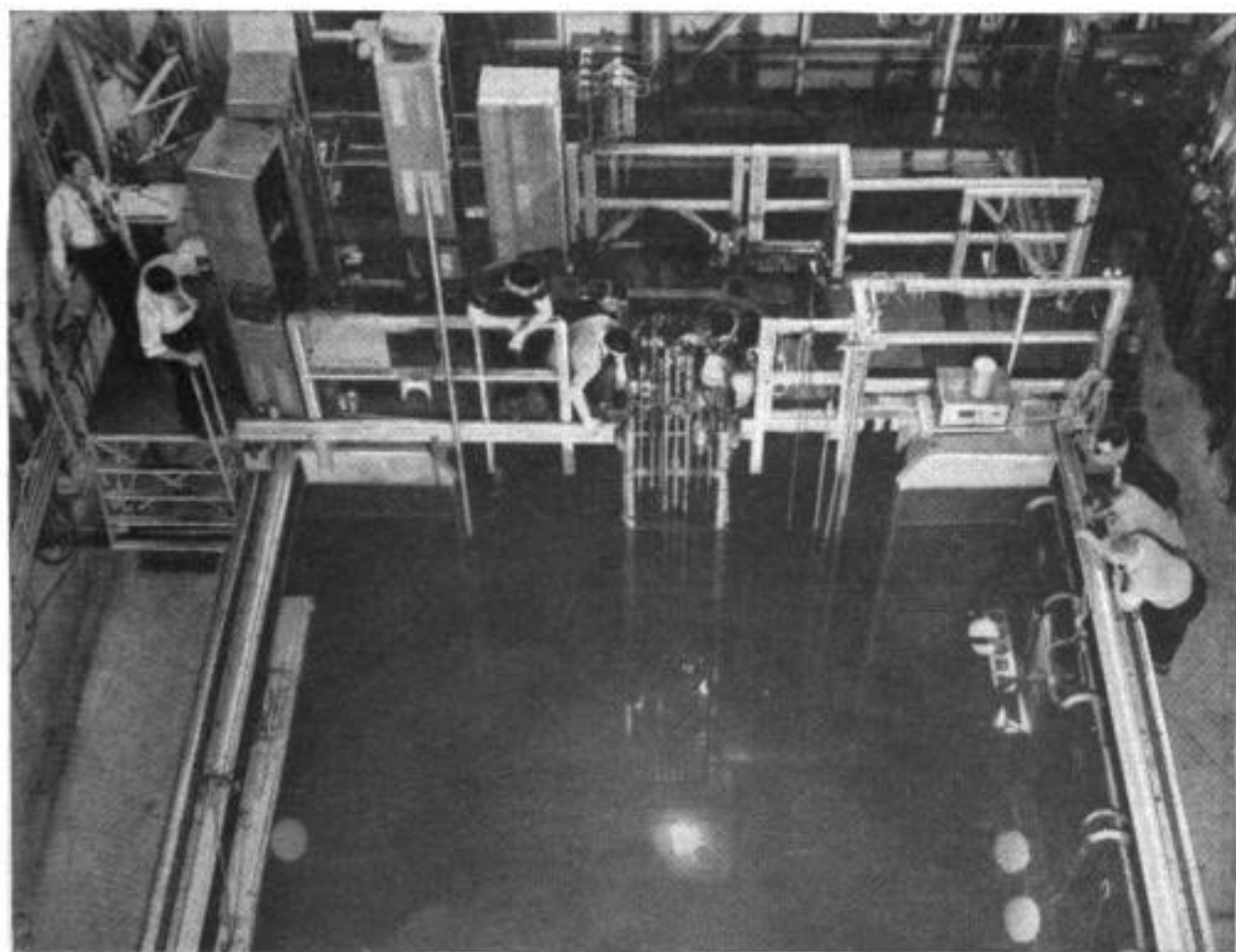
Hydraulic action raises the bed of a unique truck to a height of 45 inches or drops it to ground level. Loading and unloading time is cut 50 percent, reports one company using the truck which was engineered, designed and manufactured by

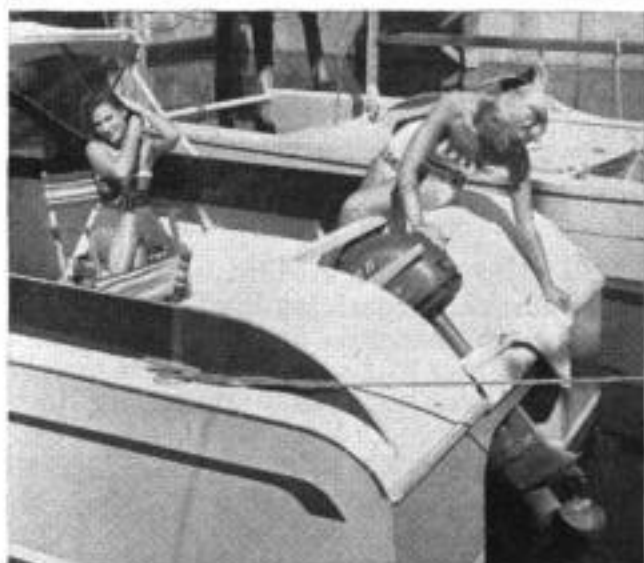
a garage owner and a truck foreman. The truck bed is carried at a 25-inch height most of the time, but it can be used continually at any height. It can be raised to an angle in four different directions to accommodate loading or unloading.

America Takes Underwater Atomic Furnace to World Conference

Delegates to a United Nations conference at Geneva, Switzerland, this month will view a "swimming pool" atomic reactor like the one in operation at Oak Ridge. The reactor operates beneath 20 feet of water.

The water provides visibility while protecting onlookers from atomic rays, and at the same time acts as a moderator to control the nuclear reaction. Qualified foreign scientists will be allowed to operate it.





Outboard Powers Catamaran

Though it is big enough to accommodate four persons comfortably, a new catamaran cruiser draws only four inches of water. With a 25-horsepower motor installed between the twin hulls, the catamaran will make 20 miles per hour. Gear and duffel can be stored in the hulls, leaving the 8 by 11-foot cockpit free for lounging. During an extended cruise, two cots can be fitted into the cockpit. The family-type craft is 18 feet long. The hulls are made of plywood covered with glass fiber. Because of the stability and buoyancy of the twin hulls, the catamaran will take four-foot waves with very little pitching.

Projectiles Fired Into Artificial Rain Reveal Raindrop Damage

Drops of rain have the effect of bullets when encountered at supersonic speeds. In order to study the destructive effect of raindrops on aircraft or missiles traveling faster than sound, Convair developed a process which tests structural materials by firing them from a 20-mm. cannon into an arti-

ficial rainstorm. The tested projectiles, which are recovered by parachutes that open after they are fired, reach speeds as high as 1900 miles per hour, or approximately $2\frac{1}{2}$ times the speed of sound at sea level. Raindrop damage often is extensive.



In one evening you can assemble a **VACATION GEIGER COUNTER**

IF YOU'RE LOOKING for a vacation in the open with adventure thrown in, why not consider prospecting for uranium? It is this generation's "gold rush."

Uranium prospectors need more than the piepan used by gold rushers of yesterday. They need a precision electronic instrument called a geiger counter.

Scores of counters are on the market, ranging from \$25 to \$500 or more. Just announced is a build-it-yourself kit that sells for \$15.95.

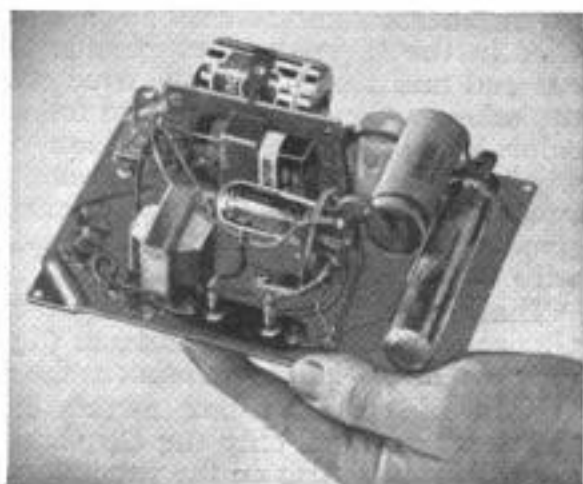
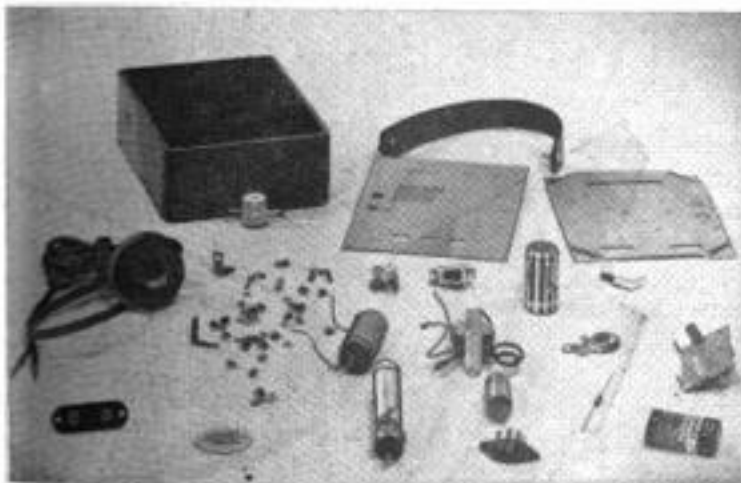
Everything is included, even a radioactive sample for test purposes and the Atomic Energy Commission's booklet on uranium prospecting.

No toy, the counter is an accurate scientific device with a maximum sensitivity of 0.2 milliroentgens per hour. Current is provided by a 22½-volt hearing-aid battery and a 1½-volt dry cell.

The only tools required to assemble the counter are a soldering iron, screwdriver and wire-cutting long-nose pliers.

Several tricks have been used by the kit designers to keep costs down. One is a simple rectifier consisting of two metal screws and a chunk of plastic. Another is the absence of a separate high-voltage circuit. The necessary high voltage is built up by flipping a switch several times to charge a capacitor. Once the capacitor is charged the counter will operate about an hour.

Below, the kit as you get it. Below right, after an evening's work, here's how the assembled parts look





Specially designed for the deaf, a quiet-listening kit has a tiny plastic earphone that fits in the ear

PUT a SILENCER on YOUR

CHILDREN PLUS TV means noise. Space ships blast off; cowboys fire at "dry gulching" bad men; Howdy Doody outshouts Clarabelle's horn. It's fun, but noisy.

Yet there's no need to be a nervous victim of television audio. You can quiet the set so Mother and her friends can enjoy a cup of coffee and some gossip while Rocky Jones blasts off from a satellite only a half-room away. And you don't have to be an electronics engineer to do it.

Kits are available for adding earphones to TV. These consist of a three-conductor cable, junction box with switch and volume control, and earphones. Such a kit is shown at top of the opposite page. Or you can buy the parts and build one yourself.

First, open the back of your set, making sure the current is disconnected. Locate the two wires from the chassis to the loudspeaker. If your set is a console, you probably won't even have to open the back to get at these two wires.

Second, cut one of these two wires at a point convenient for soldering. Follow the kit instructions and solder one color-keyed wire in the three-conductor cable to one cut end and another color-keyed wire to the other cut end. Be sure you follow the color keying or the junction-box switch won't function properly. Next, remove insulation from one inch of the uncut loudspeaker wire. Solder the third color-keyed wire to it. Tape joints.

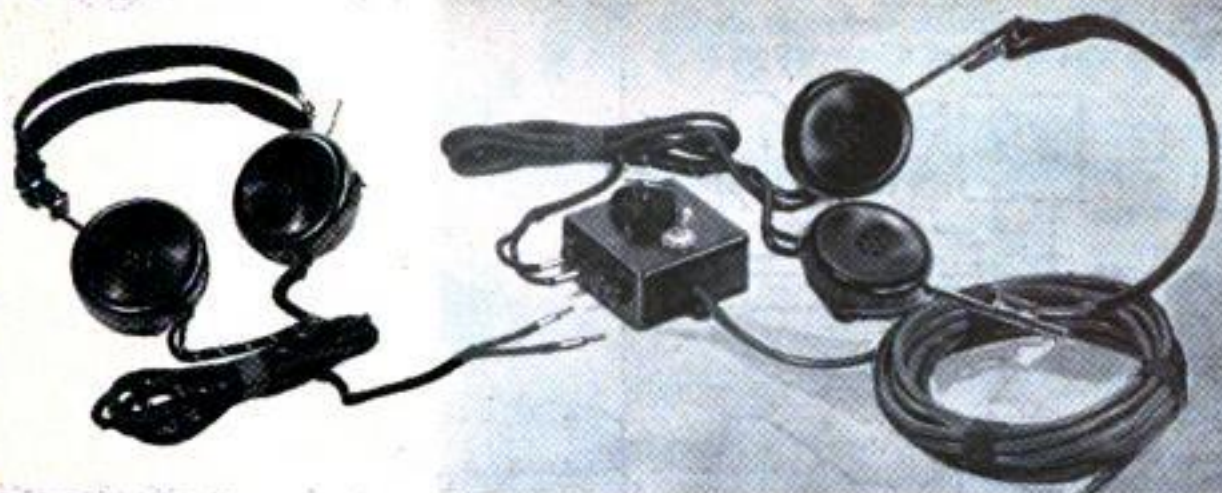
That's all there is to it. Plug the earphones into the junction box and the children can listen while you relax in the quiet.

With the junction-box switch in the "Phones" position, only the earphones get the TV sound. Also on the junction box is

a control so the youngsters can regulate the volume to suit their eardrums. With the switch in the "Speaker" position, both earphones and speaker get the sound. This position is fine for hard-of-hearing persons. They hear easily without raising the volume to a level annoying to other listeners. By the way, there are special kits for the hard-of-hearing installed the same way.

To make a big hit with the kids, go one





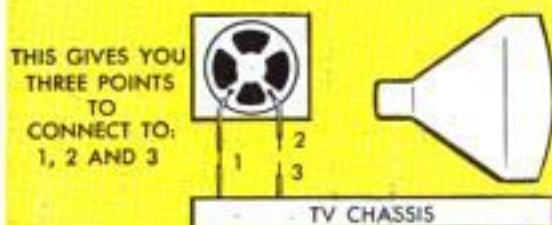
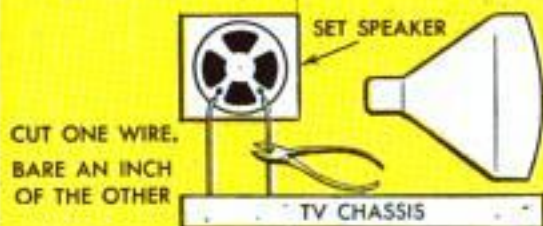
Typical quiet-listening kit for television set consists of cable, control box and two pairs of earphones

TV SET

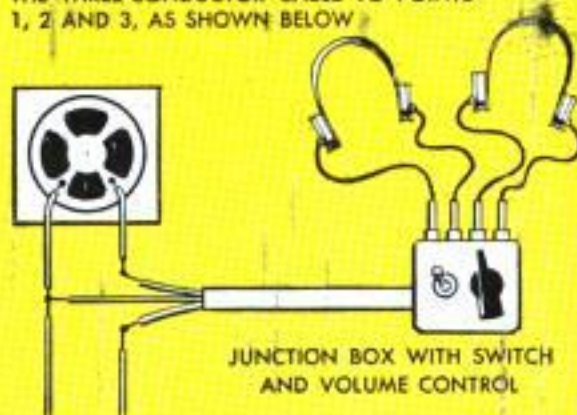
Mother and her guest relax while the Space Cadets blast off noiselessly! Earphones are attached to the helmets



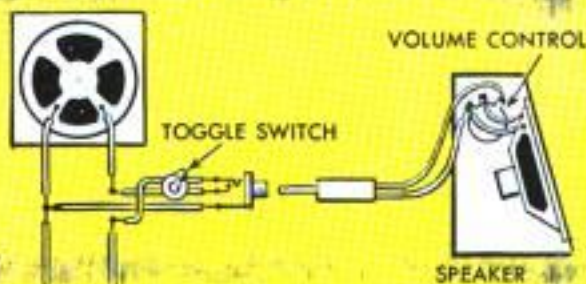
ALL THESE QUIET-LISTENING DEVICES ARE HOOKED UP THE SAME WAY. HERE IS HOW YOU DO IT:



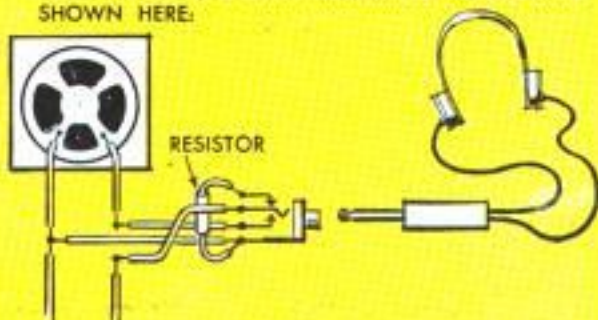
TO INSTALL QUIET-LISTENING HEADPHONES YOU SIMPLY SOLDER THE THREE WIRES OF THE THREE-CONDUCTOR CABLE TO POINTS 1, 2 AND 3, AS SHOWN BELOW



TO INSTALL A REMOTE SPEAKER YOU ADD A CLOSED-TYPE TWO-CIRCUIT JACK LIKE THIS.



OR YOU CAN USE A MAKE-BREAK JACK TO HOOK IN A PAIR OF EARPHONES, BUT YOU HAVE TO ADD A 3-OHM, 5-WATT MATCHING RESISTOR AS SHOWN HERE:



In an hour, you can make an extension speaker with these parts. Diagrams (left) and text explain how

step further and mount the phones inside space helmets, available at toy stores. Remove the phone units from the headbands. Drill holes in the helmets to match the earphone assembly-bolt positions. You will have to replace these bolts with longer ones.

You can add earphones to TV without a special kit by installing a closed-circuit, make-break jack and a matching resistor of 3 ohms, 5 watts on the back of your TV set. Details are shown in column at the left.

Another TV silencer is a small extension speaker that can be placed on the floor in front of the youngsters so the sound level can be kept low.

One way to assemble such a unit is shown in column at left. You will need a jack, plug, speaker volume control and a small speaker with wood case. The jack is mounted on the TV cabinet and wired as shown. The diagram also shows how to wire the volume control on the small speaker. By adding a toggle switch across the two wires shown, you can use both speakers at once or one at a time, as you prefer. The volume control on the extension speaker only lowers the sound level of the TV set. To increase the volume, you must use the control on the TV set. ★★★

(These kits are available at radio stores. If there is none near you, we will send a list of mail-order houses.)

the

POPULAR
MECHANICS

CRAFTSMAN



Tote Case for Your Guns

HERE IS AN IDEAL CASE for transporting shotguns and rifles on hunting trips where you are going to use more than one gun. It furnishes protection against marring and breakage, and at the same time is easy to carry. Because of its flat shape, it packs easily into a car or station wagon and at home, between trips, it pro-

vides a dry and dustproof storage cabinet.

The construction is simple, as no difficult-to-make joints are used. The over-all dimensions will be determined by the sizes of the guns to be carried in it. The top and bottom pieces are $\frac{1}{4}$ -in. plywood and the sides are of 1 x 4-in. stock. Drill holes for 1-in. screws $\frac{3}{8}$ in. from the edges of the



After box is assembled, top and bottom are separated by making a saw cut all around, shown above left

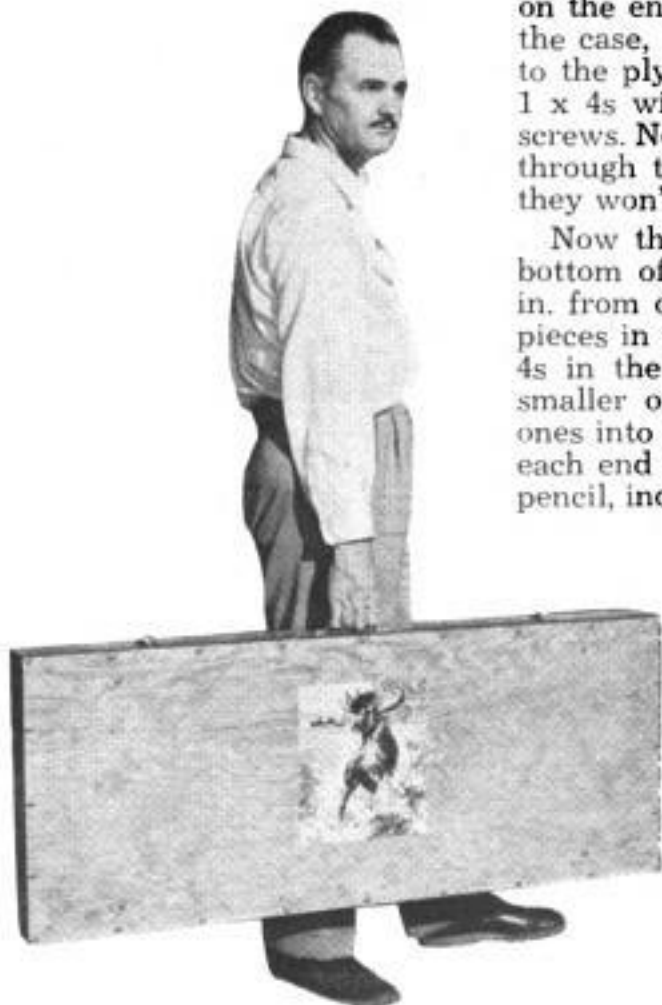
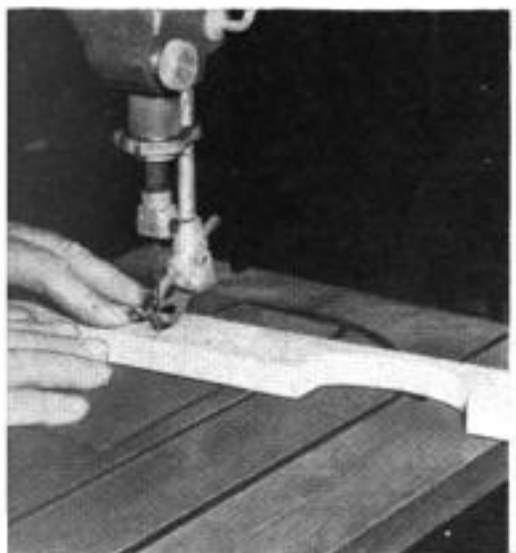


Above center, the 1 x 4 crosspieces are fitted in place. Next, at the right, gun positions are marked



Lower left, cutouts are made on a jigsaw. Center, attaching screws must not be driven through cutout

Lower right, the crosspieces are lined with strips of rubber held in place with broad-headed tacks



plywood pieces, 6 in. apart on the sides and 5 in. apart on the ends, with a screw at each corner. To assemble the case, a box is made first by joining the 1 x 4 sides to the plywood top and bottom. Coat the edges of the 1 x 4s with glue, put them in position and drive the screws. Next, join the corners with finishing nails driven through the long sides. Space these nails carefully so they won't interfere with the saw cut to be made later.

Now the box is cut all around to form the top and bottom of the case. The cut should be off-center, $2\frac{3}{4}$ in. from one side and 2 in. from the other. The crosspieces in the top and bottom are made by splitting 1 x 4s in the same proportion as the box was split, the smaller ones being fitted into the top and the larger ones into the bottom. These are laid in place 6 in. from each end and the guns are positioned on them. With a pencil, indicate the cutouts that will be necessary in the bottom crosspiece to take the stocks and barrels. Cut on a jigsaw, making each cut slightly larger than the marking to allow for padding to be added later. Fasten the crosspieces in place with glue and screws, then pad them with $\frac{3}{4}$ -in. strips of rubber cut from an inner tube. Join the top and bottom together with two or three butt hinges or a length of piano hinge. Finally, attach a handle and two suitcase latches to the front side. ★ ★ ★

Nails Pulled Without Bending



Nails can be pulled easier, faster and without bending, if a slotted wedge instead of a solid wooden block is slipped under the hammer head. As the nail is drawn, adjustments can be made in leverage by sliding the wedge to straddle the nail so the hammer is

located directly over the nail to maintain a straight upward pull. For longer wear, the wedge should be cut from hardwood.

"Sharpening" Wax Crayons



Wax crayons that must be kept pointed when used for lettering and other work requiring a fine line, can be "sharpened" in a cone shaped from window-screen wire. The edges of the wire are stapled together after it has been rolled into a

cone and the cone then is tacked to a wooden block or to the inside surface of a small box. The box serves the added purpose of being a receptacle for the wax shavings.

Sand-Filled "Fire Buckets" Are Novel Ash Trays

Miniature sand-filled "fire buckets" not only safely snuff out cigarettes but furnish conversation pieces as well. The fire-bucket ash trays are children's sand pails, purchased at a ten-cent store and painted bright red. The word "fire" is stenciled or painted on the side in black or yellow.



Aquarium sand can be purchased for use in the pails. To clean the buckets, pour the sand through a metal strainer. The strained sand can be used almost indefinitely.—Frank A. Javor, North Bergen, N. J.



Weight of Automobile Used To Break Bead From Rim

The job of breaking loose the bead from the rim of a tire is made easy by using your bumper jack and car bumper. Simply lay the tire partly under the car bumper and place the base of the jack on the casing in the manner shown. As the jack is worked, the weight of the car will force the bead from the rim. The tire and rim are then turned over and the same procedure is followed on the other side.

Ralph G. Preston, Buckley, Ill.

Pocket Liner Fastened on Wall Provides Small-Tool Holder

A plastic pen-and-pencil holder, usually fitted inside a suit or shirt breast pocket to protect the material against soiling, can be used as a handy receptacle for small tools and accessories in a home workshop or darkroom. Use a strip of adhesive or cellulose tape to attach the holder to a wall. As with any material, care should be taken not to force knives or pointed scissors through the bottom of the holder.—John J. Rea, Urbana, Ill.



☞ To prevent misplacing the instruction sheets and parts lists that come with power tools, drop them into a glass jar having a screw-type lid. The jar is stored with attachments that go with the machine.

SIDEWALK SPORTS CAR

By
Ralph T. Moore



These boys share all the thrills of driving a real car, and learn while they're doing it

A SMALL BOY and a motor-driven car are about as happy a combination as you can find. And what better way to train a future driver in both the handling and mechanical phases of owning and operating a car than to supply him with a sidewalk version of the real thing?

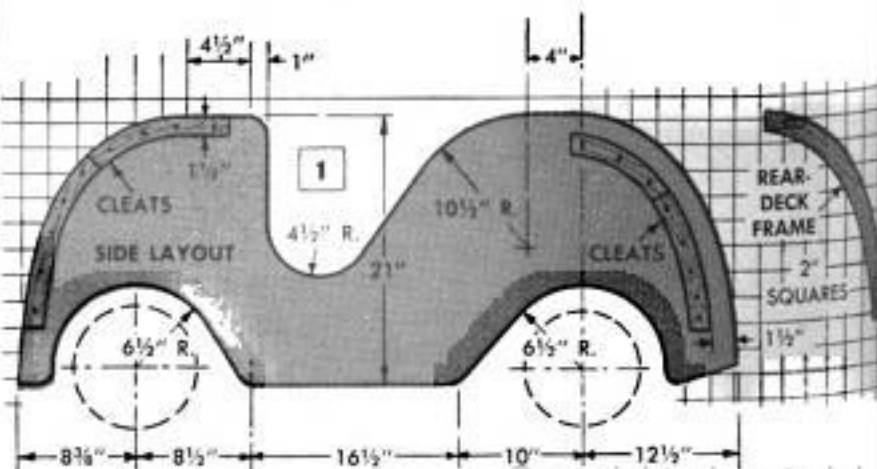
Powered with a lawn-mower motor, the car pictured above will attain a speed of 15 m.p.h., carry a 180-lb. load on level ground and turn in a 9-ft. circle. An 18-in. power mower rated at 1 hp. was used in the original car. In purchasing a used mower for this purpose, select it primarily for condition of motor, belts and tires.

After you have the mower, remove the

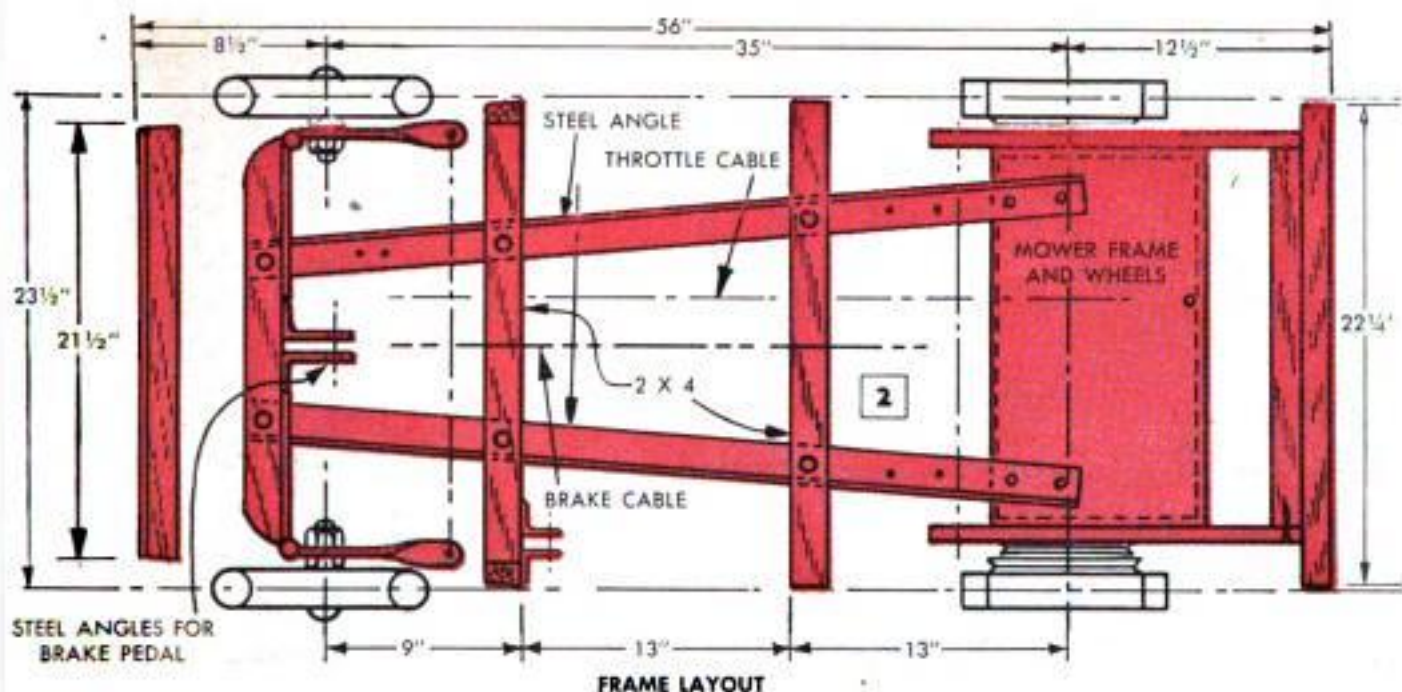
cutting blades, roller and the belt used to drive the blades. These items may be discarded, but save the various small parts.

The next step is to adapt the motor for accelerator-pedal control. This is done by removing the linkage that connects the butterfly valve to the air vane inside the flywheel cover, and making a special lever for the butterfly. Make the lever from a $\frac{1}{4} \times \frac{1}{2} \times 3$ -in. piece of aluminum or steel and drill one end for a small eyebolt. Bolt the lever to the butterfly quadrant with two small bolts so downward movement of the lever opens the valve. Then replace the spring with a length of screen-door spring to return the butterfly to the closed

Raising rear deck, as in photo at left, gives easy access to motor for mechanical adjustments and refueling. Bracket holds deck in raised position. Pattern for car sides is given below



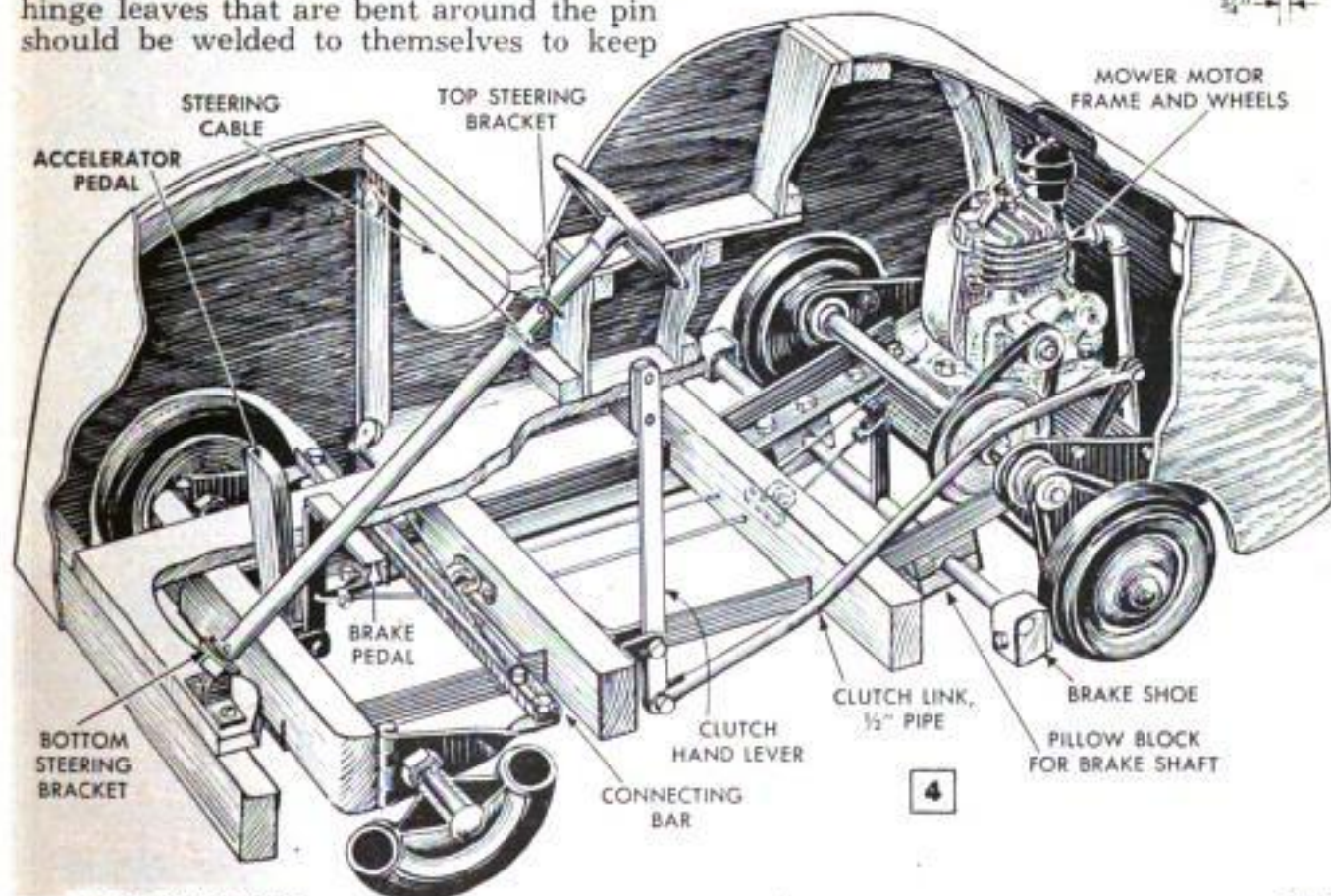
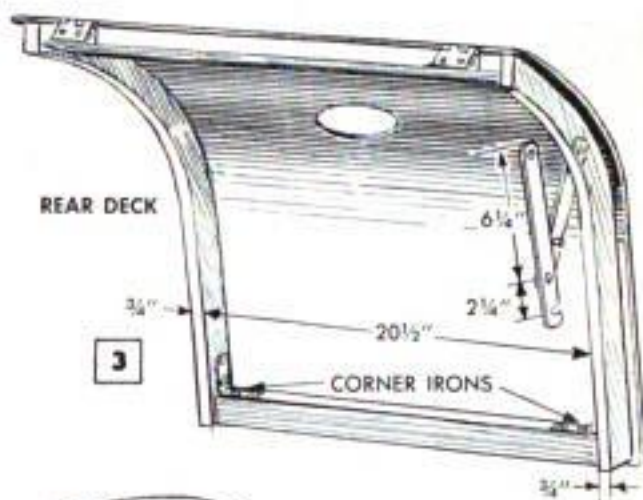
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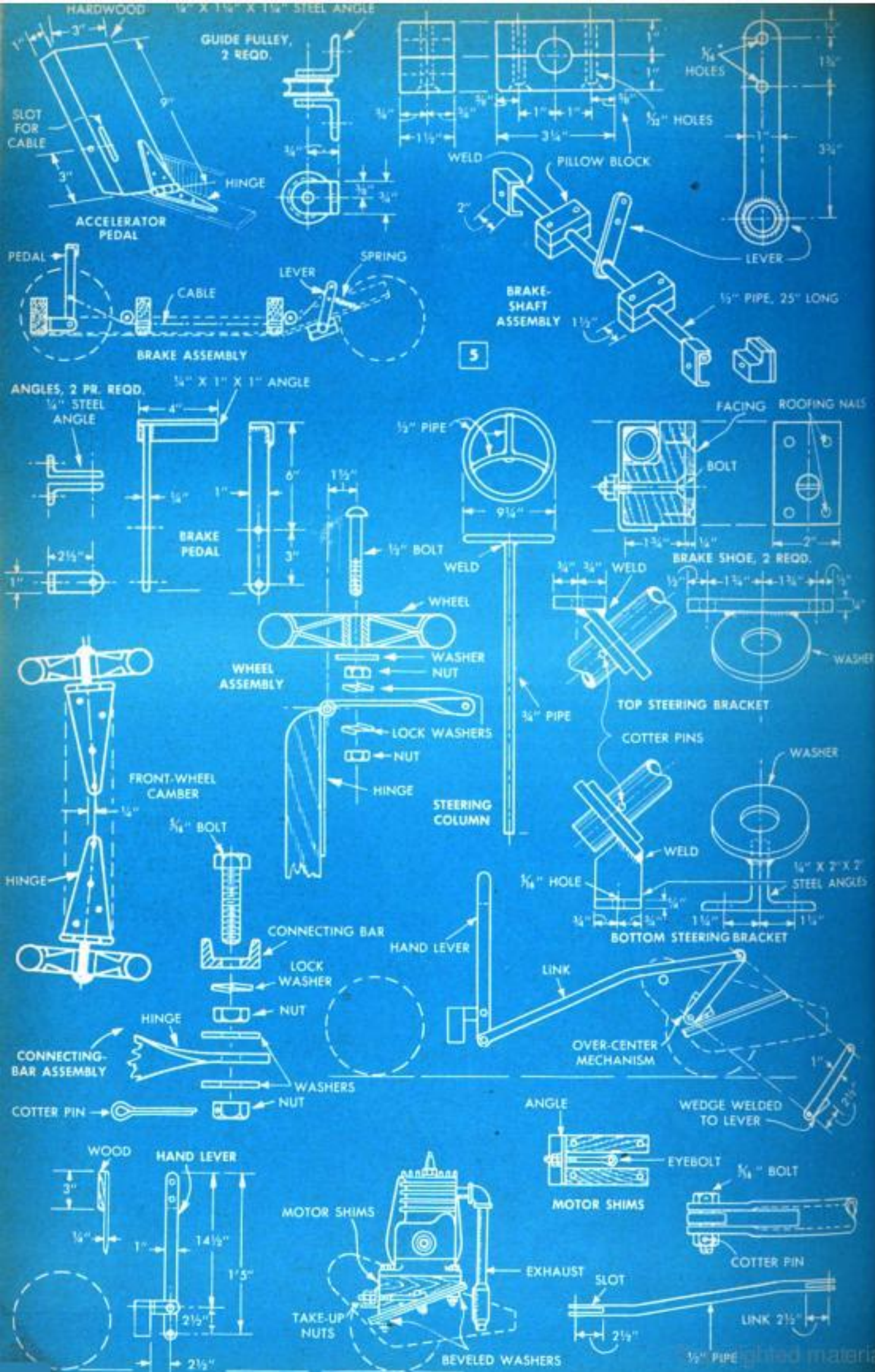


position. The accelerator pedal, Fig. 5, is connected to the lever with aircraft cable.

Remove the gas tank and thoroughly clean the inside. Before mounting the tank on the car, be sure to fit the cap with a leakproof breather tube. This is done by bending a short length of gas-line tubing to a full coil, or loop, and soldering one end of the coil to a hole drilled in the cap.

Although the rear wheels of the car are part of the mower-motor unit, front wheels and a steering arrangement will have to be provided. Use 10-in. semi-pneumatic wheels, and a pair of 8-in. strap hinges as steering knuckles. The portions of the hinge leaves that are bent around the pin should be welded to themselves to keep





them from separating during operation. Clamp one leaf of each hinge in a vise and twist its end at right angles to the hinge pin, Figs. 2 and 5, to permit attaching the connecting bar.

Check the distance between the mower wheels and cut a length of 2 x 4 so that the front wheels will be spaced the same distance when the hinges are bolted to the 2 x 4, Fig. 2. Note that camber is obtained by mounting the hinges at a slight angle.

The frame, Fig. 2, is made from two lengths of steel angle (bed rail will do) and crosspieces of 2 x 4. Slot the 2 x 4s for the angle, Fig. 4, and fasten the parts together with $\frac{3}{8}$ -in. carriage bolts and lock washers. Then cut wedge-shaped shims from hardwood to hold the motor vertical, as in Fig. 5. Note that an eyebolt is installed between the shims to permit adjusting belt tension.

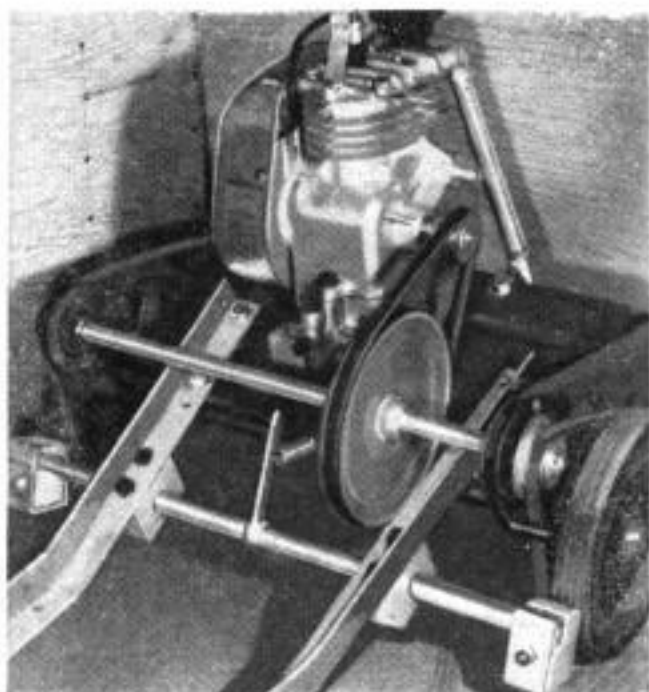
The parts of the brake assembly are shown in Fig. 4 and the upper details of Fig. 5. The brake pedal, made of steel angle welded to a flat-steel lever, pivots in a yoke also of steel angle. It is best to make the brake-shaft pillow blocks from hardwood, preferably maple. The lever welded to the shaft is of $\frac{3}{16}$ -in. steel and the brackets which hold the wooden brake shoes are of steel channel. Facing for the brake shoes is cut from an old tire casing.

Make the connecting bar from $\frac{3}{4}$ -in. bar or channel. Drill it 4 in. from each end for a $\frac{1}{4}$ -in. steering-cable bolt and assemble the bar and hinges, Fig. 5. The clutch hand lever is made of $\frac{1}{4}$ -in. flat steel and pivots in an angle-steel yoke. It is connected with $\frac{1}{2}$ -in. pipe to a lever mounted on the over-center mechanism of the mower. As the normal movement of this lever allows too much play, weld a wedge-shaped piece of steel to its lower end to restrict it.

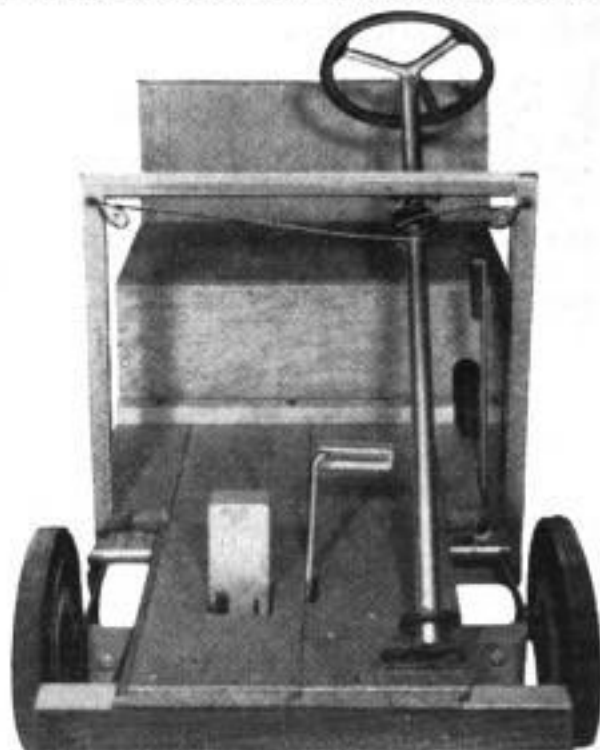
Next the vertical side-frame members and the crosspiece for the top steering bracket are installed. Either 1 x 2 or 2 x 2 lumber may be used for these parts, the joints being reinforced with corner irons. After two lengths of aircraft cable, having turnbuckle ends, are bolted to the connecting bar, floor boards are added.

The steering wheel may be purchased or made from $\frac{1}{2}$ -in. pipe, Fig. 5. A steering column of $\frac{3}{4}$ -in. pipe is passed through two steering brackets and held in place with cotter pins. Drill the column and tie the cable in place. Then make the final motor installation and add the muffler. Use $\frac{1}{2}$ -in. pipe to bring the end of the muffler flush with the bottom of the car.

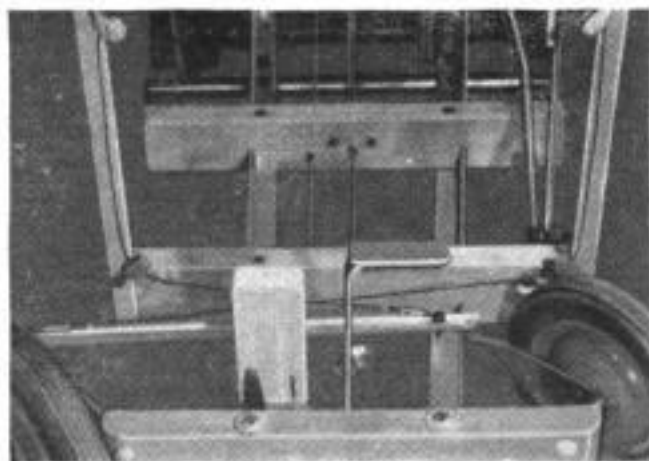
Cut and fit the seat and saw the side panels from $\frac{1}{4}$ -in. plywood as in Fig. 1. Screw bandsawed cleats to the sides and fit a $\frac{1}{8}$ -in. hardboard hood in place. Finally, make the rear-deck frame, cover it with sheet metal and hinge in place. ★ ★ ★



Note above how steel-angle frame members are bent to fit mower frame. Brake assembly is shown clearly



Cables are brought from column, above, to connecting bar where they are crossed and fastened, below

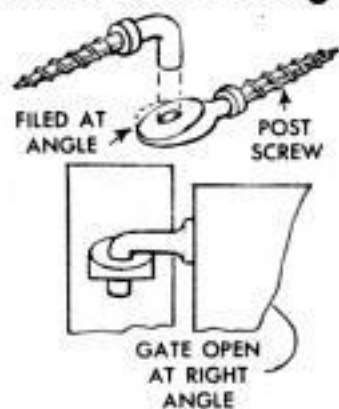




Eatable Decorative Wreath Made of Hard Candies

An eatable party wreath that will be a big hit with children, and many adults, too, is made by attaching individually wrapped pieces of hard candy to a wire frame to form a wreath. The wreath is shaped by bending a wire coat hanger to a circular shape. Wrap the wire with metal foil or colored ribbon, then tie on each piece of candy with a short length of string or light wire. A small pair of scissors, suspended from the wreath on a ribbon, is used to remove the candies. Three or four pounds of candy can be attached to the wreath by spacing the pieces closely together. The wreath is hung by a coat-hanger hook.

Change in Gate-Hinge Angle Adds Self-Closing Action



Most gates can be hung so they will close automatically by the force of gravity. On wooden gates, use L-hooks in the gate to fit over screw eyes driven into the gatepost. The bearing face of the screw eye should be smooth

and installed at an angle so the L-hooks ride upward on the eyes when the gate is opened. When the gate is released, its weight will cause the L-hooks to slide down the inclined plane of the screw eyes. The inclined plane may be attained in either of three ways: By driving the screw eyes in

at an angle, by bending them downward after they have been screwed in horizontally, or by filing the bearing surface at an angle, as shown in the detail. On steel gates which have hook-and-eye hinges, the eyes are inclined in a similar manner.

Magnet on Paint-Stirring Paddle Keeps It Against Can Side

Instead of removing the paddle each time paint is stirred, which wastes paint and is messy, simply fit the paddle with a small magnet to contact the side of the can. This will hold it out of the way when the brush is dipped into the can. Locate the magnet so the lower end of the paddle hangs above the paint can bottom. The magnet can be cemented to the paddle permanently, or held on temporarily with a rubber band.

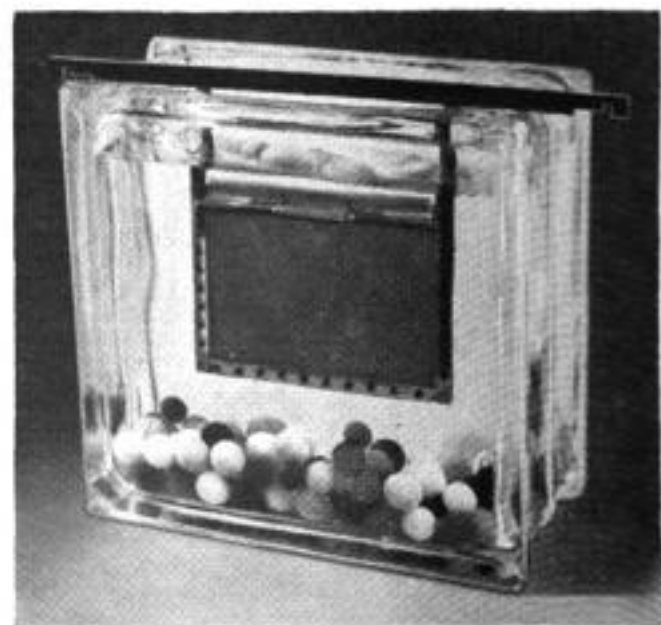


Joseph Amorose, Richmond, Va.

Glass Blocks Used as Tanks For Developing Color Film

Glass building blocks can be used to provide developing tanks for color film at much less cost than the stainless-steel tanks recommended for color processing. The blocks should be the type which have one open end, such as are used as planters. Clean glass marbles can be used to raise the level of the developing solution.

Lynda Carpenter, Los Angeles, Calif.





A.D. 200



A.D. 1800



A.D. 1955

HOW MODERN DETERGENTS WORK

By J. P. Mullen

IN ANCIENT DAYS on Sapo Hill, near Rome, there were many altars where bullocks and sheep were burned as offerings to the gods. Fat drippings from their carcasses mixed with the ashes from the wood fires and, as time went on, this mixture was washed down the hill by rain and absorbed into the soil. Roman housewives discovered that a little of the earth from Sapo Hill rubbed into the clothes was a great help on laundry day—and thus soap was discovered.

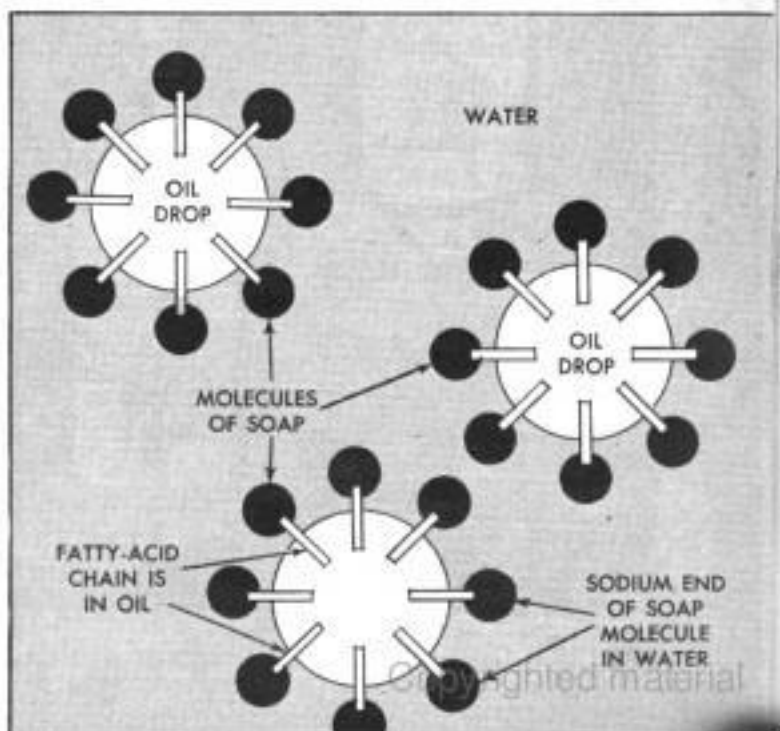
Later, some Roman deduced the real reason for the cleansing action of the Sapo earth and, by cooking animal fat with wood ashes (containing potash), was able to make soap uncontaminated with earth or clay. "Soap" perpetuated the name of Sapo Hill, and until the last century, soapmaking didn't progress much past this primitive stage. Up to a generation or two ago, every home had its iron soap kettle. And even modern soapmakers follow essentially the same process, although careful control of materials and processes produces a uniform product that is a far cry from the slippery clay of Sapo Hill.

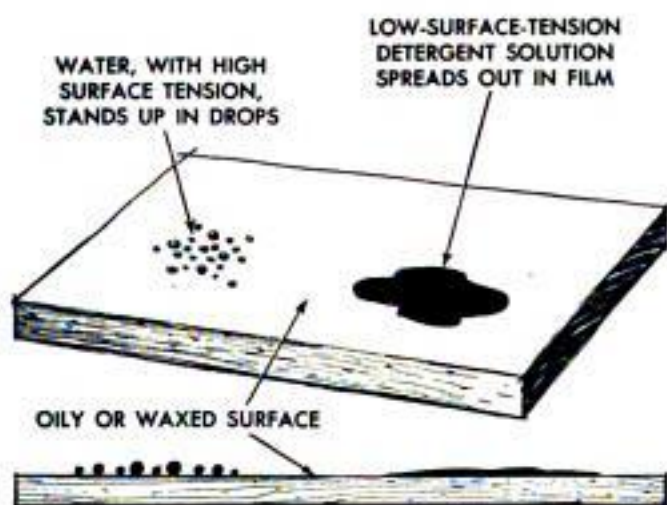
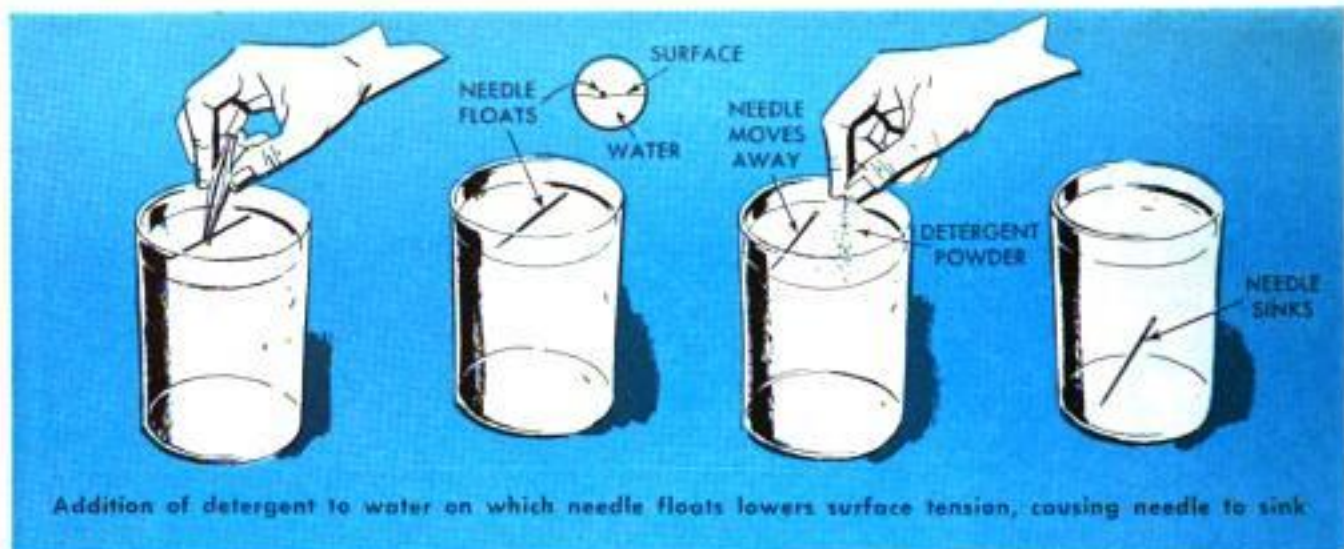
The word "detergent" describes any cleaning agent, including soap. However, popular usage has taken detergent to mean the synthetic detergents, as distinguished from soap, that are put out for home use. Detergents became possible when we began

to understand just how soap worked and why it cleaned.

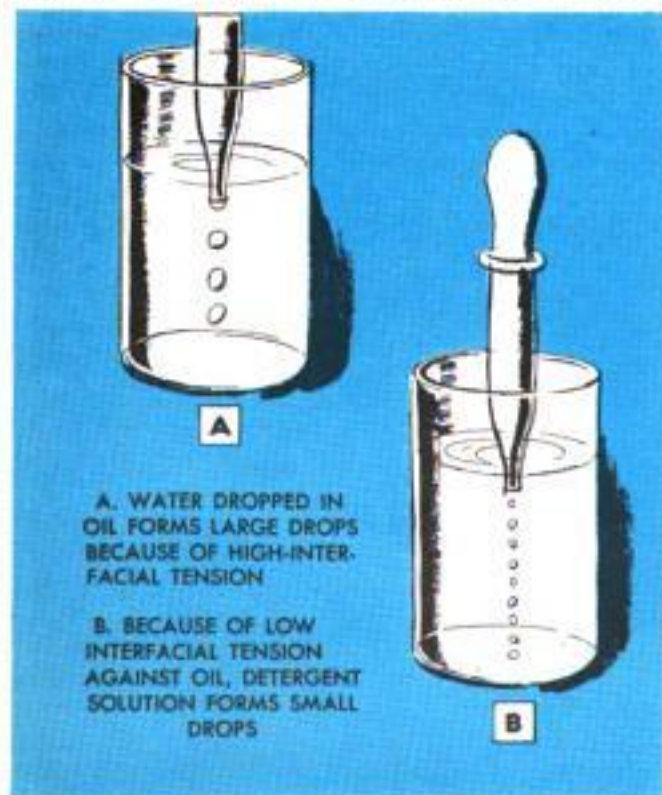
The main reason that water alone is an ineffective cleaner is its high "surface tension." Its surface acts like an elastic skin over the liquid, resisting penetration and tending to contract. This surface tension is so high that it will float a small heavier-than-water object, like a needle, set carefully on the surface. Detergents and soap lower the surface tension of the water so that the "skin" or liquid film is much weaker. This can be shown by sprinkling

The soap molecules separate oil and water in an emulsion by gathering around the oil drops as shown





The cleaning of oily or greasy material depends in part on reduction of interfacial tension, which is the surface tension or film strength where the oily liquid meets the watery liquid. A cleaning liquid which wets the oil can float it away more readily

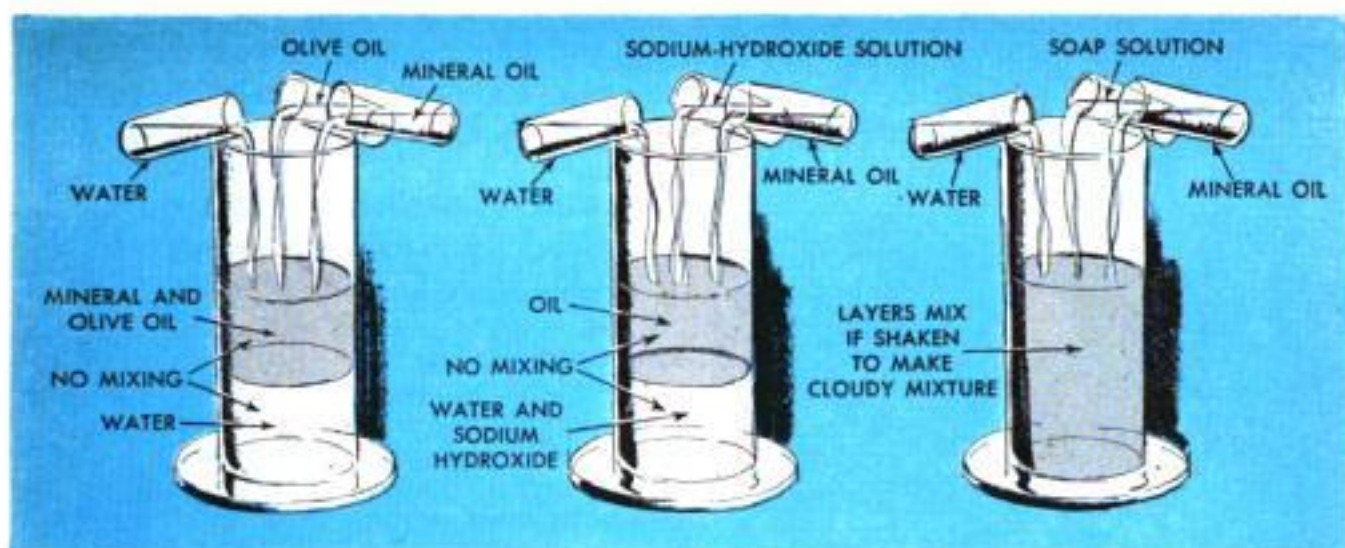


a few grains of detergent powder on one side of a floating needle. The high surface tension on the other side will immediately pull the needle over. Then, within a few seconds, as the detergent dissolves and the surface tension drops, the liquid will wet the needle and sink it. This increase in wetting action when the surface tension of water is lowered is one of the main factors in detergency, since unless the washing solution wets the dirt, it cannot float it away.

The cleaning of oily or greasy material also depends in part on the reduction of surface tension. (More strictly, on the reduction of "interfacial tension," or the film strength where the watery liquid meets the oily liquid.) Drop water on an oily surface and it will stand up in little balls, almost perfect spheres. The high surface tension is responsible, because it makes the "skin" contract. However, when detergent solution is dropped on an oily surface, the liquid spreads out in a thin film because one liquid wets the other. The surface tension isn't great enough to form the drops into spheres, so they spread out shapelessly. Naturally, a liquid that wets the oil can float it away more readily than one which doesn't. Also, the detergent solution wets the underlying surface (textile fibers, for instance) and lifts the oil off. Thus the oil is removed by rough emulsification.

To form stable emulsions (mixtures of liquids, like oil and water, that won't ordinarily mix), one of the liquids must be dispersed as extremely small drops. Detergents and soap help this process because the low interfacial tension between oils and cleaning solutions makes it easy to form the necessary small drops. A detergent solution dropped into oil will form tiny droplets naturally, proving how low the interfacial tension is. Water dropped into oil will form large drops.

Soaps and detergents have a "split personality" molecular structure, having one

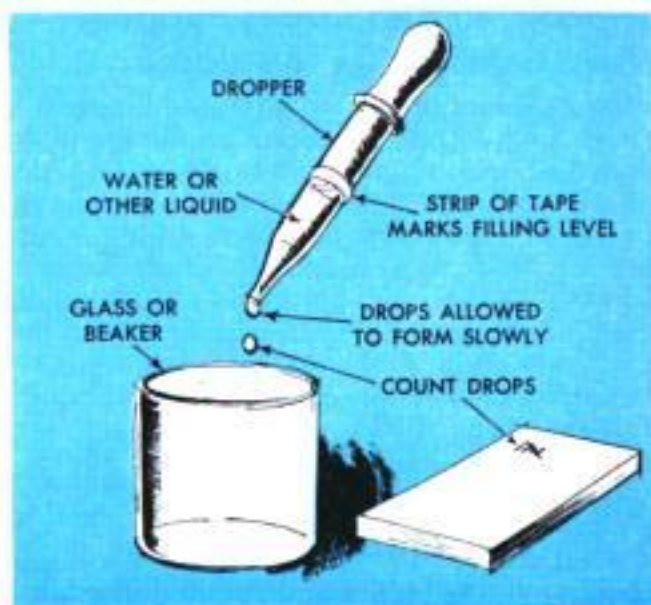


end that wants to dissolve in oil and the other end compatible with water. This can be seen by pouring mineral oil and water into a glass, and adding first some sodium-hydroxide (lye) solution, and then some salad oil, such as corn or olive oil. The sodium hydroxide will mix with water, and the salad oil will mix with mineral oil, but the oil and water layers still won't mix. However, if soap is added, the two layers can be mixed to form a milky emulsion. Soap combines in one molecule the fatty structure of the salad oil with the sodium from the sodium hydroxide, and shares the solubilities of the two materials.

This is what happens: The long fatlike end of the soap molecule dissolves in the oil drops, while the sodium end of the molecule dissolves in the water. As a result, the soap molecules arrange themselves around the oil drops, half in the oil and half in the water, thus separating the oil from the water and, at same time, keeping the drops from coming together.

Is a drop always the same size? You might think it depends on the size of the dropper, but it is actually the surface tension of the liquid that determines the size of the drop. The surface "skin" supports the drop as it grows on the end of the dropper until its weight becomes too great. This can be proved by counting the number of drops obtained from a dropperful of water and from one of soap solution, glycerin or alcohol. Each of these latter will yield more than twice as many as the water, showing that their surface tension is less than half that of water.

It is easy to make bubbles out of a liquid with a low surface tension, because the surface of such a liquid can be increased. However, it is viscosity rather than surface tension that makes bubbles long lasting. Good soap-bubble mixtures include glycerin to give greater strength. Suds that last, incidentally, have no particular relationship to cleansing ability, since their



Upper detail shows that soap solution permits emulsion of oil and water. Lower detail indicates test to prove that drop size depends on surface tension

longevity doesn't depend on low surface tension. Many fine detergents form very few suds.

This question is often asked: "Which is better, a soap or a detergent?" The answer is that under normal conditions they both lower the surface and interfacial tension of the water, permitting it to float away the dirt. However, in hard water there is a difference in their actions, for in hard water soap precipitates calcium stearate, an insoluble substance that you recognize as soap scum or as the ring around a bathtub. In the laundry, the calcium stearate is formed right in the fibers of the fabric, where it is difficult to rinse out. It is the cause of "tattle-tale gray" in white goods. Since detergents do not precipitate the calcium stearate in hard water, they are easier to use. However, softened water, from which the calcium has already been precipitated, eliminates this problem. In it, the action of both soap and detergent is essentially the same. ★ ★ ★



"Pinhole Lens" Permits Reading When Glasses Are Misplaced

In an emergency, a farsighted person, whose corrective glasses have been misplaced or broken, can read fairly small type with the aid of a "pinhole lens." The lens is a strip of cardboard in which a pinhole is punched. To minimize light reflection, the side facing the eye should be a dull black color. *Caution:* The pinhole lens should be used only as a temporary expedient. Consult an optometrist or oculist as soon as possible for proper fitting of corrective glasses.

Felt Oiling Pad on Sawhorse Rustproofs Handsaws

FELT PAD SATURATED WITH OIL UNDERNEATH SAWHORSE



the slot and down through the slit in the pad, the pad being saturated with oil.

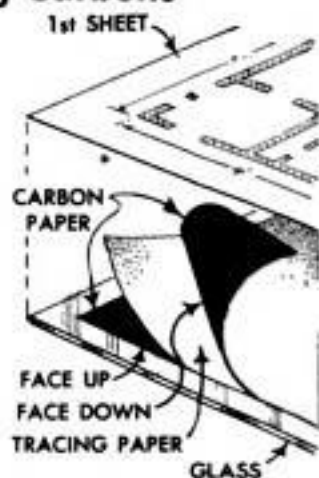
Marbles Dropped Into Paint Can Assist Thorough Mixing

To assure quick and easy mixing of left-over paint, drop a couple of marbles or ball bearings into the can before storing it. The objects eventually will become embedded in the thickening paint in the bottom of the can. When the sealed can is shaken vigorously, the marbles or bearings will not rattle until the thickened paint has begun to

mix with the oil. As soon as the objects rattle freely in the bottom of the can, you can be certain the paint is completely mixed.—Ed Packer, Oak Park, Ill.

Greater Contrast in Blueprints Assured by Facing Carbons

Traced drawings that are to be blueprinted or photo-printed can be given greater contrast and sharper detail by using carbon paper on both sides of the tracing paper. As shown in the drawing, the bottom carbon is face up, while the top carbon is face down. Carbon is deposited on both sides of the paper, providing a maximum density of line. Typed copy can be handled in the same way.



Car-Door Upholstery Replaced With Prefinished Wall Paneling

One motorist replaced the badly worn upholstery on the doors of his older-model car with pieces of Marlite prefinished wall paneling. A paper pattern first was made of the door, then transferred to the paneling. Color and design of the paneling were chosen to match the wood-grain finish of the car instrument panel. Solid colors also are available. Before it is remounted, the inside door handle can be covered with vinyl plastic to match the door.

Marah Wall Products photo



Sawhorse Holds Flags and Sign To Protect Highway Workers

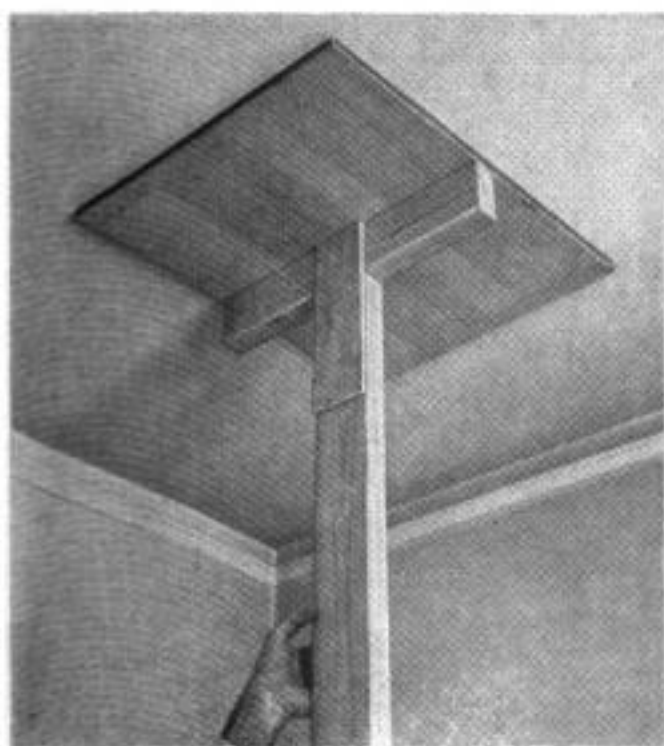


One foreman on a highway construction job employs sawhorses to hold up the warning flags and sign which protect his men while they are working. The horses are drilled at an angle to receive the flag-staffs, and drilled in the center to

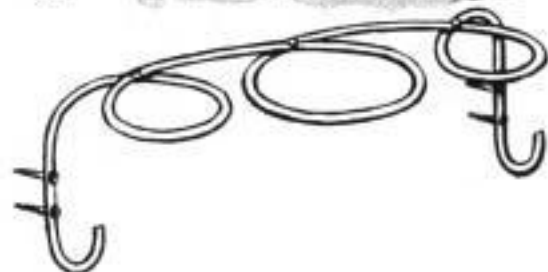
take the sign support. To prevent the sign from turning in the wind, a small wedge is inserted beside the support.

Broken Keys in Ceiling Plaster Renewed With Melted Sulphur

When a sagged spot in a ceiling indicates that plaster keys between the laths have broken, the ceiling can be repaired by using melted sulphur. The upper surface of the ceiling must be accessible. First, a piece of plywood large enough to cover the sagged spot is nailed to the end of a post and forced against the ceiling with a jack so the ceiling is leveled. Next, sweep away broken plaster above the laths. Finally, melt sulphur and pour it over the damaged area from above. The sulphur will fuse with the plaster and, when cooled, will key around the laths. Ten pounds of sulphur will repair an area about $2\frac{1}{2}$ ft. square.—O. A. Nelson, Seattle, Wash.



AUGUST 1955



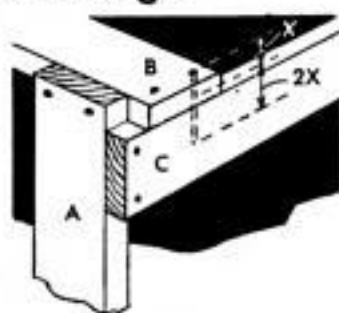
Holder Bent From Metal Rod Supports Flowerpots

A flowerpot holder bent from $\frac{1}{2}$ -in. metal rod can be used in place of a flower box when the box presents too bulky an appearance for window or house. The rod can be steel or brass, steel, of course, requiring paint to rustproof it. When bending the holder make the center circle larger than the two side circles to provide a balanced look. The vertical portions of the holder are drilled so wood screws can be passed through them and driven into the house siding. Further rigidity is assured if the points at which the rod crosses are riveted or welded together.

Interlocking Crate Corners Provide Maximum Strength

The next time it is necessary to crate a heavy object for shipping, use the interlocking method illustrated to provide maximum strength at the corners of the crate. Pieces

A, B and C all extend the thickness of the wood past the pieces nailed to their edges, and flush with the pieces nailed across their faces. Two nails should be used in each piece, and the nails should extend into the bottom piece a distance equal to thickness of the upper pieces.



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Solving Home Problems



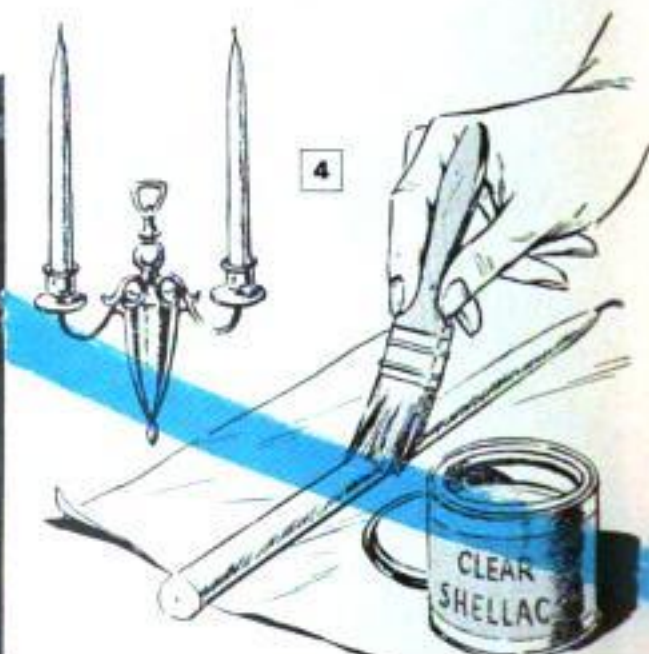
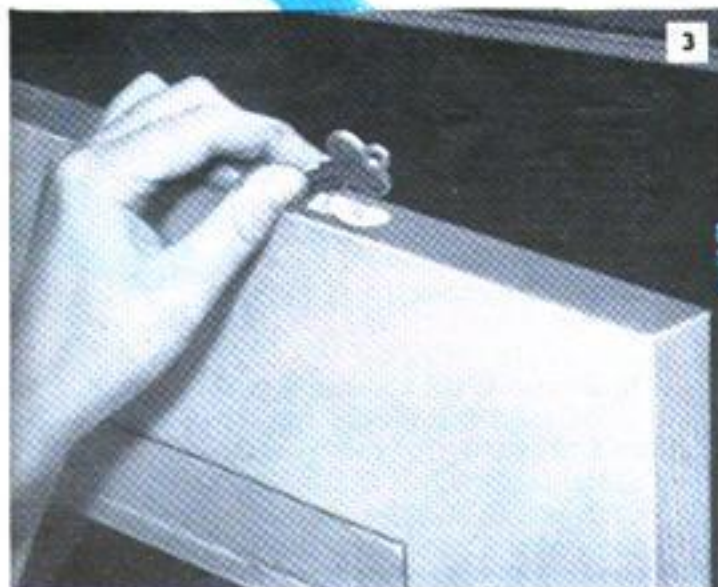
1. STORAGE FOR LEAVES of kitchen or dinette table may be provided by installing flat-iron brackets on the underside of the table top. If table has deep apron, locate brackets so leaves can be inserted while table halves are apart as shown

2. STICKING ICE-CUBE TRAYS will not be a problem if trays are placed on sheets of aluminum foil in freezer compartment. The foil prevents tray bottoms from freezing to compartment, permits trays to be removed without having to be pried loose from ice

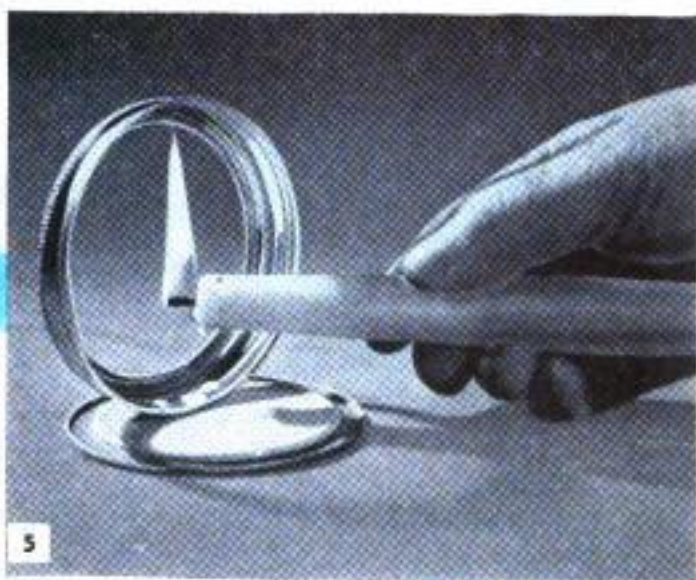


3. HIDING PLACE FOR DOOR KEY, not as commonly known as usual locations under door mats or in mailboxes, can be made by drilling overlapping holes to form a recess in top crossrail of a combination door. A similar recess in inside door provides a hiding place for small objects of value

4. BRUSHING CANDLES with a coat of clear shellac will prevent them from drooping during hot weather. The shellac coating provides the additional advantage of causing the candles to burn more uniformly and with much less dripping. Candles are cleaned by wiping with damp cloth



5. EASY REMOVAL OF FRUIT-JAR LID will be assured by lubricating the threads of lid with wax. A few drops of wax from a candle on the inside of lid will not interfere with screwing the lid on the jar and will prevent formation of corrosion between lid and jar



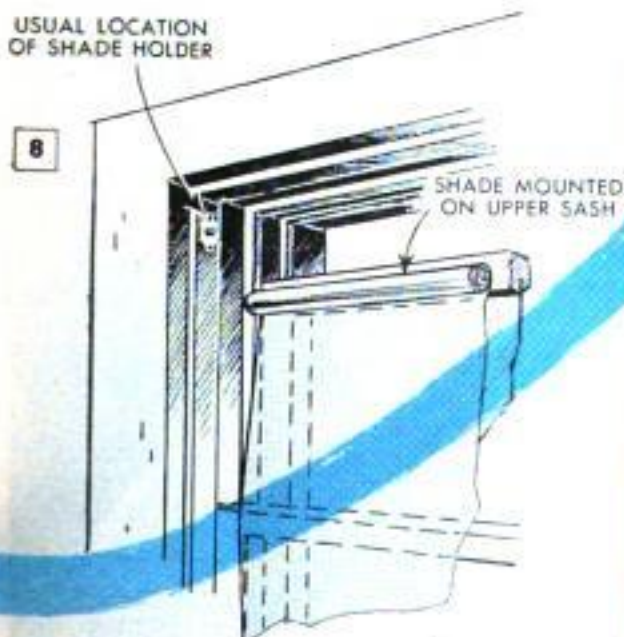
6. DISCARDED LIPSTICK CASE is converted to handy needle holder. Remove remnants of lipstick from retractable inner tube and substitute short length of cork. Needles to be stored are forced into cork, tube is retracted and top of lipstick case is fitted over needles



7. "SHELVES" FOR SMALL POTTED PLANTS may be improvised from bathroom or kitchen water-tumbler holders. In some rooms the holders may match other fixtures or be painted to agree with room decor. For contrast, holders may be painted black to simulate wrought iron



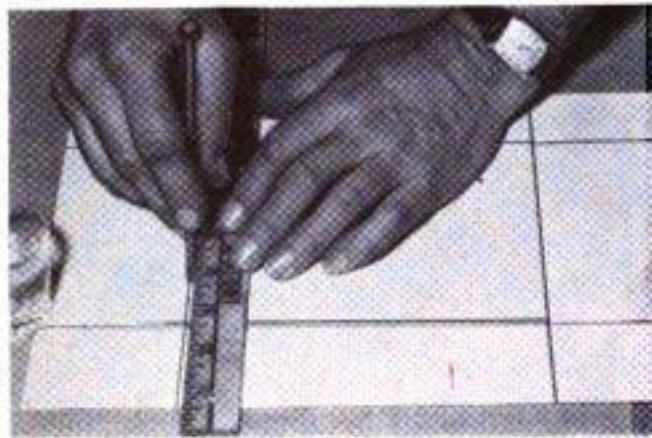
8. VENTILATION AND PRIVACY without noise of flapping shade are provided by attaching shade brackets to top rail of upper sash instead of window frame. When top sash is lowered for ventilation, shade remains below draft of air even when pulled down to window sill



9. TO ELIMINATE THE PROBLEMS caused by toddlers lifting a telephone from its cradle, fit a wide rubber band around the cradle to hold down the contacts. The rubber band can readily be slipped off the contacts when the telephone is to be used for call by an adult



Glass Cut to Close Tolerance By Using Paper Pattern



Amateur photographers, artists and home craftsmen, who only occasionally have need to cut glass, can be sure of doing an accurate job if a pattern is used. Lay out the pattern on a sheet of paper, making it the exact size and shape needed. To cut the glass, place the pattern under it and score the glass by following the lines. This method will keep errors to a minimum.

Ivan Grosvenor, Indian Rock, Fla.

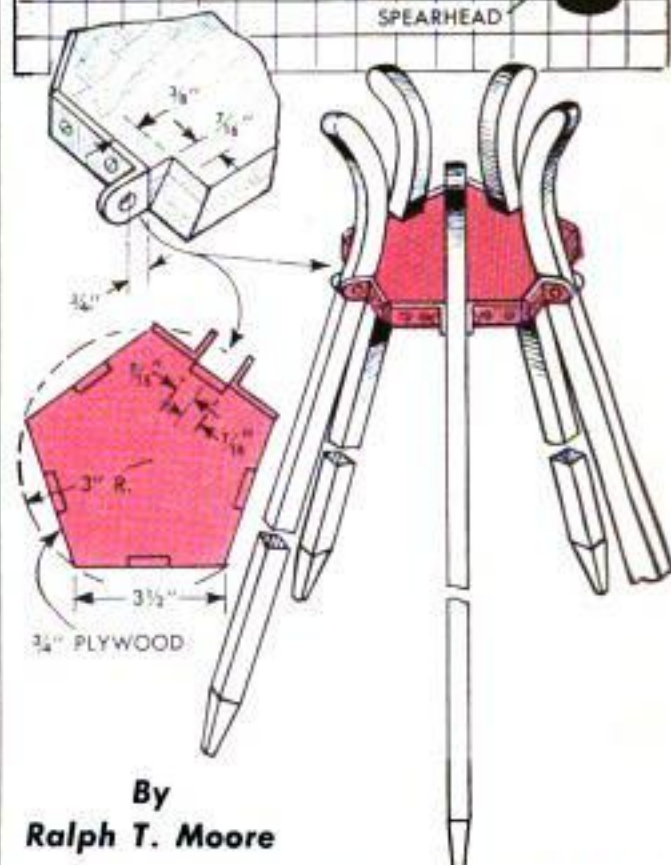
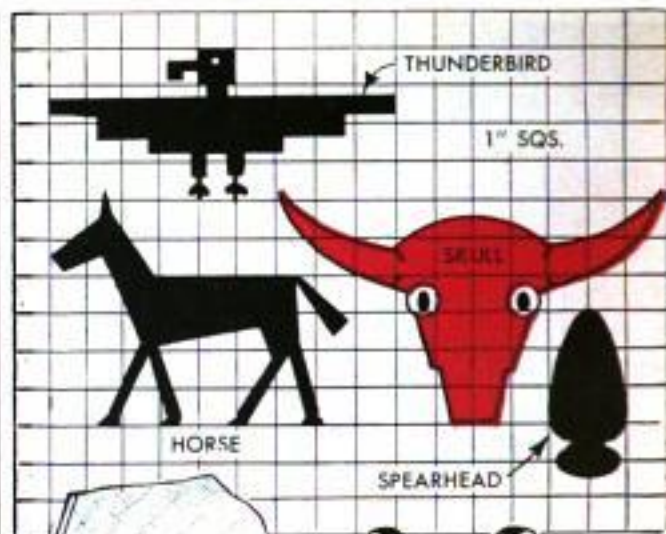
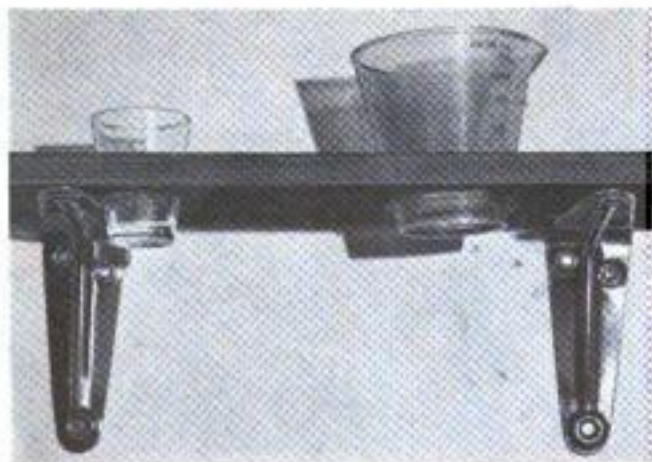
Flashlight Located in Dark

A band or two of luminous paint applied around the case of a flashlight will make it possible to locate the light if it is dropped in a dark room. If luminous paint is not readily available, a strip or two of reflecting tape, obtainable at all automobile-supply stores, may be used.

Harry J. Miller, Sarasota, Fla.

Darkroom Shelf With Holes Provides Graduate Storage

Easily tipped graduates in one darkroom are stored safely by being dropped into holes cut in a shelf. The diameter of each hole matches the diameter of a particular graduate at the midway point of the graduate's height. After being used, a graduate is dropped into its own storage spot for safety, then washed later.



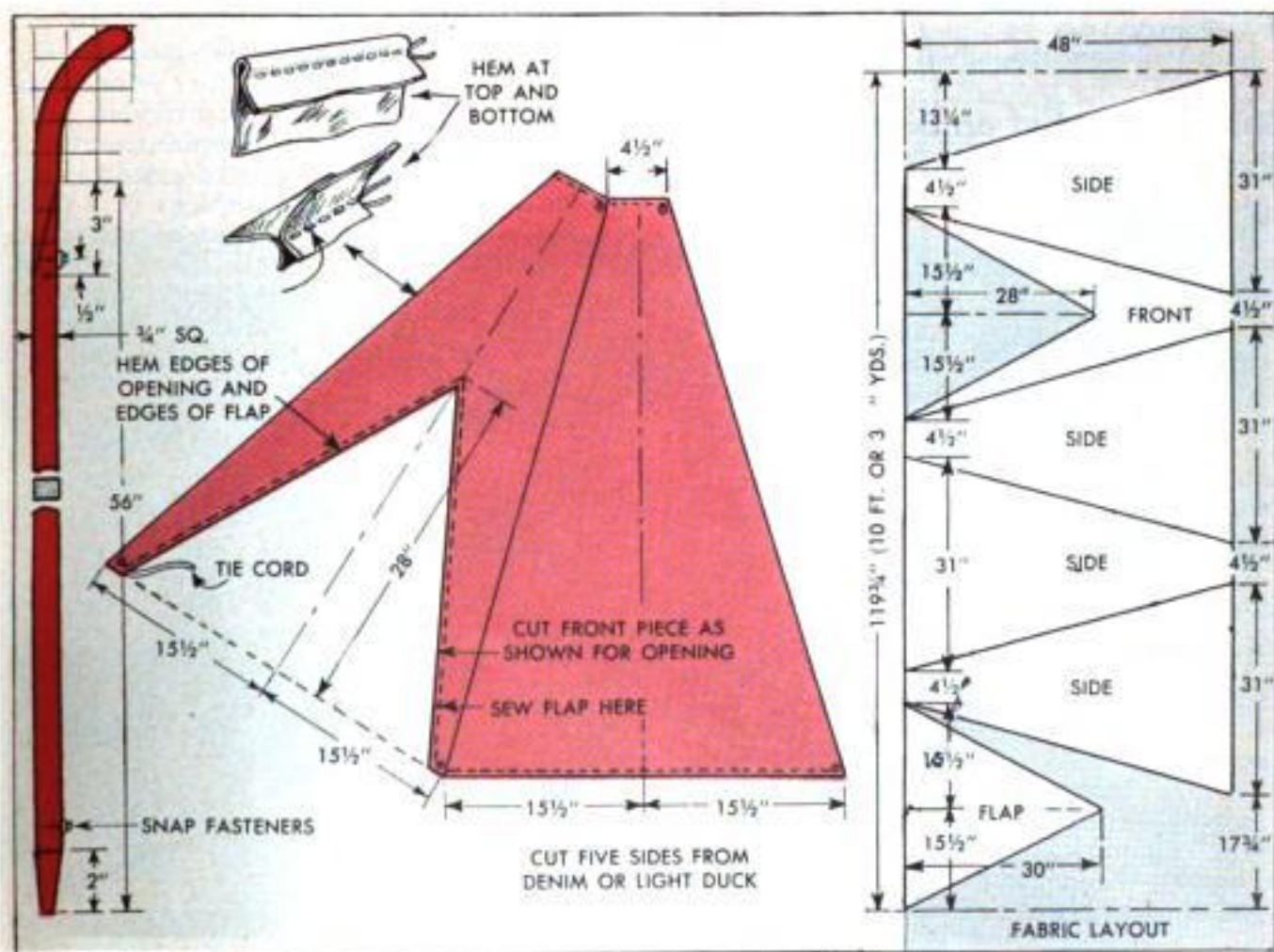
By
Ralph T. Moore



LITTLE-INJUN

TEPEE

CHILDHOOD'S favorite game of cowboys and Indians can be double fun when the back-yard "reservation" has a real Indian tepee in it. The one shown here will appeal to parents, too, because it can be erected and dismantled so easily. To set up the tepee, it is only necessary to squeeze the top curved portions together. To begin construction, cut the five poles from $\frac{3}{4}$ -in. spruce or fir. Then saw the curved ends and fasten them to the tops of the poles with glue and screws. Next, prepare the pivot block from the detail at the right, bending the angles from $\frac{3}{32}$ -in. aluminum or sheet metal. For the covering, you will need $3\frac{1}{2}$ yd. of heavy denim or light duck, 48 in. wide. ★ ★ ★



Modified Garden Rake Used As Seedbed Leveler



A simple attachment on a garden rake will save both time and labor when leveling a freshly spaded seedbed. The attachment is a 4-ft. length of $\frac{1}{2}$ x 4-in. lumber bolted to the rake teeth by means of $\frac{1}{4}$ -in. bolts and large washers. Cut a bevel on the bottom edge as shown in the detail, to increase the "bite" of the leveler. Only a few moments are required to return the rake to its original use.

Neal Houlahen, Van Nuys, Calif.

Rubber Washer on Drill Bit Protects Finished Surface



To protect a finished surface when drilling holes, slip a rubber washer over the drill bit. Should the bit unexpectedly break through, the washer

will prevent the chuck jaws from marring the finish. The washer may be the kind used in faucets or may be cut from an inner tube or stair tread.

Quick Immersion in Developer Prevents Film Fogging

Because photograph emulsions are much more sensitive to light when dry than wet, loaded film hangers should be immersed in the developer as quickly as possible. Light leaks and reflections in the darkroom which can quickly fog a film are no longer a hazard when the film is in the solution. And, although some developers incorporate

an antifog agent in their formula, care should be taken to prevent holding the film out of the developer too long when developing cut film in an open tank.

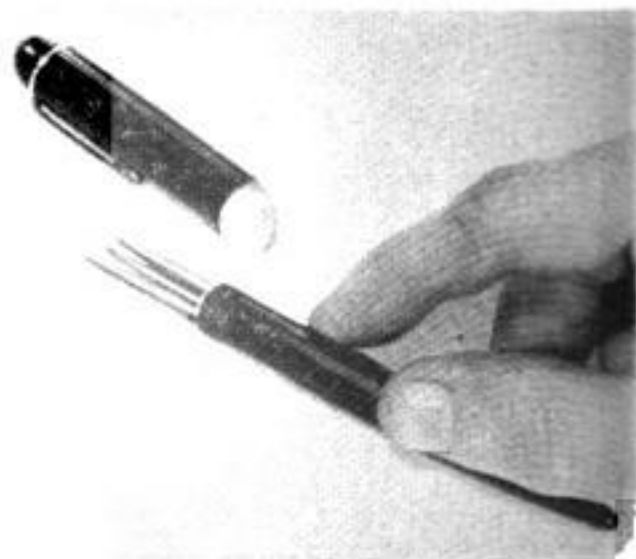
Padded Base Under Lantern Reduces Mantle Breakage

Breakage of mantles in gasoline-type lanterns can be reduced by fitting the base with a pad of sponge rubber. The pad protects the mantle by absorbing shocks, as when a lantern is set down quickly on a hard surface. When the lantern is placed on a boat deck, or other smooth surface that is subject to vibration, the pad also prevents it from sliding around. The pad need not be thick.



Fountain Pen Provides Storage For Cotton Swabs

Convenient and dust-free storage for small cotton swabs used for retouching work in a darkroom can be provided by a discarded fountain pen. Penpoint and ink sac are removed. A supply of cotton is inserted in the cap, and toothpicks or a pair of tweezers are fitted in the barrel. The pen then is screwed together and slipped in a pocket or stored with other retouching materials. A number of ready-prepared swabs could also be stored in the barrel.



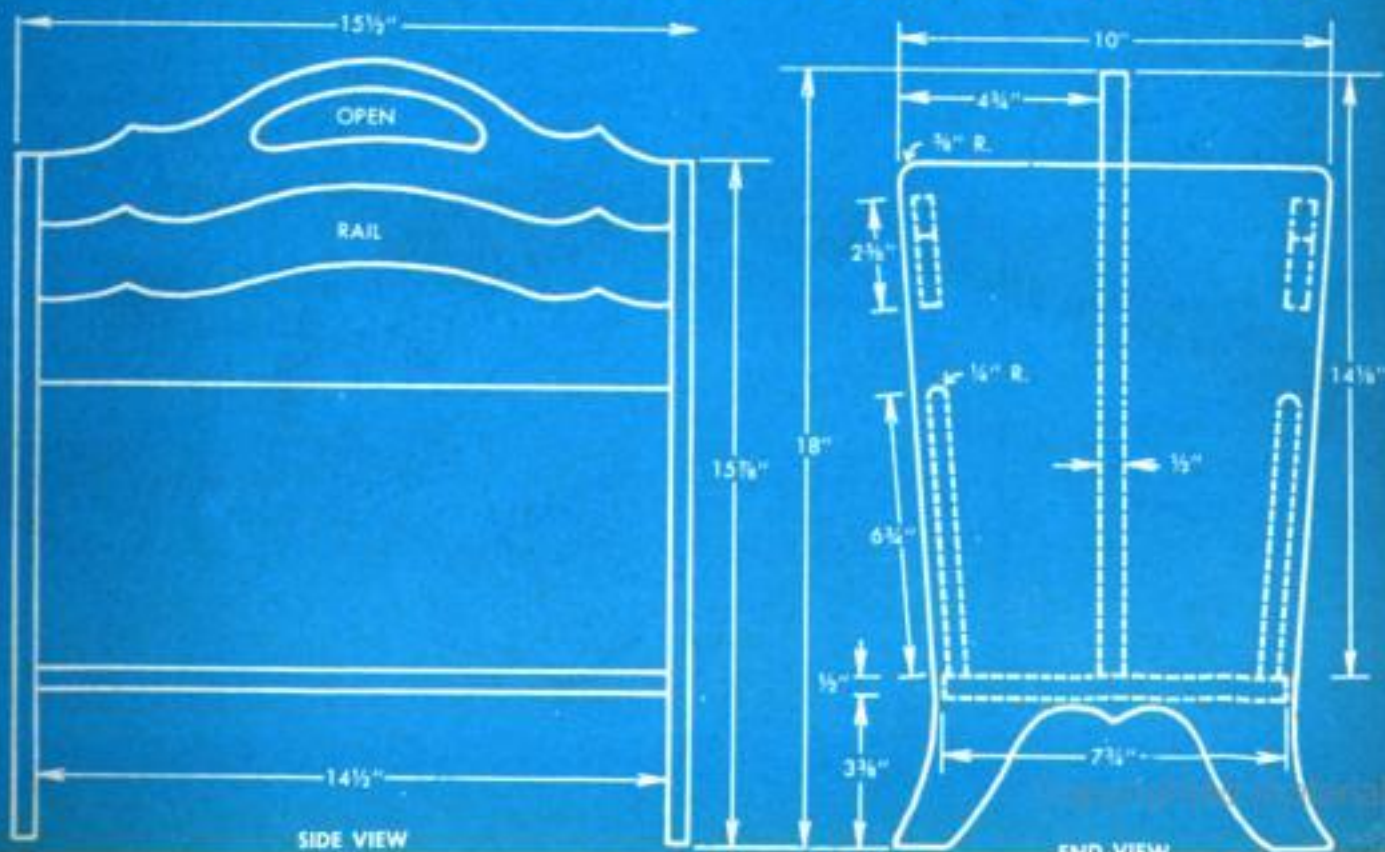
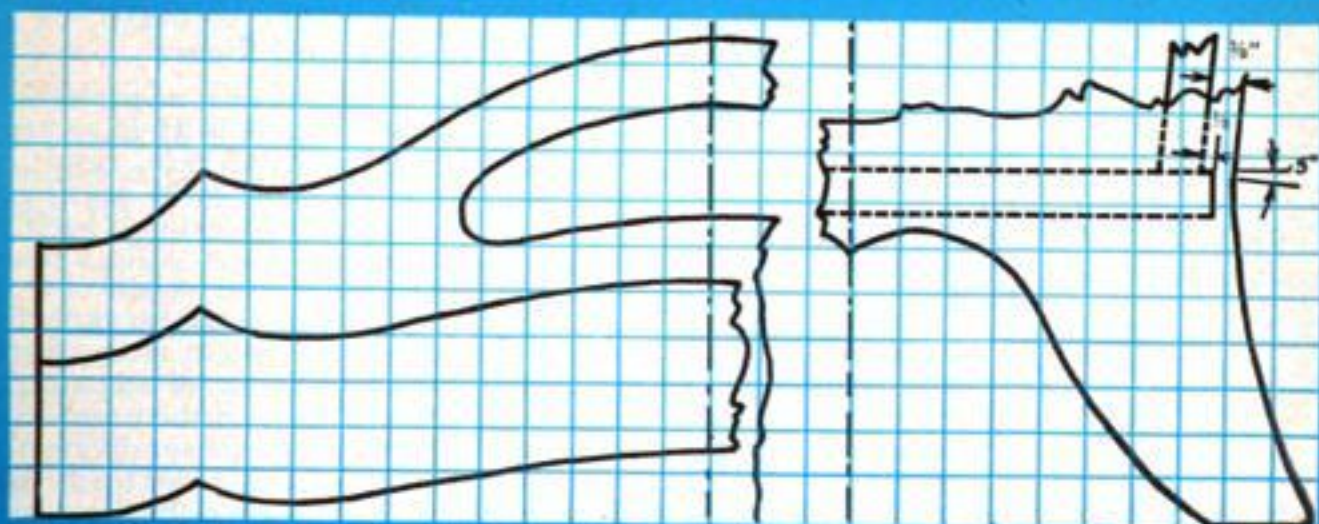
PATTERN CRAFT

Traditional Magazine Rack

Made of walnut or mahogany plywood, this attractive magazine rack is extremely easy to cut out and assemble. If you have a jigsaw or bandsaw, it is best to cut duplicate parts, such as the ends and side pieces, at the same time. This is done by fastening the pieces together temporarily with tape or by nailing through the waste stock. The rack is assembled with finishing nails. These are set and the depressions are filled with tinted wood putty

FULL-SIZE PATTERN

A full-size trace-and-cut pattern of the traditional magazine rack can be obtained by sending 50 cents to Patterncraft, *Popular Mechanics Magazine*, 200 E. Ontario St., Chicago 11. When ordering, ask for pattern No. 117

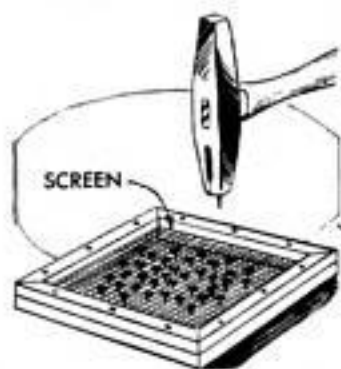




Passing Canines Refreshed At Shop "Puppy Bar"

Combining a flair for publicity with a love for dogs, one California shopkeeper built a "puppy bar" on the walk in front of his store. On sizzling-hot summer days many a passing canine stops for a refreshing drink of water. The bar was made by mortaring a few bricks together to fit around a water container.

Magnetic Hammer Picks up Tacks Singly From Plastic Screen



To easily pick up small tacks individually with a magnetic hammer, scatter them on a piece of plastic window screen tacked to a wooden frame. Shaking the screen will cause the tacks to drop into the mesh

openings point first, thus exposing their heads for easy contact with the hammer. It is convenient to use when upholstering.

Adhesive-Tape Strip on Triangle Used as Handy Penwiper



Artists and draftsmen whose work requires a penpoint free of lint and dust will find that a strip of adhesive tape attached to a triangle or T-square blade provides a handy wiper.

When it has become soiled, the tape is easily removed and replaced with a clean strip. Cloth, rather than plastic-type adhesive tape, furnishes the best wiping surface.

G. E. Hendrickson, Argyle, Wis.

Wiper for Hot Soldering Iron Utilizes Steel-Wool Pad

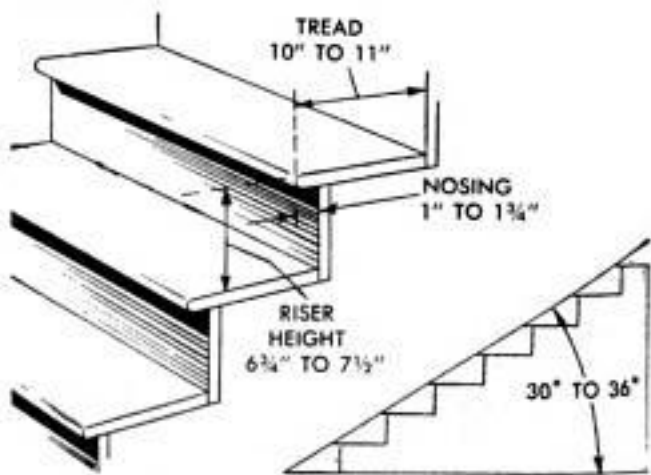
A steel-wool scouring pad, of the type mounted on a wooden handle, is handy for cleaning the tip of a hot soldering iron. To hold the pad in place while in use, drop the handle into a hole bored in the workbench top.

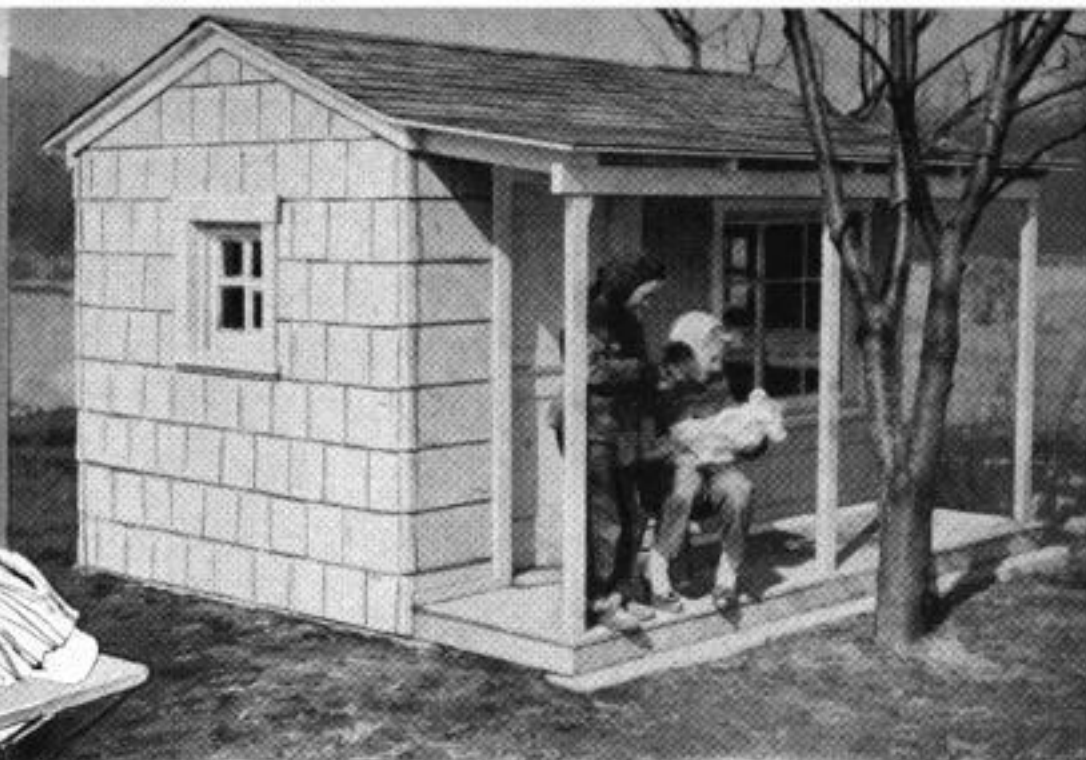


When not in use, the pad can be removed and stored with the other soldering supplies.

Determining Correct Dimensions Of Stair Treads and Risers

In stairway construction a preferable width for the treads is 10 to 11 in., with a riser height of from $6\frac{3}{4}$ to $7\frac{1}{2}$ in., resulting in a stairway angle of 30 to 36 deg. from horizontal. In restricted locations, such as in stair flights to basement or attic, a tread width of $9\frac{1}{2}$ in. and a riser height of 8 in. is acceptable. There should be no variation in tread width or riser height in any flight of steps or adjacent flights of steps separated by a landing. To find the number of risers to build into a stairway, divide the vertical distance in inches between two finished floors by 7. Generally the result will be a whole number plus a fraction. If the latter is less than one half of a riser, divide the whole number into the vertical distance to determine the individual riser heights. If the fraction is greater than one half a riser, divide the next higher whole number into the vertical distance between floors.





PLAYTIME COTTAGE

Part II

By Edward Mickley

You've been shown how the cottage is built, now to furnish it. Details show how to make a chair, table, bunk bed, even a stage for a marionette or puppet show

ALL THE FURNISHINGS for the playtime cottage are easy to make. Where two or more chairs are to be made, time can be saved by sawing several sets of duplicate parts, such as the legs, at one time. The drawing at the top of the next page gives the sizes of the seven parts that comprise each chair. Plywood, $\frac{3}{8}$ and $\frac{5}{8}$ in. thick, is recommended, the $\frac{5}{8}$ -in. thickness being used for the legs. The details show how the latter can be laid out economically by nesting the leg patterns on the plywood. The chair back is held in place with four screws.

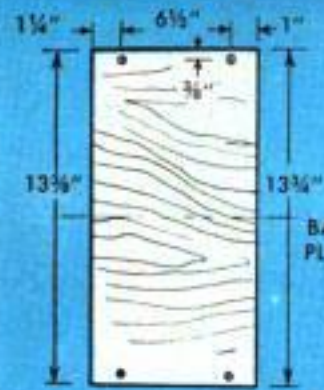
Kiddie-size bunks will increase the "livability" of the cottage. These are detailed in the drawing at the bottom of page 171 and are designed to swing upward and flat against the wall where they are hooked out of the way. The frame of each bunk is made of 2 x 2s, half-lapped and bolted at the corners and then rounded. Common furniture webbing is used to cover the frames. The individual strips are interlaced and stretched tautly across the frame and brought around and tacked to the inside. Each bunk is hinged to the wall, one above the other, with two 5-in. T-hinges, and suspended with two lengths of porch-swing chain attached to screw eyes in both the bunk and wall. Blocks of 2 x 4, installed



4 X 48"

6 X 36"

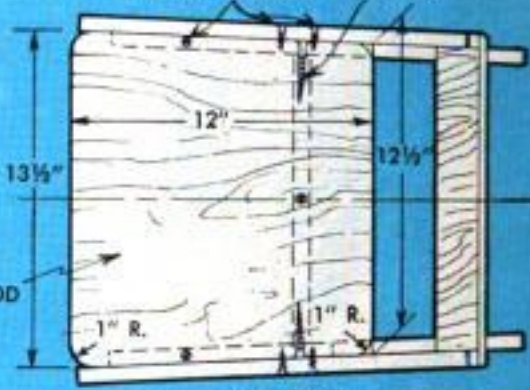
LAYOUT OF LEGS



BACK, 3/8" PLYWOOD

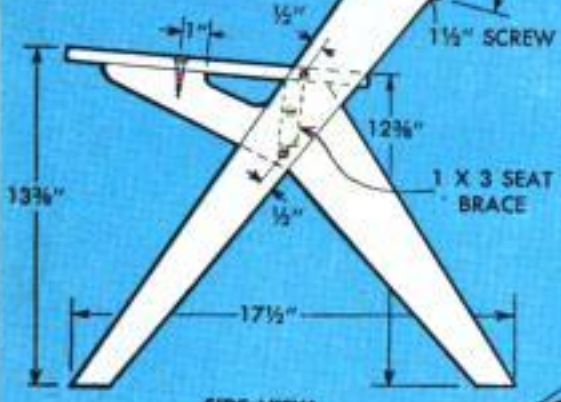
1 1/4" SCREW

#10-1 1/2" SCREWS 2" SCREW

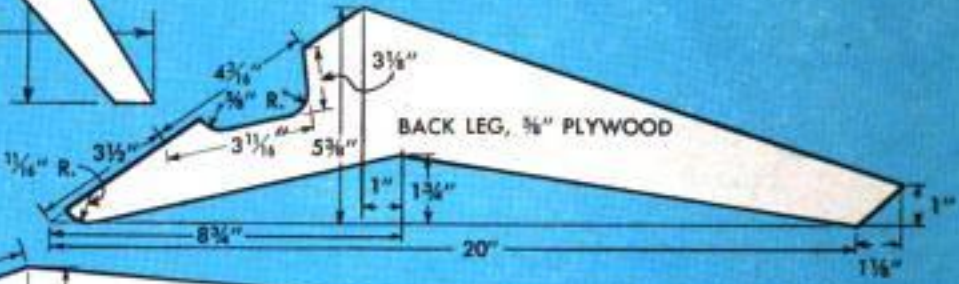


SEAT, 3/8" OR 1/2" PLYWOOD

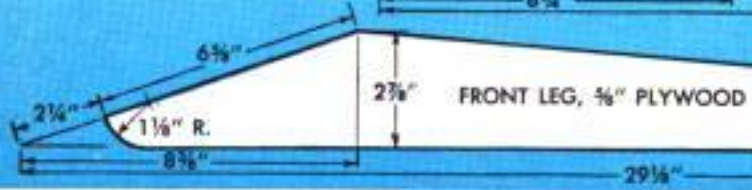
TOP VIEW



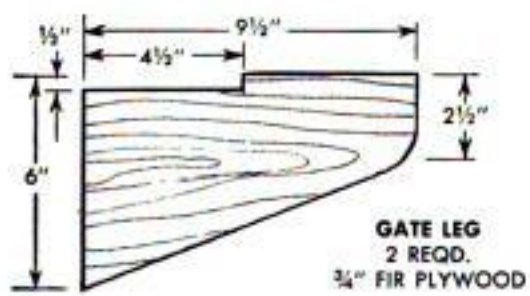
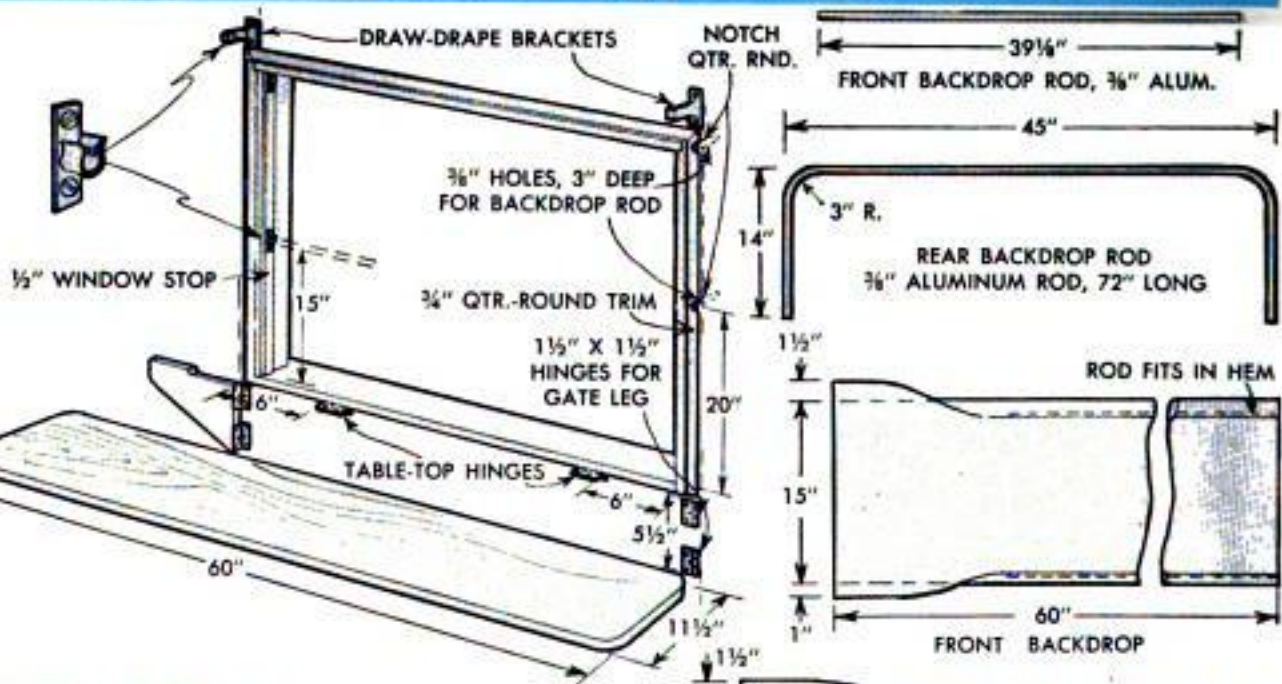
SIDE VIEW



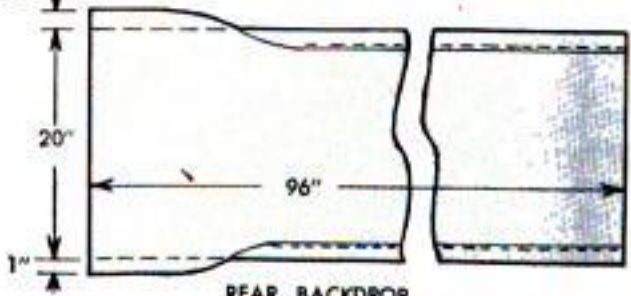
BACK LEG, 3/8" PLYWOOD



FRONT LEG, 3/8" PLYWOOD



GATE LEG 2 REQ. 3/4" FIR PLYWOOD



REAR BACKDROP POPULAR MECHANICS

between the rear-wall studs and behind the hardboard interior lining, provide solid support for the wall screw eyes.

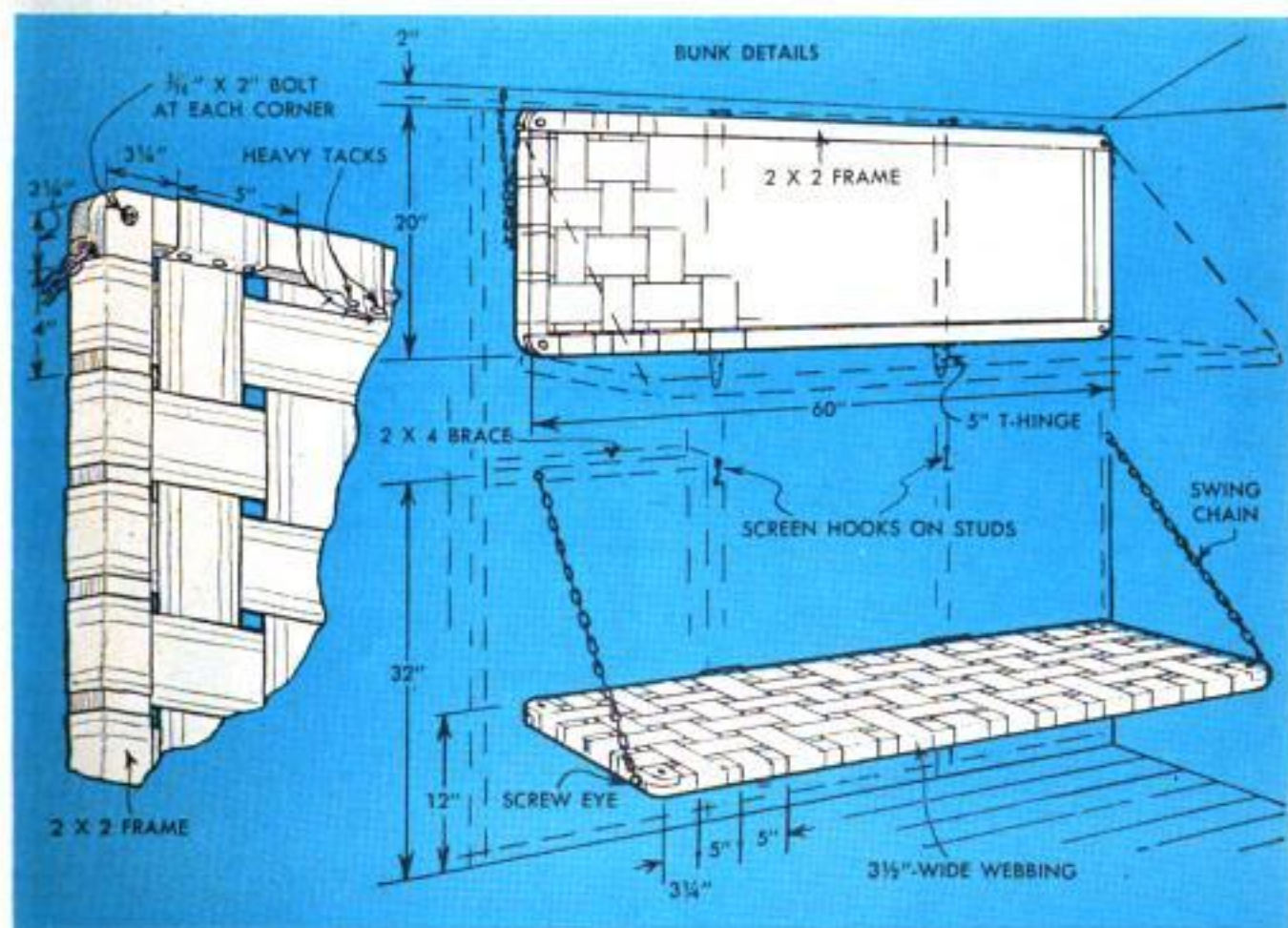
The table, which is fitted across the front window, is a 5-ft. length of 1 x 12 hinged to fold down and is supported by two swinging brackets, or gate legs. Resembling a shelf, the table serves as a double-duty stage for producing Punch-and-Judy shows which are viewed through the window from the porch. With the table swung up, the rear backdrop in its low position and the front backdrop in its high position, you have a marionette stage which is used in the manner shown in the illustration at the right. By dropping the table and reversing the position of the front and rear backdrops, you have a stage for hand puppets as pictured on the opening page. Here, in actual use, the rear backdrop would be fully closed. A regular traverse rod is used for the stage curtains. A straight length of $\frac{3}{8}$ -in. aluminum rod supports the front backdrop and rests in two standard casing brackets, a pair of brackets being located at the two positions indicated. The rod for the rear backdrop is bent to the shape shown and is supported by inserting it in holes drilled in the wall studs alongside the window. Two sets of holes are provided for this rod. The backdrops can be made from most any cloth material. These are cut to the sizes given and hemmed to slip over the aluminum curtain rods. ★ ★ ★



Backdrops are interchangeable to convert "stage" from hand-puppet use to marionette presentations



Double-deck bunks, laced with strips of furniture webbing, are hinged to fold out of way against wall

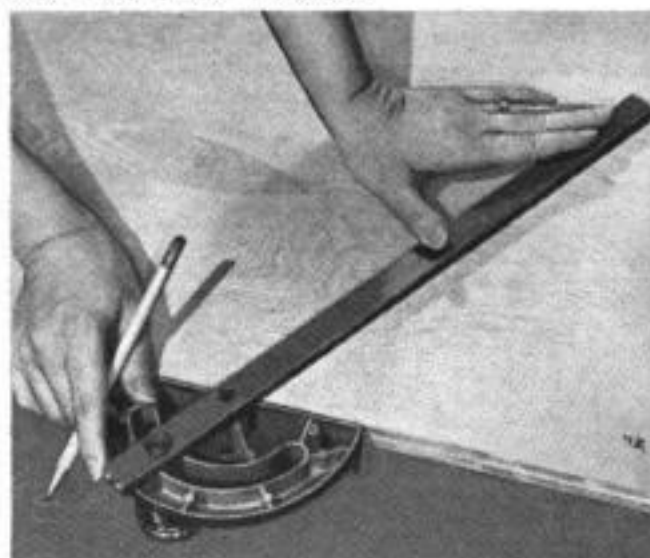




Windmill Vanes on Farm Road Indicate Culvert Location

Vanes from a dismantled windmill are used on a farm driveway to indicate the ends of a culvert. Three-vane sections at each side of the road are held in place with steel rods fitted through vane-brace rivet holes and driven into the ground. Aluminum paint assures greater visibility of the vanes at night.

Table-Saw Miter Gauge Used As Oversize T-Bevel



Next time there is need for an oversize T-bevel to mark off angles on plywood sheets, counter tops or other large surfaces, use the miter gauge from a table saw. Invert the gauge so the adjustable head will bear against the edge of the piece to be marked. Angles are set according to the protractor on the gauge.

Light-Green Enlarger Filter

A light-green filter on an enlarger will make focusing easier and more accurate. Green is the average focal length of all the colors of the spectrum and thus is the ideal color for judging sharpness. And also, as

it is a restful color, it will lessen the shock to the eye that results when you move from the yellow or red of the safelight to the blue of the enlarger light.

Robert C. Florian, Cicero, Ill.

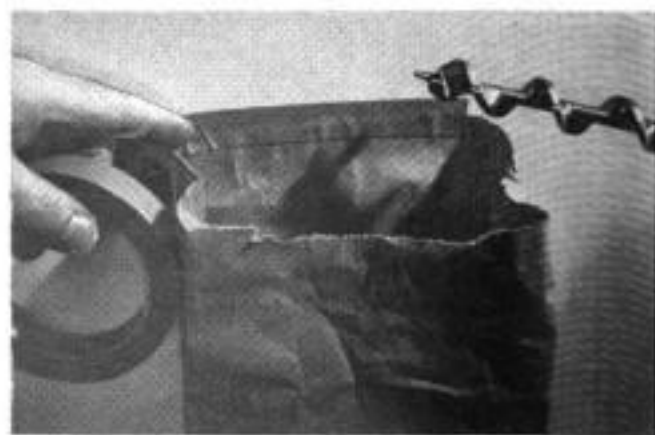
Lemon-Juice Invisible Ink Made Visible by Heat



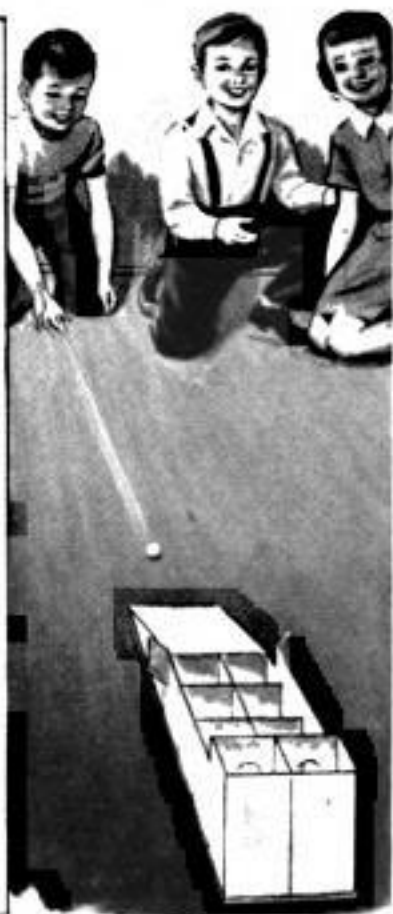
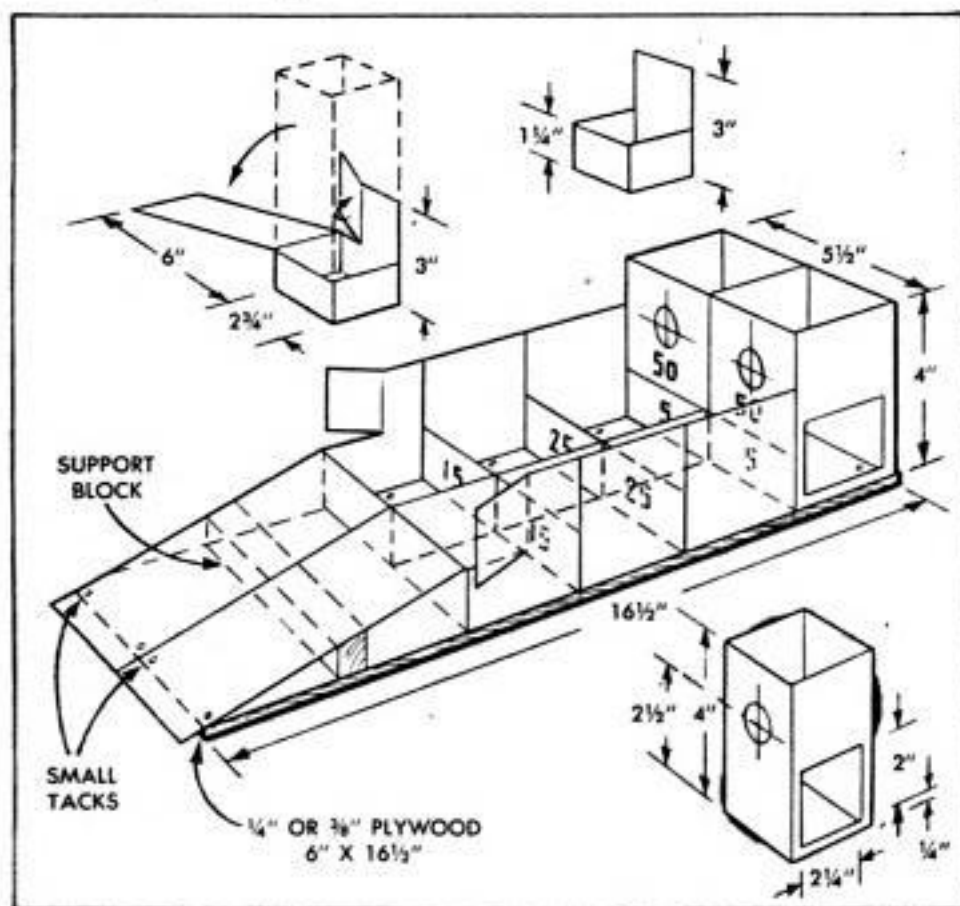
Lemon juice can be used as an invisible ink. Squeeze some into a bottle and use a clean pen for writing with it. When the liquid has dried, it cannot be seen. To make it visible once again, apply heat to the paper with an electric iron or a lamp bulb. The writing will appear brown and remain permanently visible. Use light strokes of the pen when writing so as not to cause visible scratches on the paper's surface.

Paper Bag Catches Plaster Dust When Drilling Hole in Wall

When drilling a hole or otherwise making a small opening in a plastered wall, tape a large paper bag to the wall, as shown. The bag will catch plaster and dust more efficiently than paper spread on the floor, because no dirt will settle on the baseboard or in the corner between the wall and floor. The paper bag full of debris also is easier to handle.—Ken Murray, Colon, Mich.



Rainy Day Marble Game Made of Milk Cartons



Small fry will enjoy expending some of their rainy day energy on this inexpensive marble game that requires only a sharp knife and a handful of tacks to assemble. The eight scoring boxes are cut from empty milk cartons and tacked to a 6 x 16 1/2-in. sheet of 1/4 or 3/8-in. plywood. A scrap of wood is cut to fit the ramp angle and provides a support block for the cartons. After being rinsed clean of milk, matching pairs of cartons are cut to the heights given in the details. Note that the front and rear cartons are marked and cut to make right

and left-hand scoring boxes. The angled wings on the front boxes guide any marbles that are rolled out of line. Holes are cut in the front sides of the two rear boxes, the holes being slightly larger than the marbles used. Openings also are cut in the sides near the bottoms of these same boxes to permit retrieving the marbles more easily. The ramp ends of the front cartons should overhang the end of the plywood base and touch the floor. It is best to use small carpet tacks to fasten the ramp.

Leonard W. Mitchell, Carrsville, Ky.

House Lamp Wired Through Three-Way Plug Used as Flash Holder



If a flash-attachment plug is wired to a regular three-way plug, almost any reflector or portable lamp can be used as a flash holder. Screw flash bulbs into the lamps, plug the cords into the three-way socket, plug the attachment cord into the camera and snap the picture in the regular way.

Walter Haase, Hartford, Conn.

Drawing Reversed by Tracing

A plan or drawing can be traced in reverse by placing a sheet of carbon paper face up on a hard surface, covering it with a sheet of drawing paper, then placing the drawing on top. Tracing the drawing results in a reversed copy on the drawing paper.

Flooring Strip Braces Plywood Held on Edge for Sawing



A short strip of tongue-and-groove flooring fitted over the top edge of a sheet of thin plywood or hardboard held on edge for sawing will prevent the saw blade from binding. As soon as the saw has cut to sufficient depth, fit the grooved edge of the flooring strip over the edge of the sheet across the saw cut.

Coin Protects Wooden Rule From Razor-Blade Cuts



When cutting material with a razor blade or sharp knife pulled along the edge of a wooden or plastic straightedge, use a coin to prevent cutting the straightedge. Hold blade and coin together between the fingers, with the coin bearing against the straightedge. The straightedge must be offset the thickness of the coin from the cutting edge. The coin trick also will work well when it is necessary to cut narrow parallel strips from leather, paper or other material.

Adjustment of Rotating Brush Improves Vacuum Cleaner

Very often the efficiency of a vacuum cleaner, which has a rotating brush in the suction nozzle, can be improved by adjust-

ing the brush to make better contact with the carpet. To check the adjustment, place a straightedge across the end of the nozzle. The brush should project $\frac{1}{32}$ in. above the edge of the straightedge. When too badly worn to permit adjustment, the brush should be replaced with a new one.

Hardboard Disk in Trash Can Replaces Rusted-Out Bottom

A wood or hardboard disk will extend the life of a trash can in which the bottom has rusted out. If the can has tapered sides, cut the disk oversize so it will fit tightly at a point just above the original bottom. Angle brackets must be used if the

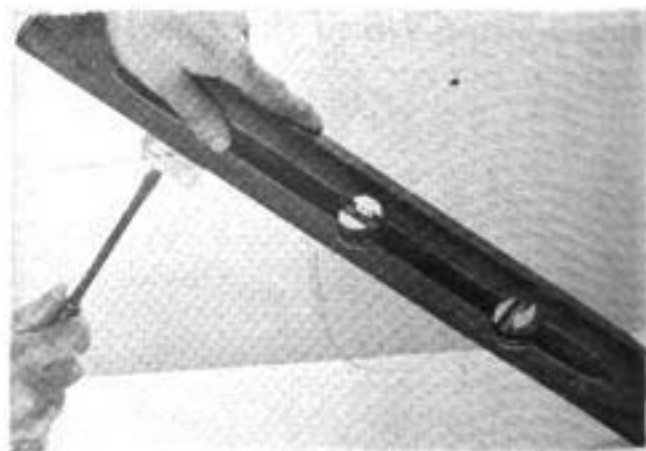


can has straight sides. In cases where the lower edge of the can also is badly rusted, locate the disk just above the damaged portion, then cut off the can below the new bottom. Paint the disk and inside of the can with roofing cement.

Level Maintains Constant Slope By Using Small Block

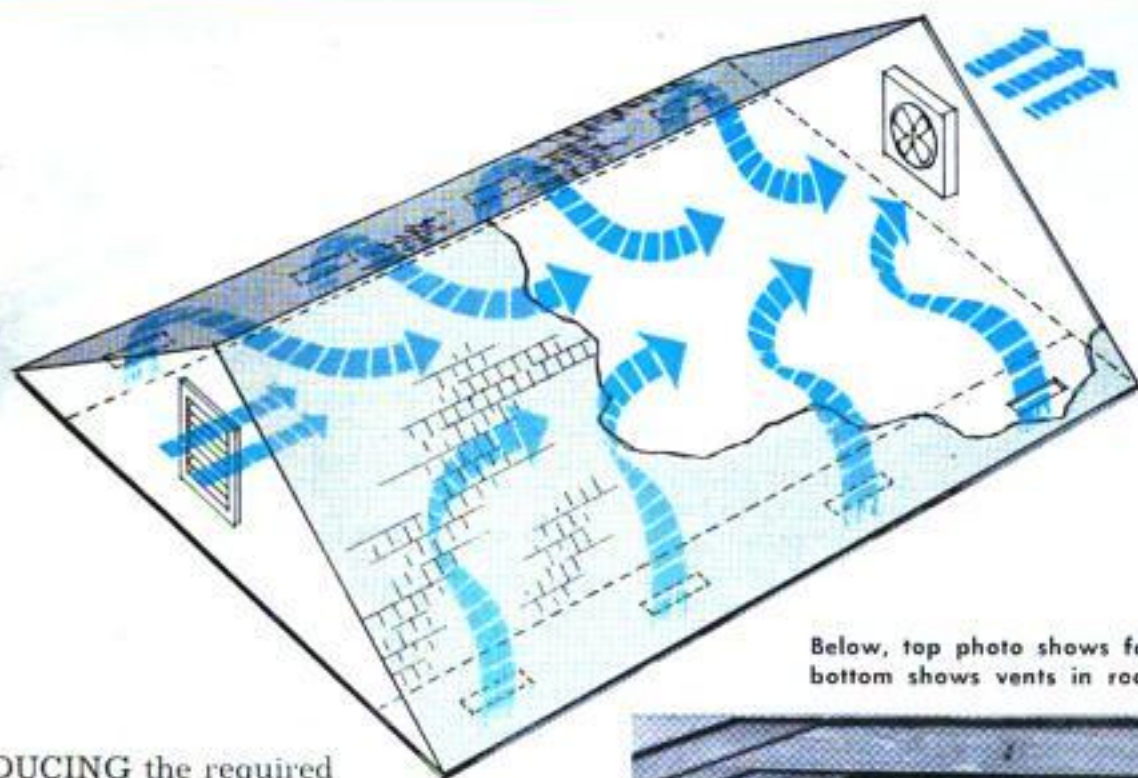
By screwing a small block to the underside of a level, it is converted to a constant-grade tool for such jobs as laying drain-tile and grading lawns. Set a tile or other piece of work to the slope or to the angle desired and place the level on it. Then slide a small block of wood under the level until the bubble centers. Mark the spot and screw the block in place. The block can be removed after the job is done.

Clyde Allison, Cadillac, Mich.



☞ To carry a shopping bag full of groceries comfortably, slip an ordinary clothespin through the handles.

ATTIC FAN AIDS AIR CONDITIONING



Below, top photo shows fan installed, bottom shows vents in roof overhang

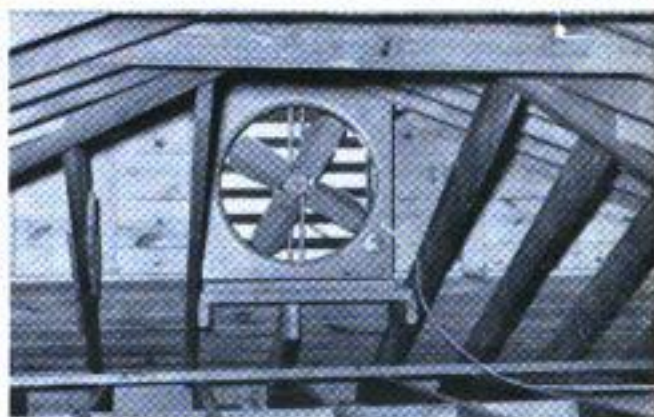
REDUCING the required size of a home air-conditioning plant from a 5-ton to a 3-ton unit has been accomplished by installing an exhaust fan to "air wash" the attic.

Approximately 40 percent of the heat gain in a modern house is confined to the ceiling area. Heat from a hot-water tank, cooking range and other household equipment is added to the heat built up by the sun's rays on the roof. Exhausting heated air and drawing in fresh air prevents heat accumulation in the attic space.

Precedent for the air-washing system was set by the Lau Blower Company of Dayton, Ohio, who installed a 30-in. fan to air-wash the attic of their laboratory. Running the fan for two hours cooled the 150-ft.-long attic by 24 deg.

In the home installation, a 24-in. fan exhausts air from one end of the attic. A louvered opening at the opposite end of the attic, and several vents in the roof overhang, permit the entrance of outside air.

A savings of several hundred dollars is realized by the lower cost of the smaller air conditioner. Homeowners report lower operation and maintenance costs for the smaller units. Sizes of exhaust fans and air conditioners are determined by figuring the heat gain in a particular house. In the example described, a heat gain of 44,000 B.T.U. was handled by an air conditioner with a capacity of only 36,000 B.T.U.





Tractor Scoop Used as Scaffold When Assembling Grain Bins

Instead of going up and down a ladder to assemble steel grain bins, one farmer used his tractor scoop as a portable scaffold. When working alone, it is necessary to raise the scoop to the desired height, then climb the framework to it. If a second person is at hand to operate the tractor, the workman can be raised and lowered in the scoop.

George R. Harrison, Valparaiso, Ind.

Holder for Shipping Labels



A handy dispenser for gummed shipping labels, that also aids in eliminating "damp-weather curl," can be improvised from a shallow glass jar. The depth and diameter of the jar are governed by the size of the labels used. Simply slip the labels into the jar with the gummed

side out, thus reversing the usual tendency of the labels to curl toward the gummed side. The jar must be clean and dry.

Water With Copper Sulphate Destroys Root Growth in Sewer

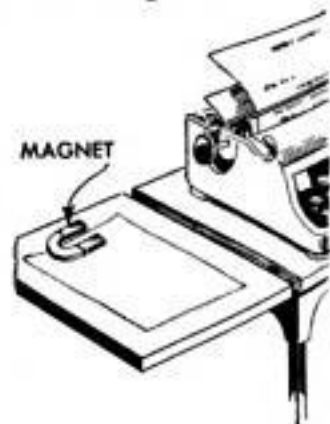
A clogged sewer, caused by tree roots penetrating the joints in the tiles, was cleared by one homeowner who treated the water in the toilet flush tank with copper sulphate. Once a week during the growing season, a lump of the chemical about the size of the end of a man's thumb is dropped into the tank in the corner opposite the outlet pipe. The lump slowly dissolves, chemically treating the water to destroy

any roots which find their way into the sewer system. *Caution:* Care must be exercised when handling and storing copper sulphate; it is poisonous if taken internally.

Arthur Richards, Belleville, Ill.

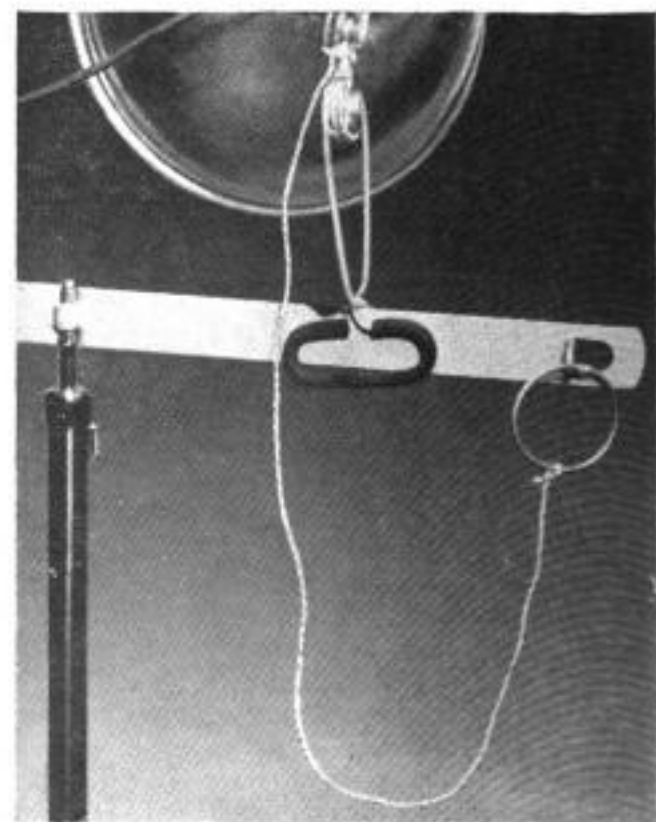
Copy Held to Typewriter Stand By Small Permanent Magnet

Sheets of copy can be held securely on the leaf of a steel typewriter stand by placing a small permanent magnet over the paper. When not in use, the magnet "stores" itself by clinging to any part of the table on which it is placed.



Line on Photoflood Reflector Prevents Equipment Damage

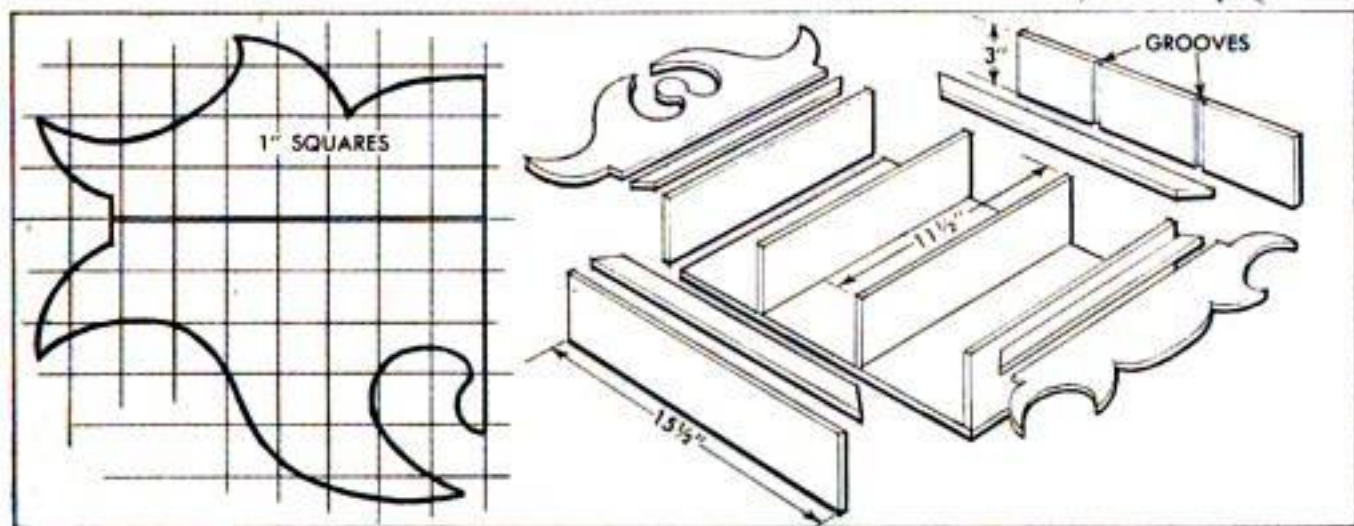
A "safety line" on a photoflood reflector will help to prevent broken bulbs and damaged equipment should the reflector accidentally be pulled or knocked off the stand. The line is a length of heavy cord or picture wire, one end of which is fastened to the reflector. The other end is tied to a clip-type notebook ring to permit disconnecting the line when the reflector is stored or used on a different stand. The safety line should be short enough to prevent the reflector from striking the floor.



Framed Shadowbox

A scrolled frame gives this shadowbox an "antique" appearance that permits it to blend well with period furniture. Except for the top and bottom sections of the frame, all parts are made with straight cuts. Patterns for the jigsawed sections are drawn by enlarging the squared diagrams below. Sides and shelves can be made from $\frac{1}{4}$ or $\frac{3}{8}$ -in. plywood which would permit cutting grooves for the shelves. If thin plywood or hardboard is used, $\frac{3}{8}$ -in.-sq. strips can be nailed to the back to provide nailing surfaces. The sides then are cut $\frac{3}{8}$ in. wider. The frame on the front of the box is cut from $1\frac{1}{2}$ -in.-wide strips, mitered and nailed to the box so their inside edges align with the inside surfaces of the box. The scrolled top and bottom pieces are attached to the edges of the frame. Use a thin backing strip along each joint.

R. W. Madden, Palatine, Ill.



Suede-Cleaning Brush Removes Excess Metal When Sweat-Soldering

A small wire brush used for cleaning suede shoes provides a handy tool for removing excess solder when sweat-soldering two pieces of metal. The wire bristles are not affected by the solder and, being made of a brass alloy, will not scratch the surface of most metals. The brushes are available in several sizes at most shoe-repair shops and shoe stores.

Model-Plane Parts Assembled With Toy-Balloon "Clamp"

One model-airplane enthusiast has discovered that an inflated toy balloon can be used to hold the assembled parts of a model in position while the glue is drying. The deflated balloon is pushed inside the framework of the model, then inflated just enough to position the part being glued.

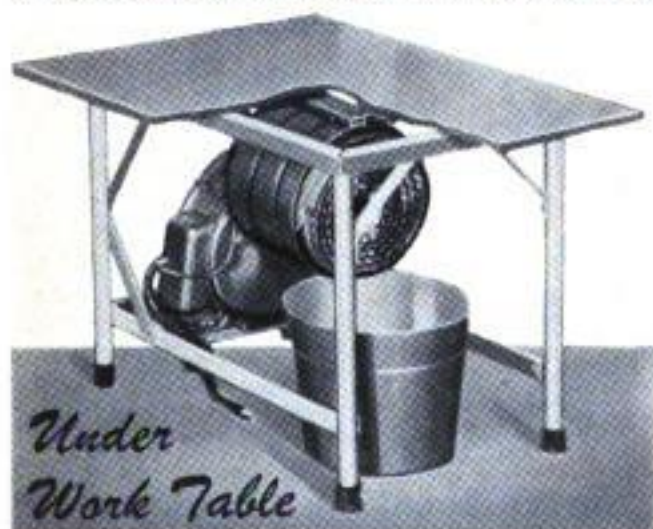


HOW TO INSTALL YOUR OWN DEHUMIDIFIER



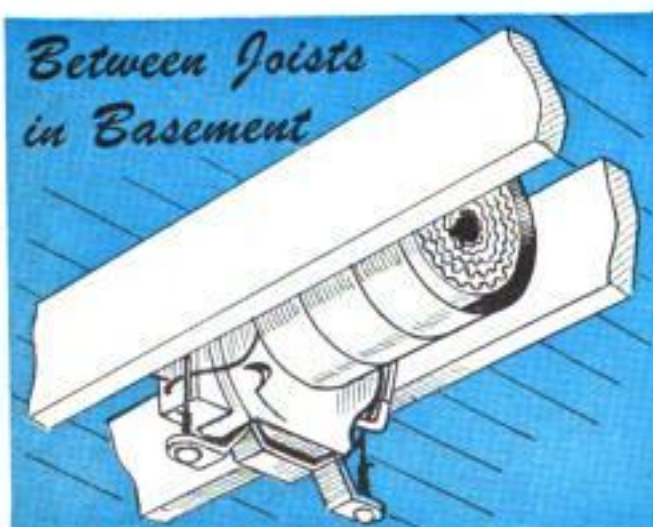
Dehumidifier

Now available for the do-it-yourself craftsman, this practical unit can be installed in many unusual ways



Under Work Table

Above, space under work table is utilized. Below, dehumidifier between joists drains into laundry tubs



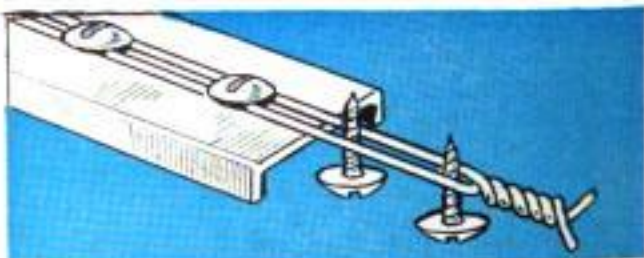
Between Joists in Basement

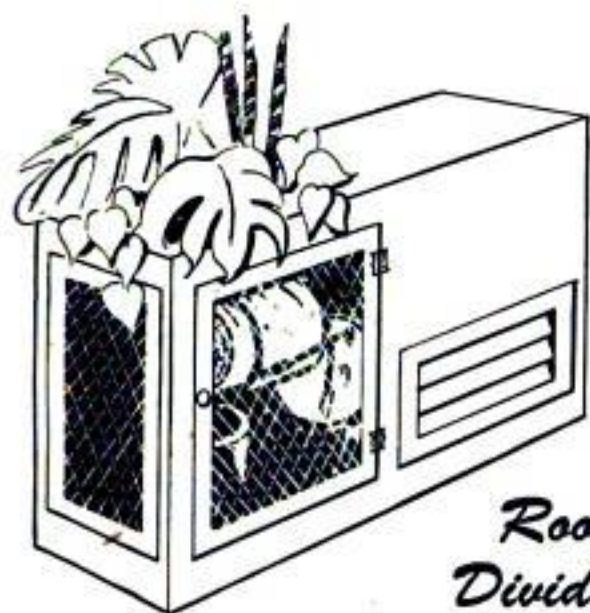
THE MAN who first said, "It isn't the heat, it's the humidity," knew what he was talking about. A good part of warm-weather discomfort comes from too much moisture in the air, which prevents rapid evaporation of perspiration from the skin—nature's way of keeping us cool. This excess moisture not only makes us uncomfortable, but also swells drawers so they won't open, pops joints on furniture and causes mildew in places, such as basements, where there is inadequate ventilation.

This excessive moisture can be removed by installing a dehumidifier. Now on the market, in addition to the types that come in a cabinet ready to be plugged in, is a do-it-yourself dehumidifier, pictured on these pages. It may be installed between the floor joists for basement operation, or concealed in a room divider, a cabinet or an end table for use in the living room. A kitchen cabinet or refreshment bar, louvered for air circulation, can house the unit, too. Mounted under a table or bench in the home workshop, it will help to keep tools from rusting.

Although supplied with mounting brackets, the unit can be hung from wires bent from coat hangers, as would be necessary when it is put between the floor joists. Keep in mind, when buying a dehumidifier for your home, that the maximum capacity of most models is about 3 gal. per 24-hr. running period in an excessively damp spot. They will give satisfactory air drying for about 1600 cu. ft. of room space under average conditions. ★ ★ ★

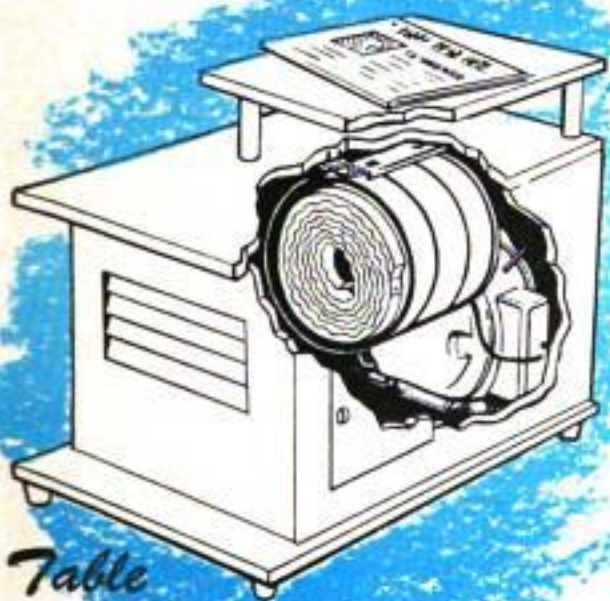
Unit can be mounted on brackets or hung from heavy wire attached to brackets in manner shown below





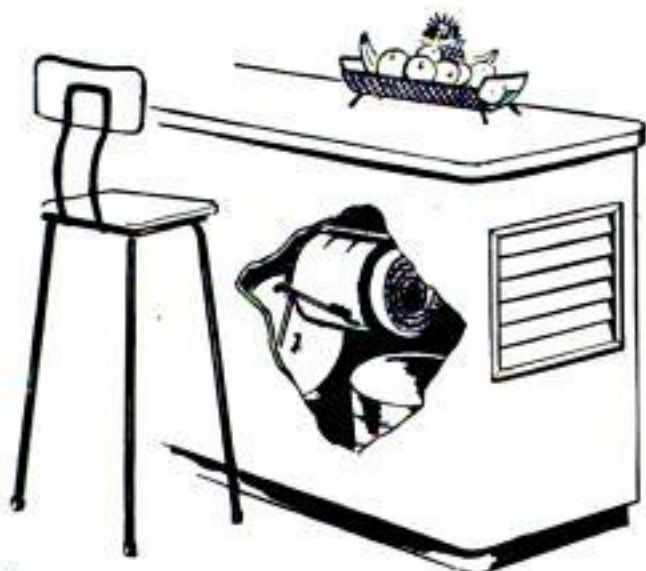
*Room
Divider*

Concealed in louvered end table or room divider, this unit can be used in living areas of the home



Table

Kitchen area is often source of excess moisture in a house. Dehumidifier concealed in a refreshment bar or cabinet base prevents spread of dampness



Refreshment Bar

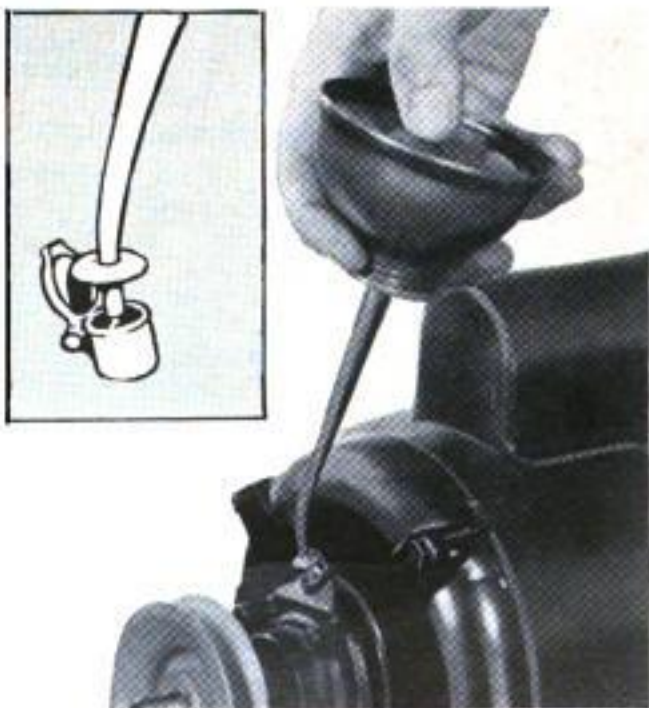
Spray Outfit Made Portable By Using Golf-Bag Cart



Equipping a manually operated garden sprayer with wheels makes it possible to spray large areas with a minimum of work. A three-sided metal or plywood box is built to fit the particular sprayer used, and the box and tank are then strapped to a golf-bag cart. The tank pump can be operated without removing the tank from the cart.—George T. Lundeen, Ripon, Wis.

Washer Soldered to Can Spout Lifts Covers of Oil Cups

A small washer soldered near the end of an oil-can spout will eliminate the problem of lifting oil-cup covers with your fingers when the cups are in hard-to-reach locations or dangerously close to spinning pulleys or gears. In use, the edge of the washer is used to lift the oil-cup cover and push it to one side so the spout can be inserted in the cup.



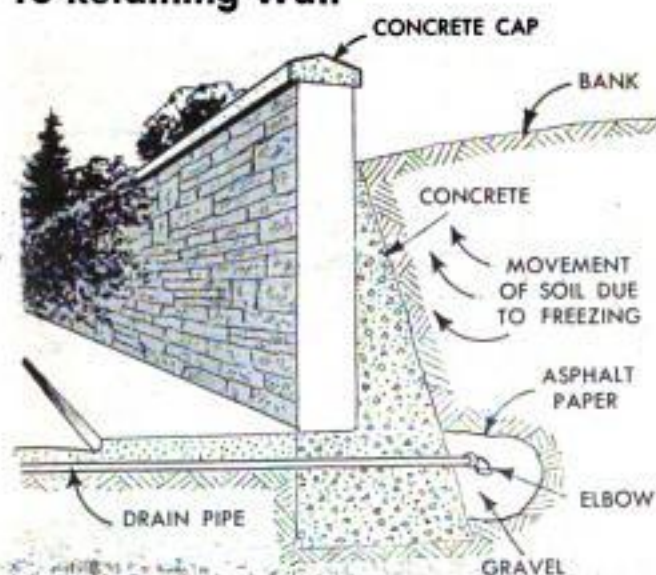


Empty Milk Cartons Utilized As Frozen-Food Containers

Empty milk cartons can be used as containers for packaging frozen foods. After the staples have been removed and the inside thoroughly washed, the sturdy, heavily waxed cartons can be used for any food from chopped stew meat to fruit juices. Freezer tape should be used to seal the cartons after the tops have been refolded on the original bends.

John Krill, North Lima, Ohio.

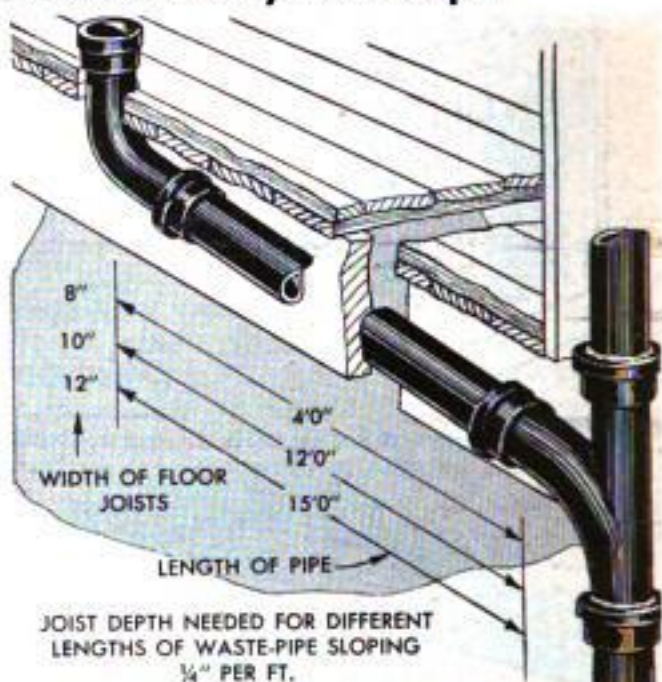
Safeguards Minimize Damage To Retaining Wall



Damage to a retaining wall from frost and water can be minimized by including a few safeguards when constructing the wall. Proper drainage will be assured if drain-pipes are set under the wall with an elbow on the inside end pointing down. Surround the elbow with coarse gravel and cover the gravel with heavy building paper. The inside of the wall facing the bank of dirt should be smooth and slope upwards so lateral pressure from frozen earth is deflected upwards. A final precaution, if the wall is brick or masonry, is to fit the top of

the wall with a concrete cap which will prevent water from seeping down through the wall.

Length of Soil Pipe in Floor Determined by Joist Depth



When a remodeling job includes installation of an extra water closet with plumbing and soil-pipe drains on a second floor, the depth of the floor joists should be considered when locating it, especially when the soil pipe must be concealed between an existing floor and ceiling. Minimum slope for adequate drainage in a soil pipe is $\frac{1}{4}$ in. per ft. The illustration gives the lengths of pipe which may be used between joists.

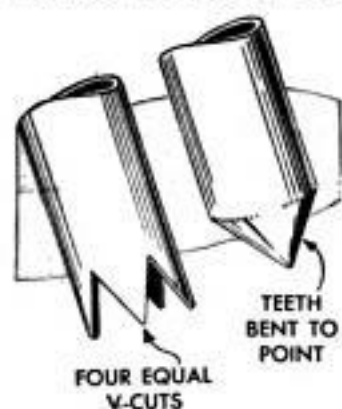
Car-Polishing Time Reduced

One owner cut down the time required for waxing the family car by wrapping the polishing cloth around a brush. The brush supports the cloth to permit polishing a wider area with each stroke. Use a brush with bristles just stiff enough to hold the cloth firmly against the curved surfaces of the car body and around chrome trim.

James E. Gray, Belton, Tex.

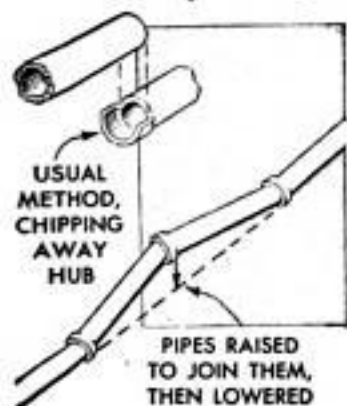


Pointing Ends on Pipe Stakes Makes Driving Easier



Pipe stakes will drive more easily if the ends are pointed. To form a point, cut four V-shaped notches in one end, as shown in the detail, and hammer the resulting teeth together. If the stakes are to be driven in very hard or stony ground, weld the teeth together after they are hammered to form a point. The teeth should be $1\frac{1}{2}$ to 2 times the length of the pipe diameter.

Hub Ends Need Not Be Broken When Replacing Clay Pipe

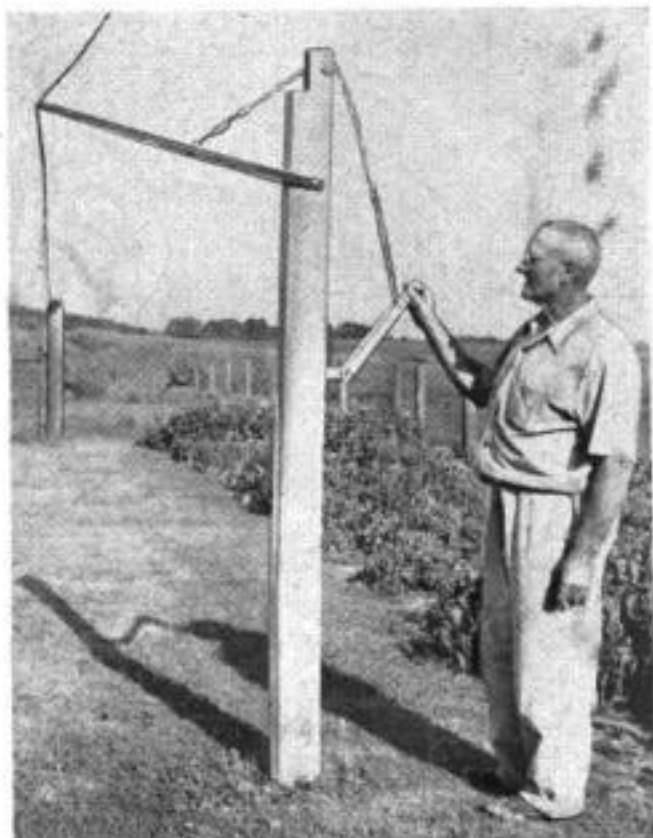


When it is necessary to replace one length of clay pipe in an otherwise undamaged sewer line, the hub of the adjoining pipe need not be broken if two lengths of pipe are removed instead of one. When two new lengths are set in position, they are raised first, so that the ends join properly, and then lowered in place in the sewer line. While there is more work involved in this method, it results in a tight joint. When the usual method of chipping away half of the hub is used, the joint is more likely to leak or admit tree roots.

Improve Plain Appearance of House Front By Adding Scrollwork



Dissatisfied with the plain appearance of his house, one homeowner improved the front by adding scrollwork in a contrasting color around the window and under the cornice at the roof peak. The scrolls were sawed from $\frac{1}{2}$ -in. exterior plywood, although $\frac{1}{2}$ or 1-in. solid stock could be used. Ready-cut cornice-board material, which can be purchased at most lumber yards, also might be used. —Hi Sibley, Nuevo, Calif.



Adjustable-Height Clothesline Requires No Props

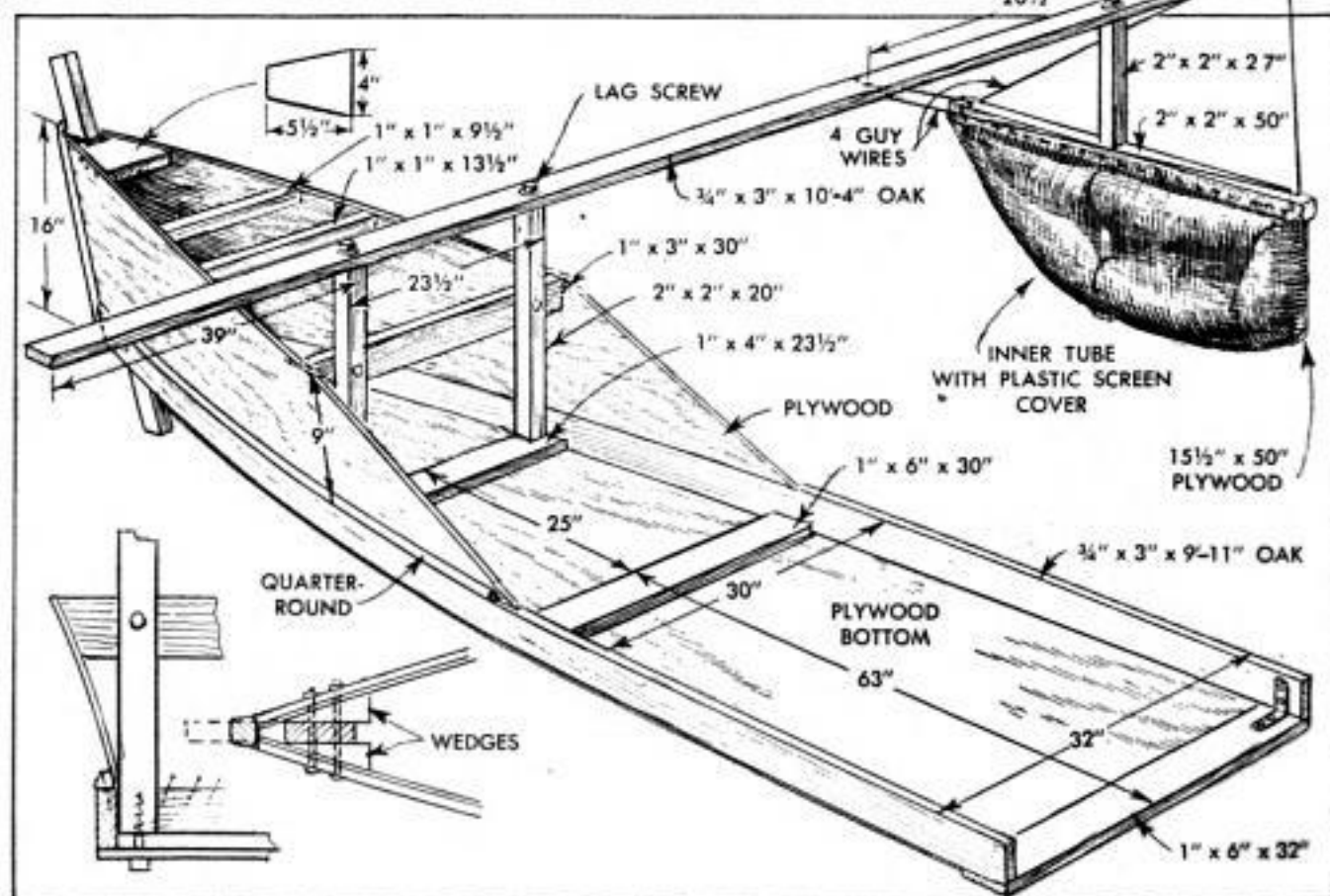
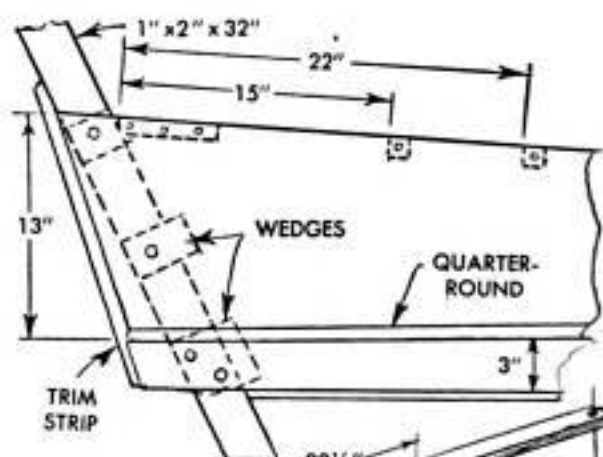
One housewife has no need for props under a clothesline which her husband installed and equipped with a built-in "line raiser." The mid-point of the line is supported on the end of an angle-steel arm pivoted to a post. A lever hinged to the back of the post is used to raise and lower the arm. Lever and arm are connected by a chain which passes over a pulley mortised into the top of the post. When the lever is pulled down, it raises the line. A means is provided for locking the lever in position. The line also is equipped with a ratchet device on one end which takes up the slack.



"Bill Bug" Outrigger Raft for Water Fun

SWIMMING is always more fun when there's a raft to play on, and the "Bill Bug" is a safe raft that won't sink and won't tip over. Built from scrap materials, it can be assembled in a couple of hours. Seven or eight inflated inner tubes provide the raft's buoyancy. They are lashed to the hull, and for better appearance can be covered with canvas. A partially inflated inner tube held in place with plastic screening was found best for the pontoon. The raft is light enough so that one man can launch it or lift it to the top of a car without difficulty.

Howard B. Hays, Chicago.



Rain Gauge Made From Bottle And Length of Wooden Rule



Amateur meteorologists, or anyone interested in keeping a record of the amount of rainfall in his area, can make a rain gauge which is accurate for all practical purposes. A glass bottle and a 5-in. length cut from a rule or yardstick are used to make the gauge. Bottle and rule are mounted

on a bracket which can be made of either sheet metal or wood. The bottle is 1½ in. in dia., the type in which Seltzer tablets are sold. Mount the rain gauge on top of a post, or in some location away from trees, buildings or other objects which might drain water into the gauge and cause a false reading.

Wm. P. Kupka, Chelsea, Iowa.

Better Electrical Connections

The "elastic locknut" used on aircraft is ideal for use on automobile and motorboat electrical connections. It is applied quickly, keeps the connection tight without lock washers and can be removed easily. Such nuts can be purchased in all sizes at any aviation-supply store.



Metal Bench Drawers Improvised By Utilizing Cake Pans

Strong metal drawers to fit under a workbench top can be provided inexpensively by using shallow cake pans or refrigerator-defrosting pans. Screw wooden strips, grooved to receive the rolled edges of the pans, to the underside of the bench top to act as drawer guides. Handles for the drawers can be made by bending up a section of the rolled edge at one end of the pans.

Simple Cardboard Frame Helps to Align Jigsaw-Puzzle Pieces



Jigsaw-puzzle fans will appreciate this frame to help in aligning the first pieces of the puzzles they put together. The frame consists of two long strips of cardboard, about ½-in. thick, laid out to form a right angle on a card table or other flat working surface. The cardboard is fastened to the table with cellulose tape, providing a firm base from which to work. For the larger, more-complicated puzzles, which may take several days to complete and must be left on the table for that time, this frame will help to prevent their being disarranged.—Thomas B. Lee, Bremerton, Wash.



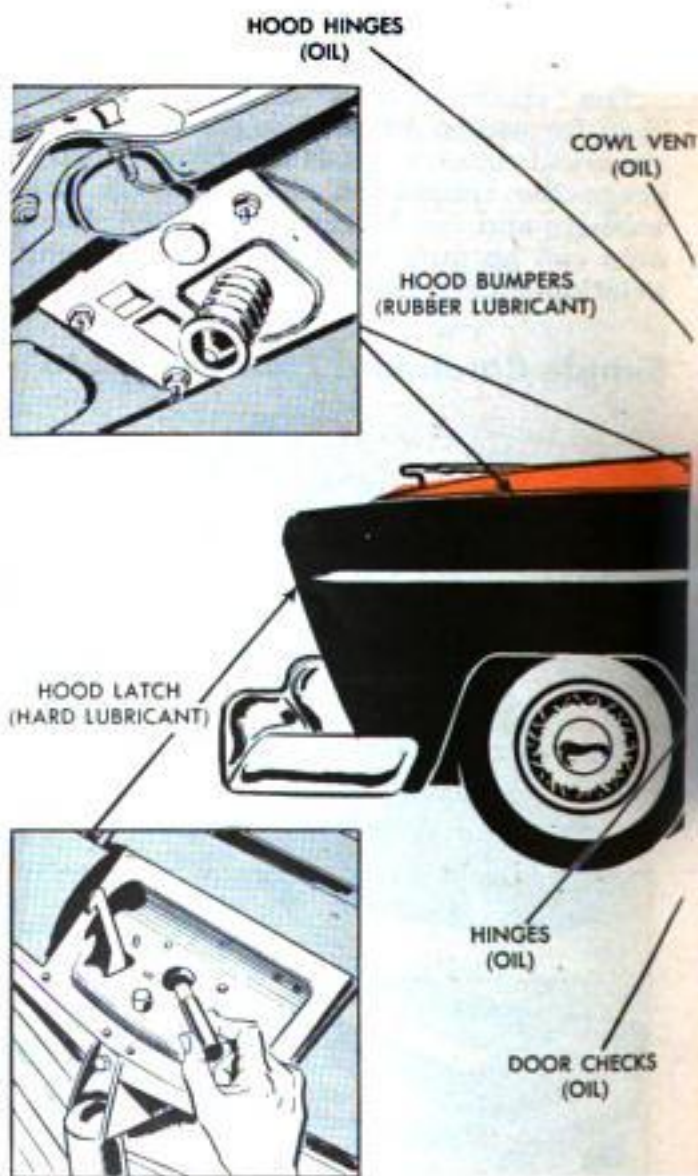
Quiet Those Car-Body Squeaks

By Ed Packer

DID YOU KNOW that the body of your car has more separate places requiring periodic lubrication than the chassis? Many of those places that need a regular application of the right lubricant are direct metal-to-metal contacts over small areas and can produce annoyingly insistent squeaks if neglected. But a drop of oil or a touch of hard lubricant here and there can put the "new" back into a car body in a way that makes the time spent well worthwhile.

Oil and grease of the correct specifications take care of the needs of the chassis, but for wear parts of the body you should use four types of lubricant. You'll need a pump-type oil can filled with light oil (left-hand photo above), a stick of hard lubricant, a flake-graphite blower or a can of lock lubricant, and a special rubber lubricant.

The chart at the right is a typical body-lubrication chart, but it should be kept in mind that the instructions given may not always agree with those of the manufacturer of your car. Where there is any doubt, or variation, follow the manufacturer's instructions. Usually, it's handiest to begin with the hood latch and work back, taking one side of the body, or both sides, as desired. Wherever oil is specified, use only a drop or two and wipe away all excess. Note especially the detailed instructions on lubricating door locks, or latches, and strikers. Use a light oil on the rotary-type lock, but on bolt-type locks use a dry stick lubricant. In some cases mechanics use dry graphite on tumbler-type locks rather than oiling as in the lower right-hand de-

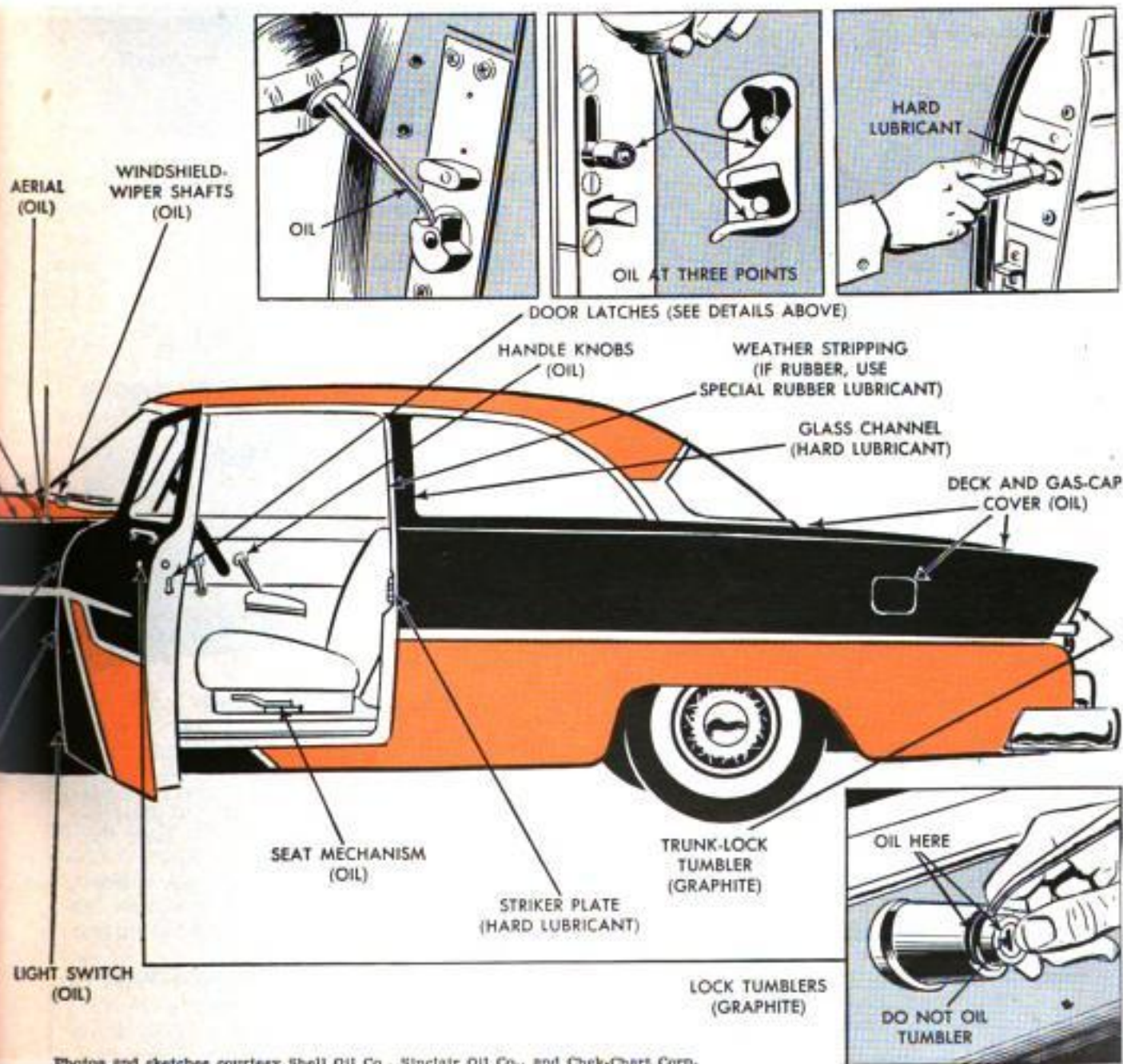


tail below, also the right-hand photo on the opposite page.

When you're working the doors it's a good idea to lubricate the glass channels with stick lubricant as in the center photo on the opposite page. This will relieve the load on the lifting mechanism caused by dry glass channels. As a rule the best way to lubricate the adjustable radio aerial is to go over the sections with a cloth on which a few drops of light oil have been placed. Then extend and retract the aerial several times to distribute the oil film uniformly. Another point often overlooked is lubrication of the rear wheel-cover latches. A drop of oil or a touch of hard lubricant on friction points of the latches not only will make the covers easier to remove, but will prevent rusting and the possible development of rattles and squeaks.

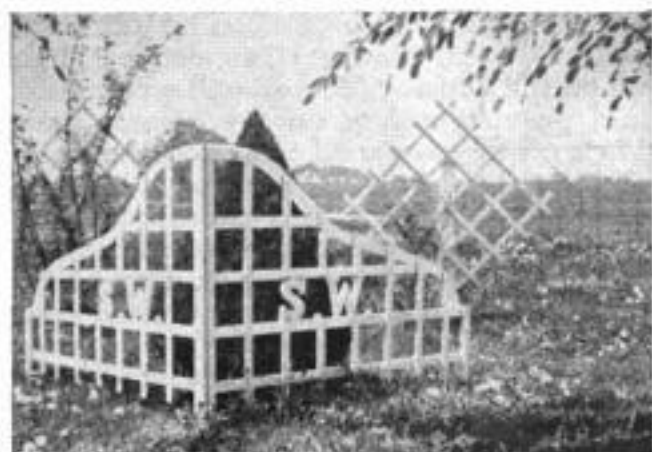
When you're lubricating the seat-adjusting mechanism, be sure to oil all surfaces that make contact when parts move. Usual-

ly a single drop of oil will do the trick. More will creep out of place and catch dust. Cable releases to the hood and emergency, or parking, brake can be lubricated adequately by placing a few drops of light oil on the housing. The oil will work inside and provide a film on the release wire. Wipe off all excess oil after application. In addition to the deck-cover, or lid, hinges and lock it usually is a good idea to oil the deck-cover brackets, especially if these are of the telescoping type. A drop or two of oil on the sliding contact surfaces eases the effort of opening and closing the cover and dampens out any squeaks that might develop as a result of direct contact of the metal parts. When you lubricate the gas-cap cover place a few drops of oil on the closure spring to ward off rust. Power units that actuate tops on convertibles and the windows on certain late-model cars should be lubricated according to each manufacturer's instructions. ★ ★ ★



Photos and sketches courtesy Shell Oil Co., Sinclair Oil Co., and Chek-Chart Corp.

Trellis at Road Entrance Identifies Farm Owner



Both attractive and functional, this trellis indicates the entrance to a farm road that leads to the house. The owner's initials set in the trellis identify the farm. If a similar trellis were used on a city lot, a street name or a house number could be used instead of the initials.

Care of Plastic-Covered Chairs

Although the covering on plastic-covered chairs seems fairly impervious to abuse that would ruin other types of materials, washing the plastic occasionally with a mild soap-and-water solution will keep the

chairs looking new longer. And if food or liquid is dropped on the plastic, wipe it up immediately, because there are some kinds of food and beverages that will stain it.

Glue Pot From Coffee Cans

An improvised double boiler for heating glue can be made from two coffee cans. The glue is placed inside a 1/2-lb. can which is suspended in a 1-lb. can containing water. A spring-type paper clamp is used to hold the smaller can above the bottom of the larger. Pliers are used to lift out the heated glue can.



Sea shells can be made into ornaments and ash trays if they are first cleaned and then given two coats of white shellac.

A Finer, Fuller Life for Your Children . . .

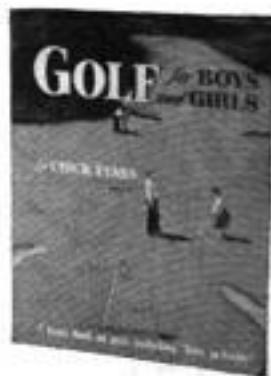
Fore! . . . A solid drive off the tee, a day in the fresh air and sunshine and friendly talk later in the clubhouse. You'd like your youngsters to have these pleasures—whether you know them yourself or not.

Golf is fundamentally Drives, Approach Shots and Putts—all of which can be taught! Your children should be given good form, good playing habits and good mental attitudes right from the start. And now they can have just that!

Golf Does Not Have to Be Expensive

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Popular Mechanics readers will like the Do-It-Yourself style of this book. It was written by one of the world's most famous amateurs for the enjoyment and instruction of other amateurs. Its main purpose is to make the game fun.



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SHOP NOTES

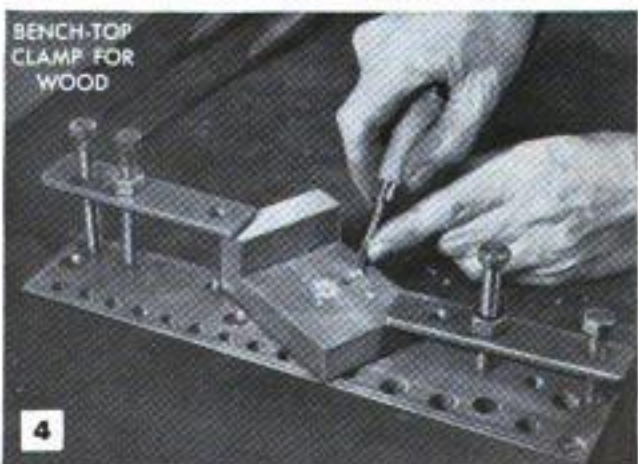
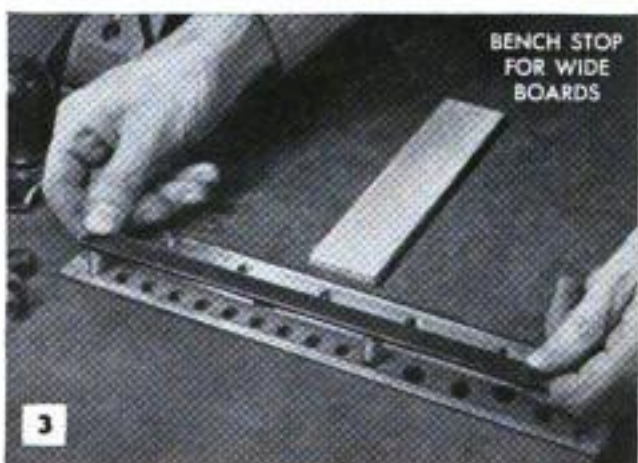
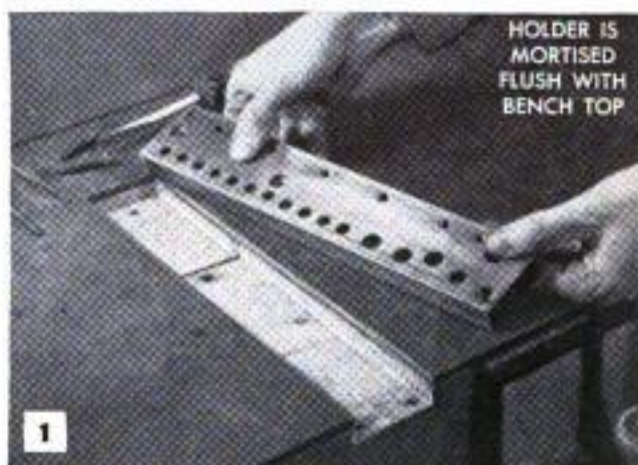
ALL-PURPOSE WORK HOLDER

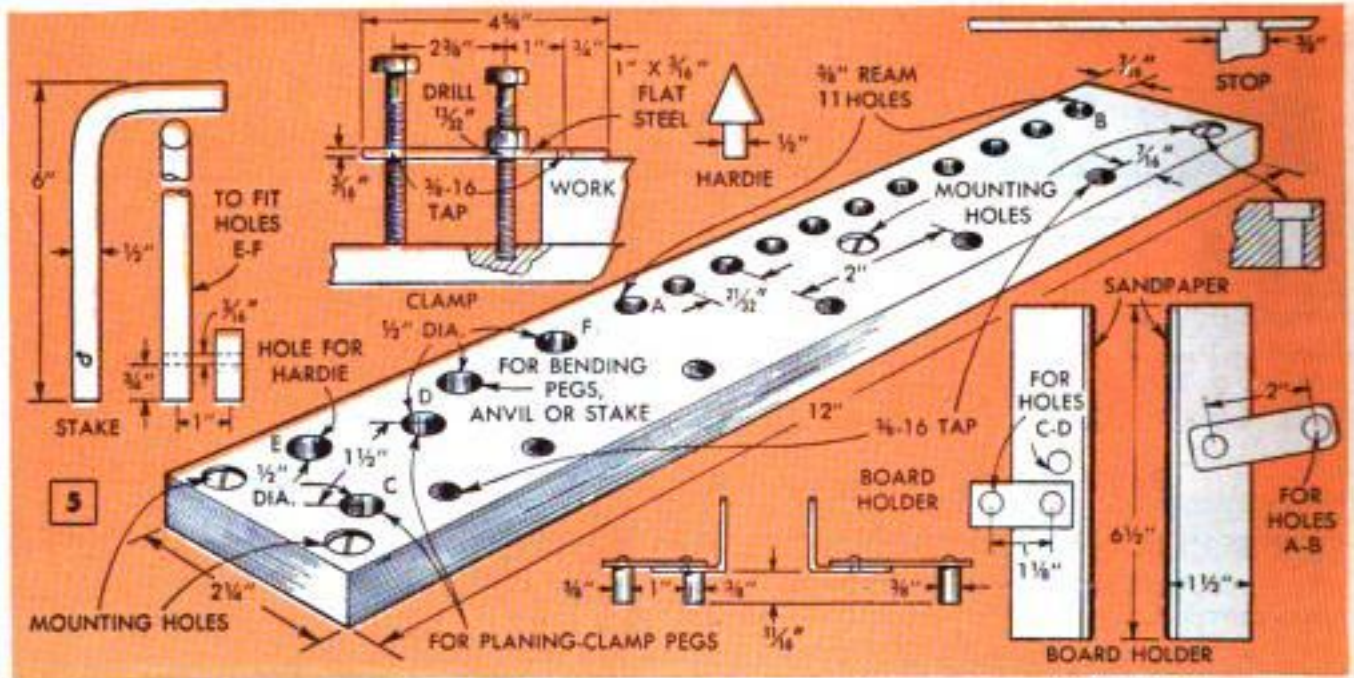
By Walter E. Burton

FEW BENCH HOLDING DEVICES, except possibly a costly universal vise, can match the all-around usefulness of this bench plate with its simple shop-made accessories. It consists of a mild-steel bar, $\frac{1}{2}$ in. thick, which is mortised flush with the bench top as in Fig. 1, and the various clamps and accessories pictured in Figs. 2 to 9 inclusive. A pattern of holes of various diameters and spacings is drilled through the bar. Several of these holes are tapped and counterbored as indicated in Fig. 5. The counterbored holes take fillister-head screws which are used to attach the bar to the bench top. Tapped holes take the various clamping devices pictured in Figs. 2, 4 and 9. A row of through holes, A-B, Fig. 5, is drilled on $2\frac{1}{32}$ -in. centers and reamed to $\frac{3}{8}$ in. These take the board holder, Figs. 2 and 5, the bench stop, Fig. 3, and the bending jig, Fig. 6. Holes C-D, E-F, are reamed to $\frac{1}{2}$ in. to take the stationary jaw of the board holder, the bending-jig pegs, or pins, the hardie and the sheet-metal stake. Note in Fig. 5, the detail showing the side view of the board holder, that diameter of the pins is given as $\frac{3}{8}$ in. This dimension of the pins permits a slight lateral movement of the jaw, adding to the gripping power of the unit when holding stock on edge as in Fig. 2. Pins $\frac{1}{2}$ in. in dia. can be used.

Six holes, two of these spaced on 2-in. centers, are drilled and tapped $\frac{3}{8}$ -16 to take the clamp screws, Figs. 4 and 9. The detail of the overarm clamps, Fig. 5, gives the thickness of the clamping bars as $\frac{3}{16}$ in. For heavy work use $\frac{1}{4}$ -in. clamping bars. Note that one screw passes through a clearance hole drilled in the bar and is turned into a tapped hole in the plate. The second screw is run into a tapped hole in the bar and the end bears against the surface of the plate. When this screw is tightened, the screw nearest the work serves as a pivot. A typical setup is shown in Fig. 4.

The method of fastening the pins to the bench stop, Fig. 2, is shown in the upper right-hand detail in Fig. 5. The holes are

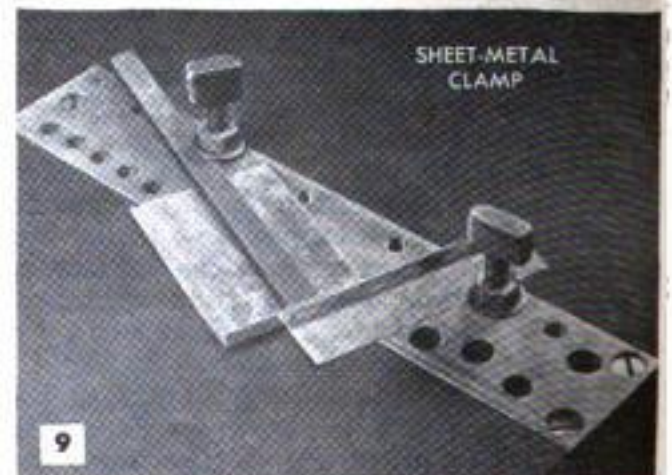
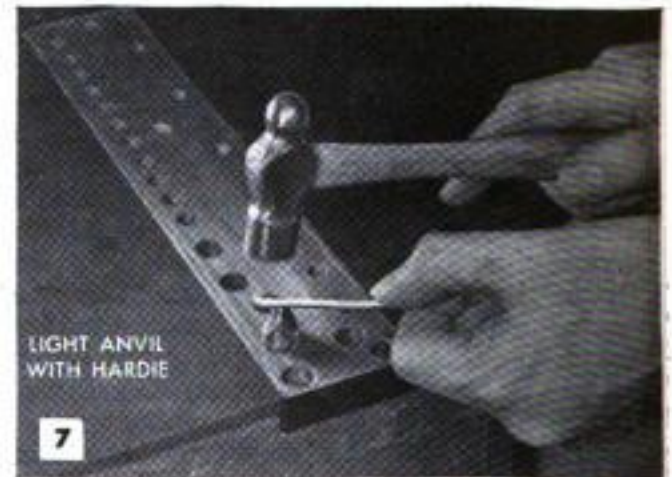
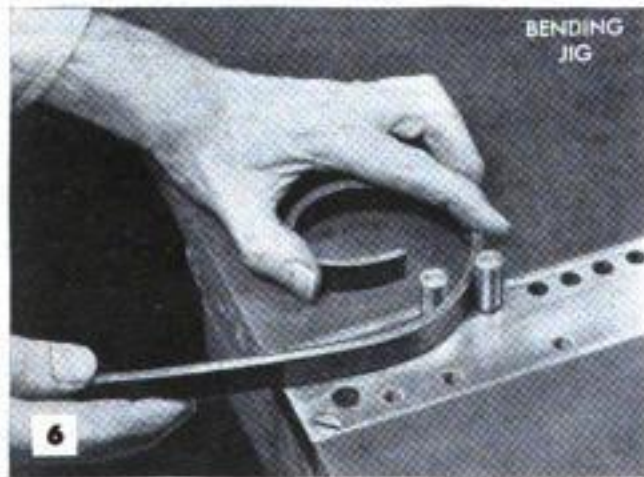




drilled in the bar to diameter of the shoulder on the pins. Then the holes are countersunk (with an angle-point countersink) and the projection of the pin peened over as shown. The same method of fastening can be used when attaching the pins to the links on the board holder.

The bending jig consists of two pins which are placed in adjacent 1/2-in. holes as in Fig. 6. If desired, a pair of 3/8-in. pins can be made to fit the holes A-B so

that any desired spacing may be obtained for various bending jobs. The stake, Fig. 8, is joined to a short pin which prevents it from turning while in use. The connecting transverse pin which joins the short pin to the stake should be a drive fit in 3/16-in. reamed holes. Where the plate is to be used as an anvil for light work it is desirable to have it hardened at a steel-treating shop to prevent denting and burring. Drill and tap before hardening. ★ ★ ★



Lifted Wood Chip Hides Nailhead In Furniture Construction

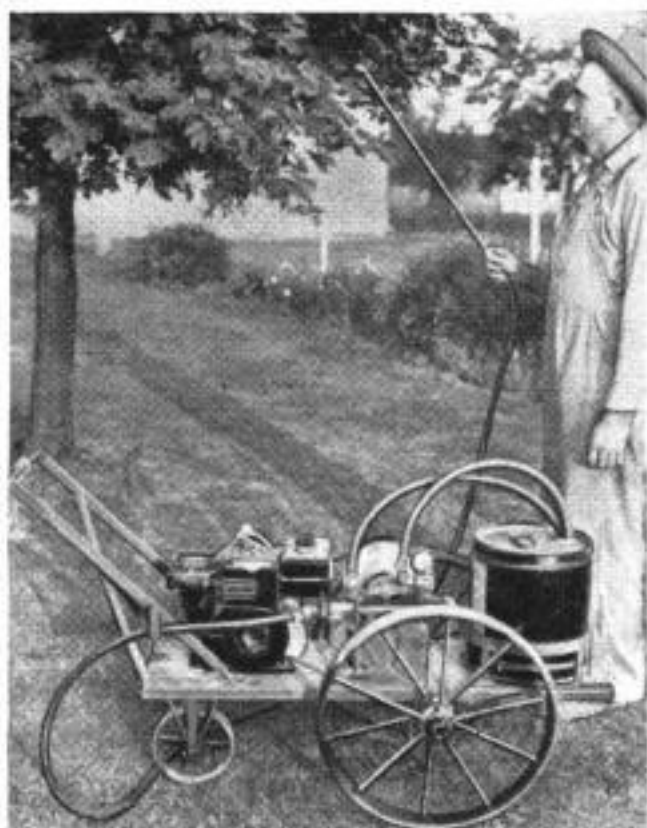
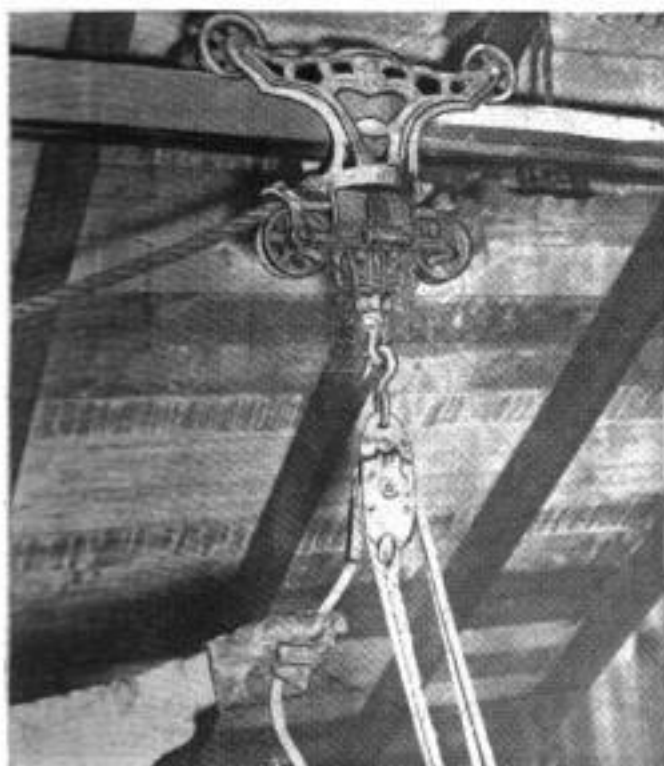


An effective method of concealing nailheads in furniture construction is to cover each nail with a wood chip lifted from the surface with a wide-sweep gouge. Do not cut the chip loose. Drive the nail into the recess under the chip, using a nail set to drive it

so that the chip will not be broken. When the nail has been set, coat the chip with glue and press it into place. Hold it flat with a weight. After the glue has dried, sand the surface smooth. A fine line of glue will be the only indication of the nailhead location.

Tractor Equipment Installed With Aid of Fence Stretcher

A wire-fence stretcher of the block-and-tackle type having a locking brake, hooked to a hayfork carrier, provides one farmer with a crane for lifting and installing heavy equipment on his tractor. The hayfork carrier runs on a stub track which is mounted under the roof of the machine shed. The track permits greater flexibility of use for the stretcher and allows unused equipment to be lifted and moved over to the floor of the loft for storage.



Portable Farm Sprayer Powered by Gas Engine

Powered by a small gasoline engine and mounted on a three-wheeled cart, this sprayer is completely portable. Insecticides, weed killers and other chemicals are carried in 5-gal. cans which fit in a welded rack on one end of the cart. When it is necessary to spray a distant outbuilding or pasture, the unit is light enough to be lifted onto a pickup truck for transport.

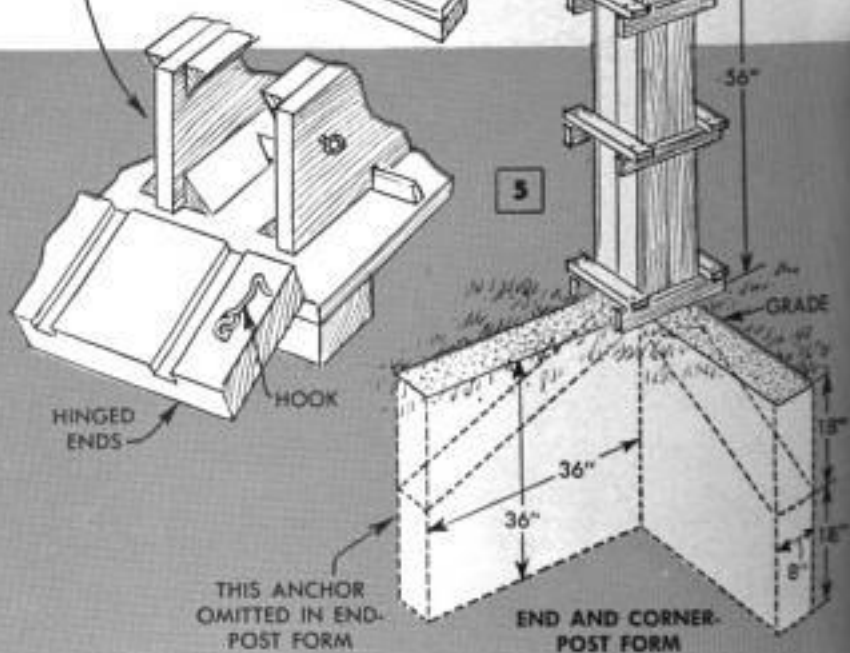
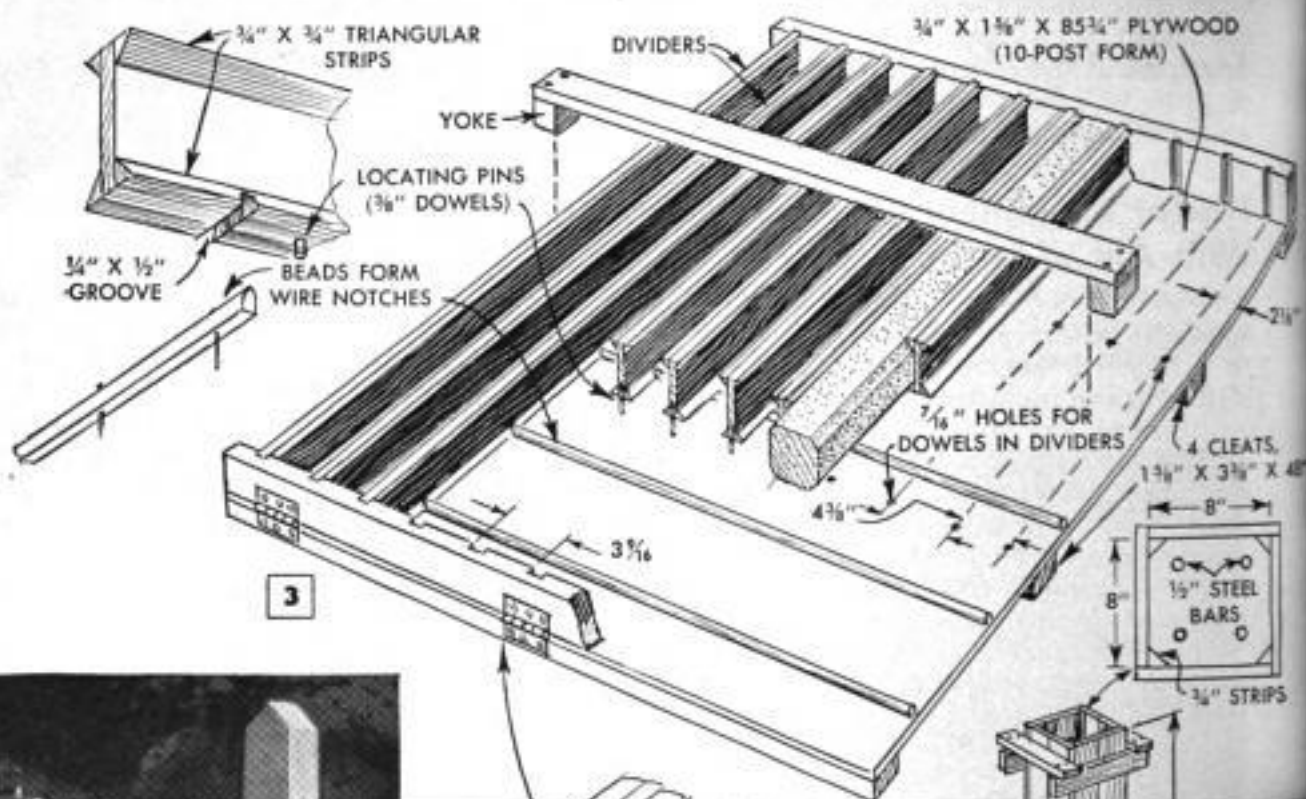
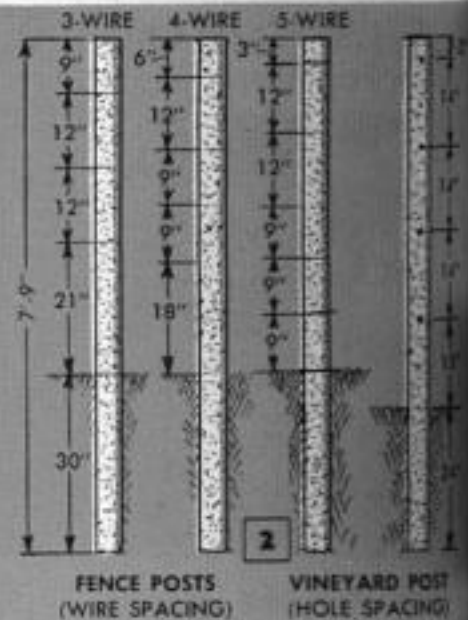
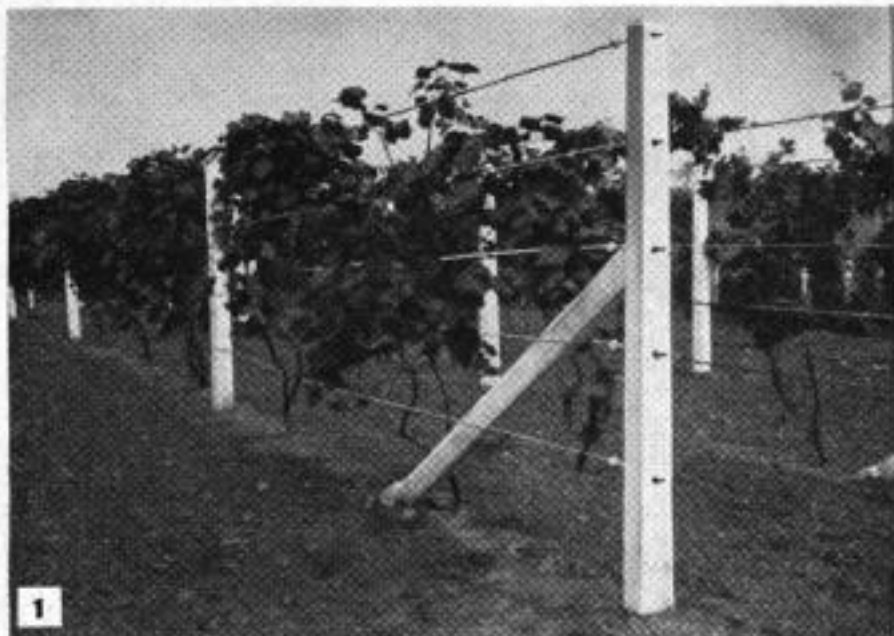
A. M. Wettach, Mt. Pleasant, Iowa.

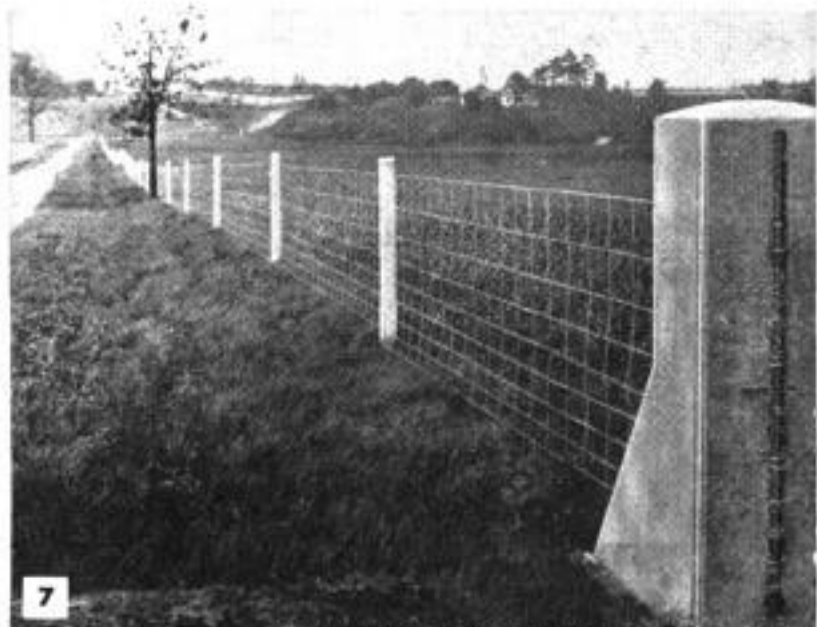
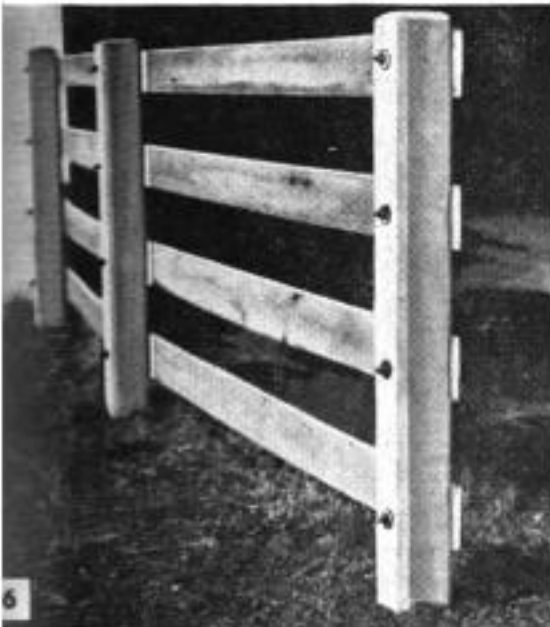
Sign Has Charred Background And Raised Lettering

Novel wooden signs with charred backgrounds and raised letters, such as those used for cottage name and address numbers, can be made by using some asbestos paint or cement and a blow-

torch. First, the letters or numbers are painted with the asbestos mixture and allowed to dry thoroughly. Next, a torch is played over the wood until it is charred away enough for the characters to stand out. The characters then can be painted a bright color. If the asbestos compound is one with an asphalt base, it should be cleaned off before painting, because it will bleed through the paint.







Photos and tables courtesy Portland Cement Association

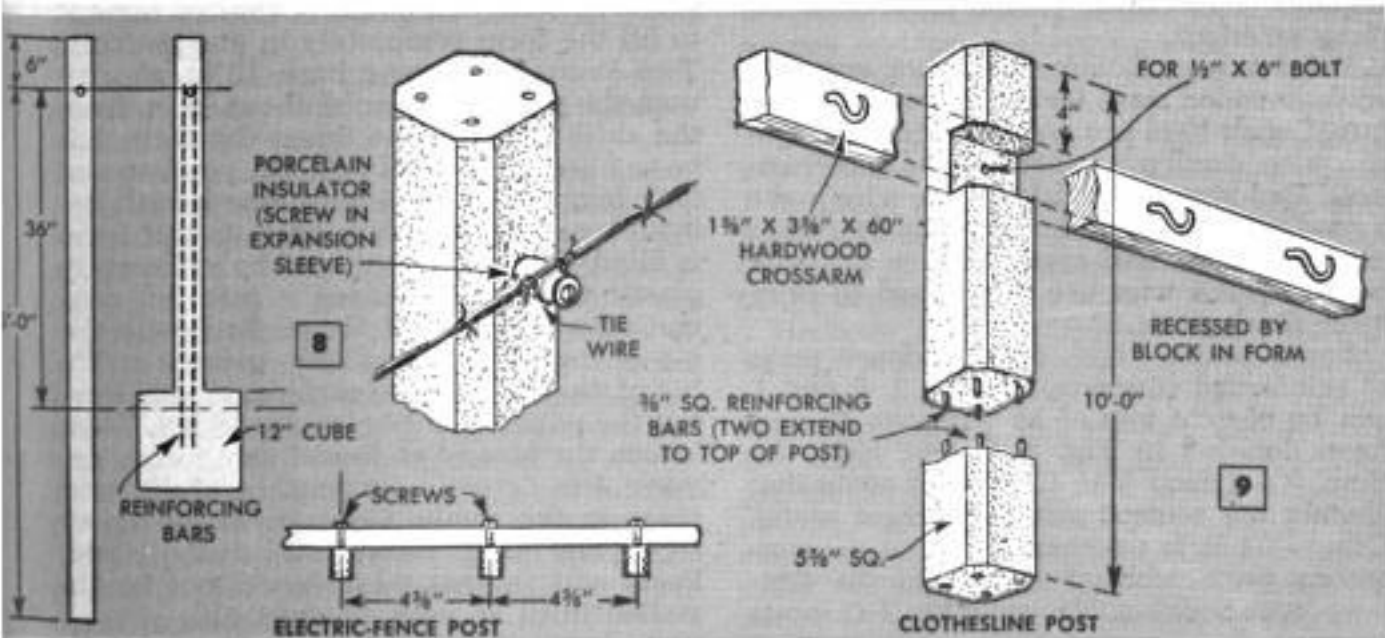
FARM REPAIR AND IMPROVEMENT with concrete

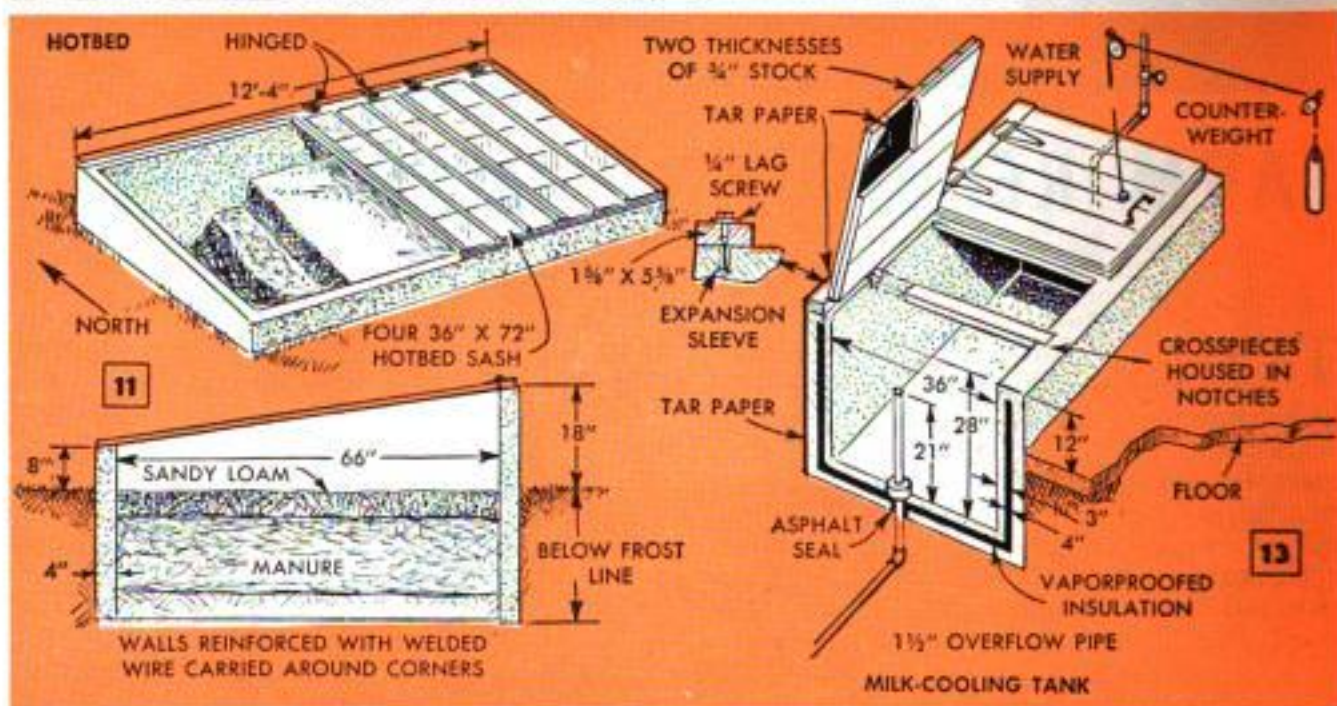
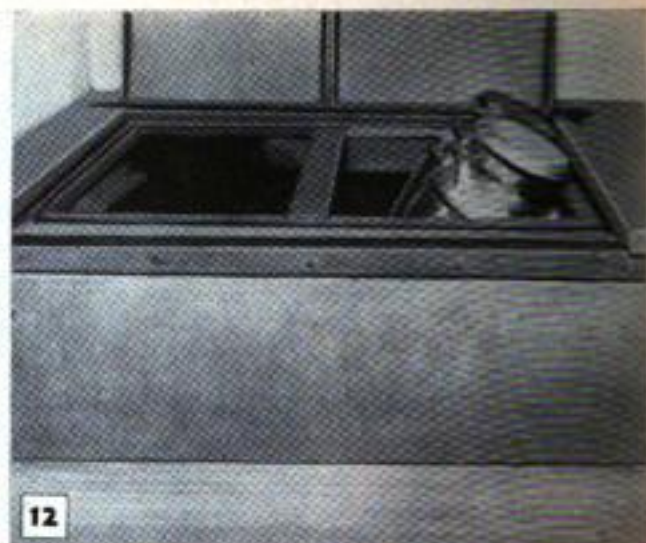
THERE'S NO MATERIAL quite like concrete for making permanent repairs and improvements on the farm. It's easy to handle, easy to mix and requires no maintenance after curing. It's rodent, vermin, insect and fire proof and does not rust, rot or warp.

Concrete mix: A 1:2¼:2½ mix is recommended for casting into fence posts, vineyard posts and clothesline posts, but a 1:2¼:3 mix is best for tanks, floors and other projects pictured and detailed on these pages. The numerals, in the sequence given, refer to the proportions of the ingredients—portland cement, clean, sharp sand and gravel or crushed stone. A sack of portland cement equals 1 cu. ft. Before

mixing, measure the materials, then mix the dry sand and cement thoroughly. Add gravel in the correct proportion and mix again. Finally, add the correct amount of water and mix a third time. Use only clean water, from 3¾ to 6¼ gal. for each sack of cement used. If the sand is wet, add the minimum amount of water. If slightly damp, the maximum amount stated.

If less than the required amount of water is added the mix will be too stiff and air pockets will form. The larger gravel sizes will collect against the form boards. When pouring in deep forms, spade and tamp the mixture to obtain uniform distribution of the particles. A concrete mix should be used within 45 min. or less, as otherwise



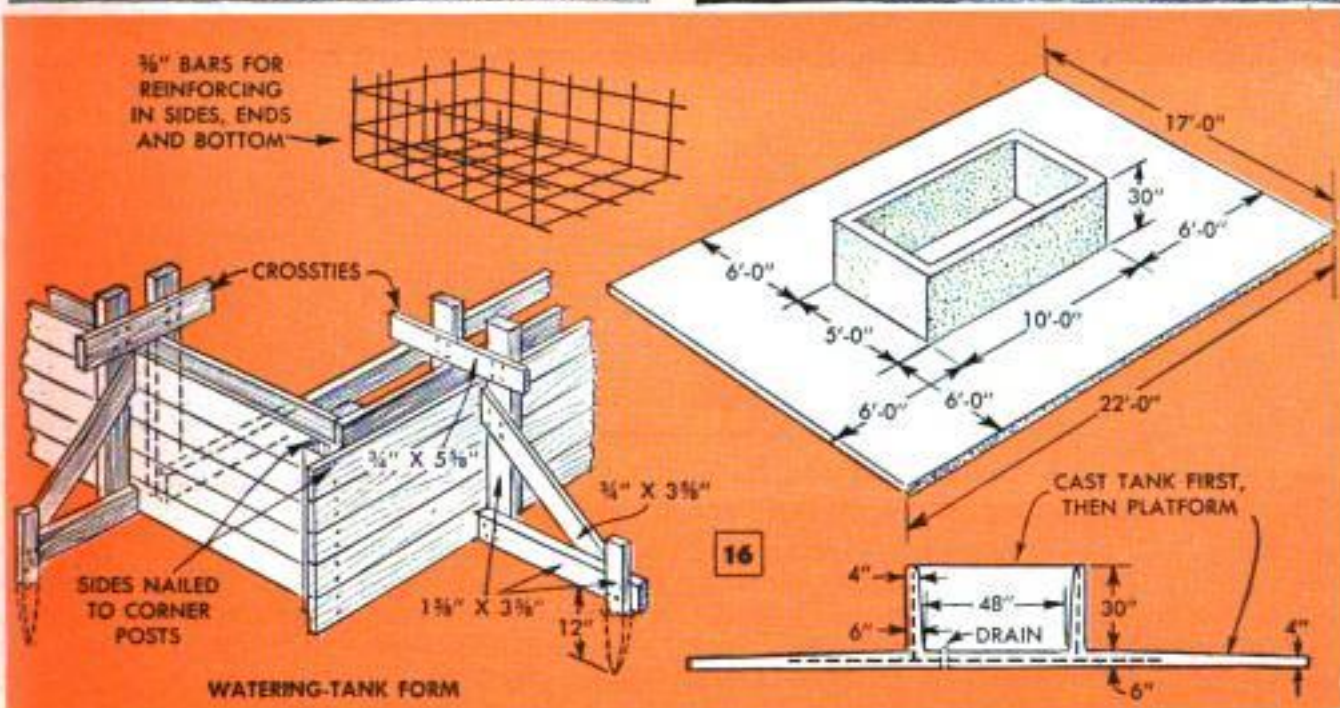
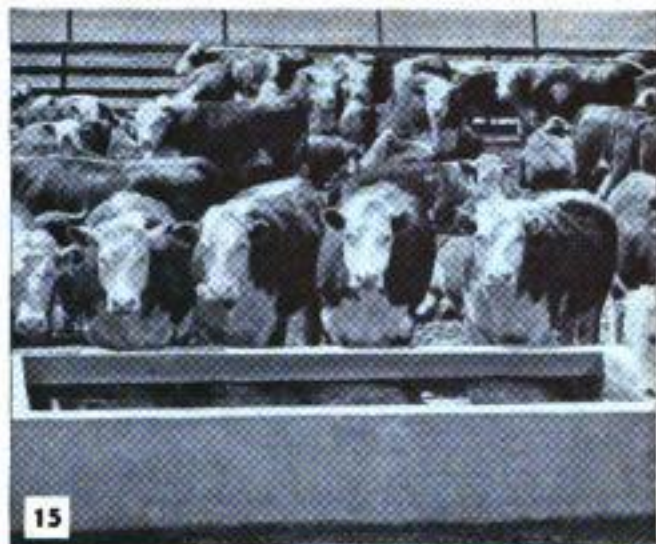
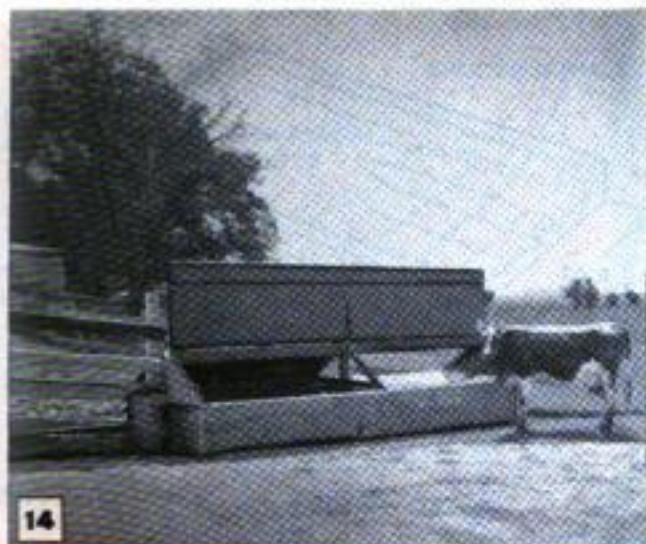


it begins to set and is no longer suitable for use. When the mixture has set sufficiently to resist finger pressure after pouring and finishing, cover with burlap, straw, or earth and keep the covering moist for 7 to 10 days. This curing period assures maximum strength.

Reinforcing: Reinforcing bars come in recommended sizes for every common job, but if such bars are not available you can use wire, small pipe, steel angles and channels. Two layers of welded fence wire make a good reinforcement for small tanks, ramps and floors of small area. Narrow strips of welded fence wire are often used to reinforce fence posts.

Fence posts: Rigid, durable fence posts of reinforced concrete, Figs. 1, 2, 6 and 7, can be cast in lots of 10 with the 10-post form detailed in Fig. 3. If you have the time, it's a good idea to face all parts that contact the cement mix with sheet metal. Otherwise it is necessary to coat all contacting parts with oil to prevent the mixture from sticking. To make ten 7-ft. posts

you will need 1½ sacks of portland cement. Gravel should be screened to ¾ in. or less. Note that the dividers and sides of the form each have two dowels that fit in holes in the bottom of the form to hold them in place. Be sure that you mix enough cement to fill the form completely in one pouring. Two ¼-in. reinforcing bars, 12 in. shorter than the posts, are placed about ¾ in. from the sides of each one when the form has been filled about half full. Or, you can use four lengths of No. 6 wire, one length being placed near each corner as the form is filled. The mixture should be sufficiently plastic to permit working it into full contact with the form. Strike off flush with the top of the form after filling, using a strike board, then trowel the surface smooth. Permit the pouring to harden for 48 hrs. Then loosen the hinged ends and side forms, remove the "green" castings carefully and place in the shade. Cover with burlap or earth and keep moist until fully cured. Posts cast in this way should not be installed until at least 30 days old.



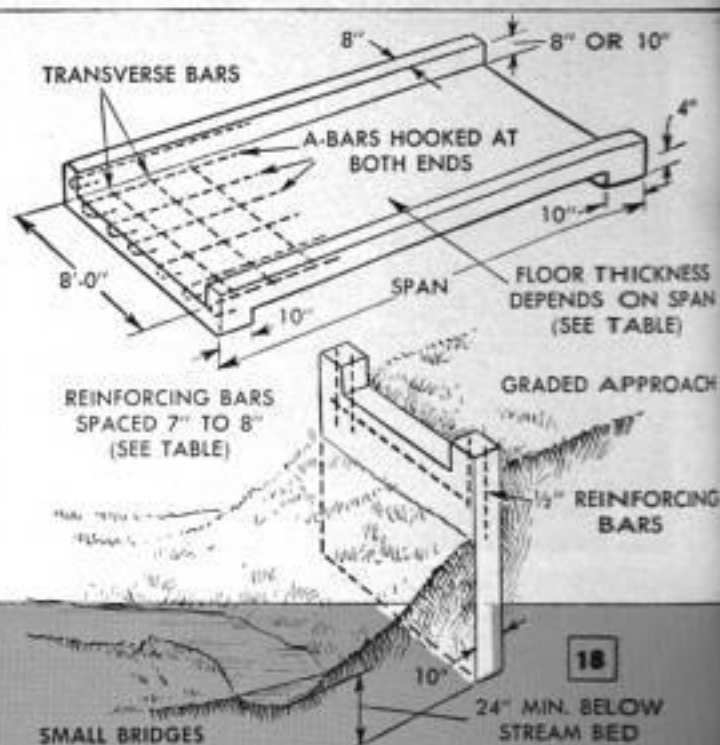
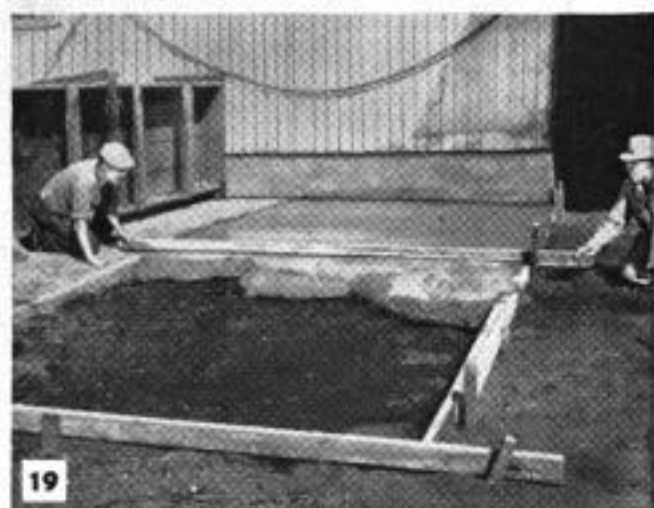
Beads on the bottom of the form shape round-bottom grooves on one side of the posts where the line wires are to be tied. Common spacings are given in Fig. 2 for 3, 4 and 5-wire fencing. Spacing of holes for vineyard posts is given in the right-hand detail, Fig. 2.

End and corner posts must resist much greater strains than line posts. Fig. 5 shows a method of casting a corner post with heavy anchors which extend in two directions to serve as braces. In most soils the excavation for the anchors can be dug with a tile spade, making the earth itself serve as a form below grade. The wooden form needed for that portion of the post which is above ground must be securely braced before pouring the concrete. Standard spacing of line posts is 16½ ft., but some requirements call for spacings of 10 ft. or less. Mailbox posts, Fig. 4, should be anchored in the same manner as corner posts. They can be cast with or without the brace pictured. For permanence, mailbox posts must be reinforced.

Electric-fence posts in permanent locations can be cast with below-grade bases as in Fig. 8. The base is a 12-in. cube of concrete. The wire is tied to porcelain insulators screwed to expansion sleeves cast in the post. Attach the sleeves to a strip with screws and press them into the soft concrete. The spacing indicated in Fig. 8 is quite commonly used.

Clothesline posts, Fig. 9, are cast somewhat heavier as they must extend about 7 ft. above grade. Reinforce the posts and place a block in the form to provide a recess near the top of the post for attachment of the crossarm.

Hotbeds and cold frames: Both should have a southern exposure and preferably should be located in a sheltered area where drainage is good. Use regular hotbed sash and hinge each one to a strip attached to the concrete with screws driven into expansion sleeves, the latter spaced in the same manner as those cast in electric-fence posts. In some cases hotbeds are placed close to a building wall and artificially



Clear span in feet	Thickness of slab in inches	"A" bars required in slab	
		Dia.	Spacing
6	5 1/2	3/8-in.	8 in. o.c.
9	6 1/2	3/8-in.	7 in. o.c.
12	7	3/4-in.	8 in. o.c.
15	8	3/4-in.	7 in. o.c.

All transverse reinforcing bars are 3/8-in. rounds placed 8 in. on centers.

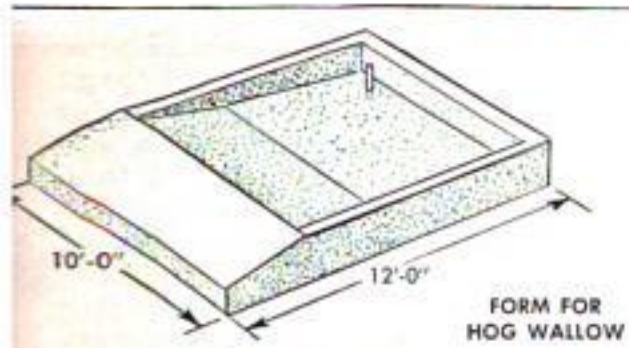
heated by steam or hot water circulating in copper coils embedded in a layer of cinders in the bottom of the bed. A positive means of controlling the temperature must be provided. Electric heating cables, properly installed, also can be used.

Milk-cooling tank: Figs. 12 and 13 picture and detail an insulated milk-cooling tank which can be constructed with a capacity of 4, 6 or 8 milk cans of standard 10-gal. size. To cast the tank, build a form similar to that in Fig. 16 for the inside and that portion of the tank wall above the floor of the milkhouse. Nail small blocks to the inside face of the side forms to cast recesses for the removable crosspieces. When necessary to cut vaporproofed insulation, dip the cut edges in hot asphalt to form a seal against moisture. The rail to which the doors, or lids, are hinged is lag-screwed to the concrete, the lag screws being driven into expansion sleeves cast into one wall. For ease in handling, the doors should be counterweighted. An asphalt seal prevents leaks around the overflow pipe. The latter should be carried below frost level when run outside the milkhouse. Tanks of this type should be used only in locations where approved.

Stock-watering tanks: A clean watering tank is one of the first requirements on a

livestock farm. Figs. 14 and 15 picture typical rectangular stock tanks built of reinforced concrete. After building the form for the walls of the tank, it's a common practice to pour the bottom first, placing the reinforcing bars in position in the sides, ends and bottom. Be prepared to pour the sides before the bottom slab sets in order to obtain a solid bond between the two at the corners. After removing the forms (in two to four days) it's a good practice to plaster the inside with a cement mortar consisting of portland cement, 1 part, and sharp sand, 2 1/2 parts, adding just enough water to produce a plastic mix. Fill any air holes in the outside walls with the mortar. Pour a platform, or ramp, about 6 ft. wide around the tank, troweling to a 2-in. slope. Although not detailed in Fig. 16, some builders provide additional support for the ramp by spacing concrete "caissons" midway between the edge and the wall of the tank. The outer edges are supported on an apron which, in colder climates, extends below frost level. Hinged covers, Fig. 14, help keep the water cooler and also to prevent the entrance of chaff and dust.

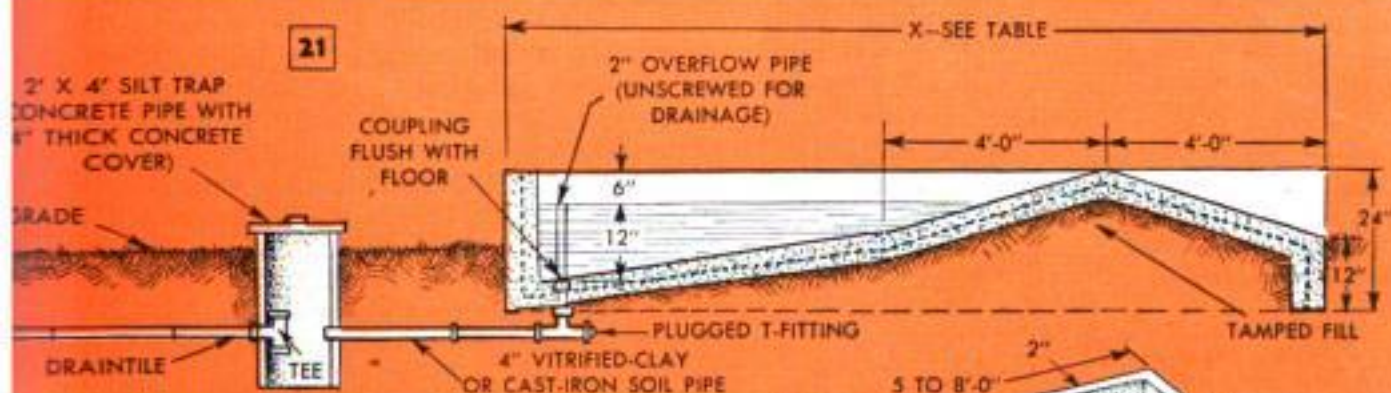
Small bridges: On many farms, bridges over ditches and small streams are time-savers when it is necessary to move equipment from one part of the farm to another.



FORM FOR HOG WALLOW

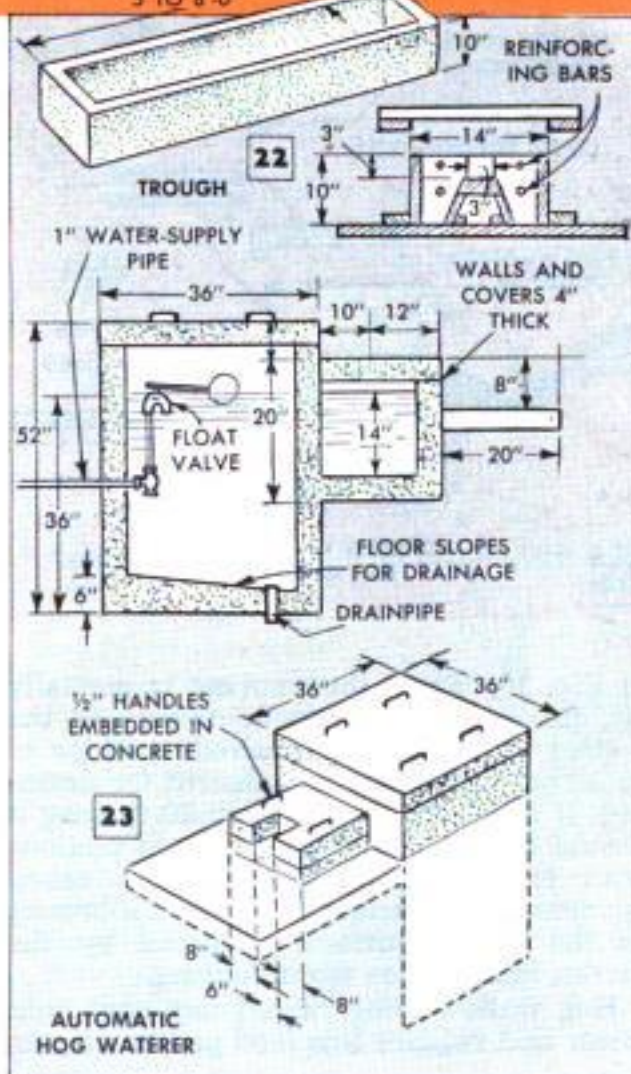
RECOMMENDED SIZES

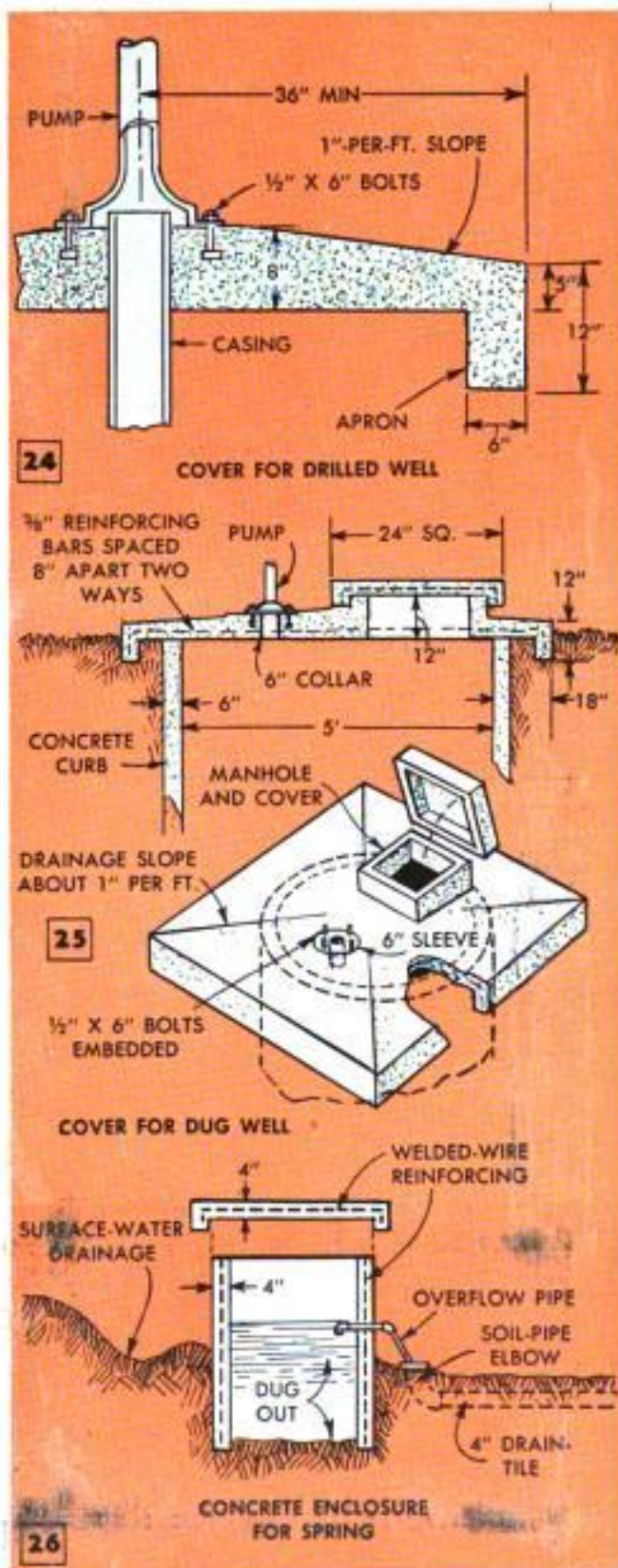
No. of head in herd	Width in feet	Length in feet
15	10	12
25	14	16
50	18	20
75	22	24
100	26	28



For short spans, a reinforced slab laid on buttresses, Fig. 18, will carry the average traffic safely across deep ditches and small streams. Short spans can be cast on level ground with only side and end forms to be built. Such slabs should be cast with end aprons. Longer spans, Fig. 17, must be cast directly on the buttresses and will require the building of a complete form. When the buttresses are poured, set steel rods in the concrete so that the ends project about 3 to 4 in. These will serve to anchor the slab. The size and spacing of reinforcing bars, also the thickness of the slab, will vary with the span. Recommended sizes of bars and thicknesses of the concrete are given in the table, Fig. 18. Buttresses should extend not less than 24 in. below the bed of the stream.

Floors: Few improvements save so much time and labor on the farm as concrete feeding floors, Fig. 19. Pouring a feeding floor is a simple job as you require only side and end forms. First step is to clear away all debris and level the grade. If the floor is to get hard service, or is in an exposed position, it's a good idea to excavate and put in a tamped gravel fill 5 to 6 in. deep. Then set the forms. Usually a form of 2 x 4s gives the right thickness, about 3 5/8 in. Pour the whole floor in one operation and level with a strike board as





in Fig. 19. When the pouring is partially set, finish with a float or trowel to the degree of smoothness desired. A slope of $\frac{1}{4}$ in. per ft. usually is sufficient for drainage. If the floor is more than 20 ft. long it should be poured in two or more sections with expansion joints. In many cases, farmers finish feeding floors with a broom, as the rough surface produced by the broom finish gives surer footing.

Hog wallow: Hog raisers say hogs gain faster and require less feed per lb. of gain

when they have access to a wallow, especially in hot weather. Figs. 20 and 21 give the construction details for small and large sizes. Choose a location near the feed lot and, where possible, near shade. Some builders pour a platform, or ramp, 4 to 6 ft. wide around the wallow. This should include a curb to prevent undermining of the structure.

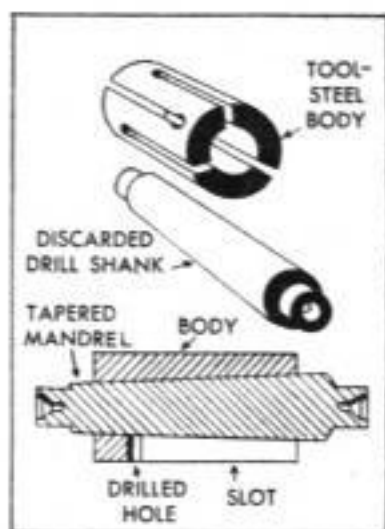
Hog waterers: Where hog waterers can be located permanently, farmers generally use concrete construction. Fig. 23 details an automatic waterer designed to be built with a storage tank below grade, keeping the water cooler in warm weather and helping to prevent freezing in cold weather. The dimensions given are average and can be varied to suit special requirements. When casting the covers, place a thin strip in the form to shape a recess, or rabbet, around the edges. This will prevent the covers from shifting when in place. Shut-off valves usually are located at the source to the supply line so the latter can be drained at the tank to prevent freezing in severely cold weather. In some cases, a trough, Fig. 22, serves the purpose better than a permanent watering tank. Cast the trough in the form, shown in the sectional view, and use at least four reinforcing bars. Use a $1:2\frac{1}{4}:2\frac{1}{2}$ mix for this type of casting.

Well covers: Well water may become contaminated if the well is not adequately protected against the entrance of surface water. Drilled wells, Fig. 24, should be covered with a concrete platform not less than 6 ft. square, the cover to be poured with an integral apron as shown in the sectional view. The purpose of the apron is to prevent seepage and undermining of the platform itself. The well casing should extend $1\frac{1}{2}$ to 3 in. above the surface of the platform and provision must be made for bolting the pump in place. Bolts embedded in the concrete can be protected against rust by coating with a corrosion inhibitor. In most locations a dug well can be given protection against contamination by a concrete curb and cover built as in Fig. 25. The construction is essentially the same as that in Fig. 24, except that the cover is provided with a manhole giving access to the pump cylinder. The platform has a 6-in. sleeve embedded to provide an opening of sufficient size for installing or pulling the pump. The manhole must be provided with a snug-fitting cover. It should be reinforced and cast with an overhanging lip.

Enclosure for spring: Spring pollution can be entirely prevented, or at least minimized, by enclosing the flow in a concrete curbing provided with a cover, Fig. 26. The curbing is set in an excavation. An overflow pipe runs the water into drain tile which carries it to the livestock tank. ★★

Expanding-Plug Holds Center-Bored Work

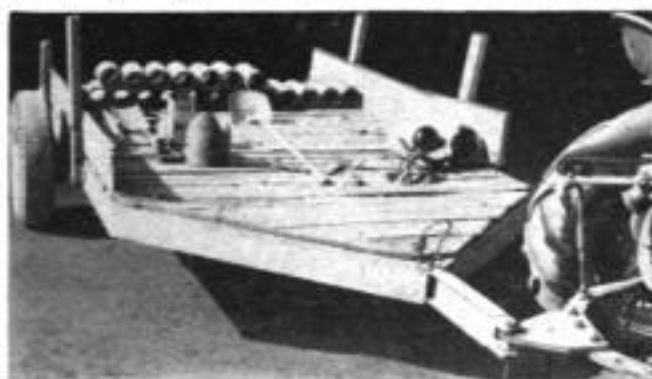
Center-bored work is held firmly for machining in a metal-working lathe using the expanding plug shown in the detail. The shaft of the plug is a No. 2 Morse taper shank cut from a discarded twist drill. The shank is faced off square and a center hole is drilled and countersunk in the end. The original hole in the tang end can be utilized if it is not badly damaged. The tool-steel body of the plug, which has been drilled and taper-reamed to fit the shank, is fitted over the shank and the assembled unit then is mounted in the lathe. The body first is machined to the desired outside diameter, after which three equally spaced holes are drilled close to



each end. A thin slitting saw next is used to make the six alternate slots that permit the body to expand when the taper shank is inserted.—C. W. Woodson, Chicago.

each end. A thin slitting saw next is used to make the six alternate slots that permit the body to expand when the taper shank is inserted.—C. W. Woodson, Chicago.

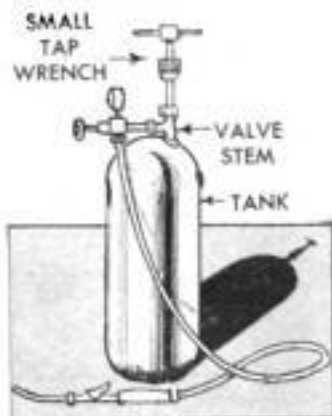
Multipurpose Farm Trailer Transports Heavy Machinery



Originally built wide and low to transport heavy farm machinery, this two-wheeled trailer also is used as a portable workbench when a low work surface is convenient. A specially designed drawbar made from 4-in. steel channel permits the trailer to be tipped up so machinery can be rolled or driven up onto the bed. The frame of the trailer, which is clamped directly to the axle without springs, is a welded assembly of 5-in. steel channels and I-beams. The 7 x 10-ft. bed is floored with planks.

Tap Wrench Used as Valve Handle On Compressed-Gas Tank

A T-handle tap wrench can be used as an effective valve handle on tanks of compressed gas that are fitted only with a projecting valve stem. The wrench can be adjusted to fit snugly on the square shoulder of the valve stem to permit accurate control, and is easily removed and stored in a toolbox. Use of the tap wrench eliminates scored and burred valve stems which result when a pipe wrench is used.



R. M. Woodbury, Natick, Mass.

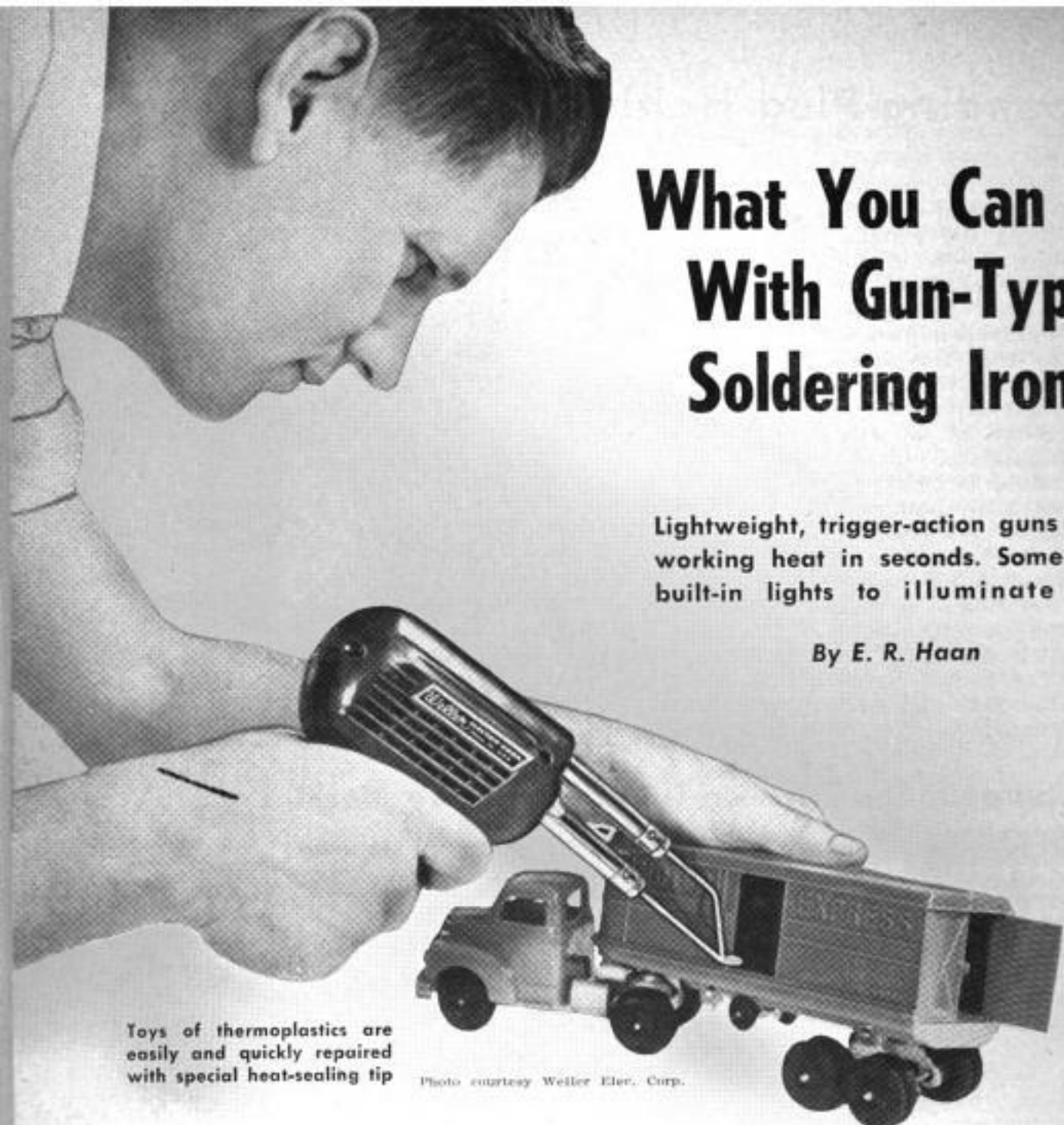
Rule Held for Glass Cutting By Bits of Friction Tape

To hold a ruler or yardstick firmly and with less danger of slipping at a crucial moment during glass cutting, place a number of small tabs of friction tape on the underside of the ruler before putting it in position. Even with the cutter pressing against the ruler, there is little likelihood of its slipping.

What You Can Do With Gun-Type Soldering Irons

Lightweight, trigger-action guns reach working heat in seconds. Some have built-in lights to illuminate work

By E. R. Haan



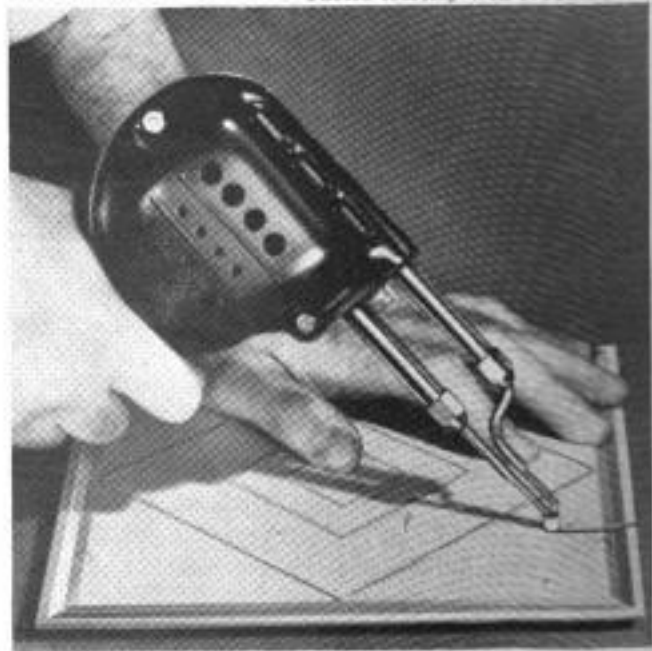
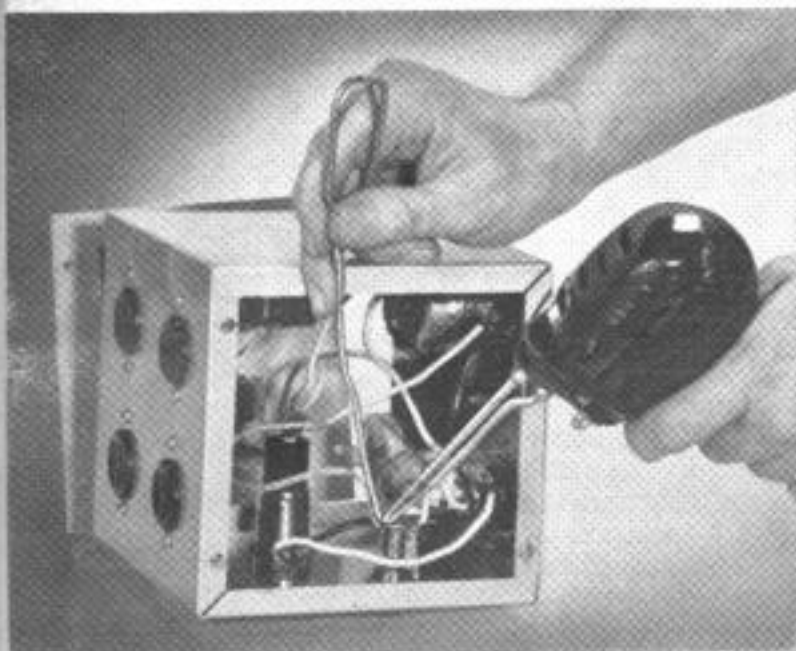
Toys of thermoplastics are easily and quickly repaired with special heat-sealing tip

Photo courtesy Weller Elec. Corp.

Small size of gun tips makes it easy to reach places inaccessible to conventional-type soldering irons

Gun fitted with cutting tip is the thing for cutting plastic tile. Just invert tile and follow mark

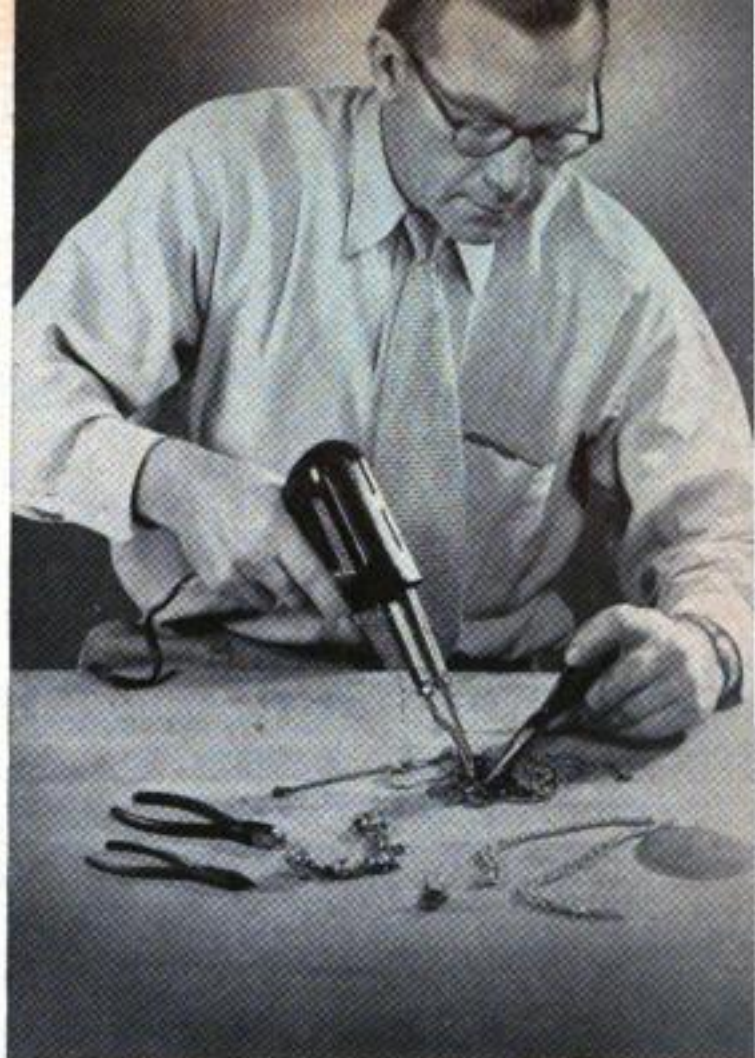
Photos courtesy Wen Products, Inc.



BALANCED on a positive pistol-grip handle, the new trigger-action soldering guns can be worked in almost any position safely and economically. The tips heat to working temperature in a few seconds, eliminating the necessity of holding the conventional iron in position until the heat transfers. The small tips of the guns can be worked effectively in restricted areas inaccessible to conventional irons. When not in use the gun is automatically turned off on release of the trigger, thus reducing current consumption to the minimum. The tips cool quickly, reducing the fire hazard when the gun is laid on a bench or stored in the toolkit. Trigger-type guns such as those pictured are available in different sizes (rated according to wattage) for light, medium and heavy-duty work.

Trigger guns are of two types, one having a built-in transformer, the other a resistance-wire winding controlled by a thermostatic element. The transformer-type gun works only on a.c. The resistance-type gun works on either a.c. or d.c. For good results it is necessary to use a gun of adequate size for the work, especially when it is necessary to heat metal rapidly, as in sweat-soldering long joints in flat work. Some guns have two-heat switches, the maximum being obtained by pulling the trigger all the way in. This is an advantage on heavy work, or where it is necessary to heat metals of the heavier gauges in seam soldering. The guns are especially fast and effective on electrical work, as the pistol grips give positive control when working in a confined area.

Due to the variety of tips available, the guns have many other practical uses around the home. For example, homeowners who install plastic tile themselves use the guns for cutting individual tiles when fitting around sinks and bathroom fixtures. There's a special knife-edged tip made for the purpose. Merely install the tip in the gun and invert the tile on a flat surface. Mark the cut on the back of the tile and then proceed as in the lower left-hand photo on the opposite page. The hot tip makes a clean, sharp-edged cut that fits snugly against square, mitered or curved edges. The trick is to keep the cutting tip moving uniformly across the work under a light, steady pressure. The knife-edged tip is also useful for softening hardened putty as in the center photo on the following page. Use of the gun with cutting tip eliminates the necessity of loosening old putty with a chisel, with the attendant possibility of the chisel slipping and damaging the sash frame. Running the knife-edged tip slowly along the joint where the putty joins the wood will cause the former to peel cleanly from the wood.



If you've ever tried to repair jewelry with a soldering iron you'll appreciate the speed of the gun

Note the comfortable, natural position of the hand on the pistol grip. Gives perfect control at the tip



Photo courtesy Garden City Industries, Inc.



Accessory tips are supplied for instant-heat guns. Pad-type is used for sealing plastic containers



Cutting tip also is useful for softening hardened putty. Removes putty quickly without damaging wood

Here's a gun in use with a pad tip. Works perfectly for sealing plastic containers of the type pictured



The smoothing tip quickly seals home-freezer packages of the thermoplastic type as shown in the lower left-hand photo. The tip used for this purpose terminates in a flat pad as in the upper photo at the left. The shape of the tip makes it simple to apply heat just where it is needed to effect a complete seal of freezer packages. The method works equally well for sealing breaks in the seams of thermoplastic galoshes, raincoats, shower curtains and other items made of the same material. The tip also can be used for melting sealing wax, or stick shellac when repairing furniture. Still another use is in the repair of plastic toys, an example of this application being pictured in the upper photo on page 198. A similar tip pictured in the right-hand photo below consists of a flat pad designed especially for raising dents when repairing furniture. Just apply a drop or two of water in the dent, spread a damp cloth over it and apply the iron tip directly over the dent. Steam is generated almost instantly, causing the wood fibers to swell, restoring the depressed surface to the original level. On very deep dents it may be necessary to repeat the operation. This type of tip also can be used to heat-seal plastic containers and wearing apparel and melt stick shellac. When heat-sealing containers and seams, it's a good idea to place a thickness of heavy paper over the area to be heat-sealed. The paper prevents any tendency of the tip to stick to the plastic.

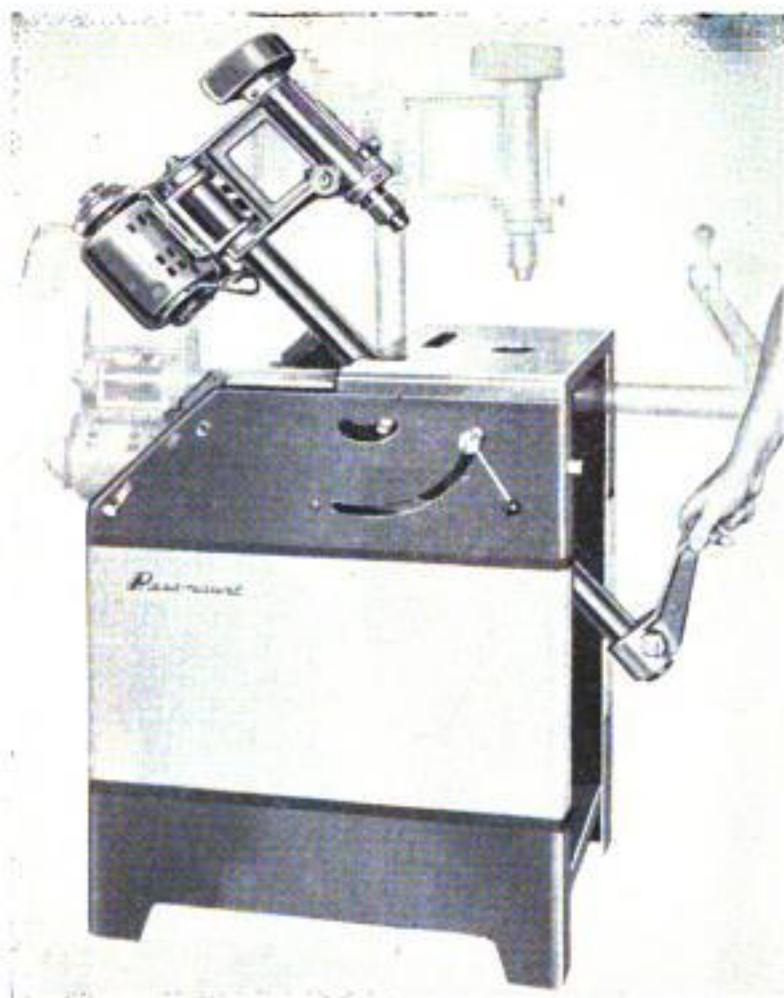
When soldering with any gun-type iron it is essential to follow good soldering practice. Metal surfaces must be thoroughly cleaned and properly fluxed. Keep the soldering tip fully tinned by first cleaning and fluxing and then coating with solder while hot. Joints in flat work should be tinned and then joined by sweating. When possible, all other types of joints should be preheated, then soldered. In this way you get a thin film of solder between the joining thicknesses of metal. ★ ★ ★



Tip for repairing dents in finished surfaces is interchangeable with regular soldering tip. Also seals wax-paper packages and plastics



Above, drilling at an angle without blocking the work is an exclusive feature. Below, "chop sawing" short stock is fast and safe

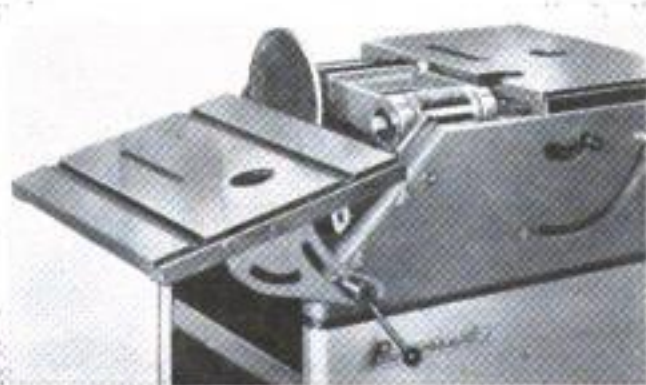


Above, right, multipurpose tool is five machines on steel floor stand. Change-overs are made in seconds

POWER WORKSHOP HAS NEW FEATURES

THIS PARAMOUNT multitool unit performs operations of five separate power machines. It changes from one tool to another in seconds due to an exclusive new design in which spindle and motor are mounted on a tilting boom. Unit has such features as a machined table without inserts, 360-deg. radial drill and novel hidden saw which retracts below table on completion of cut. Saw table tilts 45 deg. for sawing and disk-sanding. Spindle and motor swivel to any desired position, horizontally or vertically, for drilling and drum-sanding operations. Lathe tailstock serves as handle when tilting the boom for critical adjustment of blade or dado height when grooving and also for lifting the circular blade through the table slot when "chop sawing."

Right, another exclusive—sanding drum drops into hole in table, utilizing full length of sleeve. Below, lathe and sander are quickly set up



SHOPPING FOR



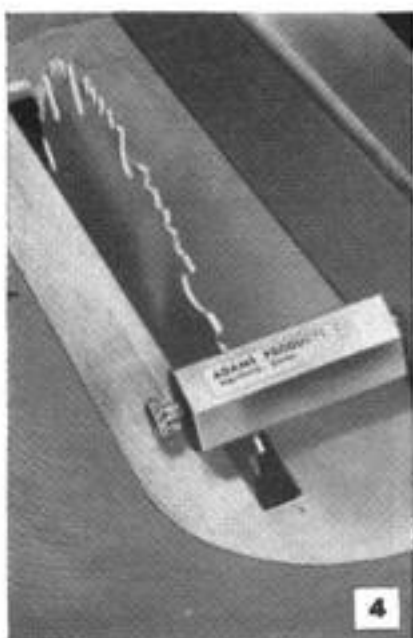
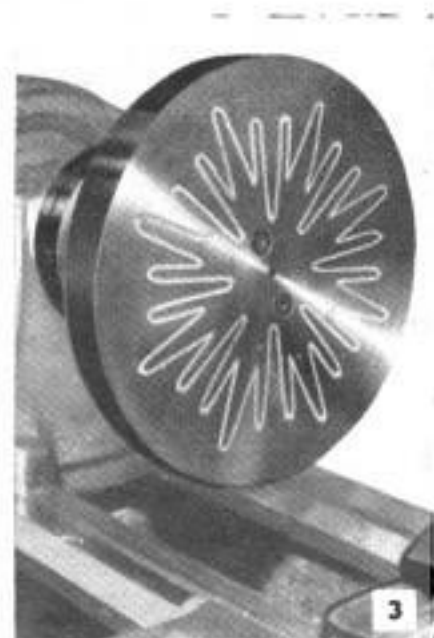
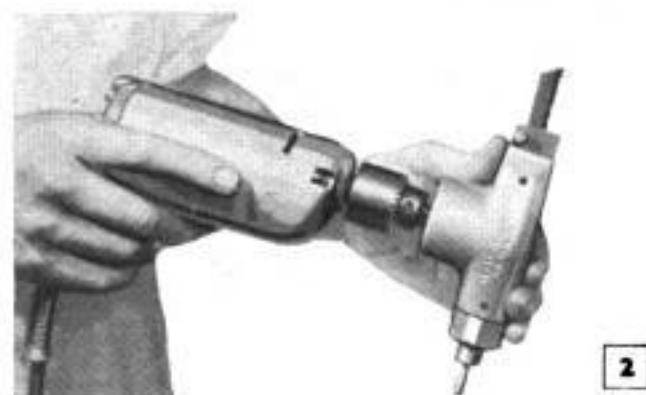
1. NAILING MACHINE speeds up correct nailing of hardwood flooring. Shortens distance the user must stoop in order to drive nails. Reduces the fatigue of the job many builders regard as the most tiring of any in the home-building industry. After driving one nail by striking the plunger of the tool with a special rawhide mallet, another nail drops automatically into place. Nail is driven and set in one operation
Independent Nail and Packing Co., Bridgewater, Mass.

2. ACCESSORY SAW for 1/4-in. electric drills doubles as a nibbler for cutting openings in sheet metal. Also cuts wood and plastics, using interchangeable blades. Moving parts are mounted on ball and needle bearings designed for hard service. There are no gears in housing. Drive to cutting tool is through crank and connecting rod. Wear parts are hardened steel
Little Beaver Industries, 38809 Mentor Ave., Willoughby, Ohio

3. MAGNETIC LATHE CHUCK comes in 10 and 12-in. dias. and has a magnet pattern consisting of 48 radial magnetic gripping edges. Magnet pattern assures a much stronger and more uniform gripping action on certain types of work which are difficult to hold. Operates on 6-volt d.c. and is controlled by a special panel-mounted switch in power-supply line
Magnetic Holding Devices, 2034 E. 22nd St., Cleveland 15, Ohio

4. FENCE-ALIGNMENT GAUGE quickly corrects fence alignment on circular-saw tables. Gauge is clamped to the blade in the position pictured and ripping fence brought up until it touches the contact button on end of gauge opposite the clamping screw. Then blade is rotated backward until it again rests on the machine table. If gauge binds, fence is out of true
Adams Products Co., 119 Ann St., Hartford 3, Conn.

5. COMBINATION HAMMER AND WRENCH has a wide application around the home, shop and on the farm. A hammer poll and short neck are forged on stationary jaw and there's a nail puller and case opener on outer end of handle. Movable jaw is spring-loaded and slides into position for instant grip on nuts of various sizes. Jaw has fine-screw setting
G. M. Co., Manufacturing, Inc., 13-08 43rd Ave., Long Island City, N. Y.



TOOLS

6. MITER FOR COMPOUND ANGLES is fitted with two powerful magnets that hold the saw blade tightly against the single guide face. Guide tilts 45 deg. in two directions, making it possible to cut compound miters up to 45 deg., or any angle between. Magnets are placed at each end of guide to prevent whipping of blade and thereby assure a straight precision cut

Bay City Foundry, 133 N. Avalon Blvd., Wilmington, Calif.

7. CIRCULAR-SAW VISE takes all blades in the common sizes. Holds blade rigidly in filing position, thus eliminating one of the principal objections to filing circular blades by hand, that of vibration of the blade under the file strokes. This special feature is due to the wide, curved sweep of the clamping jaw which grips blade tightly over a wide area

Anton L. Ponsetti, 309 W. Dakota St., Spring Valley, Ill.

8. HAMMER-OPERATED PUNCH PRESS cuts clean, accurate shapes in sheet metals up to 14-ga. Openings up to 1¼-in. dia. are easily punched by placing material over die, lowering the ram and then striking lightly with a hammer. Details at the left of the photo show the variety of work that can be done. Press can be bolted to bench top in handy position

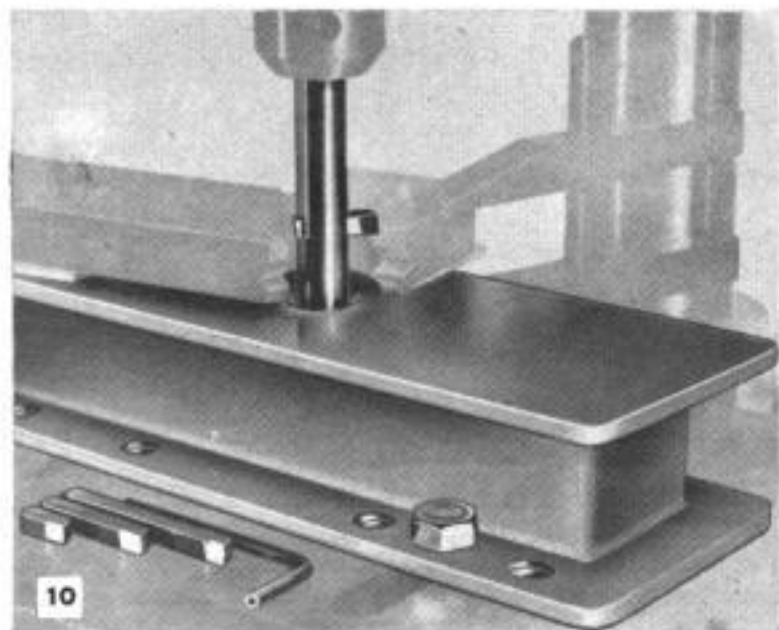
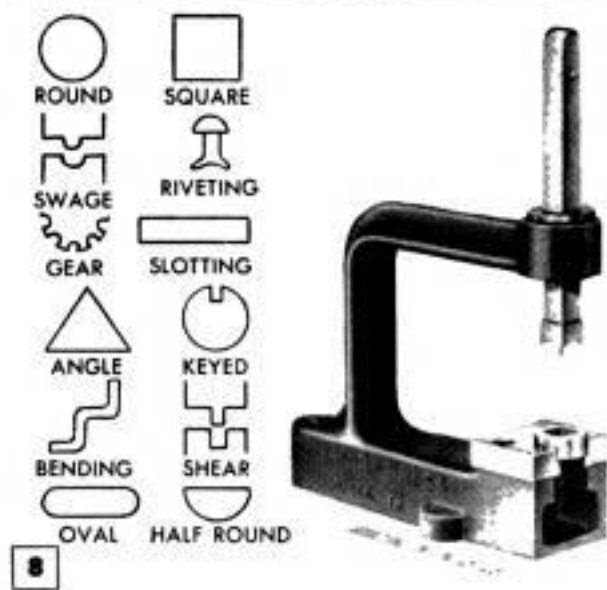
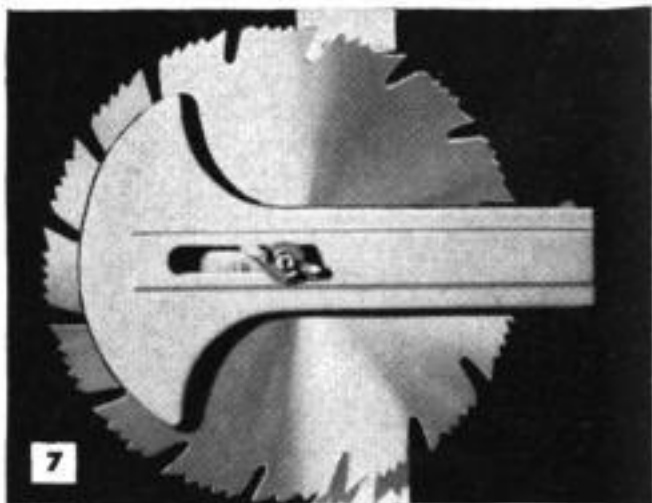
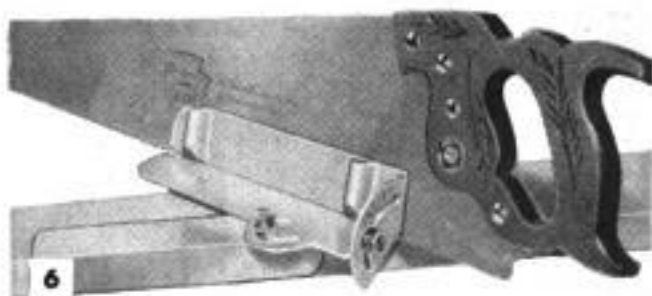
Chase Manufacturing Co., Los Angeles 6, Calif.

9. PAINT SCRAPER is especially designed for removing paint smears from glass panes. Tool is fitted with a scraper blade held in a vertical position at the forward end of the holder, which also serves as a handle. Flat, sliding base supports the blade at the same height and prevents tilting. Removes paint from the glass without damaging the edges of the putty

Leyton Enterprises, Box 17234, Foy Station, Los Angeles 17, Calif.

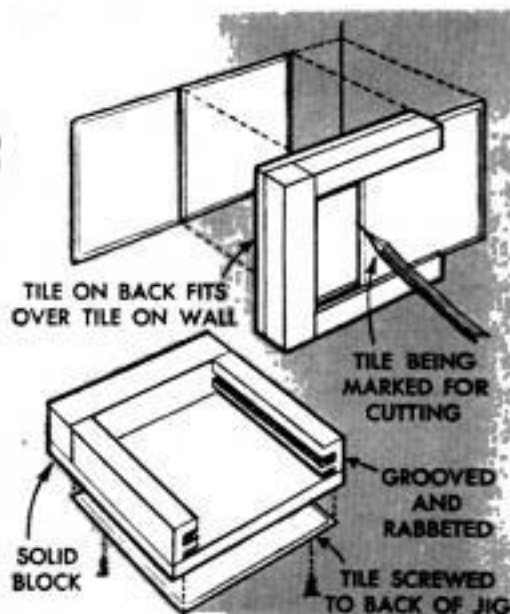
10. PRECISION BORING FIXTURE for drill press is designed for industrial and home-shop use. Consists of boring bar and fly cutter and an auxiliary worktable with a working surface of 3½ x 8¼ in. Extended edges of the table permit rapid clamping of work. Holes in worktable base register with slots in any drill-press table. Bores holes from ½ to 2½-in. dia.

Donnell Co., P. O. Box 84, St. Joseph, Mich.



Jig for Marking Plastic and Metal-Backed Tile

By minimizing the chance of improperly cutting plastic or metal tile to fit in corners, the simple jig illustrated lessens the time and labor involved and saves the cost of spoiled tiles. The jig consists of a piece of plywood to which a tile is fastened with its back side out. On the opposite side of the plywood two strips are fastened. The strips are grooved and rabbeted, as shown in the detail, to hold two tiles in alignment with the tile on the back of the jig. In use, the tile on the back is placed

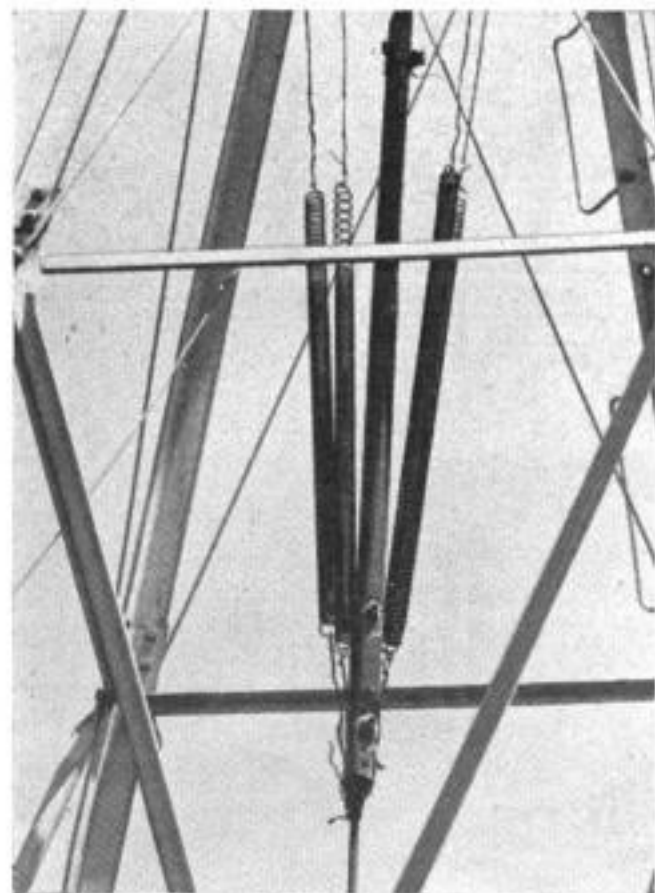


over the last tile on one wall. The outside tile in the jig then is moved until it touches the adjacent wall and the underneath tile is marked for cutting. Plastic tile can be scored and broken, while metal-backed tile

requires sawing or cutting with metal snips. Most hardware stores rent tile cutters, either the lever type or the small electric circular-saw type now on the market.

W. G. Waggoner, Sacramento, Calif.

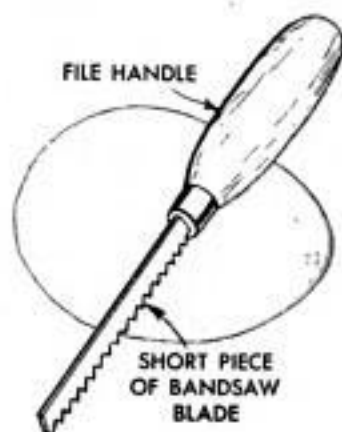
Helper Springs on Windmill Permit Easier Starting



A windmill will start with much less wind when the pump shaft is fitted with helper springs to offset the weight of the shaft, pump rod and column of water in the pump. Because it usually stops at the bottom of a stroke, an ordinary windmill requires a maximum of power to start again. However, since the gate springs shown on the windmill in the photo are under tension at the bottom of the stroke, the mill will start with about one third of the wind usually needed.

Piece of Bandsaw Blade Used as Keyhole Saw

A short piece of a broken bandsaw blade, when fitted with a handle as shown, makes a very handy keyhole and hobby saw. A detachable file handle that features a setscrew to hold the file in place is most convenient, although any wooden handle could be used if a small hole were drilled through the blade and handle, and a pin driven through it.



When a can of antifreeze or other similar liquid is opened for pouring by punching two holes in the top, the unused portion can be sealed airtight by using two lumps of modeling clay.

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How filters can improve your pictures



Filters are to photography something like the finish you add to a piece of furniture. The bench or table you make will serve perfectly well without the finish. But with it, its beauty is greatly enhanced. And so it is with your pictures. Film does a fine job—filters help it do an even better one.

What is a filter and what does it do?

Basically, it's a piece of scientifically tinted gelatin or glass placed over the camera lens. When photographing a scene on black-and-white film, objects in the scene, though

colored to your eye, will come out in the finished print in many shades between black and white. These shades will come out more accurately, properly light or dark, with the assistance of the proper filter.

Notice how the use of a filter has improved the picture above, bringing out clouds and other detail in dramatic contrast. Made without a filter it would have appeared as in the smaller illustration.

In other words, filters make good photographs *better*. They put *you* in command, so to speak, of every picture you make,

and enable you to emphasize important details which otherwise might not appear.

What filters to select? While there are hundreds to choose from, a few will cover nearly all normal black-and-white picture-taking needs. In the table below are listed the Kodak filters that make a practical kit—together with the primary uses of each. You can buy inexpensive all-glass filters, such as the new Kodak Pictorial Filters, or for finest picture results, the professional-quality, gelatin-in-optical-glass Kodak Wratten Filters.

There are some very useful Wratten filters for color photography, too. One is the

Kodak Skylight Filter (from \$1.75) which is used for outdoor Kodachrome shots on hazy or overcast days, and in open shade to reduce excess bluish light for a warmer, more pleasing result. Others are the Daylight Filter (No. 85) which adapts indoor Kodachrome Type A Film for outdoor use (from \$1.75), and the Flash Filter (No. 81C) which adds warmth to indoor Kodachrome Type A shots taken with Class M bulbs (from \$1.75).

For more detailed information on color filters and their uses, ask your Kodak dealer for the Kodak Data Book, "Filters and Pola-Screens." (\$.35)

KODAK FILTER GUIDE FOR BLACK-AND-WHITE FILMS

FILTER	SUBJECT	EFFECT DESIRED
Kodak K2 Wratten or Kodak Yellow Pictorial (with Verichrome or any panchromatic film like Plus-X)	Clouds against blue sky Object or figure against blue sky Distant landscapes	Clouds emphasized, sky darkened Normal contrast between object or figure and sky Slight haze reduction
Kodak X1 Wratten or Kodak Green Pictorial (with panchromatic films only)	Foliage Portrait of person Clouds against sky	Lighter Natural skin tones Clouds emphasized, sky darkened slightly
Kodak Wratten A or Kodak Red Pictorial (with panchromatic films only)	Object or figures against sky Distant landscapes	Sky greatly darkened for dramatic contrast Reduces atmospheric haze



Kodak Adapter Ring—Slips over camera lens, holds any filter of same Series size. Comes in Series IV to IX sizes. From \$1.35.



Kodak Wratten Filters in "B" Glass—In a wide range of colors for a variety of subjects. Series IV to IX sizes. From \$1.75.



Kodak Pictorial Filters—Available in Yellow, Green, and Red in Series IV, V, VI sizes. From \$1.50.

Prices are subject to change without notice

Eastman Kodak Company
Rochester 4, N. Y.

Kodak
TRADE MARK

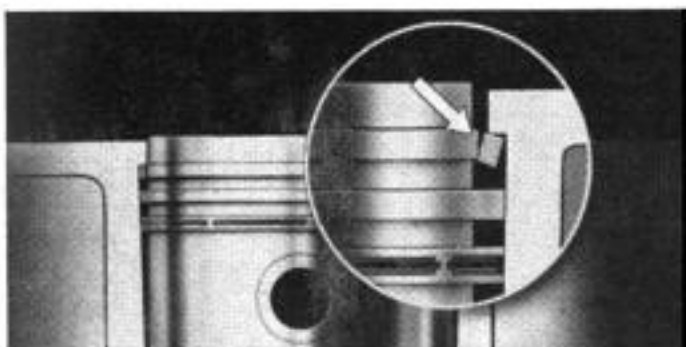
Care and Feeding of Engines



BY
S. P. CORP

GET RID OF THAT RING RIDGE!

When you are about to install new rings, remember: Before you take piston and rings from a cylinder, *remove the ring ridge* to avoid trouble! This is the ridge, or rounded shoulder, which has formed at the top of ring travel in the cylinder. It's almost impossible to force a piston assembly out of the cylinder while the ridge is there—and even if you succeed, you are inviting damage to the lands of the piston. If the ridge is not removed the edge of the new top ring will strike the ring ridge, damaging both the new ring and the piston.



RING BROKEN DUE TO RIDGE

Use a good ring ridge cutting tool to remove the ridge. First, put the piston at the bottom of its stroke and cover it with a clean rag coated with oil. Then set the cutting tool so it will cut into the top of the ring travel not more than $1/32$ ". This will insure a smooth wall surface for the new compression ring.

Whenever new rings are installed, idling speed of engine should be increased so that there is ample oil pressure to lubricate the new rings until they have seated. If possible, driving speed of engine should be increased to, but not over, 50 mph for the first 200 miles. This assists in seating rings and insures good lubrication.

WRITE FOR NEW FREE MANUAL

Sealed Power has prepared a new 24-page illustrated booklet, "Care and Feeding of Engines," with carefully indexed articles on everything from automatic chokes to windshield wipers. It's yours for the asking, and a postal card will bring your copy by return mail. When you re-ring, use Sealed Power KromeX Ring Sets—with "chrome where it counts," to fight friction, corrosion, abrasion, and heat in modern engines. For power, economy, and long, long, ring life, be sure you get KromeX! Sealed Power Corporation, Dept. G-8, Muskegon, Mich.



Sealed Power

PISTON RINGS

Clinic for Homemakers



As a service to our readers in solving the hundreds of problems pertaining to a home—inside or out—the editors of *Popular Mechanics* invite you to present your problems to The Clinic Editor for help and advice. Address your questions to The Clinic Editor, *Popular Mechanics Magazine*, 200 East Ontario Street, Chicago 11, Ill.



Heating Basement

Q—I replaced my hand-fired furnace last year with a new gas-fired unit. During the winter my basement was cold. With the old furnace going it was always comfortably warm. What can I do about it?

—C. E., Ind.

A—Modern heating plants are designed to put the heat upstairs. Only a very small percentage of the total output escapes to the basement by radiation. About the only source is the vent pipe from the burner to the chimney. If this is short then the heat loss to the basement area is insufficient to raise the temperature of the room appreciably. However, we would hesitate to recommend that you install extra ducts to direct heat into the basement, as this would add considerably to the heating load. The additional load would not only raise fuel costs, but might result in unsatisfactory operation of the heating unit during severely cold weather, as the total heat requirement might be increased to a point above the maximum output of the furnace. Perhaps you would find that a single duct taken off the warm-air plenum would divert sufficient heat to "temper" the basement without greatly affecting the satisfactory operation of the furnace. This duct should be fitted with a means of regulating the amount of heat which is diverted to the basement.



Siding Shrinkage

Q—Although the siding on my new home was primed before application, shrinkage of the boards has opened the joints. The shrinkage is uneven, leaving cracks, or openings, which vary in width. What remedy is there, other than replacing the siding?—O. N., Ga.

A—We would not consider replacing the siding, at least at the present time. It can be suspected that the shrinkage which is causing the defect you describe is due not only to shrinkage of the siding boards, but to the framing members as well. This will stabilize at some point, after which a more or less permanent repair can be made. Little if any harm will result from waiting until stabilization of the framing and siding takes place. Then you have at least two choices as to the method of repair. One is to fill the openings at the ends of the boards with a calking compound, using a gun with a $1/8$ or $1/4$ -in. tip. Care must be taken to fill

(Continued to page 210)

DURATITE



with these 2 fine surfacers
you can fill any imperfection
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Want a nice "Satin" finish on your suede shoes? After you've cleaned them thoroughly, try buffing with a strip of Extra Fine Emery Cloth by CARBORUNDUM... makes worn and crushed spots in the nap look like new again.

Drippy paint cans are annoying, especially when you want to move them. Next time you're painting indoors, try this: tape a large paper plate to the bottom of your can of paint. This not only keeps drippings off the floor, but provides a wide non-tipping base... lets you slide the can across the floor with one hand. Best tape for the job, of course, is FLEXBAC® Masking Tape by CARBORUNDUM. Be sure to keep a couple of rolls around the house for all sorts of handy jobs. Always sticks to any surface... peels off easily, too!

Make a hit with your wife by showing her the easy way to cut small patterns out of thin cloth. Just give her a few sheets of CARBORUNDUM's Medium Flint Paper and tell her to trace the designs or shapes on the paper back. By placing the grit side of the sheet against the material, to keep it from slipping, she can cut accurately along the pencil lines, right through paper and cloth. A real time-saver for housewives who make patchwork quilts... won't hurt the shears, either!

Neat way to store drills so you can select the one you want in a hurry: roll a strip of corrugated cardboard into a tight circle and fit it into an empty tin can (a coffee can is perfect). Then place your drills between each layer of cardboard — using the corrugations as slots to hold them upright.

Tighten loose handles on picks or axes in a jiffy. Just fold a strip of Coarse Emery Cloth by CARBORUNDUM — so there's emery on both sides — and wrap it around end of handle. Then drive the handle back into place, for a tight, permanent fit.

Do you have any short-cut ideas that save time or work around the house and workshop? Send 'em to me — each on a separate postcard. I'll pay you \$5.00 right away for each one I can use in later columns. If I can't use 'em (because of duplicates, etc.), I'll send you a worthwhile little gift anyway.

For a free folder called "How to sand" which The Carborundum folks have printed, address a postcard to me...



"Handy" SANDY
CARBORUNDUM

REGISTERED TRADE MARK

Niagara Falls, New York

(Continued from page 208)

the openings flush with the surface, as otherwise an unsightly seam will result. The other method, one sometimes used by builders, is to square the ends of the siding boards with a portable electric saw. They do this by snapping a chalk line across the ends of the boards, then setting the saw to a depth that permits the blade to cut through the siding only. In some cases it is an advantage to tack a straightedge to the wall to serve as a guide for the saw. After the ends have been squared by removing only a fraction of an inch from each one in this manner, the original trim boards are replaced by new ones ripped to a snug fit against the ends of the siding boards. Although it takes somewhat longer to accomplish, this is the recommended repair.

Woodenware Finish

Q—I have just finished turning a salad set from hardwood and now I'm wondering how to finish the pieces. I've been told that linseed oil is the proper finishing material. Also, I understand that there is a special lacquer made for this purpose which is designed to bring out the graining of the wood and to withstand repeated washing. Which finish should I use for best results?—R. W., Tex.



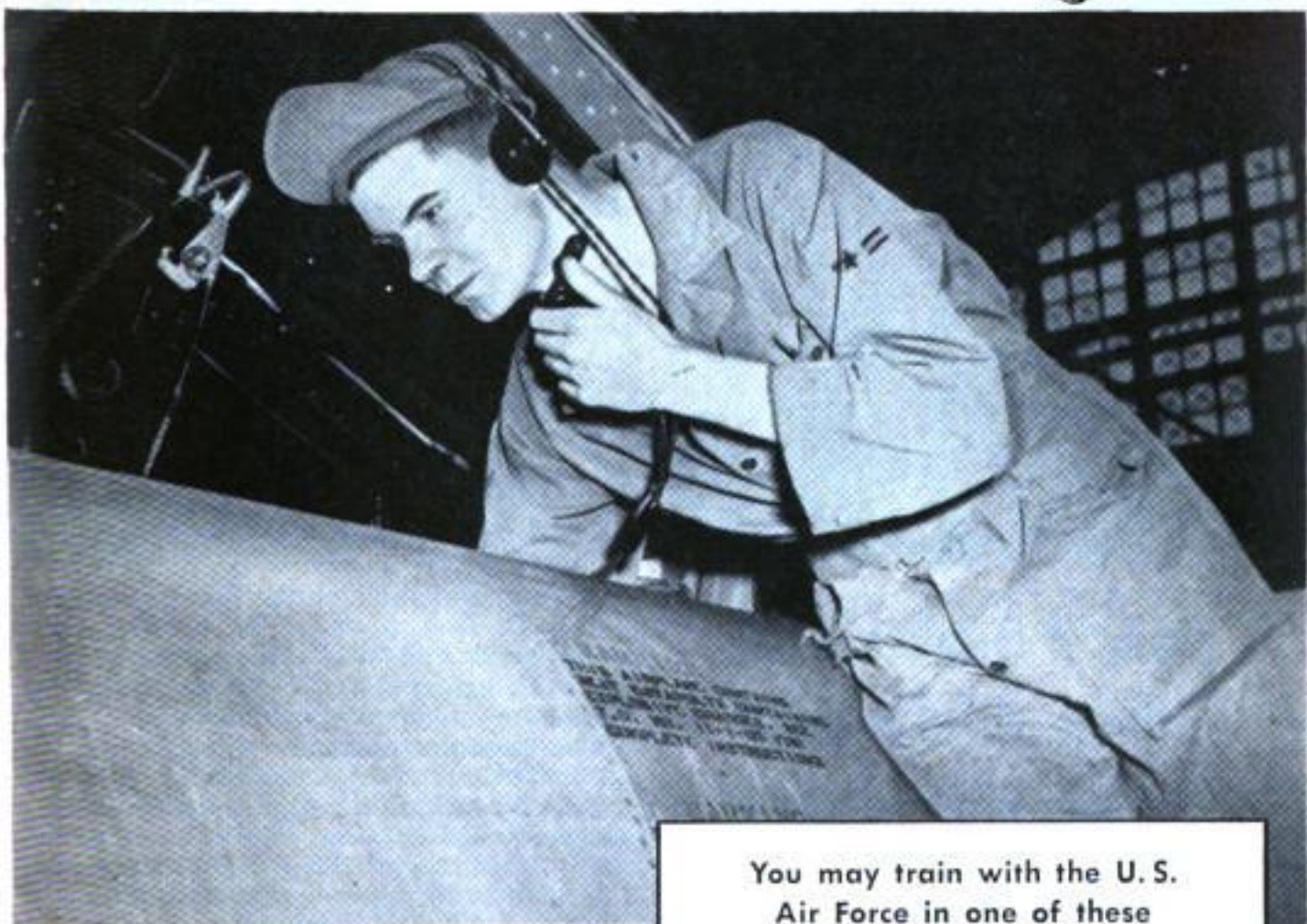
A—We would not use ordinary linseed oil, as its purity cannot always be relied on. There are, as you say, lacquers made for the purpose. However, we would suggest that you consider using pure olive oil as a finishing material. You did not say what kind of hardwood you used for the turnings, but olive oil can be used as a finish on most common hardwoods. It absorbs readily, even in close-grained woods such as maple and, with repeated applications, builds a deep finish of exceptional durability. Simply apply with a soft cloth, allow the coating to absorb, and then wipe off the excess oil on the surface. Allow to dry overnight, then apply a second coat.

Blond Finish with Paint

Q—I have an old-style chest of drawers which I think is made of oak, at least the graining of the wood appears to be that of oak. The finish is dark colored and is in rather poor condition, although the chest itself is still good. I'd like to remove the old finish and re-do the piece in the new blond finish, but I don't know how to apply blond finishes of the type I see on modern furniture built of oak and other woods. How is it done?—M.L., N.H.

A—The degree of success you have in applying a blond finish to an old chest such as the one you describe depends more or less on the quality of the surface you are able to produce by scraping and sanding after the old finish has been removed. If you are sure that the wood is genuine oak (some old pieces were made of chestnut and ash, and some were combinations of several woods) the first step is to apply a varnish remover. Scrape off the softened varnish and as much of the stain underneath as possible. Cut off the remaining stain with a cabinet scraper. This will remove most of the filler and any discolorations and give you bare wood to start with. Then do a thorough job of sanding. A simple method of attaining a fairly attractive job is to apply a coat of oil-base paint or semigloss enamel in an ivory color, or if you like the coloring a little richer, use a cream color. Before the paint sets, rub off the excess with a soft cloth until the grain and character of the wood show through the coating. It may be necessary to continue the application-and-rubbing sequence until you get precisely the shade you want. The base pigment in the paint will act as a filler and the coloring pigment as a stain. When you have the right color, allow the coating to dry for several days. Then sand very lightly with fine paper and finish with a coat or two of pale varnish. There are other methods, of course but the procedure outlined is one of the simplest.

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Smoke-Eating Catalyst

(Continued from page 133)

a metallic air-filter mat and is made of high-resistance wire covered with platinum and palladium derivatives. It is designed to facilitate contact with as much of the fumes as possible without retarding the flow too much.

Hydrocarbons from the fumes unite with oxygen and "burn" without flame on the surface of the catalyst. The combustion heats the outflowing air. The higher the potential energy content of the fume-air mixture, the greater is the temperature rise.

An energy equivalent of 1 B.T.U. per cubic foot at 500 degrees Fahrenheit results in a catalyst-discharge temperature of about 600 degrees Fahrenheit. Energy concentrations of 5 B.T.U. per cubic foot or more, however, are encountered in fumes. The temperature rises as high as 1200 degrees and brings the catalyst element to a red glow.

The fumes are passed through the catalyst at around 500 degrees Fahrenheit to achieve the desired result. Grease on an axle doesn't do any pulling. Just so with the catalyst. The filter element doesn't enter the reaction—it just speeds it along at lower temperatures.

Norbert Ruff became the firm's sole employee in Detroit while his brother and Suter worked at other jobs. In 1948 he began building a test model with the research engineer of a chemical company.

The chemical company was faced with extinction if it couldn't control fumes from a phthalic-anhydride plastic base-making process. Fumes turned to acid on contact with moisture and the company was besieged by irate officials and householders from surrounding communities.

"They needed an answer—quick. We thought we had it," Norbert Ruff says.

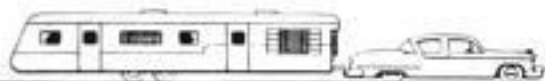
The trio of engineers joined with the firm to build a tiny test model which worked. A full-scale test model uncovered a few bugs before 15 more units went into operation protecting the whole plant. The firm is socially acceptable now.

There are some shortcomings. Incombustible solids such as fly ash from wood fires will clog the elements. Fumes from zinc, lead and mercury "poison" them.

But the system does have wide application. It is used with paint, varnish, enamel and foundry core-baking ovens; with solvent-evaporation processes, coffee roasters, burn-off furnaces, fish-oil and animal-fat rendering processes; in paper printing and varnishing, asphalt processing, chemical plants and plastics manufacturing. ★ ★ ★

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Sweden's Navy Joins the Underground

(Continued from page 108)

problems as brittleness, difference of expansion between the bit and the steel, variations in angles and radii of the bits, variations for different types of ore—all these and other difficulties had to be studied and solved. Millions of feet of rock were drilled from 1942 to 1952 while careful figures were maintained, comparing the efficiencies of conventional tools with those carbide-tipped. The startling results were clearly shown by the figures from a particular power project in the Alps where, halfway through the operation, a change was made from conventional to new methods: With conventional tunneling methods the men advanced 4500 feet in five months. The following five months, with new equipment, they advanced 12,400 feet. Speed increased from six to twelve inches per minute in hard granite.

Eight drill steels or jack bits were needed in the old equipment to accomplish the same work done by the new tools with only two or three sharpenings at the face.

Because the equipment is so light and flexible, it is now possible to place a hole exactly where it is wanted. It can be driven to any depth quickly, accurately and at a fraction of the old cost. Furthermore, a large Canadian mine, making a comparative study of the dust created by the conventional and the new steels, reported that conventional drilling produced two to seven times as much dust as the new drills. In other words, the new equipment lessens the hazard of silicosis.

Many companies in Sweden now share the rapidly expanding market for rock-drilling equipment. The output of that small country, estimated at 150 tons a year, is exceeded only by the rapidly growing output of the United States.

Though traditionally neutral and still aloof from NATO's defense pacts, Sweden is well aware that being rich in minerals and forests, and productive in her industries, she would be a rich prize for conquest. Four minutes by jet from Soviet air bases in the Baltic, she is in dead earnest in preparing her vulnerable nation, spending 17 times as much per capita as we do in the United States for home defense. For these shelters, for stockpiles of supplies, for training and promotional work, Sweden spends four dollars for every Swede. We, on the other hand, spend 23.5 cents per capita. Sweden allots seven percent of her military budget to the protection of her own country; only $\frac{1}{10}$ of one percent of

(Continued to page 216)

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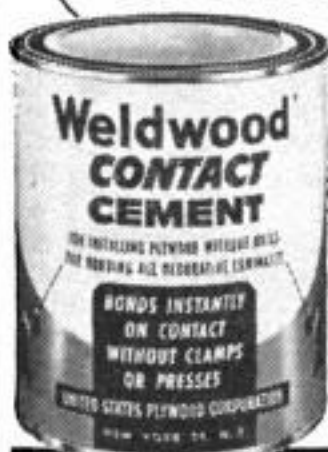
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In this country, protective measures are left to the option of individuals. In defense-conscious Sweden, however, it is required by law that builders of all dwellings for three or more families must provide adequate underground shelter, and this must be done at their own expense, not that of the government.

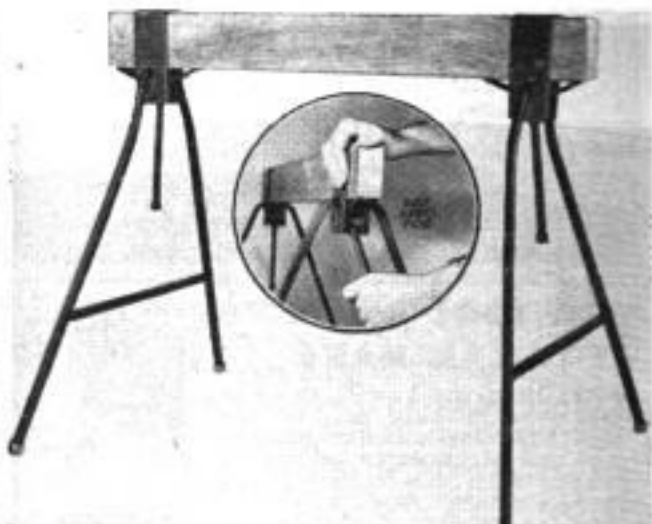
Swedes are not only energetic, they are also tremendous realists. They know that enemy attack could strike at any moment, that neutrality in a hydrogen age is no longer a defense. With vigor, new tools and new speed, their blasting and burrowing continues.

In this country, only a small beginning has been made. To date, a limited number of insurance companies, banks and government agencies have started to convert caves to storage places for vital records—though not yet for the people. Large limestone caverns in western Pennsylvania, formerly used as mushroom cellars, are now being surveyed as possible public shelters. E. I. du Pont de Nemours & Co. recently built a huge underground concrete and steel vault beneath one of its buildings in Newark, Del., large enough to hold seven medium-sized houses. Perhaps this country

can look to Sweden for lessons in burrowing underground. ★★★

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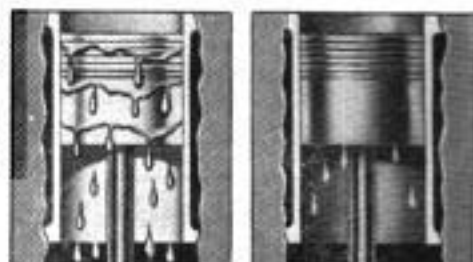


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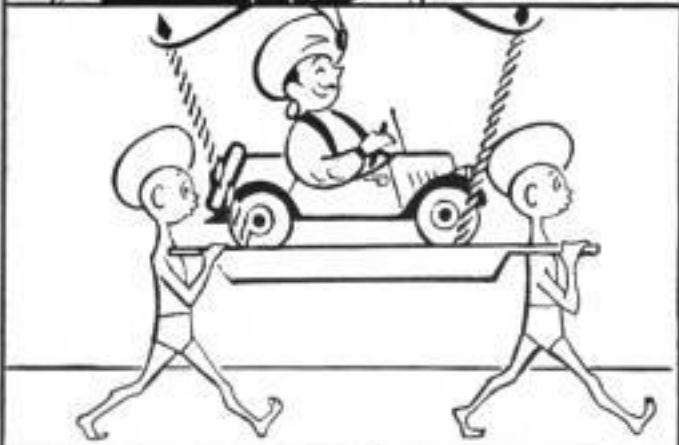
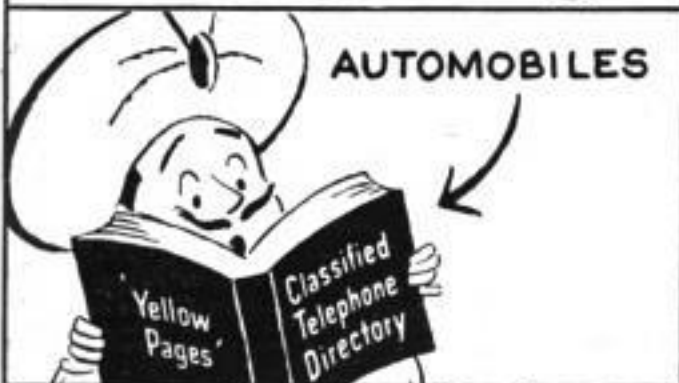
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Big-Game Sculptress

(Continued from page 100)

Eyes, hoofs and noses she paints with the tip of an artist's brush.

It takes several hours for the coloring to dry, and in the meantime Frances Poe checks the weather forecast; you have to consider many things in this business. If a west wind is blowing the next morning, a downdraft will be created in the kiln and the oven won't reach the desired temperature. Gas pressure is at its height in the very early morning, so she places the pieces in the kiln soon after midnight. Baking, at a temperature of 2300 degrees, takes seven to nine hours.

The intense heat of the firing causes the decoration colors to fuse into the body of the figurine. At the same time, the clay and feldspar are gradually transformed into needlelike crystals suspended in glass. The network of crystals gives porcelain its strength. The purpose of the flint, which does not melt, is to act as a skeleton during the firing process. Silica remaining after the crystals have formed becomes the fine glass which gives porcelain its great scratch hardness and translucence.

Antlered figures like deer rest upside down in the kiln on little prefired clay racks. During the firing process, antlers twist and legs go out of shape. Miss Poe, checking on her work through a peephole in the door of the kiln, adjusts such peculiarities with clay weights hung on the twisted extremities.

Often she fires the figurines five or six times before all the pieces in a group are ready to be fired together on a common base. When all the pieces are perfect, she fills her air brush with a milky glaze and covers the entire group with the white substance. The glaze is composed of body material plus lead, zinc and whiting.

Again the pieces go into the kiln, this time for the glaze firing, which gives the figurines a permanent, durable and glossy sheen. This firing, at about 2200 degrees, lasts about five or six hours. If all goes well, and none of the pieces is broken, the group is ready for its trip to a customer or a showroom.

At this writing, you could only buy the miniature game animals from Miss Poe, from a small gallery on Chicago's Near North Side, or from her agent, Irving Tarrant. Tarrant, an art appraiser and special lecturer at the Art Institute of Chicago, will tell you that they're examples of a unique art form.

"To my knowledge," he says, "Frances Poe is the first and only artist to do the

(Continued to page 220)

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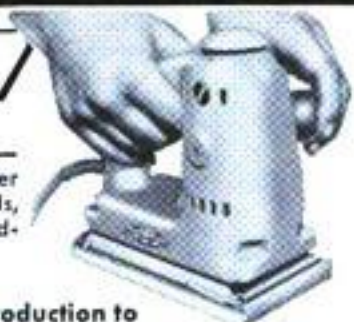


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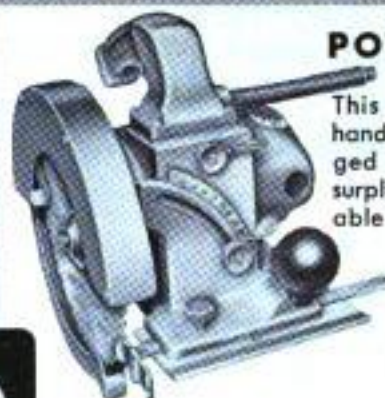
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diversified American animals in the difficult medium of porcelain."

On display in the gallery you'll find deer, elk, moose, caribou, sheep, goats, antelope, musk oxen, bison, bears, pumas, jaguars and even tiny skunks of porcelain. Once a week or so, Frances Poe will turn out a new figure. Just about as often, one of her admirers will purchase an animal at a price ranging from \$3.50 to \$150.

It's not a mass-production operation. Each figurine is an individual sculpture, and takes her at least three days. No molds are ever made. Twenty percent of the work still shatters in the kiln, and 40 animals are a good year's production.

The people who buy the figurines are almost as diversified as the animals themselves. And each has a different reason for his purchase. There's a doctor who likes the anatomical correctness of the animals, a ceramics engineer who's been to all the famous potteries of Europe without finding their match and an artist who's furnished an entire room around his collection of her work.

Her next big project? Chances are it will result from a bit of detective work she's conducting on the black jaguars of western Brazil. (Now that she's finished sculpturing all of the large North American game, she has turned to South America.) According to the natives, the jaguar lures fish with his tail. He slaps the water with it in imitation of falling fruit and grabs the deluded fish as they surface. But you won't be able to buy a fishing jaguar until the rumor is thoroughly checked, for Frances Poe is a careful "workman."

In the meantime, also, you'd have to play second fiddle to a kingfisher with a fractured wing or a stray dog with a broken foot. Animals always have priority over business at Poe's. ★ ★ ★

Listening to Lightning

Lightning flashes in all parts of the world are heard and recorded by special radio equipment built by Leonard N. Liebermann, associate professor of geophysics of the University of California's Scripps Institution of Oceanography. Lightning, it has been found, produces "static" which is able to travel around the world because of a layer of ozone 40 to 60 miles above the earth. The antenna of Liebermann's radio receiver gives him the direction from which the lightning strokes originate, and the tone of the signals tell him how far they have traveled. The received signals are within the frequency range picked up by the human ear.

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the end of a year. It produces one band of ultraviolet light which destroys airborne bacteria, and another band which attacks odors and eliminates staleness. Similar applications have been used for some time to purify recirculated air in hospitals, food plants and public buildings.

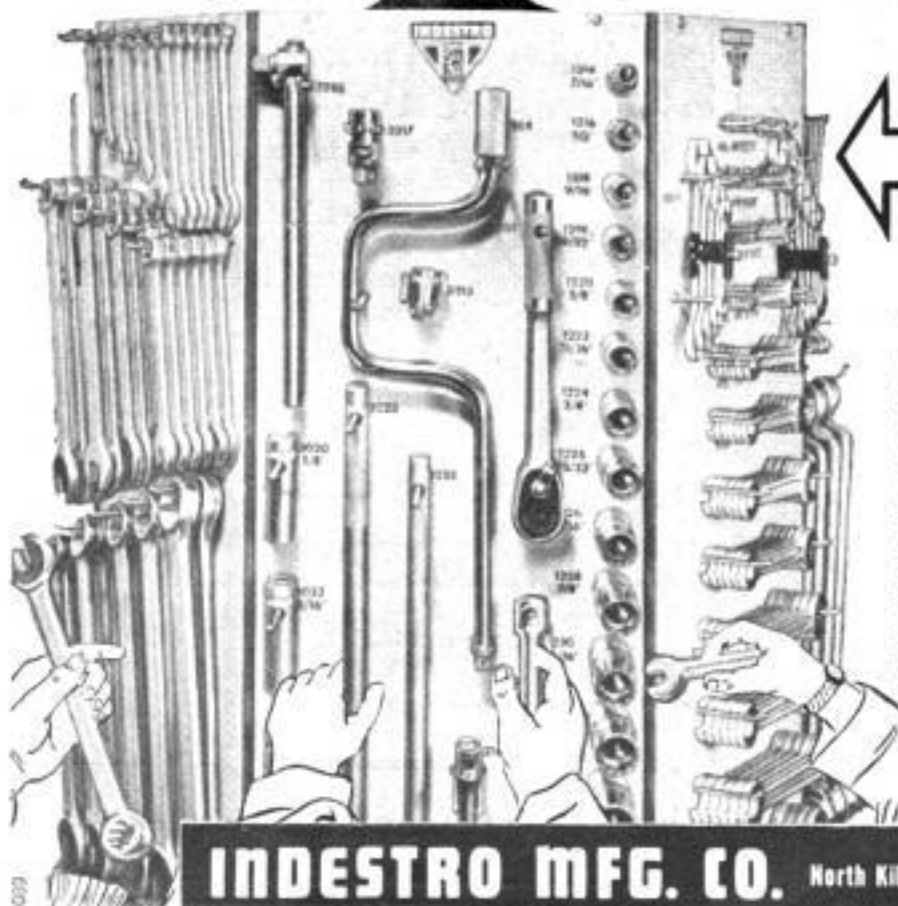
Radar Controls Freight Cars In "Hump" Yards

Several railroads are installing radar and electronic computers in "hump" yards to control freight cars. A hump yard has an artificial hill. Freight cars are pushed to the top of the hill, uncoupled and allowed to roll into the yard, where they are guided by switches to the proper track, thus assembling them into trains. Electric "car retarders" and push-button switches have taken most of the labor out of the hump yard. Now the General Railway Signal Company has developed radar instruments which track the car as it moves through the yard. An electronic computer integrates the car weight, curve resistance of the route, weather conditions, rolling distance and other variables. Electrical impulses then operate the retarders to ease the car into its proper track at just the right speed for gentle, damage-free coupling.

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Clymer Tests the De Soto V8

(Continued from page 126)

lively engine that on long stretches would push the car along at 110 miles per hour on the speedometer (which was about 6 percent on the high side). The engine is as free from vibration as any I've tested. All Chrysler-built products have rather soft front ends when cornering and De Soto has the usual amount of soft spring roll but, in spite of this, there is a great amount of stability at all speeds. I had the feeling that the car was always well under control, regardless of road condition or speed.

Chrysler's power steering is better than when first introduced. The steering wheel returns to normal position without help from the driver after cornering. If the hands are removed from the steering wheel when coming out of a corner, the front wheels automatically straighten out. The 3.5 turns of the wheel (without power there are 5.5 turns) from lock to lock are satisfactory, but there still is a tendency to oversteer with power steering.

I abuse the brakes a great deal in my tests and I found De Soto brakes to be tops. The parking brake is one of the best I have ever used, but I still don't care for a transmission hand brake as compared with the conventional parking brake on the rear wheels.

In passing other cars on steep grades and even on long hills the kickdown (below 60 miles per hour) feature is quick and positive. There is a real surge of power as the lower gear reduction smoothly takes place and, unlike with the old slow-shifting De Soto Fluid-Torque, there is a thrill in operating the PowerFlite-equipped car. There is some creep or forward movement when Low or Drive is engaged with the engine idling.


Over sand-rutted roads, up and down steep grades and on sharp turns I could uncover no defects, except a couple of body squeaks. Each was noticeable for a few miles and then disappeared.

I tested the car with both premium and regular gas. While premium is preferable, the car had less ping on regular gas than most cars with high-compression engines. Owners will get decent service on the cheaper grade of gas. De Soto's hemispherical combustion chambers are responsible for this.

The two-speed, electric windshield wipers are excellent. I am happy to see De Soto still using practical bumpers without the bulletlike projections, so that another car can be pushed in an emergency.

I especially like the instrument panel,

(Continued to page 226)



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Jacobs

CHUCKS

If it's a Jacobs it holds

except that I think the small gauges should be more readable. The needle indicators are preferable to the red warning lights now used by many makers.

The heating and ventilating system is efficient, although somewhat noisier than necessary with the blower operating.

You can't beat the window cranks on De Soto. Less than two turns of the crank open or close the window.

De Soto, like all other Chrysler products, has the new automatic-transmission lever on the instrument panel. The more I use this the more I like it. One reason is that it eliminates any obstruction under the right side of the steering wheel.

The wrap-around windshield affords good front vision, although some owners feel there is some distortion at the edges and that the corner posts are too thick. I can't see much difference in front and side vision with the wrap-around windshields.

I like the new door handles. When you push with the thumb, the handle pops out so it is easily grasped by the fingers. The doors open easily. From an opening of only 12 inches, the door will automatically close without assistance, merely by its weight. Very little pressure is needed to close the doors.

I like the driving position, the springing and the proximity of the wide brake pedal to the foot throttle, also the large trunk, the roomy interior and the appointments and color combinations.

I found some water leakage at the lower left corner of the windshield.

The turn-indicator lever is too far away from the steering wheel. It should be raised at least two inches.

The most annoying feature I found is the operation of the release lever for moving the front seat forward and backward. The lever not only requires a lot of pressure, but a flimsy wire arrangement runs across under the seat to lock it. There is too much effort required to adjust the seat. One wouldn't expect to find such sloppiness when almost every other feature is well designed. (I understand De Soto is changing this feature and perhaps by the time this article is in print an improvement will have been made.)

During a drizzling rain, when the front door was opened, water dripped onto the running board and carpet from a point below the ends of the windshield. When the door is closed, it squeezes the rubber water gutter, creating an obstruction where the water normally would drain out. ★ ★ ★

☞ Cosmic rays cause ions that give raindrops their electric charge, according to a recently advanced theory.

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LESS
MOTOR

"Easy to Handle and Beautiful," Report Owners of the De Soto

(Continued from page 130)

A big 87 percent of the owners say they don't want any more horsepower (De Soto now has 200 and 185-horsepower engines). However, 11 percent of the owners do want more power while a tiny 2 percent want less. This seems to bear out the claim of the industry that the public won't buy less power and that's why manufacturers are giving them more.

"I think present horsepower is satisfactory. You can't use all the power you have as it is."—Minnesota store owner.

"I would like more horsepower. There

1955 DE SOTO V8 SPECIFICATIONS

ENGINE

Bore and stroke.....	3.720 x 3.344 in.
Piston displacement.....	291 cu. in.
Brake horsepower.....	Fireflite: 200 at 4400 r.p.m. Firedome: 185 at 4400 r.p.m.
Compression ratio.....	7.5 to 1
Transmissions.....	3-speed conventional; overdrive; PowerFlite transmission (torque converter with gears)

GENERAL

Wheelbase.....	126 in.
Tread, front.....	60.2 in.
Tread, rear.....	59.6 in.
Weight, unladen.....	Fireflite: 3940 lb. Firedome: 3870 lb.
Turning-circle diameter....	43 ft. 9 in.
Steering wheel turns, lock to lock.....	5.5 turns
Length over-all.....	217.9 in.
Width over-all.....	78.3 in.
Height over-all.....	60.6 in.
Road clearance.....	Fireflite: 6.2 in. Firedome: 6.3 in.

CAPACITIES

Gasoline.....	20 gal.
Oil.....	5 qt.
Water.....	23 qt.

INTERIOR DIMENSIONS

Front hiproom.....	63.3 in.
Rear hiproom.....	64.0 in.
Front headroom.....	35.0 in.
Rear headroom.....	34.5 in.
Front legroom.....	44.6 in.
Rear legroom.....	44.8 in.

are some 1955 cars that will outdo the De Soto."—Arkansas contractor.

"I would rather have less horsepower and more economy although present power is satisfactory."—North Dakota telephone man.

Why did these owners buy a De Soto? Last year De Soto ranked 11th in total sales and this year it is still 11th despite a tremendous increase in the number sold.

(Continued to page 230)

SHOP BY MAIL and **SAVE** at **GROBAN'S**

SURPLUS & NEW MANUFACTURE EQUIPMENT FOR HOME, FARM & FACTORY
ALL ITEMS UNCONDITIONALLY GUARANTEED

SELF-PRIMING ALL BRONZE & MONEL GEAR PUMP

ITEM #383—USE FOR:
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FEATURES • Needle Bearing Construction • 1 1/2" Pipe Thread Inlet, 1 1/4" Hose Outlet • Standard 3/4" Keyed Shaft • All Bronze Body & gears, Monel Shaft • Equipped with Drain Cocks, Grease Cup, Steel Internal Drive Gears for long, trouble free service.

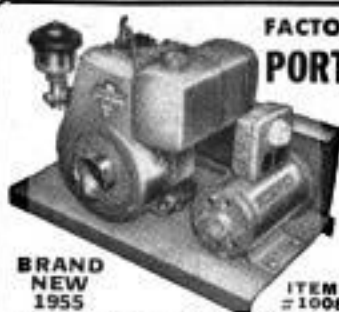
CAPACITY: From 10 to 80 Gal. Per Min. At Speeds from 550 to 2400 Rev. Per Min. Using from 1/2 to 16 Horse Power. For Pressures to 160 lbs. Ship. wt. 58 lbs. U. S. Navy Cost \$168.00. **F.O.B. Chicago 39.50** Ea. Two for 75.00

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ITEM #166—Use on road machinery, vibrators, paper mills, wire reels, hydraulic presses, speed control units. Ball bearing construction, balanced cam design assures high efficiency performance. When used as a pump: delivers 8 G. P. M., 1000 P.S.I., 8 H.P. At 1200 R.P.M. as a **HYDRAULIC MOTOR:** Rated up to 12 H. P., up to 2400 R. P. M. Standard 3/4" pipe thread ports, 3/4" shaft with keyway. Dimensions: 14 1/2" x 8" x 7". Weight 63 lbs. Regularly \$212.00. **OUR SPECIAL PRICE... ea. 59.50** F.O.B. Chicago 2 for 110.00



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 • Electric Saw, Electric Drills, Pipe Bender.
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 • Water Pump, Radio, Lights, Air-conditioner.

BRAND NEW 1955

ITEM #1008

COMPACT — FITS IN THE TRUNK OF YOUR CAR

1000 WATTS OUTPUT, continuous duty. 115 Volts A.C. 60 cycles, 9 amps. Powered by husky, easy starting Clinton engine. Engine and generator operate at 3600 R.P.M. for maximum efficiency at minimum weight. Both units are mounted on steel base, with heavy sheet metal belt guard. Generator is self regulating, and is equipped with outlet box containing fuse and 2 A.C. convenience receptacles. Cost only 5c an hour to operate. Dimensions: Length 20 1/2", Width 12", Height 16". Shipping wt. 100 lbs. F.O.B. Chicago.....

149.50

700 WATT-GENERATOR SET—same as above, slightly smaller—with Briggs-Stratton Engine—Model 708—F.O.B. Chicago..... **129.50**

1500 WATTS-GENERATOR SET—50% more capacity—with husky Clinton 3.8 H.P. Engine. \$100 below usual price—Model 1508—F.O.B. Chicago..... **199.50**

New... ALL PURPOSE 5-TON HAND WINCHES

IDEAL FOR:
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 • Loggers • Roofers
 • Construction uses

Manufactured by: Seattle Chain and Mfg. Co. — Div. of Republic Steel. 5-ton capacity, single drum, 2 speed, compound gear, locable cam and lever type, with hand grip steel shoe brake and spring actuated steel safety dog. The drum has a 5" core, is 9" long, and has a capacity of 365 feet of of 1/2" rope. Adjustable hand crank allows greater cranking speed. **DIMENSIONS:** 22"x24"x16". Packed in wooden box—Ship. Wt. 200 Lbs. Regular Value \$161.50. Now only..... **79.00** FOB Chicago



ITEM #737

To place phone orders call Webster 9-3793

GROBAN SUPPLY CO. Dept. **PM-8**
 1139 S. WABASH AVE., CHICAGO 5, ILL.

300 AMP. D. C. GENERATOR IDEAL FOR WELDING GENERATOR

Type R-1, ITEM #91
 rated 300 Amps. — 30 Volts. Mfg. by Jack Helms, Government Acquisition Cost \$380.00. Shpg. wt. 55 lbs. Dimensions: 16"x10"x7". Complete with instructions to connect as Welder. F.O.B. Chicago..... **35.0**



ITEM #90 — When connected as a welder, this unit will deliver 200 amps for a sustained period and 350 amps for intermittent service. This generator is widely used for shop-bu portable welders. Rated 200 amps., volts, 2500 R.P.M., using 10 H. Dimensions: 15" L. x 6" W. x 8 1/2" H. Spliced drive shaft. Gov't. Ac cost \$300.00. Shpg. Wt.: 51 lbs. F.O.B. Chicago..... **22.5**



GROBAN FOUR-WAY OPEN CENTER HYDRAULIC CONTROL VALVE

ITEM #126 — Four-way open center control valve with built-in adjustable relief valve factory set 1000 P.S.I. Spring loaded neutral position. For use with one double acting cylinder in neutral position. Locked pump unloads. Can be used as single unit or mounted in series. Has 3/4" pipe thread inlet and outlet 1/2" pipe thread cylinder port. Finger grip handle. Ship. w 10 1/2 lbs.



AN OUTSTANDING BUY!
F.O.B. Chicago 21.50

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New do-it-yourself book by Weldwood shows you

how to wood panel a wall • how to make a plastic laminate sink top • how to saw and work plywood • how to finish plywood • what to do about a "problem" basement • how to glue plywood and has all kinds of tips for the home craftsman. Plus dozens of pictures of finished projects!

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Enclosed is 25¢ for your new "Weldwood Do-It-Yourself" book. Please rush my copy!

Name

Address

City State

Most of them give previous ownership as the reason for buying a De Soto.

"The thing that convinced me was the performance of my 1953 De Soto."—Oklahoma machinist.

Next most frequently given reason is the new De Soto styling; after this comes the Chrysler reputation for good engineering. Fourth most frequently given reason is that the De Soto dealer offered them the best deal.

"Its beauty sold me. I like the body styling with sloping hood and rear deck. I don't like the boxed look other new cars have."—Texas chemical-plant operator.

"The engineering of Chrysler Corporation."—Ohio driving instructor.

"De Soto gave me the best offer on my old car."—Iowa insurance man.

More Best-Liked Features

The following quotations describe additional best-liked features in order of the frequency of mention by De Soto owners:

"Terrific response to the accelerator."—Nebraska welder.

"Remarkable road hugging at high speeds."—Tennessee Linotype operator.

"Roadability on mountain roads is exceptional."—New Mexico telephone man.

"Wide, roomy seats. Comfortable seat height."—Colorado farmer.

"I like it fine, especially its wonderful brakes."—Montana mechanic.

"Good visibility."—Virginia merchant.

"PowerFlite is excellent. Very smooth starts. Selector lever on dash is handy to use."—Illinois farmer.

"I like the low hood. Gear shift on dash."—Ohio glassworker.

"We have a pink and ivory De Soto. It is the most beautiful car we have ever had."—Alabama garage owner.

"I like the two-tone color divisions."—Washington truck driver.

"Roomy trunk."—Washington fisherman.

"Comfortable driving position."—Texas Naval officer.

"I drive a car hard in medical practice. I never warm it up before starting out and I drive fast. Yet I feel I am getting everything I want from this car. I have never been so satisfied with a car as with my De Soto."—Oregon physician.

More Complaints

The following quotations are typical of those giving owners' complaints. These are listed in order of frequency of mention.

"The dash panel is trimmed poorly. The trimming does not fit any place, which is a shame for such a pretty car."—New Mexico real-estate man.

(Continued to page 232)

MODERN

LAWN MOWER SHARPENER

COMPARE BEFORE YOU BUY



Write for free booklet 10E

Oil remains in engine while sharpening. Bed knife sharpened in same centers — no attachments needed.

Start your own business—**increase your income**

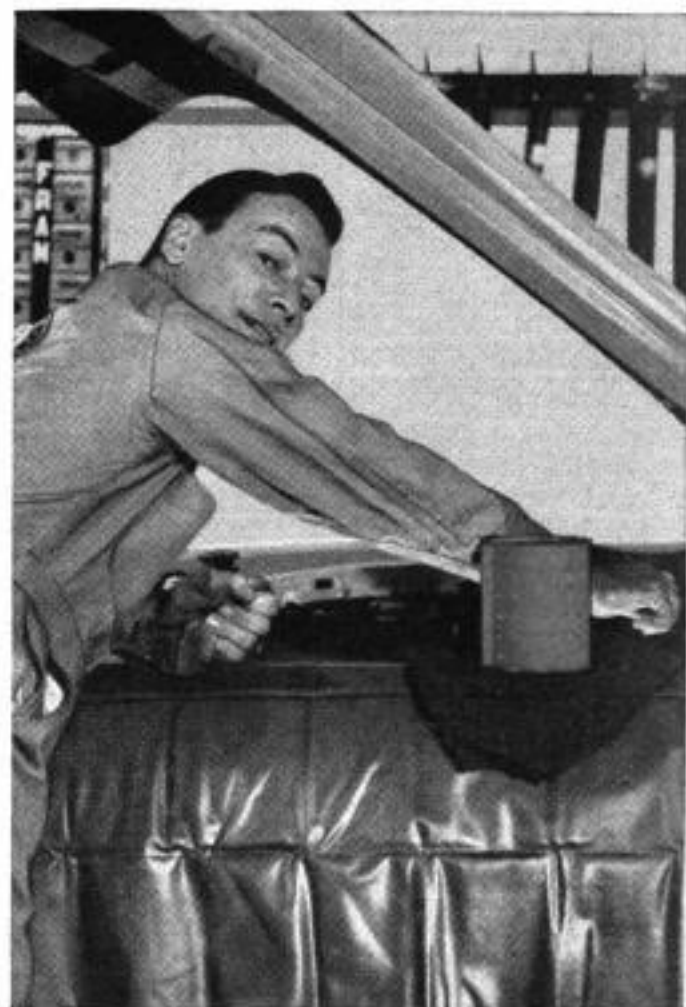
Sharpens any mower in ten to twenty minutes. Handles complete assembly of all reel types including 36 in. power mowers. Handle, wheels, roller, and engine are not removed.

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MODERN MFG. CO.

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Former government geologist, with nearly 30 years experience, tells you everything—what to look for, where to look, use of counter, staking your claim and all the other things you need to know—in his new pocket-size book for amateur prospectors. Order your copy of "MILLIONS IN URANIUM" now, \$1.95. Money refunded if not satisfied. Sorry, no C.O.D.'s.

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NEW EXHAUST CUT-OUT
Exhaust line is controlled from the dash. Can be used as a cut-out in the country and closed in restricted areas. Or may be used to operate two different toned mufflers. Well constructed of heavy plate steel. Strengthens the exhaust pipe.
UNIVERSAL—Fits All Cars
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Here it is for the sport car enthusiast. Not a vibrator or other substitute but a genuine motor driven horn.
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It's the New "Bee"! Gives a most amazing and commanding two-tone bell sound. Easily installed under car floor by driver's seat. Strap on plunger lightly polished. Fits any car.
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Special Curved Convex Glass Gives Curb to Curb Vision—Eliminates Blind Spots—Wider Range of Vision thru the Larger Windows of New Cars. CURVED MIRROR—2 1/2"x10" in Metal Case Painted a Neutral Gray Hammered Finish with a Plastic Lens to Match. No. 93—Fits all cars. One each year, make & model. POSTPAID, Ea. **\$2.94**

Porous Bronze OIL FILTER ELEMENT
WITH LIFETIME GUARANTEE and Built-in Magnesium Acid Neutralizer
Porous bronze Element never wears out or needs replacement. Lasts for a lifetime of the car. Element removes all harmful particles yet retains your expensive additives. Lets you drive up to 10,000 miles without changing oil. Fits all cars except those with Full Flow Oil System listed below. State your make, model & car.
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Element only, POSTPAID **\$4.95**

Porous Bronze FILTER ELEMENT FOR FULL FLOW OIL SYSTEM—Fits V8 Buick, Olds, DeSoto 52-55; Ford, Merc. 54-55; Chev. 51-55; Dodge 53-55; Plymouth 1953; Ford '6, '52-55; Lincoln 52-54; Chev. exc. V8 46-54. Buick car, year and model. No. 117—Regularly **\$13.95. POSTPAID, only **\$8.95****

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PUMP FASTER with a HYDRO-JET!

Made of aircraft grade aluminum alloy, this rugged #10 centrifugal pumps up to 4500 G.P.H. Ideal for irrigating, draining, filling, spraying. Uses 1.6 to 1/4 H.P. motor. Rustproof 1/2" shaft, oil less bearing. 1/2" suction, 1/2" discharge, std. pipe threads, adaptable to garden hose. **\$8.95**

Heavy-Duty HYDRO-JET #20 fits and empties pools, ponds, etc. Extra powerful up to 8000 G.P.H. Use 1/4 to 3 H.P. motor. Rugged, rustproof 1/2" shaft, oil less bearing. 1/2" suction, 1" discharge, std. threads. **\$11.95**

Prepaid if cash with order. Send Check or M.O. \$2 deposit if C.O.D. Money-back guarantee.

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THE ROUTER... what it is and does

This 40-page book with 100 illustrations tells you. Write Stanley Electric Tools, 628 Myrtle St., New Britain, Conn., enclosing 50¢. Ask for ROUTER BOOK.

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Get in on Micro-Midget racing, America's newest, most exciting, and fastest growing sport. Speeds up to 30 M.P.H. on a 1/10 mile track. Can be purchased in kit form or complete ready-to-run. Send 25 cents for completely illustrated literature describing all details.

Now available the HANDBOOK for SAFELY RACING CARS. This handbook is the most complete and up-to-date information and has data on rules and regulations for 1/16, 1/32, 1/64, 1/8, 1/4, 1/2, 3/4, 1, and 200 C.C. Cars. Only \$1.00.

COMET MANUFACTURING CO., Dept. 16, P.O. Box 1882, Sacramento 9, Calif.

"I don't like the dash panel or the knobs. At night all the knobs are alike and it is hard to find the one you want. The shift lever should light up for night driving."—Missouri farmer.

"Uses too much gas. PowerLite is too expensive driving in city."—Arkansas minister.

"Only trouble I have had is the hose on the power steering came apart at the connection to the oil reservoir. I understand the old-type hose caused a lot of trouble. Dealer replaced it with a new type of hose without charge."—Texas telephone worker.

"Trunk lid weak. Sometimes have trouble latching it."—New York technician.

"Jerks when transmission shifts (Power-Flite). We need defrosters nine months of the year here and they are no good with the curved windshield. They clean only the lower half."—Nevada carpenter.

"Don't like the door handles. Doors too hard to close."—Utah contractor.

"Rear-view mirror too small and placed so sun visors hit it when pulled down."—Idaho retired Army officer.

"Hard to get in and out of back seat of special coupe because not enough foot clearance between front seat and door-frame. Paint holidays around trim."—Washington jeweler.

"Uses too much oil."—North Dakota businessman.

"Passing gear does not take hold quickly enough."—Texas grocer.

"Gas fumes from gasoline tank get into driving compartment. Up to now dealer has failed to fix this."—California barber.

"I bump my knee on the front door post because of wrap-around windshield."—Oregon textile worker.

"I don't like the ash tray. You have to take your eyes off the road too much when using it."—North Dakota farmer.

"Fan belt that drives power steering doesn't stand up. I have had two already."—Maine cement finisher.

"Clock can't be seen in daylight."—Massachusetts piano tuner.

"Clock located dangerously in case of an accident."—North Dakota salesman.

There you have it—the good and the bad, as described by the owners of the 1955 De Soto. For an exact tabulation of these likes and dislikes see the percentage table on page 129. ★ ★ ★

Turn back to page 126 to begin Floyd Clymer's road test of the De Soto.

☛ Meteoritic dust particles which act as nuclei on which raindrops condense are one of the principal factors in formation of rain, says Dr. E. G. Bowen, Australian radiophysicist.

For lawn mowers

New 3-in-one Oil-Spra lubricates all over — forms a barrier against rust! Press button for penetrating oil spray!



"3-IN-ONE" OIL

SHAW PLOW, CULTIVATE, MOW, RAKE
BULLDOZE, SNOWPLOW
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TRACTORS

Just steer it with power turn. Several walking & riding models up to 14 H.P. Low price! Write for FREE literature.

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VARIABLE SPEED

HYDRAULIC POWER TRANSMISSION

It has Infinite Speeds 0 to 550, Reverse, Automatic Overload Protection; Adjustable Torque up to 180 inch pounds. 5/8" Input and Output Shafts. It will handle 1/2 to 1 1/2 H.P. Motor. Case measures 7 1/2" long, 7" high, 6 1/2" wide. VALUE OVER \$300. Shipping Wt. 25 lb. On C.O.D. Orders we require a 10% only deposit.

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ASK YOUR HARDWARE DEALER

OVERLOAD SPRINGS

\$9.95 Per Pair
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2,000 lb. Size \$11.95

For cars and trucks. Front and rear. Gives 2,000 lbs. extra capacity for all 1/2, 3/4, and 1 ton trucks, 500 or 1,000 lbs. extra for all cars. Easily installed. Guaranteed. State make, model. Dealers wanted.

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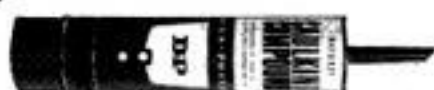
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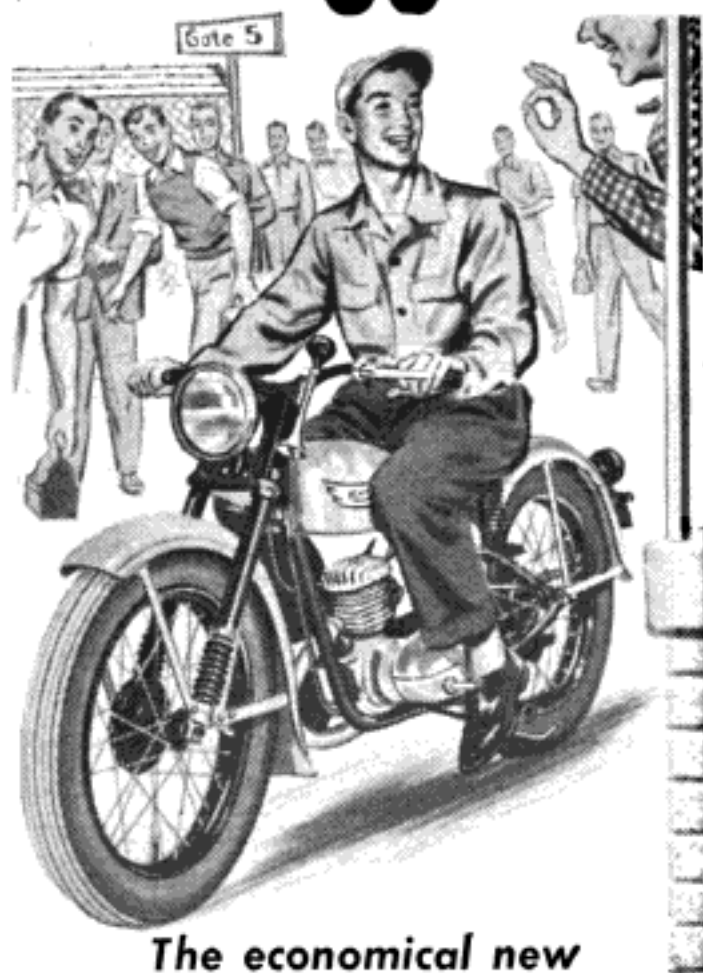
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The HARLEY-DAVIDSON Motor Co.
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It's Lonesome Up in Space

(Continued from page 79)

the northwest, and there were clouds over Mexico in the south. There were broken clouds over the Sierra Nevada Mountains away below me. Everything seemed fuzzy and not even the mountain details were sharp and clear. I was looking down through virtually all of the earth's atmosphere and it created a hazy effect, partly obscuring the surface markings.

At the top of the flight I was out of power and I began preparing for a dead-stick landing that was more than 100 miles away. This wasn't as tough as it sounds. The first things to do were to level off gradually to avoid weightlessness, get back down through the speed of sound, and then begin a wide sweeping turn that was possibly more than 30 miles across. This would head me back over the desert east of Los Angeles and bring me down to 30,000 feet, not too far from Rogers Dry Lake at Edwards.

Slowing down through the speed of sound was alarming the first time it ever happened to me, and it's still a rather startling experience. You'll remember that supersonic flight is silent except for the sounds of the equipment in the cockpit. But as the plane loses speed there's a sudden loud commotion, a rush and roar of noise like the sound of a cascade or waterfall. It's the sound of the air hurtling past the canopy. This gradually subsides as the plane slows to subsonic speed.

Landing on the surface of the big, flat, dry lake at Edwards is a tricky job. I may touch down at 180 miles per hour, without power and with no points of reference on the lake bed to help gauge my height above the ground. So the pilot of the low-escort plane talks me in.

He's off to one side, pacing me in the air, and he judges my height by the distance to my shadow on the surface. "You are 100 feet high," he tells me. "Come on down. Come on down. Easy. Okay. You are landing."

Incidentally the F-86 escort pilot puts his own landing gear down before he comes in alongside to instruct me. Concentrating on my shadow, it's possible that he may fly too low and unintentionally land his own plane.

The Bell rocket aircraft have soft landing gear and yet when they roll to a stop after an altitude flight they hammer and jar like a farm wagon without springs. This is because the hydraulic fluid in the landing gear is still stiff from the minus 65 degrees in the upper air. It hasn't had time to warm up.

(Continued to page 236)

Build this space-saving sofa-storage unit



the Western Pines

get complete detail drawings and easy-to-follow directions in

FREE PATTERN KIT 321

along with the picture-packed booklet "Friendly Home Ideas in Western Pine." Write for it to Western Pine Association, Dept. 321-N, Yeon Bldg., Portland 4, Oregon.

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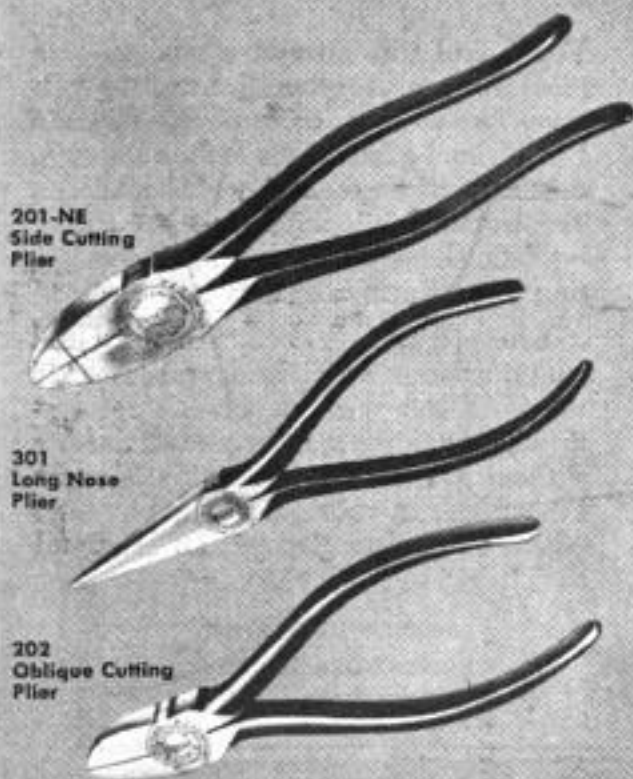
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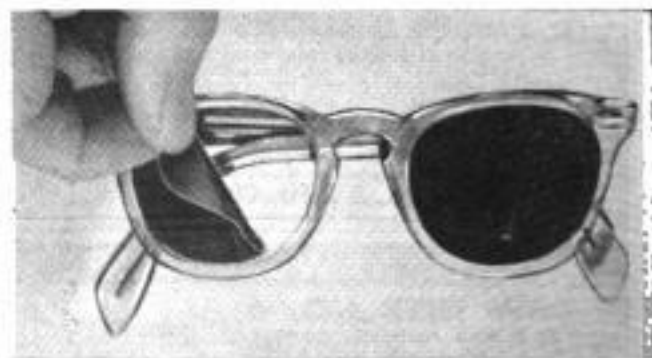
Aerodynamic heating has been no special problem to the rocket planes so far because most of the flights have been at altitudes where aerodynamic heating is not acute during speed runs of short duration. Too, the frigid liquid oxygen used as the fuel oxidizer helps keep the whole plane cool. Aerodynamic heating could distort a plastic cockpit windshield, however, so the Bell aircraft use glass windshields that resist the heat better.

Exhaustive studies of aerodynamic heating are being made with the X-1B which has been especially instrumented for recording the heat rise at supersonic speeds in medium altitudes.

There are about half a dozen qualified rocket test pilots in the Air Force today, each of whom has logged about 5000 hours in other kinds of aircraft. The full schooling before they qualify for rockets includes 500 hours in jets, six months at the Air Force test pilot school at Edwards, then one to three years testing the newest military jet aircraft and flying escort for rocket planes. After that come several weeks of intensive training in rocket-plane systems and their operation. Finally a pilot is ready to be coached for his first flight in a rocket.

The rocket planes we are flying today are really "Model T" aircraft compared to those we will have in the future. The new X-2 that looks superficially like another member of the X-1 series is the first step ahead. Eventually we will have rocket planes that can be flown with less effort and fly faster without encountering controllability problems. ★ ★ ★

Sun Patches for Eyeglasses



You can convert your regular spectacles to sunglasses with a pair of stick-on patches that cut down glare. The plastic patches, trimmed to size, are simply pressed onto the surface of the regular glass lens. They peel off easily and can be used again and again. Because the patches are unbreakable and so compact they will fit into a billfold when not in use.

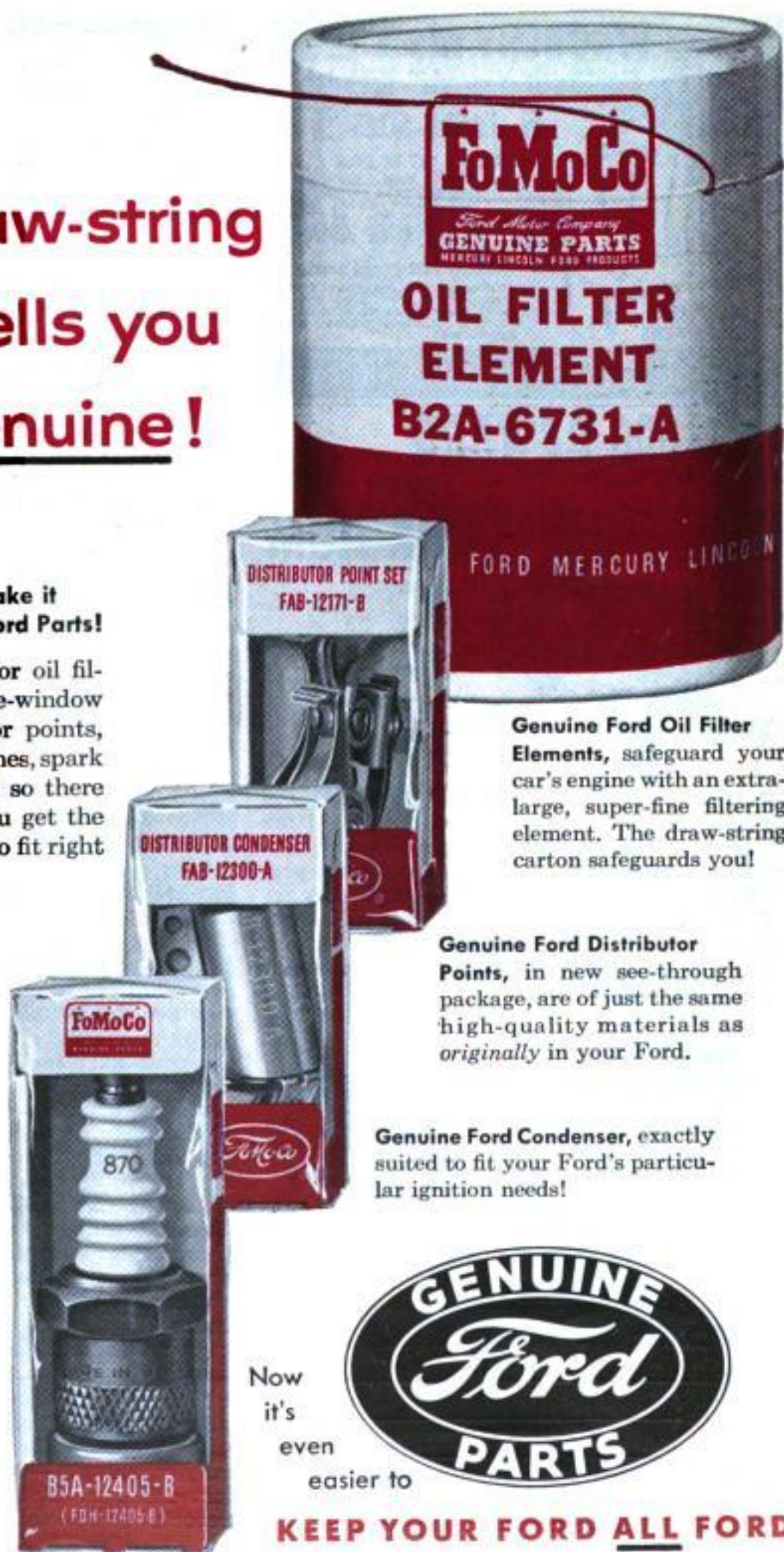
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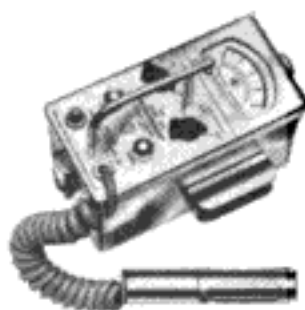
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World's Largest Manufacturer of Radiation Instruments

Rangers on the Trail of the Lost

(Continued from page 69)

members, makes the ranger organization quite unique.

Incorporated as a nonprofit group in 1947, SVIR Inc. is an outgrowth of the Pacific Coast Militia Rangers—15,000 commandos who stood guard on Canada's west coast from 1942 to 1946. The nucleus of the present outfit was 86 veterans of No. 1 Company, PCMR, whose military duties included mapping and patrolling 16,000-square-mile Vancouver Island at a time when Japanese submarines were shadowing west-coast shipping and during which a Nip undersea raider surfaced and shelled a lighthouse at Estevan Point, on the west side of the island. They blazed trails, built cabins and established caches in previously unexplored territory and have made good use of this experience in carrying out peaceful pursuits.

Apart from the knowledge they've passed on and the training they've given, the rangers have made a number of notable contributions to safety in the woods. Techniques and equipment they have developed are now being adopted by other organizations throughout Canada and the United States. Their emergency questionnaire form, for example, is now being used by police officers. Incorporating a sketch map, it provides participants in a search with all pertinent information at a glance.

The ranger stretcher kit consists of two packboards—one bearing a robe-type sleeping bag, the other the canvas, aluminum spacer bars and small ax. The latter packboard weighs only seven pounds and, once two poles have been cut, can be assembled in a couple of minutes.

Another ranger brainchild is the use of a rescue flare for aircraft searches, overcoming the difficulty of a lost person revealing his position to the pilot of a plane, particularly at night. Because of the importance of ground-to-air signal, the key to the new idea is possession of a set of signal flares by each firearm license holder. Numbered and registered in Game Department records for their shelf life of seven years, the cost of these rockets runs about seven cents a year. Tied to a gun barrel or pole, the flares can be fired at a moment's notice, immediately pinpointing the user's position.

Rocket SOS flares may soon become standard equipment for hunters, hikers, trappers and skiers and the rangers have only one regret—they aren't applicable to lost children. Because missing-youngster reports evoke the most immediate and

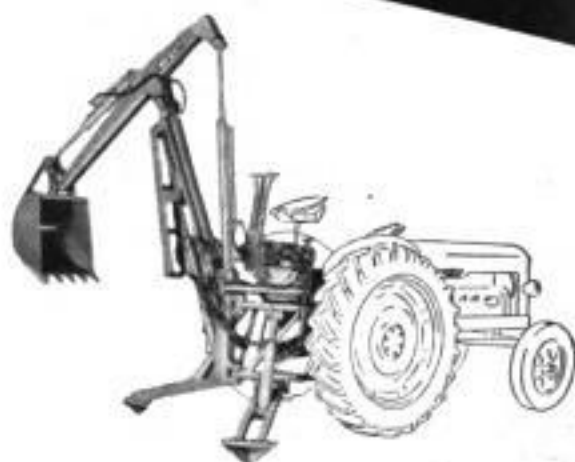
(Continued to page 240)

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AUGUST 1955

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sympathetic response from SVIR members, they have made a detailed study of accidents involving children and adolescents. They have located close to 30 youngsters who were lost.

"In the beginning, rangers engaged in a search often had their pay docked by their employers," recalls head ranger Francis Morse. "Nowadays, pay continues. We regard the time and effort contributed to emergency service as comparable to the work of the average service club. We never criticize being called unnecessarily, but are dismayed when it is too late."

Representing men and boys in all walks of life, the rangers have grown to a strength of 150 seniors and 25 juniors. They engage in weekly outdoor activities, hold monthly meetings and "family days" and conduct hikes, hunting and fishing expeditions and tournaments. Those in the under-21 category conduct their own affairs, with senior supervision. An outstanding achievement of the juniors was the recent opening of a safe trail up Mount Finlayson, a 1342-foot peak with treacherous escarpments and shale slide areas.

Originally financed by a \$60 membership bond issue, the rangers raise funds by holding an annual Sportsman's Rummage Sale on the eve of the hunting season and by renting their club grounds for picnic purposes. Their emergency equipment includes a Cessna 195 seaplane, a 36-foot diesel craft, a gasoline-engine-equipped communications car with a Hallicrafters transceiver, modified Army surplus walkie-talkies, an ambulance, a dog trailer for their two bloodhounds and a field kitchen. While this makes an impressive list, they probably won't rest until they've added a helicopter to it. In any case, besides training youth, encouraging outdoor activity and having a lot of fun, they'll perpetuate the essence of the wartime ranger spirit by always being ready to serve their fellow men. ★ ★ ★

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Aerial navigation is advanced by an automatic sextant that sights and tracks the sun during the day and the stars and planets at night. A sextant tracking device is located at any point on the plane where a clear view of the sky is afforded. The navigator presets on his remote-control panel the estimated position of the celestial body. Then a photosensitive telescope on the tracking device searches the designated patch of sky. It finally locks on the proper star and the navigator reads the bearing on his control panel. He then use this information to determine his position.

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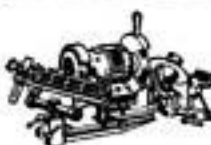
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(Continued from page 10)

A hole was drilled in the block of wood to put in the light socket. From that hole the battery hole was drilled crosswise of the block just back of the light socket. The hole for the wire that runs to the bulb was drilled from the light socket to the bottom of the battery hole. A hole was drilled from the switch to the light-bulb hole.

Wires were bared on the end and fed through the holes drilled for them.

The battery sits against the bared wire in the bottom of the battery hole for a ground.

A brass strip was used for the switch (first I used a doorbell switch but it made the microscope look clumsy) and was fastened against the other wire which runs from the bulb. This completed my circuit.

A plastic pie container was cut up to make a slide for the microscope.

Wayne Groth,
Seventh Grade,
Streator, Ill.

Correction

An item in the May issue, page 134, stated erroneously that a new life preserver is inflated with oxygen. Cartridges of carbon dioxide are used for inflation.

To the Editor:

On page 125 in the June issue of *Popular Mechanics*, the article "Skin Divers: Play It Safe" was written very well; but it left out one very important thing. This one thing is more apt to kill you than any one thing that you mentioned in your article. This is a fatal illness called air embolism and is one of the most feared things in diving work. Surprisingly enough, few amateur skin divers know about it. It is caused by expanding air in the lungs. If an amateur diver should suddenly lose his mouthpiece or come to the surface, and if he panicked, he would hold his breath. This is one mistake he won't make again. As he ascends, the air increases in volume and the air is forced through his lungs into his blood stream. By the time he has reached the surface he is unconscious and rarely can anyone be revived from this. The only chance there is is to put him under immediate compression in a decompression chamber and you don't find one of those on a public beach.

William J. Miller,
Shafter, Calif.

(Pictures of the atomization of fuels in jet engines are taken with a whirling mirror and a one-shot camera that stops action at $\frac{1}{4,000,000,000}$ second.)



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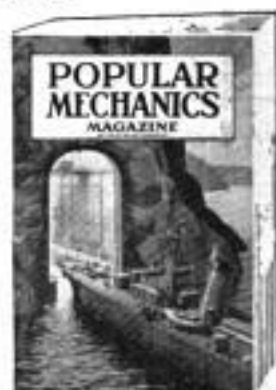
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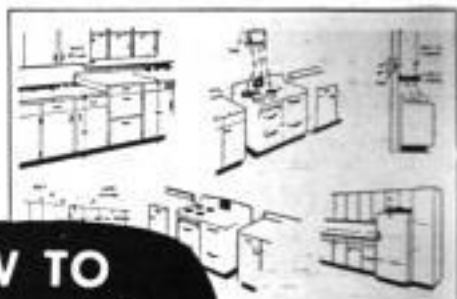


759 PICTURES

Above: How to lay a new roof over the old.

Right: New walls over the tired old walls. A few of the 83 modern kitchen ideas.

Below: Modern ceilings for old basements.



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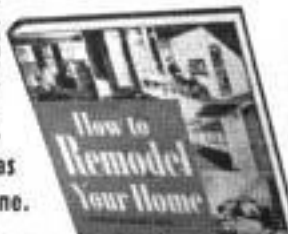
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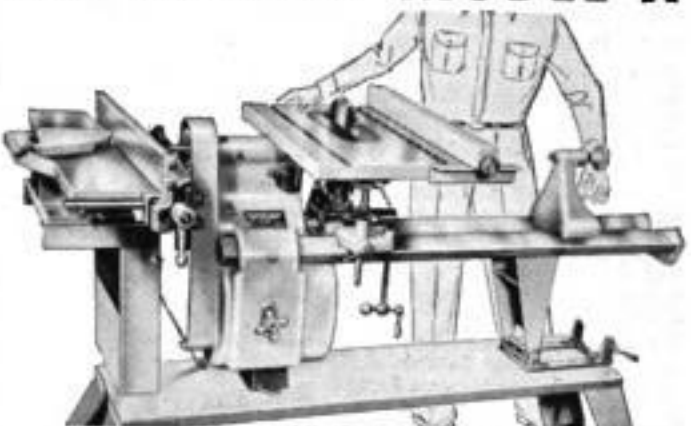


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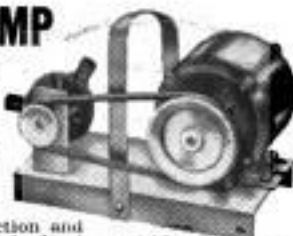
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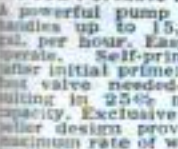
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foot valve needed—re-
sulting in 25% more
capacity. Exclusive im-
peller design provides
maximum rate of water
flow—horsepower. Jet
handles water contain-
ing a large percentage of
stone, gravel and
sand. 2 in. suction and
discharge. Powered by
easy starting 6 hp. Wisconsin
engine and mounted on
steel skids. Wt. 250
lbs. (Item 503). Factory price. **\$275.00**
Our special **\$200.00**

EXTENSION CORD



Heavy duty and very flexible.
Neoprene 14-2 cable.
20 year quality. Wt. 12
lbs. (Item 185) 100 ft.
Complete with rubber plug
and outlet. A terrific
buy at only **\$8.95**

NO. 12-2 POWER CABLE. Very flexible rubber
covered, special outside shield for grounding
power leads, etc. 50 ft. (Item 190) Wt. 8 lbs.
\$6.95. 100 ft. (Item 200) . . . **\$12.95**

SAVE middleman profits BUY DIRECT from MASTER MECHANIC factory

(Item 24)



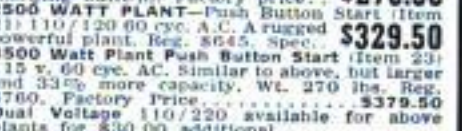
600-700 WATTS PUSH BUTTON START

115 v. 60 cyc. AC
Powered by a rugged
2 HP easy starting
Briggs engine. No
wiring necessary!
Just plug in and op-
erate. Plenty of cur-
rent for any oil burn-
er, freezer, brooder,
emergency lights,
etc. which require
up to 700 watts. Ideal for television and
radio. Complete with Voltmeter and built-
in winding to charge 6 v. auto batteries. (Item
24.) Wt. 75 lbs. Easily fits in car trunk.
Re prepared if storm knocks out
power lines. Reg. \$275 value. . . . **\$143.50**
1000-1200 Watt Plant (Item 45) same as Item
24 but larger generator and engine
with 50% greater output. . . . **\$199.50**

1300-1500 WATT PLANT

115v. 60 cyc. AC Push But-
ton Start. Powered by a
3 1/2 HP. Clinton engine.
Combines big output with
easy portability. Provides
emergency power for oper-
ating any oil burner,
sump pump, freezer,
television, lights,
communications sys-
tems, etc, which re-
quire up to 1500 watts.
(Item 22.) Wt. 110 lbs.
Reg. \$475 value. Factory price. . . . **\$239.50**
1750 Watt Plant Powered by 4.5
Briggs engine. Electric starting & battery
charging built-in. Factory price. . . . **\$279.50**
2500 WATT PLANT—Push Button Start (Item
21) 110/120 60 cyc. A.C. A rugged,
powerful plant. Reg. \$645. Spec. . . . **\$329.50**

3500 Watt Plant Push Button Start (Item 23)
115 v. 60 cyc. AC. Similar to above, but larger
and 33% more capacity. Wt. 270 lbs. Reg.
\$760. Factory Price. . . . **\$379.50**
Dual Voltage 110/220 available for above
plants for \$30.00 additional.



HEATING & VENTILATING FAN

(Item 10) Easily installed in
furnace pipes. Forces even heat
to all rooms. Over range re-
moves kitchen smoke and odors.
Powerful, continuous duty motor.
110-120v. AC. Mount in
wall or ceiling to ventilate any
area. Quiet, step-adjuster fan moves huge
volume of air: 400 to 600 CFM.
8" Pipe, wt. 5 lb. . . . **\$6.85**
9" Pipe, wt. 6 lb. . . . **\$7.85**
10" Pipe, wt. 7 lb. . . . **\$8.85**
12" Pipe, wt. 8 lb. . . . **\$9.85**
HEAVY DUTY FAN. Semi-enclosed motor,
suitable for spray booths, restaurant ex-
hausts, poultry houses, etc. 10" Fan, wt. 8
lbs. (Item 10E) . . . **\$11.95**
12" Fan, wt. 10 lbs. (Item 10D) . . . **\$12.95**



JET FLOW BLOWER

Tremendous air movement (1800
CFM) and quiet operation make
this double inlet 10" turbine
blower unbeatable for heating,
cooling, drying and air condition-
ing. Ideal for attic or barn ven-
tilation, converting gravity heat-
ing to forced air; spray booth ex-
hausts, etc. Operates with any
bearings. Includes variable speed motor pulley
and belt. Dimensions 19" hi x 18" x 16 1/2".
Outlet opening 13" x 11 3/4". Wt. 45 lbs. Item
245. Reg. \$54.50. . . . **\$27.50**

HEAVY DUTY 1 1/2 HP motor for above **\$16.95**
12" TURBINE BLOWER Similar to above, but
larger with 2400 CFM capacity. Wt. 65 lbs.
(Item 245a) Reg. \$70.00. Factory Spec. **\$34.50**

JET STEAM MASTER



Now a super efficient portable steam
generator that pro-
duces live steam at
160 lbs. pressure in
60 seconds from a
cold start! Produces
large volume of high
pressure steam on 2
pints of fuel oil. In-
stantly cleans sticky
grease, dirt, rust,
oil paint, etc. off
implements and road
machinery. Pays for
itself in a few weeks.
Sterilizes soil. Steri-
lizes milk equipment, etc.
Fully automatic—oil fired with new, built-in
lifetime bronze water circulating pump. Draws
water from bucket or pail. Simple and safe
operation. Can use 1/2" built-in safety valve.
Complete with 12 lb. of hi-pressure steam
hose and new triple efficiency steam gun that
automatically mixes in steam solution if de-
aired. Wt. 250 lbs. Item 463.
Special factory price. . . . **\$329.50**

LESS THAN WHOLESALE GIANT 2000-2800 WATT PLANT

110-120 v. 60 cyc.
AC, absolutely
best made—ex-
clusive dynamo
armature; heavy
windings develop
up to 5000 watt
overload for mo-
tor starting. Skid
mounted—portable.
Powered by
an easy starting Briggs or Wisconsin 8 HP
engine—complete with all accessories; engine
easily disconnected for other uses. Big outlet
box, voltmeter, no wiring necessary. Ample
current for all purposes. Factory warranty.
Item 233. Wt. 210 lb.
Reg. price \$815. Special at. . . . **\$299.50**
Same plant with electric
self starter (Item 31a) . . . **\$359.50**
Generator only and control box. . . **\$169.50**
DUAL VOLTAGE 110-220 available on any
of above models for \$28.00 additional.



52 pc. SOCKET SET

Highest quality,
guaranteed non-
breakable sockets
made by Husky.
Beautifully matched
chrome thin wall
alloy absolutely the
best. Contains a
complete set of 28
sockets in 1/2",
3/4", 1", 1 1/4",
1 1/2", 2", 2 1/2",
and 3" drive, plus
all necessary exten-
sions, handles,
speeders, reversi-
ble ratchets, etc.
all uncond. guaran-
teed against breakage. A beautiful set of tools
that will handle any job in a big doghouse
steel box. Wt. 17 lbs. (Item 203)
List price \$62.90. Factory special. **\$27.95**

CONDITIONAIRE VENTILATING FANS

Save big money installing
your own exhaust fan. Ef-
ficient propeller type blade
moves huge volume of air
quietly and effortlessly.
Heavy welded frame—pre-
drilled for easy installation.
Just cut opening and bolt
in place. Continuous duty
motors. Ideal for attics,
restaurants, garages, barns,
chicken houses, etc. Control
manually or with thermostat.



Blade Opening CFM	Wt.	Item	
18"	18 1/4"	2925	19 lb. 365a \$27.95
18"	18 1/4"	2950	27 lb. 365b \$31.95
24"	21 1/4"	4100	30 lb. 365c \$39.95

9 TON HYDRAULIC PRESS

A tremendously powerful hydraulic
press, capable of exerting 18,000
lbs. pressure. Pays for itself many
times over—straightening bent con-
necting rods, king pins, crank-
shafts, axles, link pins and
bars— or pushing out frozen
bearings and bushings. Devel-
oped pressure under pre-
cise control and visible
at all times on accurate
gauge. Complete with both
large and small anvils and
jigs to straighten any kind
of curve or bend. (Item 404)
Wt. 110 lb. Actual list price
\$365. Our special
close-out price. . . . **\$69.50**



MASTER DC ARC WELDERS



Now! a portable, rugged, industrial type welder with terrific performance, yet at a price hundreds of dollars less than you'd expect. Senior model made for years of trouble-free, continuous service. High capacity DC welding unit enables you to tackle any job with confidence—easily welds anything up to 2" plate using from 1/16" to 1/4" rods. Built-in stabilizer and cooling system makes arc easy to strike and hold. Dual control rheostat provides low heat soldering, brazing and welding from 30 to 300 amps. Complete with instructions, guarantee and triple V-belt or flat pulley. You can pay more, but you can't buy a better welder.
WELDER ONLY—DUAL CONTROL MODEL. Same as above but drive with your tractor, jeep or gas engine of 14 HP or more. (Item 282a.) Wt. 110 lbs. \$420 value. . . . **\$119.50**
WELDER ONLY—STANDARD MODEL. Same as above but with single rheostat for heavy metal welding only. (Item 282.) Wt. 110 lbs. \$400 value. Special. . . . **\$99.75**
COMPLETE POWER MASTER (Illustrated above) powered by a 14.6 hp., air cooled Wisconsin engine. Wt. 480 lbs. (Item 280) Compares with welder coating \$1200. . . . **\$449.50**
Factory Special.

WELDING KIT 20 ft. leads,
welding helmet, electrode holder,
ground clamp. Sold
only with welder at. . . **\$10.50**

Send check or M.O. Prices f.o.b. Factory. 10 day Money back guarantee. SEND 10c for . . . **BIG 1955 Catalog**

MASTER MECHANIC MFG. CO., DEPT. NRM

Burlington, Wis.

How to pass a genius



All of us can't be geniuses. But any ordinarily talented mortal can be a success—and that's more than some geniuses are.

Now, as in Æsop's time, the race doesn't always go to the one who potentially is the swiftest. The *trained* man has no trouble in passing the genius who hasn't improved his talents.

In good times and bad times, in every technical and business field, the *trained* man is worth a dozen untrained ones, no matter how gifted.

The International Correspondence Schools can't make you into a genius. For more than 60 years, however, I. C. S. has been helping its students to become *trained, successful leaders*—and it can do the same for you.

Mark your special interest on the coupon. Don't be like the unsuccessful genius who wastes his life in dreaming of what he intends to do. Act now!

For Real Job Security—Get an I. C. S. Diploma! ... Easy-pay Plan ... I. C. S., Scranton 9, Penna.

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ICS

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(Partial list of 277 courses)

Without cost or obligation, send me "HOW TO SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

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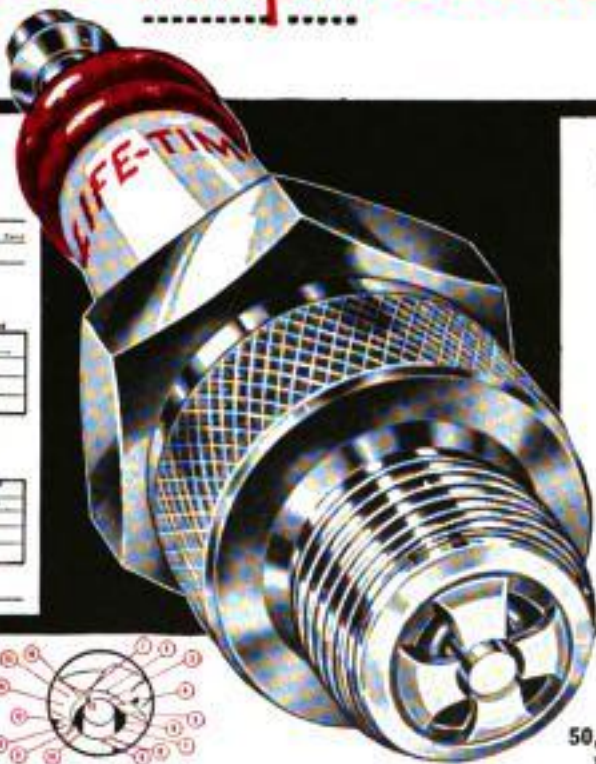
Name _____ Age _____ Home Address _____

City _____ Zone _____ State _____ Working Hours _____ A.M. to P.M. _____

Occupation _____

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special tuition rates to members of the U. S. Armed Forces.

7 pt. Self-Cleaning Plug Alone Shows 8 hp Gain and 7 mph Greater Speed!



Eddie Edmunds
CHASSIS DYNAMOMETER CHART

Make: Continental Year: 1951
Model: Continental Super 80 Engine: 800 cc

Power Test

Power Test	Continental	LIFE-TIME	Continental	LIFE-TIME
Top Speed (mph)	84	91	87	94
0-30 (sec)	11.2	10.5	11.8	11.0

Recommendations

Tustin Auto Parts
118 West Main Street Tustin, California Phone ELectric 6933

Department No. 11
Customer Name: Edmunds

Dear Sirs:

In December 1951, 1951 at Orange County, California, Orange County, California, we tested 4000 sets of the LIFE-TIME Spark Plug in comparison with 4000 sets of the Continental Spark Plug in comparison with 4000 sets of the Continental Spark Plug with the following results:

Run in	Continental	LIFE-TIME
1 - 4000 sets	3000 sets	4000 sets
2 - 4000 sets	3500 sets	4000 sets
3 - 4000 sets	3000 sets	4000 sets
4 - 4000 sets	3500 sets	4000 sets

These sets included in other changes made during 50,000 car miles.

The above 4000 sets included in 50,000 car miles and 1000 sets of the LIFE-TIME Spark Plug in comparison with 1000 sets of the Continental Spark Plug.

F. Robinson *R. C. Calkins*



NOW 17 PT. FIRING WORKS
Note electrodes closely. A circular firing area (four concave segments) is being the same from all points. Electricity has property of arcing from closest point. Current also arcs more widely from apex of two planes than from the face of a flat, metallic surface. Note that there are 16 apexes (where two planes meet) - all the same distance from the center electrode. Normal heat and spark erosion are spread around the entire 360 degrees and around the whole circumference of the center electrode.

- **INDIVIDUAL INSPECTION**—Each LIFE-TIME Spark Plug is tested for firing in oil and for resistance to 20,000 volts C.M.
- **PERMANENT GAP**—After months of use LIFE-TIME Spark Plugs make at exact factory pre-gap.
- **SELF CLEANING FOR LIFE**—Confined gases exploding in chamber formed by multiple electrodes reclean arcing surfaces with each firing stroke.

50,000 CAR MILES!

Before LIFE-TIME development, the spark plug was the most often replaced part of your car. Engineers agreed that "creeping paralysis," gradual electrode disintegration, carbon buildup, widening gap, could waste one gallon in ten. The LIFE-TIME Plug has now gone far beyond the life of the average set of tires, the average battery. This plug still fired clean, hot and steady at 50,000 car miles!

Most spectacular spark plug research breakthrough in 50 years allows us to include this unique and unprecedented warranty with every set of LIFE-TIME Spark Plugs. We GUARANTEE GREATER GAS MILEAGE - GREATER ACCELERATION - A MAJOR POWER INCREASE - OR YOUR MONEY BACK.

FULL ROTATING SPARK
allows overall cooler electrode temperature for greatly increased life. Hotter spark prevents fouling, yet the rotating cooling effects minimize the common faults of burning, erosion, blistering and insulator failure. Compare this principle with the conventional 2-point spark plug design.



PLATINUM-NICKEL ALLOY ELECTRODES—Metallurgists' first major step beyond platinum-iridium alloy electrodes. Arcing points of this material have continued to function after the equivalent of 120,000 car-miles.

SPECIAL SINTERED CORUNDUM INSULATOR—Made of gem-like mineral which conducts heat 20 times better than ordinary porcelain. Special shape is designed to vaporize and disperse wet carbon and oil.

NOW... ORDER REGISTERED SET FOR YOUR CAR AT POPULAR PRICE!
Dealers and Distributors: *The LIFE-TIME Spark Plug* is now in full production. Write for full details. Distributors: Please inquire as to status of your territory.

YOU RECEIVE BY MAIL

this registered set of LIFE-TIME Spark Plugs in proper series (heat range and gap) for the car you indicate in coupon. NOW AVAILABLE FOR AMERICAN & EUROPEAN PASSENGER CARS, TRUCKS, BOATS, FARM EQUIPMENT, INDUSTRIAL ENGINES.

LIFE-TIME Spark Plug Division, CONTINENTAL MANUFACTURING CORP. Washington Blvd. at Motor Ave. Culver City 69, California

Continental Please mail postpaid. \$8.95 (includes) 1 set of LIFE-TIME Spark Plugs in proper heat range and gap for 800 cc 800 cc Continental price of 95c per plug (Set of 6) \$1.50, set of eight, \$7.50. 10r set of \$1 per set, balance C.O.D.)

Size of my car is: _____ Year: _____

Model: _____ No. Cyl. _____

I enclose \$ _____ (check, cash or money order)

Name: _____

Address: _____

City: _____ Zone: _____ State: _____

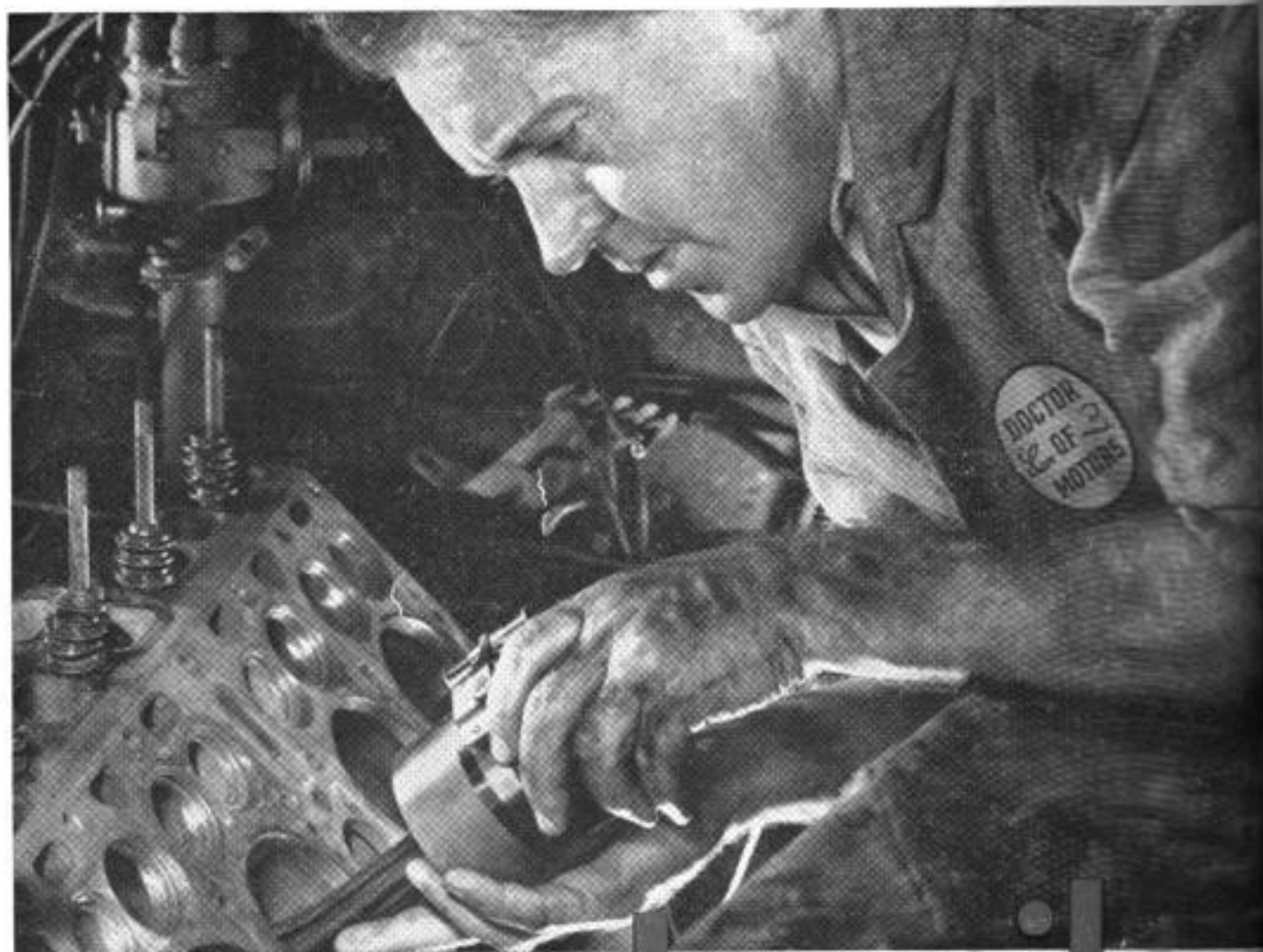
8 HORSEPOWER GAIN!

Dear Car Owner:

The real test of a spark plug is "What will it do in my own car?" Take the above dynamometer test on a 1951 Buick Super. It shows an 8 horsepower gain with Life-Time 11-point plugs. This was a 125% hp gain at 2000 RPM. You don't need a dynamometer with Life-Time plugs. You can feel the difference both in your ride and your pocketbook. Try a set and let the hose from you about them. Many thanks!



Frank Robinson
Inventor of the LIFE-TIME Spark Plug



For thousands of **extra miles**
of peak-performance, re-ring with Perfect Circle...

THE BRAND MOST PEOPLE PREFER!

Doctors of Motors *everywhere* know from experience that Perfect Circle's 2-in-1 Chrome piston rings assure sustained power and positive oil control.

In Perfect Circle's 2-in-1 Chrome piston ring set, *both* the TOP ring *and* the OIL ring are plated with thick, solid chrome giving complete wear protection throughout the

entire area of ring travel. Life of cylinders, pistons and rings is *more than doubled!*

Enjoy thousands of *extra miles* of carefree, economical driving by installing Perfect Circle's 2-in-1 Chrome piston rings. Perfect Circle Corporation, Hagerstown, Indiana; the Perfect Circle Co., Ltd., Toronto, Ontario.



Perfect Circle

2 in 1 chrome piston rings

The Standard of Comparison

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