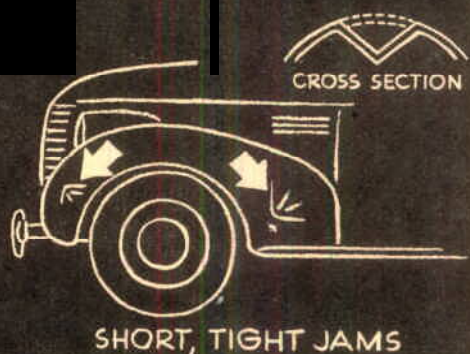
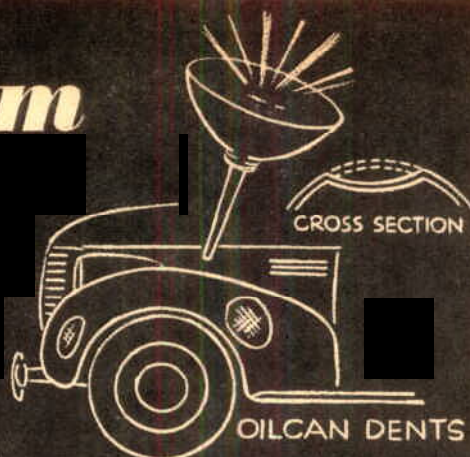
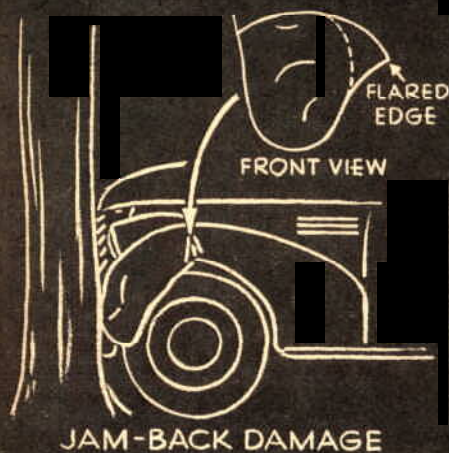


# Bump 'Em Out Yourself



Are your fenders dog-eared? It's easier to iron out dents than you may think. Just common tools are needed.

By E. F. Lindsley

THERE'S a rule to remember when you're removing a dent from an automobile fender. Even more than you'd like to get rid of the dog-gone thing, the dent itself wants to come out. Here's why:

A dent is as out of place in a stamped sheet-metal part as one in a drum head, and built-in strains are constantly trying to force the metal back to its original curvature. It follows that your work should be planned to give these forces a helping hand. Metal that's badly stretched, torn, or cracked is the only exception.

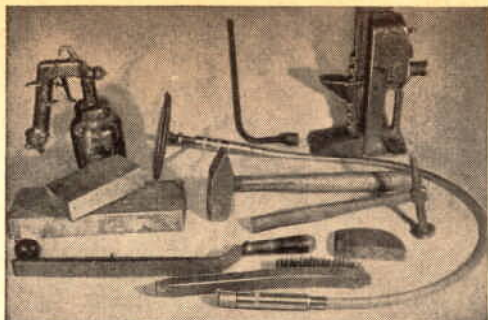
Fender dents fall into three general classifications. First and most common is the oil-can or dish-shape. A type more difficult to remove is the short crease, or jam, stretched into the metal by such unyielding objects as

bumpers and lamp posts. The most troublesome is the jammed-back fender resulting from head-on impact. Here, the rolled edge of the fender shows a definite bellling out and the front part is bent back toward the wheel.

All three conditions also are found in doors, hoods, rear decks, and other locations—but such cases usually require expert attention and special tools. Stick to fenders until you've gained experience.

Step one in removing any dent is careful examination of the edge contours of the fender. Sighting along the rolled bead and comparison with an undamaged member will usually disclose irregularities in the basic alignment. Once these have been spotted, use a jack or timber to force the misalignment back towards its original curve, and use blocks as needed to hold this pressure on the metal while removing the dent. Restoration of the original pressed-in stresses makes dents come out easily. If the rolled bead at the fender edge is buckled, straighten

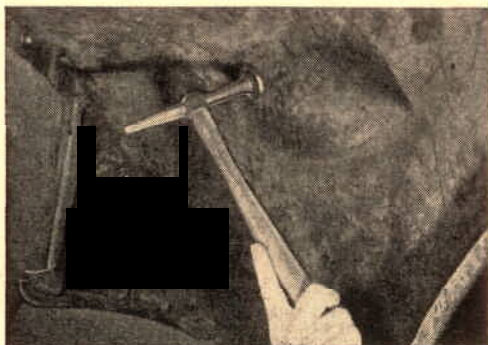




**Few tools are needed** for home fender repairs. The main ones are hammers, a jack, spray gun, vixen file, wire brush, dolly, and wood blocks. A flexible-shaft sander-polisher also is useful.



**Oilcan dents** usually are easily removed and often the finish is still good. Sometimes just pressing out with your hand will do the job. Place the other hand on the outside as above.



**Gentle tapping** along the edges with a hammer will cause a stubborn oilcan dent to pop out. Avoid heavy blows and never strike the center.



**Short, tight jams** take hammer work from inside and a bumping dolly against the outside. Again confine the blows to the edges.

it at least partially before going further.

At this stage, a clean oilcan dent can often be popped out by a simple push with the hand. This is a satisfying occurrence. If a pop-out seems impossible, sight along the outer fender surface at the edge of the dent. Often a very slight raising of this edge can be detected. If such is the case, tap around this raised area from the outside. In theory, at least, the tapping builds further tension in the dented area. In practice, the theory will commonly prove out by allowing the dent to be popped out.

Should the depression still not yield to hand pressure, start with a light hammer, working from the inside of the fender, and tap gently around the edges of the dent. *Do not strike the dent in the middle.* Although a tempting tactic, the latter almost always results in stretched metal and a bulge in the finished job. The object of edge tapping is to reduce the sharpness of the dent edges. If this tapping is done in easy stages, the dent will either come out suddenly of its

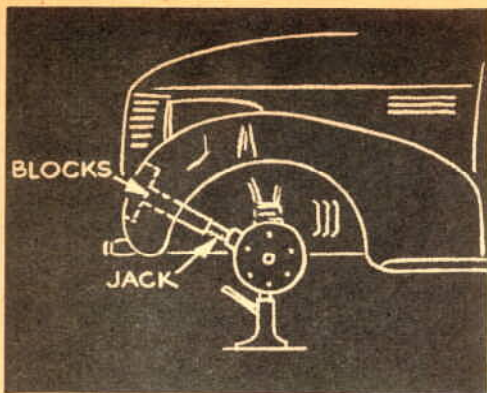
own will, or a push with the hand will spring it back.

Once the main dent has been returned to the natural contours, a few small dimples and a slightly raised area around the edges usually remain. Ordinarily these can be cleaned up with a few well chosen blows from a light hammer. Use the backing dolly here to prevent any tendency for dents to become "warts."

The jammed-back fender usually requires the application of a jack or timber, and over-forcing is necessary to allow for the natural spring-back. The technique is one of working back and forth; force the fender partly into line, straighten edges and remove major dents, bring more pressure on the alignment jack or timber, clean up the dents a bit more, and continue until the fender holds its proper alignment without springing back.

The removal of sharp, stretched depressions is often a real job. Severe metal stretching requires an acetylene torch and





Jammed fenders may be returned to position by placing a jack between padded wood blocks and a solid frame member. After normal contours are restored, clean up all minor dents.



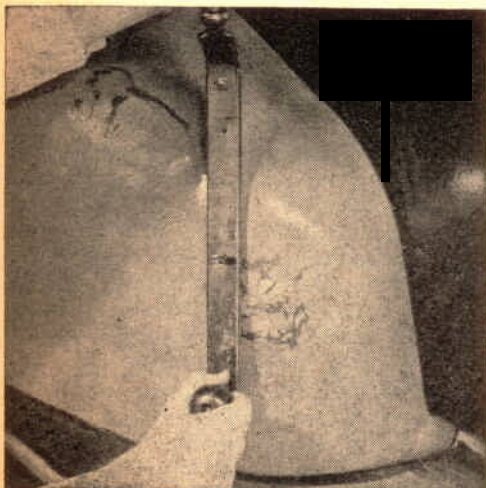
Refinishing the dent area requires thinner, primer-surfacer, rubbing compound, sandpaper, finishing color, and masking tape. Lacquer is preferable to enamel since it dries quickly.

a metal-shrinking technique to cure it, and a repair shop is the place for such work. However, if the damage is not too serious, treat it the same as you would an oilcan dent. Begin at the edges and gradually level out the entire area to the general contour. Frequent backing of the hammer with the dolly is called for here. When a sharp dent is removed, it should be remembered that the excess, stretched metal must go somewhere. It may compress slightly, but not enough to return to its original form. Hence, it is necessary to distribute, or "blend," the extra metal over a somewhat larger radius of curvature than the original shape. If this blending is skillfully done, the ordinary eye cannot spot it.

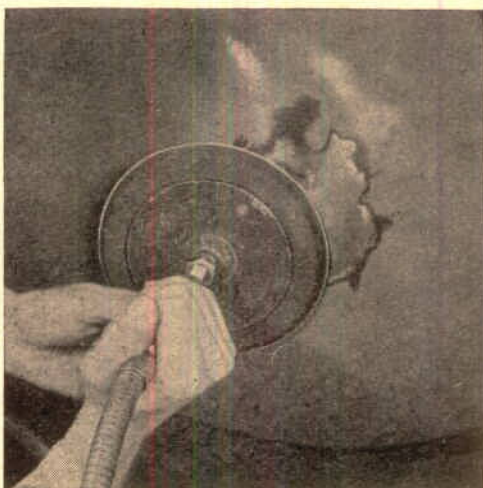
Refinishing is essentially the same for all dents. Begin by cutting down the high spots with a vixen file. Excess filing is, of course, to be avoided. When a slight amount of cutting fails to bring the entire surface true, it is a sign that the hammering is not right and more gentle tapping is needed to bring up the low spots the file misses.

When the repaired area reveals no irregularities to the eye or fingertips, a flexible shaft and rubber-backed abrasive disk are useful for removing file marks and feathering back the old paint finish. If such equipment is not available, the worst file marks can be taken out with a mill-cut file.

In home repairs, a better job will result if the entire fender or panel is repainted. The first step is removal of old wax, oil, and



Using a vixen file in long strokes, begin to remove tool marks and feather back the old paint around the damaged area. Also clean all wax, oil, and dirt from the surface.



Clean up the file marks with abrasive paper and rubber polishing disk on a flexible-shaft tool. Then rub the area with wet sandpaper to get a good priming and painting surface.



dirt. Cleaning preparations made for this particular job by paint manufacturers should be used. Sanding does not remove wax satisfactorily but merely forces it into the old finish. Once the surface is clean, water-sanding with No. 320 paper is in order. Incidental scratches can be leveled down and the old paint surrounding the repair feathered back with 280 paper. Always use the finer paper over the spots sanded with 280; the coarse scratches have a way of coming through.

After sanding, clean the surface once more and avoid touching it from there on. Mask any parts in line with the overspray.

Mix a supply of primer-surfacer and spray it lightly over the repaired area and any areas that were deeply scratched. Build up successive thin layers of surfacer but at no time apply so much that it tends to run or sag. Drying time depends somewhat on the air conditions. For best results, the temperature should be around 70 deg. F. In any case the primer-surfacer should be "hard" dry before you attempt to sand it. Usually an hour or less is adequate for drying and a careful pressure with a finger nail will show if the primer is hard.

Use 320 paper and water to sand the primer to an absolutely smooth surface and to feather out the edges. Clean the surface carefully with water and examine it for imperfections. If any are found, it means that the sanding was inadequate, or, if the sanded primer is thin and bare metal shows through,

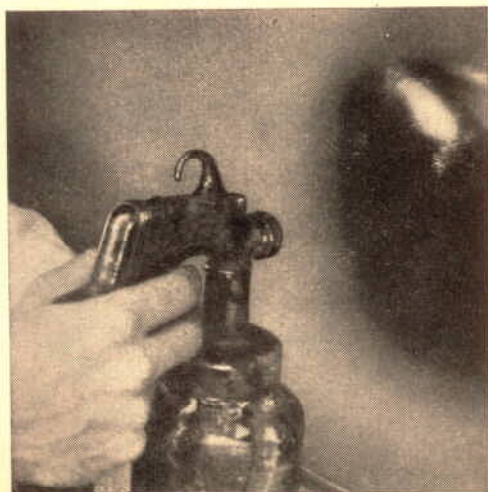
insufficient primer was applied. In the latter case, another build-up of primer is indicated.

When the car has a synthetic enamel finish, enamel may be used if a dust-free work place is available. However, lacquer is probably best for amateur finishing. It can be applied outdoors in nearly anything short of a high wind or plague of gnats, and it dries rapidly. If you don't have a spray gun, you can still get excellent results with auto enamel, paintbrush, and patience.

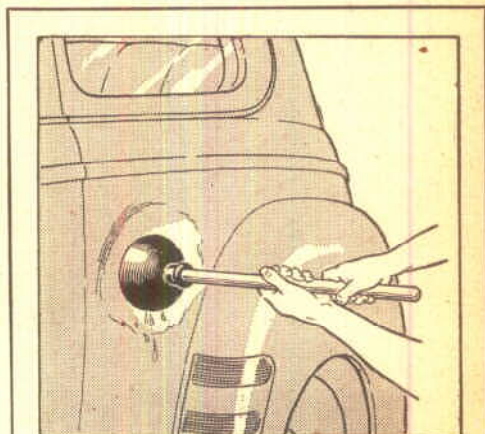
The usual spray procedure with lacquer is a thinned out mist coat—to give the following coats something to "hang" to—followed by several cross-lap coats for build. Don't be afraid to put on enough lacquer, and pay particular attention to the fender edges and projections where subsequent rubbing is likely to cut deep. Once the final spray pass has been made, clean out the gun and forget the job for at least a day.

Then examine the spray job carefully for orange peel, blemishes, runs, and other imperfections. (Orange peel is the term applied to innumerable tiny pits resembling the skin of an orange.) A surface skillfully sprayed with good equipment should need no more than a quick rubbing with compound. An amateur job may require more elbow grease. If done very gently, wet sanding with 400 or 600 paper generally will remove runs, orange peel, small dust motes, bugs, and pipe ashes.

Follow the sanding with rubbing compound, and then wax the fender. **END**



Lay a smooth surface for the finish coat by applying the primer with a spray gun. Follow the priming coat with wet sanding. You'll get a better job by refinishing the entire fender.

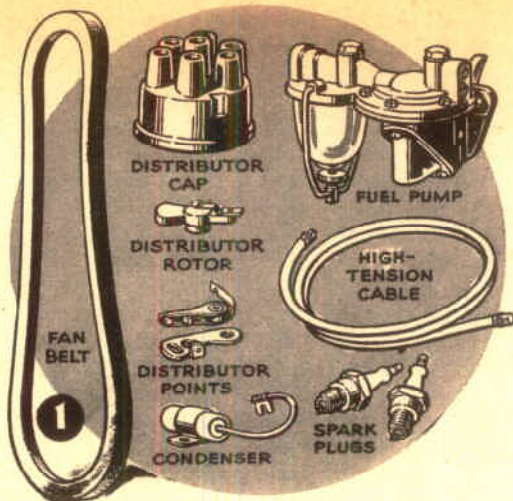


A sink plunger often will enable you to pop out a dent that's located in a spot you can't get behind. Dip the plunger in water first. The drawing shows how it's done.—L. B. Wessel, Madeira, Ohio.

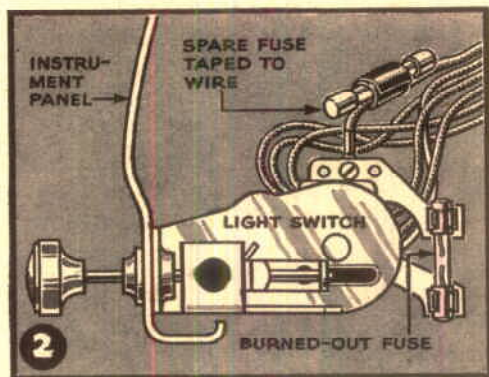




**1. Spare Parts Pay Off.** Some years ago I adopted the practice of always carrying this kit of spare parts, and at one time or another I have found a use for each item. Even if someone else makes the repairs, it is often a timesaver to have the necessary part readily available. Incidentally, the cable, long enough to reach from the coil to distributor, may sometimes be the means of starting the car when the original has become wet.—WALTON E. BRIGGS.

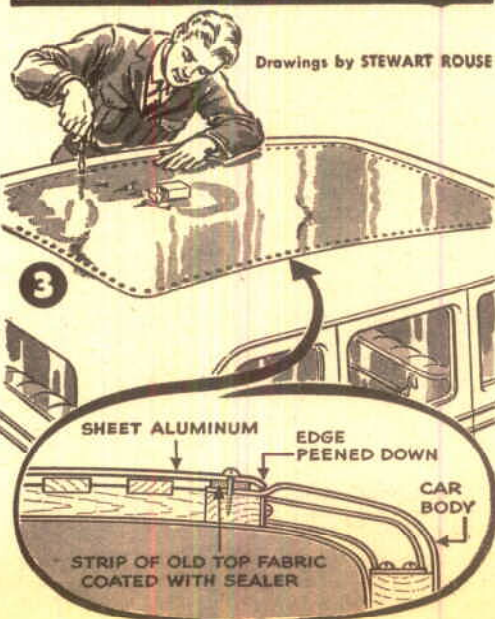
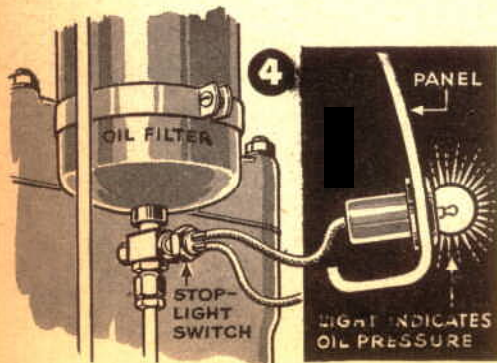


**2. Keep Extra Fuse Handy.** A fuse seldom blows on a car, but when it does you may be out of luck if you haven't another. A good idea is to tape a spare to a wire leading from the fuse or at some other adjacent point.—J. O. SACKERSON.



**3. Aluminum Used for Top.** A new car roof may be made from a 4' by 6' sheet of war-surplus aluminum. Using the old roof as a pattern, I cut the aluminum  $\frac{1}{8}$ " wider all around. Then I peened down the edge, cut strips from the old fabric top, coated them with sealer, placed them around the edge, and fastened the aluminum with brass screws spaced 1 $\frac{1}{2}$ " apart. The roof is perfectly rainproof.—HOWARD CARE.

**4. Light Shows Oil Pressure.** Unable to buy a new oil-pressure gauge, I installed a hydraulic stop-light switch on an oil line, ran a lead from the hot ammeter terminal to one side of the switch, and a wire from the other side to a light on the dash. As long as there is sufficient oil pressure, the light glows.—JAMES SWAIT.





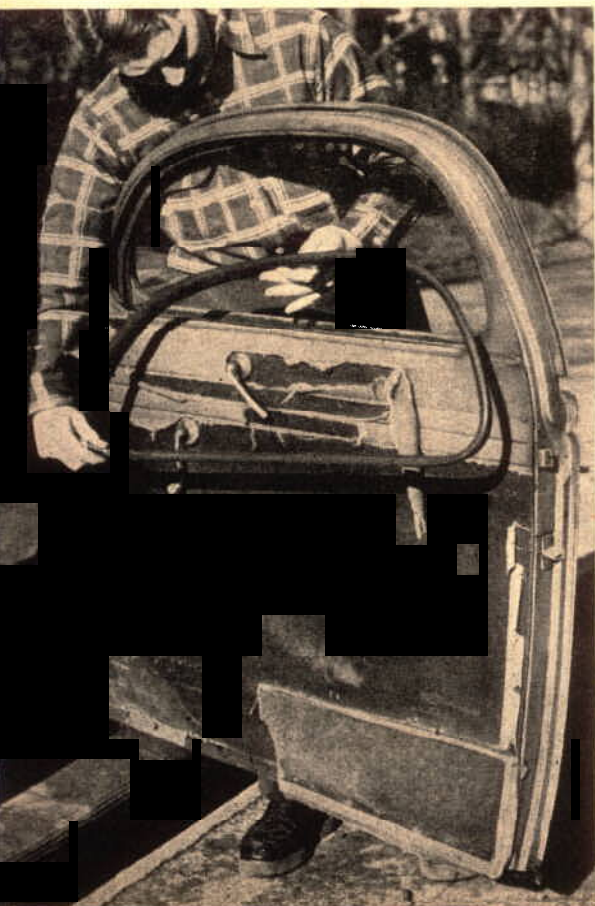
# Replace That Worn Upholstery

**R**IPPED or worn door lining makes a car look years older. Replacing the old lining with composition board is a simple job. You don't have to be an expert upholsterer, and all you need are a few hand tools. The board will give your car's interior a clean, neat look and it'll wear for years.

The photos below and on the next page show such a job being done with  $\frac{3}{8}$ " Leatherwood®, made by the Masonite Corp., Chicago. This board has a simulated-leather surface. The board requires no finish, but

you can paint or tone it to any shade you want. It can be cut with an ordinary saw, but should be cut slightly full. Frayed edges left by the saw can be removed by careful filing after the new panels are mounted on the car doors. Use a medium file and draw it from the surface of the board toward the back. Don't file in both directions or you may chip the board.

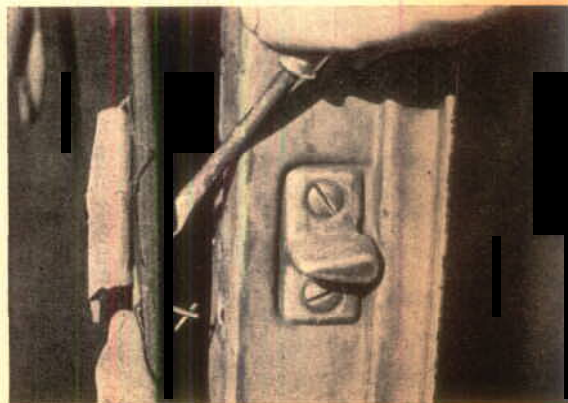
After you've cut out the new panels, clamp them in place on the doors. Check the location of the holes that are already ▶



First step in replacing upholstery of car door is removing window frame. Back out screws and you can lift the frame out of the window.



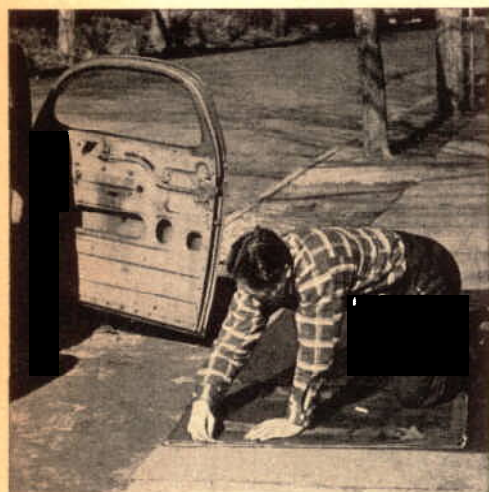
Take off door handle and window crank. Press inward on base plate to expose lock pin. Use small nail to push pin out of collar and shaft.



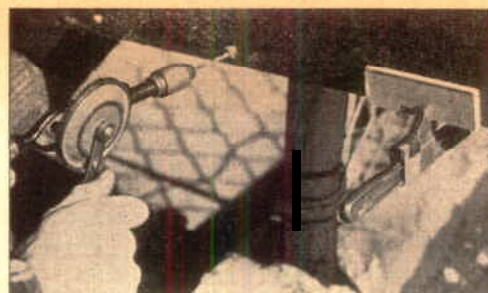
The old backing board usually is held to door by spring prongs snapped into holes in door. Pry prongs out of door with a screwdriver.



in the door before you drill new holes. Then you won't be drilling through the board and into an old hole. The old holes will be too large for the  $\frac{1}{8}$ " 8-32 self-tapping screws that you'll use.—*Emil E. Brodbeck, Mt. Vernon, N. Y.*



Place new material face down. Put old board face down on top of it. Use old board as pattern and draw all around it with chalk.



Use No. 28 drill and  $\frac{1}{8}$ " 8-32 self-tapping screws. Drill holes through composition board and into car door. Space holes 6" or less apart.



Holes for window crank and door handle will have to be drilled before board is mounted. Round edges of the board with a file.

### Paper Cup Lines Gluepot

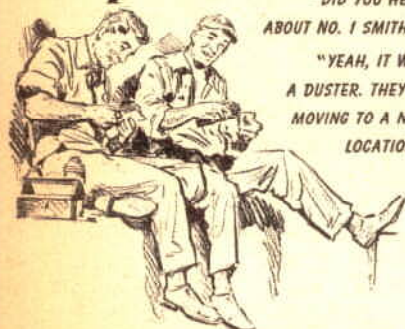
WHEN mixing a small quantity of glue or wood filler, I raid the kitchen for one of the paper containers that's used for baking cup cakes. I insert this in a small tin can, mix the glue in the cup, and, when I'm through, discard the cup. Result: no messy gluepot to wash out.—*Tom Griberg, Moline, Ill.*

### He Drives from the Sidecar



WHEN August Paul travels with his motorcycle, he rides comfortably in the sidecar instead of straddling the bike in conventional fashion. A mechanic in Munich, Germany, Paul rigged up the vehicle himself, installing a steering wheel, gear shift, and other controls in the sidecar.

### Shoptalk:



"DID YOU HEAR ABOUT NO. 1 SMITH?"

"YEAH, IT WAS A DUSTER. THEY'RE MOVING TO A NEW LOCATION."

What are they talking about?

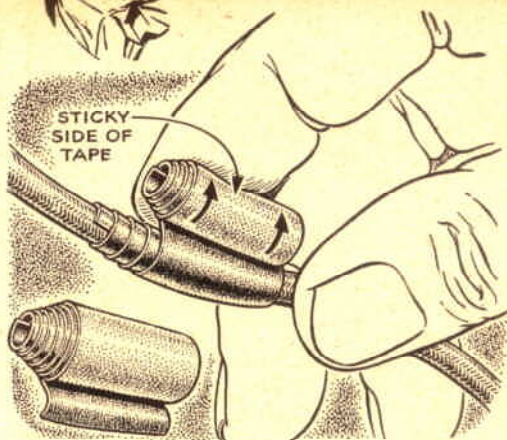
Where do they work? Answer below.

*They're oil-field workers. No. 1 Smith is the name of a well—the first well drilled on the Smith lease. Duster is a dry hole. The drill rig is being moved to another spot to drill another well.*

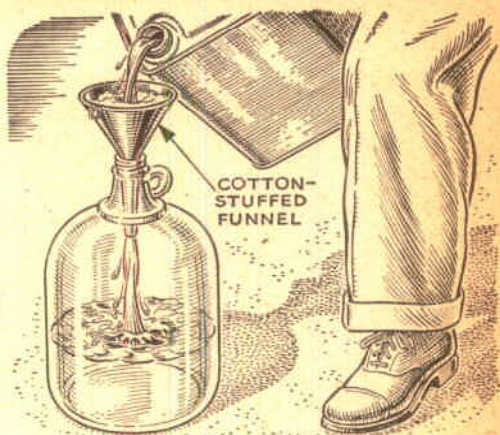




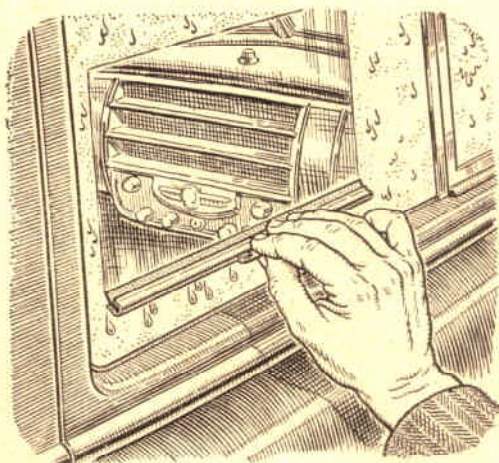
## Hints from the Model Garage



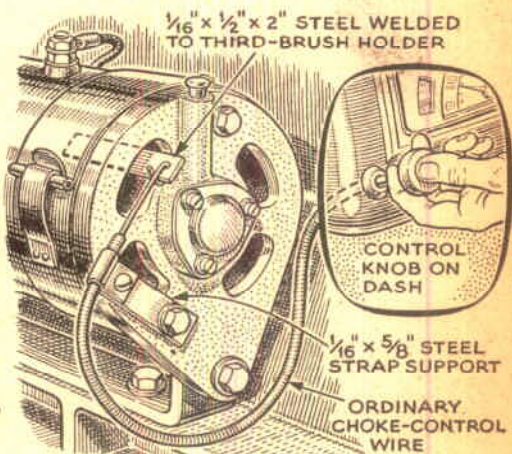
**Look, One Hand!** In a spot where there's barely space for one hand, how can you tape a wire? Simple enough, says Harry Morse, Oakland, Calif. Tear off a piece, re-roll with the sticky side out, and wind on with the fingers of one hand.



**Filter Your Antifreeze.** Before putting stored antifreeze back into your car, it's a good idea to filter it through a wad of absorbent cotton placed in a big funnel. You'll find a surprising amount of last year's dirt on the cotton.

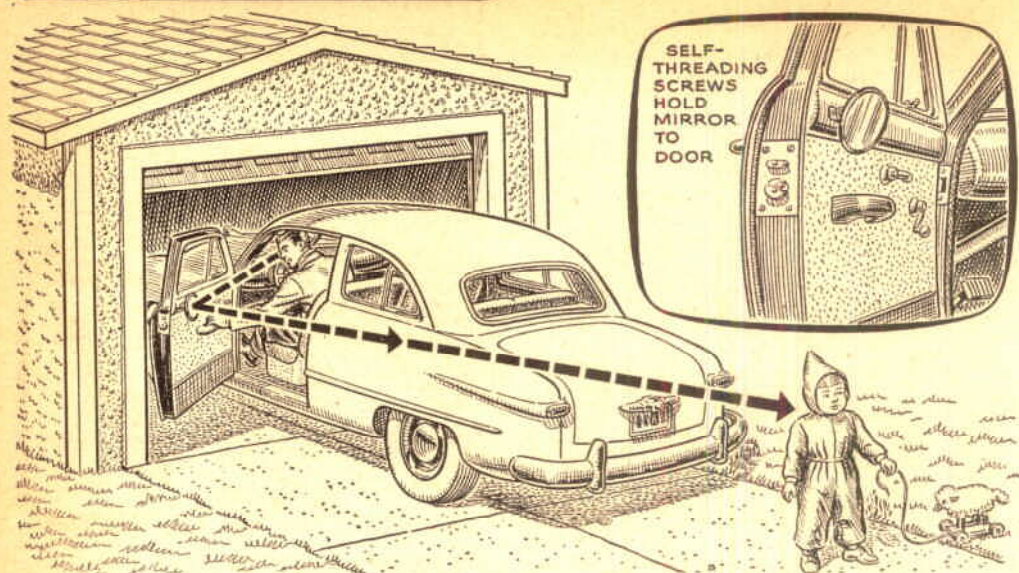


**Clearing Fogged Windows.** Richard H. Hanson, of Melrose, Mass., makes it a practice to carry an extra windshield-wiper blade. Besides serving as a spare in case of loss of one of the regular blades, it also comes in handy as a squeegee for clearing fogged windows. It's also useful for drying the windows after a car wash.



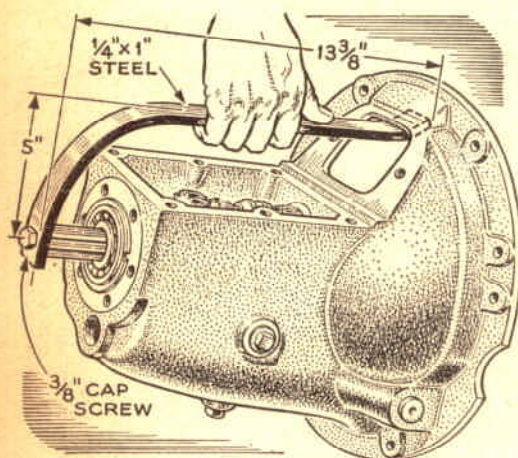
**Varies Generator Output.** This control enables Rowlins Howard, Rushville, Ind., to vary the generator output on his 1934 Chevrolet to suit conditions. On short hops and at night, he pulls the knob and gets readings of 15 or 20 amp. On a long trip he cuts output back to 4 or 5. This helps prevent battery overcharging.



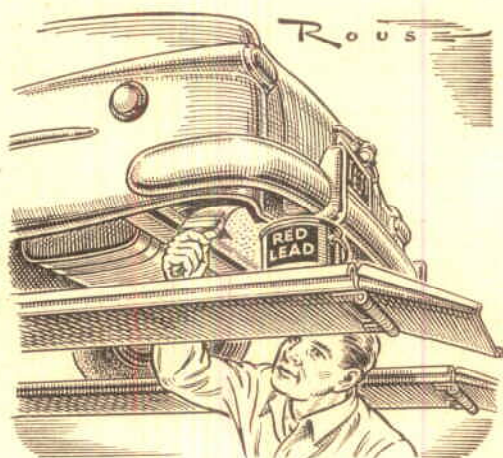


**Door Mirror Widens View.** If there are children in the neighborhood, backing out of a driveway is always a risky business. A mirror mounted on the driver's

door as above will help cut down any blind spot behind the car. Locate it as near as possible to the outer edge of the door to get a wide angle of vision.



**Transmission Lifter.** Back in the days when Fords had the shift lever on the floor, the lever could be used to lift the transmission out of the car. But on later models there's practically nothing to which you can hold. To ease the job, mechanic William E. Ware, of Shirley, Ind., made the lifter shown here.

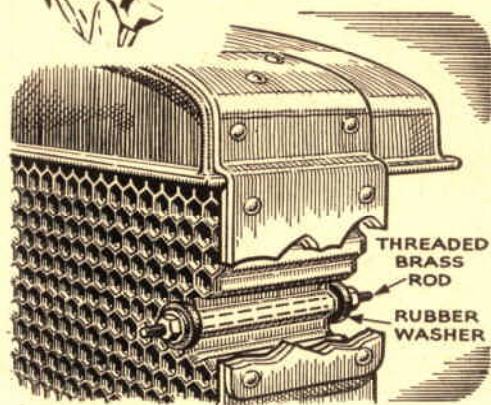


**Red Lead Stops Rust.** If you don't want to spend the money for a regular undercoating job, you may want to try red lead. You won't get any sound deadening, but at least you can protect the fenders and other metal from rust. A. Bogossian, Brooklyn, N. Y., reports he finds absolutely no rust two years after doing his car.

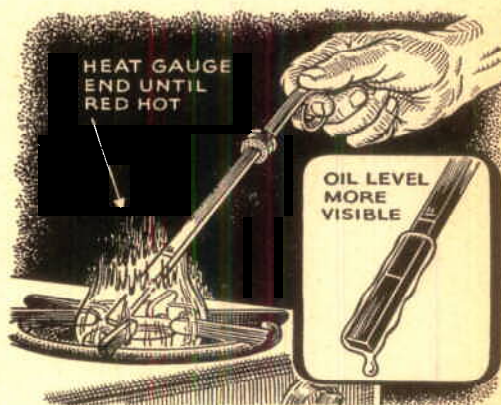




## Hints from the Model Garage



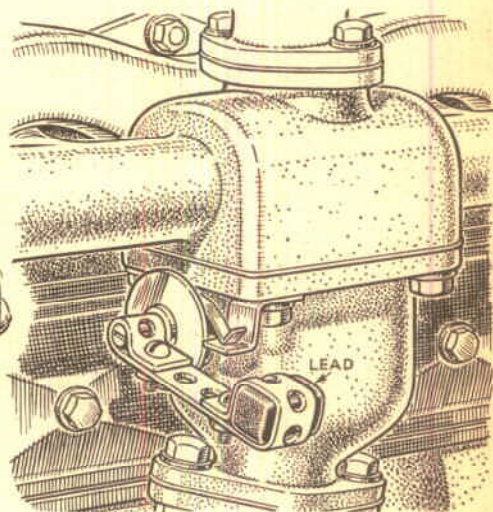
**Stopping a Radiator Leak.** When a leak developed in one cell of his honey-comb type of radiator, Joseph C. Cappetta, New Haven, Conn., stopped it as shown. The brass pin must be longer than the depth of the cell. The rubber washers seal the leak.



**Oil Line Shows Better.** To make the oil line more visible on your crankcase dipstick, Edward Wujcik, of Detroit, suggests heating the gauge end red hot in a gas flame and then letting it cool. The heat changes the color of the stick.



**Paper Tests Brakes.** Not sure which of his front brakes was grabbing, Lewis A. Emswiler, of Etna, Ohio, placed several sheets of newspaper on the garage floor in line with the wheels. Driving on the paper, he applied the brakes. The wheel with the grabbing brake ruffled the paper. It remained smooth under the other.



**Homemade Balance Weight.** When the balance weight on his manifold heater broke off, Sidney E. Lang, of Bakersfield, Calif., made his own as shown. After bolting a piece of plumber's strap around the control rod, he formed a loop in the other end, adding just enough lead to keep the valve open while the motor was cold.



# ENGINE NOISES

## Does Your Engine Purr . . .

warning that some part of your engine isn't functioning as it should. It usually comes in plenty of time for you to make the necessary repair before serious damage is done. And for the average driver, faced among other things with a shortage of major replacement parts, this is a blessing.

All drivers are familiar, of course, with the fuel knock. When using a poor quality of gasoline it is often heard when your car is pulling a heavy load. Provided ignition timing is correct and the engine isn't loaded with carbon, this knock simply means that the engine wasn't designed for the poor gas it is forced to burn.

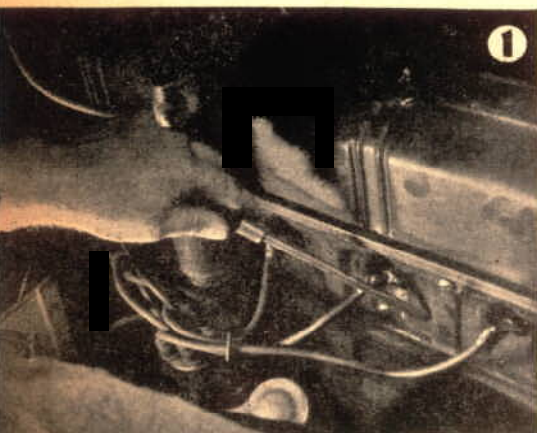
But those raps, slaps, thumps, metallic knocks, clicks, throbs, roars, whines, hums, and squeals—they can mean something entirely different, and they frequently do. You will find it well worth your while to learn what each means, if only to know which can be safely ignored and which can't.

An illustrated table of eight of the most



**A** NNOYING though it may be when your engine develops a click, rattle, thump, squeak, or pounding that you haven't heard before, such noises serve two valuable purposes. They act as danger signals, and they also serve as clues by which you can determine where the trouble lies. Once you have tracked down the sound to its source, it is usually easy to decide what, if anything, you ought to do about it. Some noises—once you know what causes them—can safely be ignored.

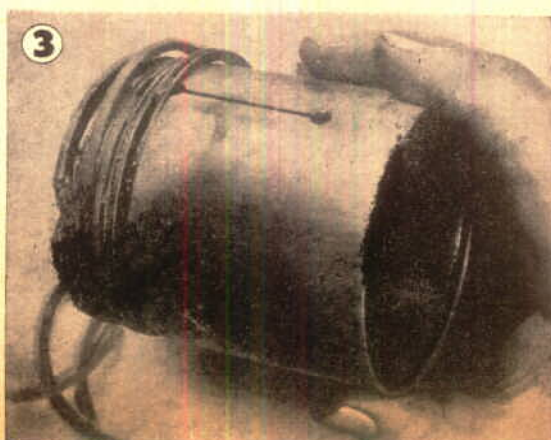
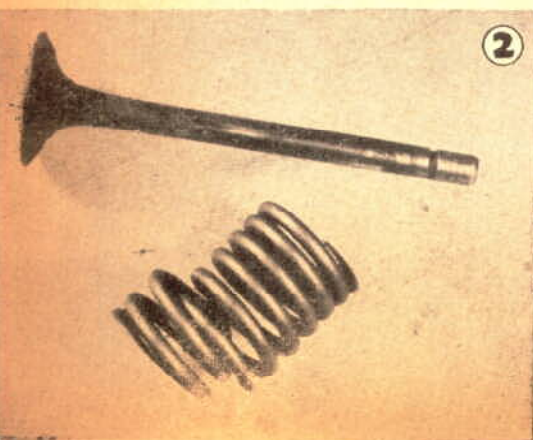
Any knock is first of all a warning—a



**1** Shorting out each cylinder in turn will often locate the one in which the cause of a knock exists. This eliminates much unnecessary work in hunting for a faulty part. Short the spark plug with a screwdriver that has an insulated handle

**2** Warped valves or broken springs like those shown in the photo cause rapid clicking. The noise can be lessened by the shorting test. New parts should be installed for the defective ones

**3** Running an engine having broken piston rings can cause trouble. The ruined piston shown below was chewed up by faulty rings. Sharp clicks at all engine speeds indicate a broken ring. The noise is not decreased by shorting the spark plug





# AND WHAT THEY MEAN

## or Does It Knock, Thump, Pound, and Chirp?

important of these noises is given in the chart below along with their causes and cures. You must remember, though, that noises in an engine are at best difficult to describe, and many are so nearly alike that you may find it hard to distinguish between them. With practice you should be able to tell most of them apart and learn to locate the underlying trouble by considering three

factors: the kind of noise, when it occurs, and what effect shorting out spark plugs has. This will prove a great help in determining whether to look for it on the spot or whether you can postpone the search until a convenient time.

A simple trick is used by expert mechanics to locate a knock. They hold a screwdriver or other rod of iron or steel to various parts

### COMMON ENGINE NOISES

SOUND	WHEN HEARD	CAUSE	DIAGNOSTIC CHECK	TREATMENT
SHARP RAP	IDLING SPEED	① LOOSE WRIST PIN	CAN BE SHORTED OUT	REPLACE PIN
FLAT SLAP	ACCELERATING UNDER LOAD	PISTON SLAP ②	CAN BE SHORTED OUT, LESSENS WITH HOT ENGINE	REBORE BLOCK AND REPLACE PISTON
INTERMITTENT, HEAVY THUMP	RUNNING WITHOUT LOAD	CRANKSHAFT END PLAY ③	CANNOT BE SHORTED OUT, DISAPPEARS UNDER LOAD	TAKE UP
METALLIC KNOCK	IDLING AND SLOWING DOWN	WORN OR LOOSE BIG-END BEARINGS ④	CAN BE SHORTED OUT, DISAPPEARS UNDER LOAD	REPLACE BEARING
RAPID CLICKING	CONSTANT	INCORRECT VALVE ADJUSTMENT ⑤	CAN BE SHORTED OUT BY CYLINDERS, FEELER GAUGE SHOWS WRONG GAP	READJUST
LOUD, RAPID CLICKING	CONSTANT	BROKEN VALVE SPRING ⑥	CAN BE DULLED BUT NOT STOPPED BY SHORTING	REPLACE
THROB, ROR, KNOCK, OR CLICK	CONSTANT, CONSPICUOUS ON ACCELERATION AND AT HIGH SPEED	LOOSE MUFFLER, Baffle, OR PIPE ⑦	CANNOT BE SHORTED, INSPECT FOR TIGHTNESS	TIGHTEN OR REPLACE
WHINE, HUM, OR SQUEAL	CONSTANT, CONSPICUOUS AT IDLING SPEED	WORN WATER-PUMP OR FAN-PULLEY SHAFT OR BEARING ⑧	CANNOT BE SHORTED, DISAPPEARS WITH GREASING	GREASE, REPLACE IF NEEDED





of the engine and listen at the other end to locate the point at which the noise sounds loudest. This may not be easy at first, but with a little practice the trick should prove valuable. Try holding your thumb on the rod at one end. Place your ear close to the thumb and touch the engine here and there with the other end of the rod.

If the noise originates in one cylinder, it can often be located by a process of shorting it out. In this test use a screwdriver with a wood or insulated handle and simply short out one spark plug after another until the noise disappears during the shorting. The cylinder in which the trouble is occurring can thus be determined, and the loose wrist pin, slapping piston, faulty connecting-rod bearing, or defective valve can then be ferreted out without taking down more of the engine than is necessary.

A loose or worn big-end bearing on a connecting rod can be located in this way. It also often makes itself known to the experienced mechanic by its metallic knock when the engine is idling or slowing down—a noise that disappears when the engine is under a light load. One test is to accelerate the engine and then to close the throttle suddenly, at which time the knock should be very pronounced. Examine the bearing, and if it is worn or loose, the most practical treatment is to replace it with a new one.

The identifying noise of a loose wrist pin is a sharp rap, also occurring at idling speed. Such a pin is also best replaced by a new one. If the old pin is broken, the noise will be very loud and very metallic. Such a pin is dangerous as it may break the piston and cause serious damage to the engine. Even if the noise can't be shorted out entirely, shorting will soften the sound.

A piston that has become loose in the cylinder slaps against the walls with a flat, slapping sound heard when accelerating and when under load. It is less apparent when the engine becomes hot. The noise disappears when the correct cylinder is shorted out. The remedy is to remove the faulty piston, rebore the cylinder, and install an oversize piston. Broken rings cause a sharp click at all speeds and can't be shorted out. They should be replaced before they do any damage.

Loose main bearings are indicated by a deep, heavy, dull thump, increased on acceleration and under a heavy load. However, loose bearing shells in the crankcase cause a knock so similar to a main-bearing knock that it is almost impossible to distinguish between them without tearing down the engine for inspection. If a main bearing is at fault, it is best to replace all the main bearings while the engine is torn down; but only the bearing shell that is loose needs

to be replaced. A loose shell can rarely be made to fit correctly again. Too much end play in the crankshaft causes an intermittent, heavy thump. It disappears under even a slight load. The end play should be taken up by the means provided in the design of your particular engine.

Replace loose camshaft bearings, but check first for broken or sheared dowel pins and replace them as well as the faulty bearings. Inspect the gear if end play is indicated, for it may not be tight enough on the shaft and pressing it on tighter may eliminate the difficulty. If a worn thrust plate causes end play, it should be replaced by a new one, as should a gear that has a chipped or broken tooth.

Valve noises range from light taps and slaps to squeaks and knocks, and as a rule they do not indicate trouble that might lead to a major breakdown. The most common are those caused by improperly adjusted push rods where excessive clearance results in tapping. It is simple to readjust them to the manufacturer's specifications unless the adjustment units have become worn, in which case new adjustment units should be installed. You can short out or reduce noises caused by incorrect tappet adjustment.

It may be necessary to put in a new push-rod assembly if wear in the push-rod guides cause side slap. If the assembly is loose on the block, indicated by a rattle, a general tightening of all nuts is sufficient. New valves and guides are required when valve stems are loose in the guides. If valves stick, the engine should be cranked over slowly with the valve cover off so you can see whether all the valves come to a normal closed position. Any that do not will probably be warped or have a broken spring. Defective units should be replaced. Broken valve springs cannot be shorted out completely, but the sound can be dulled.

In addition to these main engine noises, there are miscellaneous knocks and thumps that it is well to know. Various loose engine supports may allow the engine to thump on its bed on rough roads or when the clutch is being engaged or disengaged. A loose muffler or loose baffle plates in the muffler can set up a disturbing racket, as can a loose tail pipe. Ungreased or worn water-pump bearings or ungreased fan pulleys will often cause an eerie whine. A loose flywheel knocks most noticeably when the engine is accelerated and also while the clutch is being engaged or disengaged. Wear in a distributor shaft or bushing often causes a grinding noise when the engine is idling. Timing gears that are meshed too tightly will hum like a worn rear end but not so loudly. Most of these parts can await repair at your convenience.