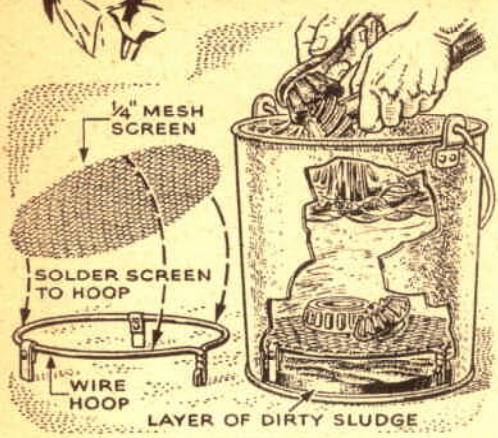
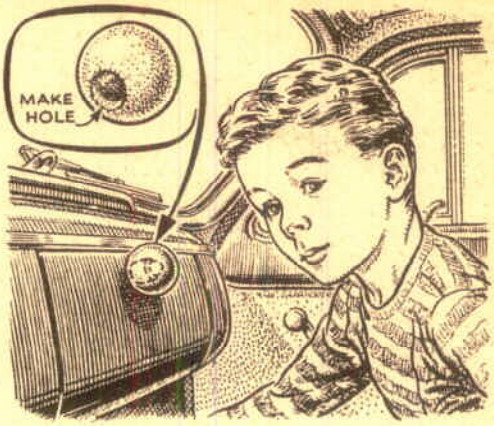
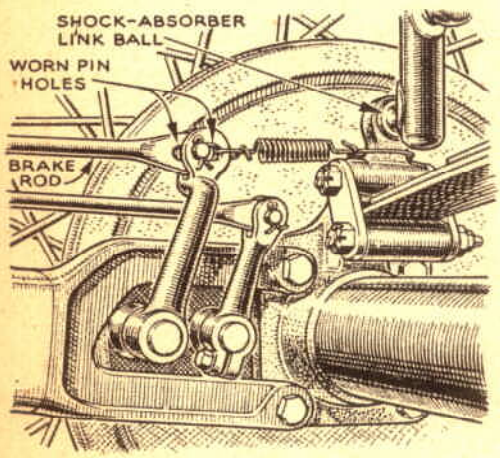
Hints from the Model Garage



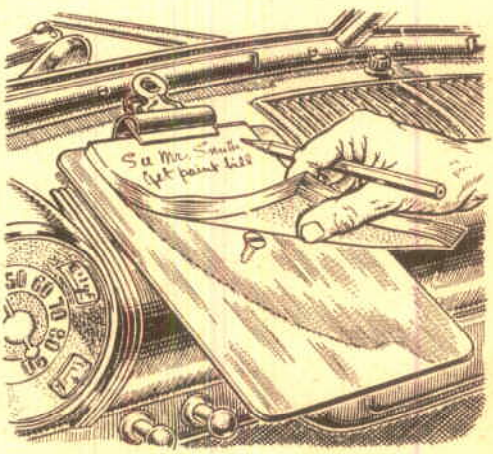
Solvent Stays Clean. Harry Morse, of Oakland, Calif., suggests putting a screen in your parts-cleaning bucket when you're taking down a unit. It lets dirt settle to the bottom and keeps it from being stirred up while you're brushing parts.



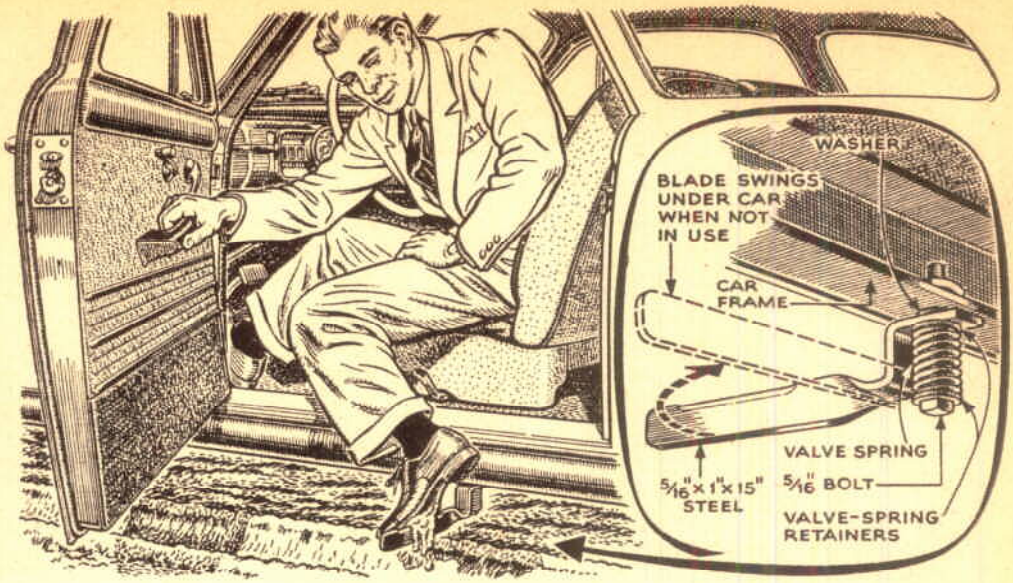
Ball Protects Children. Knobs or handles on the dash can give youngsters a bad bump on sudden stops. Sponge-rubber balls fitted over the protruding parts reduce this hazard. A dab of gasket shellac in the hole will attach the ball securely.



Spring Holds Brake Rod. Model A Ford owners sometimes have trouble keeping the mechanical brakes in adjustment because of worn linkages. In such cases, it's probably advisable to install new linkages if available. But you might like to try the idea illustrated above, suggested by J. O. Troemner, of Madison, Wis. The spring takes up the slack that results from the worn pin holes, preventing the brake from dragging when off.

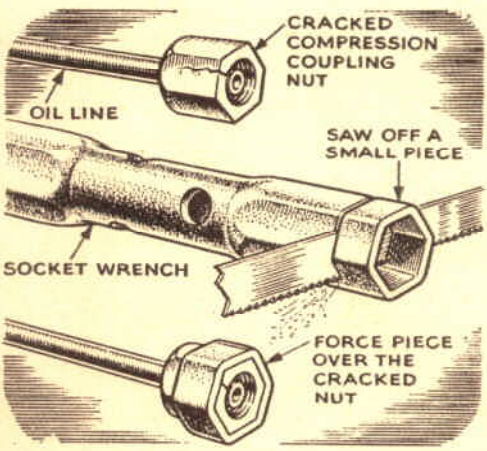


Make Notes While You Ride. A note pad is often a useful thing to have at hand in a car, especially if you are apt to be forgetful. S. D. Laing, of Burrton, Kan., made provision for one in his car by mounting a 4" by 7" piece of heavy sheet aluminum on the dash at a convenient writing angle. A single self-tapping screw holds the piece of aluminum. A pad of note paper is clipped to this, and a pencil is kept in the clip.

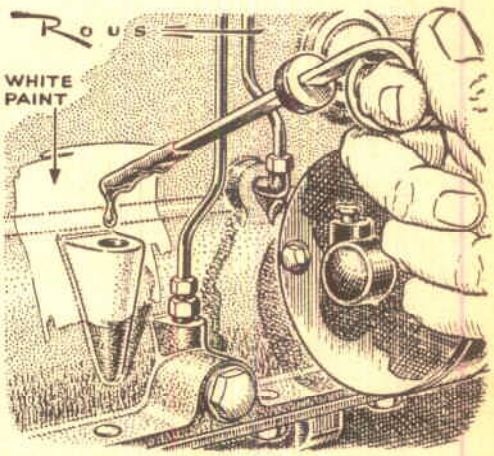


Scraper Cleans Your Shoes. A shoe scraper conveniently mounted will help keep the interior of your car cleaner. The one shown was designed and built by members of the auto mechanics class at the senior high school in Midland, Mich.

Dimensions were chosen to suit a new Hudson, an existing hole being used to mount the scraper. By changing the dimensions, you could adapt the scraper to other makes. It might be best, however, to bend up a strip of tin first as a template.



Socket Repairs Oil Line. When an oil line began to leak because of a cracked coupling nut, Norman EnHolm, of Lake Mahopac, N. Y., made an effective repair in this way. After disconnecting the union, he selected a hex socket wrench that would not quite fit on the nut. He then hacksawed a piece off the socket, squeezed the cracked nut together with a clamp, and drove on the collar. It stopped the leak.



Keep Your Oil Clean. The dirt and grit that gets into your crankcase through the dipstick hole may not amount to much, but why take a chance? Scrape the accumulated oil and dirt away from the opening occasionally so you won't shove it inside by accident. At the same time, apply white enamel around the hole. It will make future cleaning easier and help you locate the hole to replace the dipstick.

An Expert Tackles a Valve Job

By R. P. Stevenson

PSM photos by W. W. Morris

YOU can't drive a car forever without getting a carbon-and-valve job. Sooner or later, the engine begins to knock badly, idle roughly, or skip under load. Or perhaps a mechanic looks up from a compression gauge and tells you the compression is low in one or more cylinders.

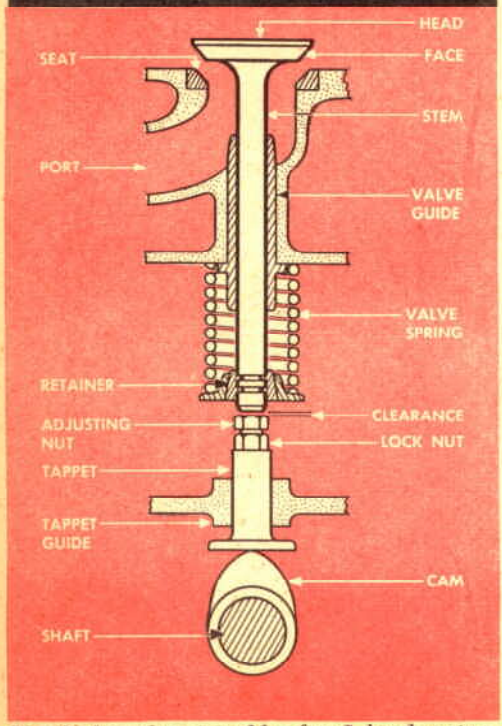
When Model T's were stylish, lots of men did the job themselves, and it's still within the range of the man who likes to work on his own car. But in many ways, the job no longer is as simple as it once was. So, whether you are a hot man under the hood or turn the job over to a mechanic, you should know how an expert does it.

Your expert in this case is John Kowalski, who spends a great many of his working hours peering into cylinder blocks in the shop of James F. Waters, Inc., a company that operates one of the largest service garages in the East. These are pictures of an actual job performed on a 1941 Plymouth. The procedure may be considered typical for an L-head engine.

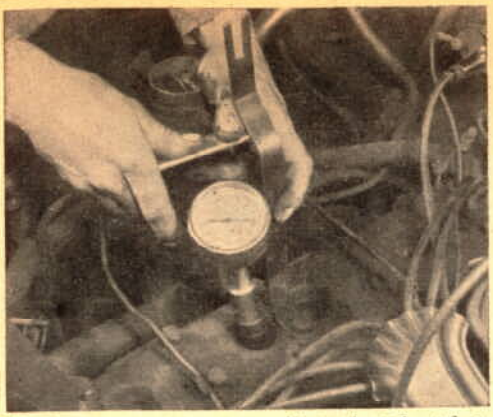
One thing you will notice is that the valves aren't ground against their seats; instead, every valve and seat is refaced. Because this can be done uniformly, the valves need not be kept in order.

Although not shown in the sequence of photos, the mechanic also checks each valve spring with a spring-compression tester, discarding those that don't come up to a specified pressure. To keep the valves from sticking when the engine is first started, a drop or two of oil is placed on each stem before reassembly.

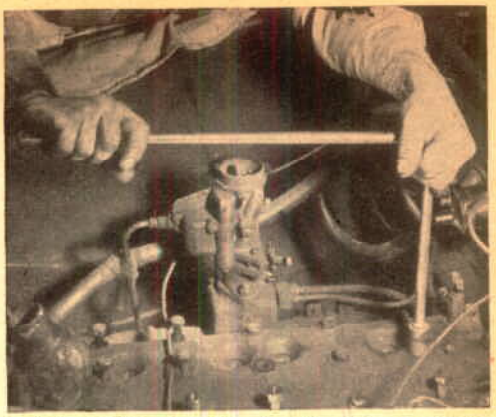
Along with a carbon-and-valve job, Plymouth factory policy specifies a complete engine tune-up. A working period of eight hours is allotted for the entire job.



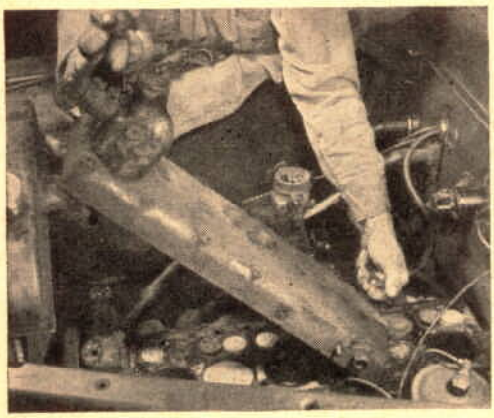
Here's the valve assembly of an L-head engine. Valve seats are refaced as shown in the photo.



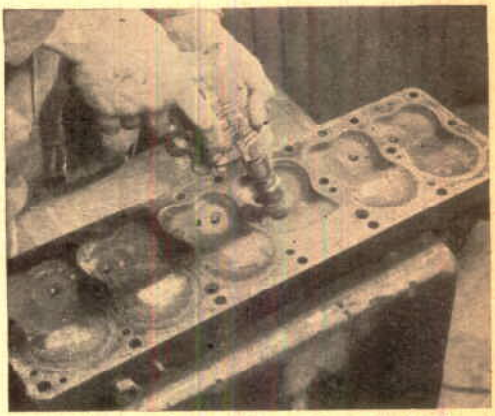
1. A compression gauge hints that the job is needed, as a low reading suggests that a valve is sticking or burned. In this shop, compression is always tested as part of a regular tune-up.



2. The job begins. To clear the way, the water is drained off, and the hose, air cleaner, oil filter, distributor, and wiring are removed or loosened. Then head bolts are removed as above.

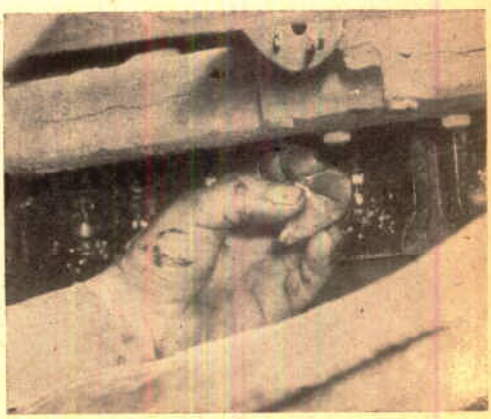


3. As the head is lifted off for cleaning, carbon may be seen on the piston and valve heads. The mechanic gets a good grip on the head; even aluminum ones are awkward to handle.

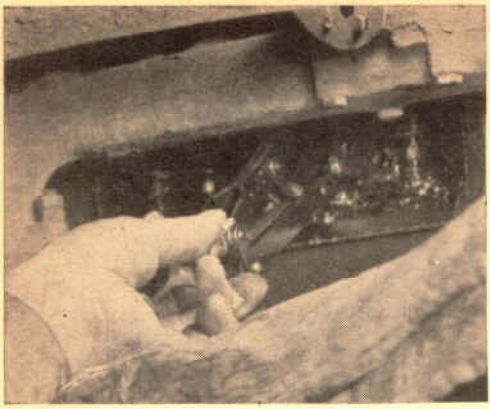


4. Carbon is cleaned from the cylinder head with a wire brush chucked in a small electric drill. This step could be postponed until just before it is time to reinstall the head.

5. To reach the valves, the front is jacked up and the right wheel removed. Then the mechanic takes off the fender plate, heat shield, fuel line, and (above) side plates over the valves.

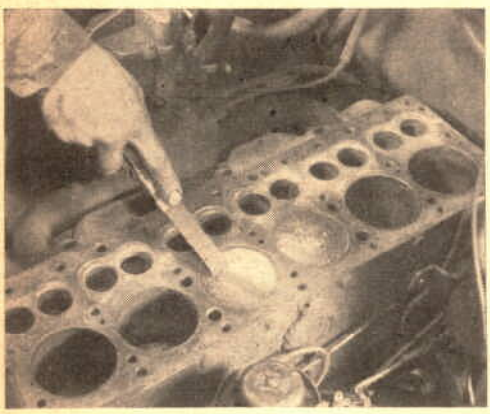


6. Oil-return openings near the tappets are plugged with cloth before the valves are touched. This keeps the small locking keys from falling into the crankcase. [*Turn the page.*]



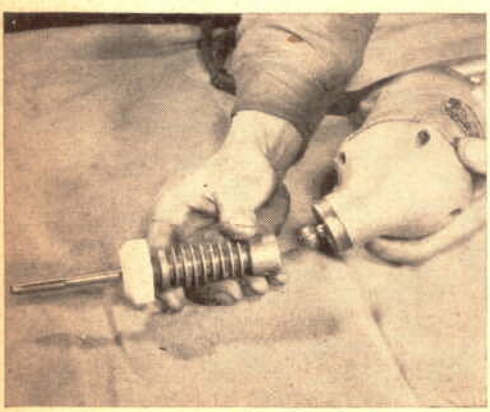
7. Inserting a valve lifter, the mechanic now compresses the spring so that the keys may be removed. Before this, he checks to see that the valve is in the down position; that is, closed.

8. Using a mallet, he taps the valve head after it has been raised by the lifter. This loosens the keys for removal. Unless it is stuck, the valve can now be lifted out with the fingers.



9. Carbon is scraped from the piston heads and the entire upper surface of the block when all valves have been removed. The mechanic works carefully to keep scrapings out of the bore.

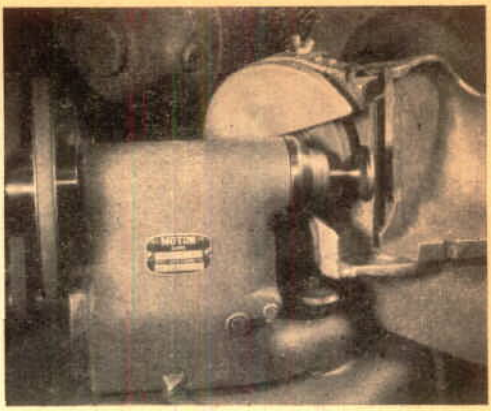
10. All valve guides are cleaned with a reamer chucked in the ever-handy drill. Sometimes, a guide is worn so much that it must be replaced. Note the clean block after the carbon removal.



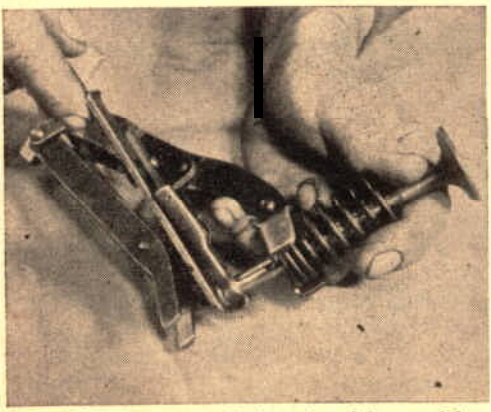
11. Valve seats are refaced with this grinding tool, shown in use on page 180. The protruding stem keeps the stone and seat in proper relationship. The grinder has a 45-deg. face.

12. Since the seats must be refaced at exactly 45 deg., the cutting stone is dressed from time to time in this way. In some cars, for instance the Pontiac, the valves are seated at 30 deg.

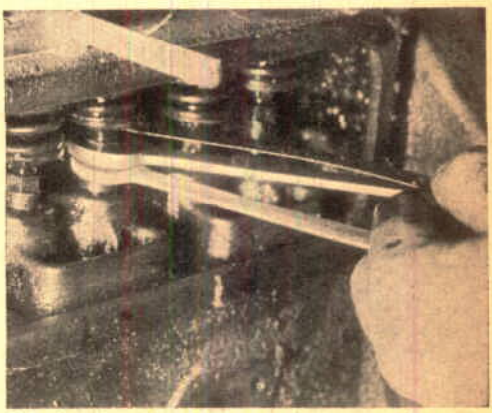
13. Valves are cleaned with a power brush in a machine shop adjoining the garage floor. The carbon quickly comes off and the metal of the head, face, and stem is left bright and shiny.



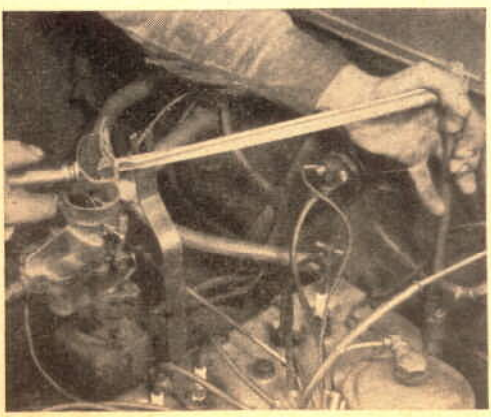
14. Valve refacing is next. Each is mounted so its face contacts the grinding wheel at 45 deg. Valve and wheel revolve in opposite directions. The ends of the stems are also faced off square.



15. Valves are installed with a lifter and key inserter. When the lifter is removed, spring tension forces the retainer down over the two small keys, locking them in place on the stem.



16. Setting the clearance is an exacting step. With one wrench on the lock nut and another on the adjusting nut, a feeler gauge does the job. Here, intake clearance is .006", exhaust .008".

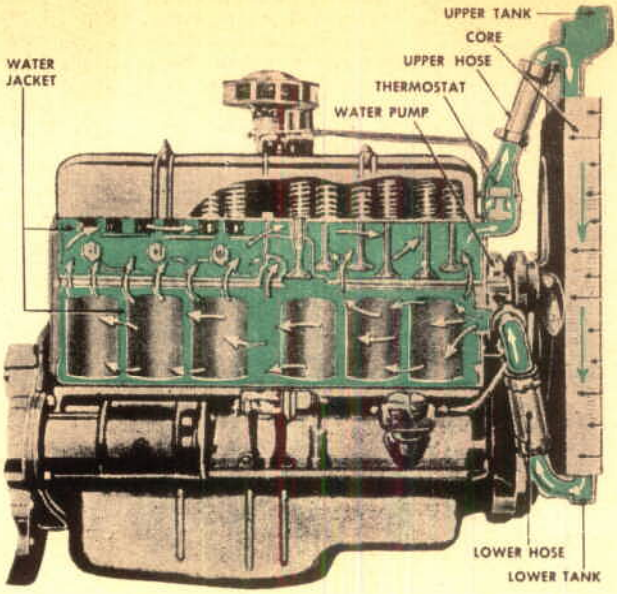


17. A torque wrench sets the head bolts at the proper tension as the final step. New gaskets are installed, of course, before the head and valve-cover plates are returned to place.

18. When the job's complete, a motor analyzer gives the car a checkup before release to the customer. It tests compression, timing, setting of the points, and carburetor adjustment.

How Your Car's Engine Is Cooled

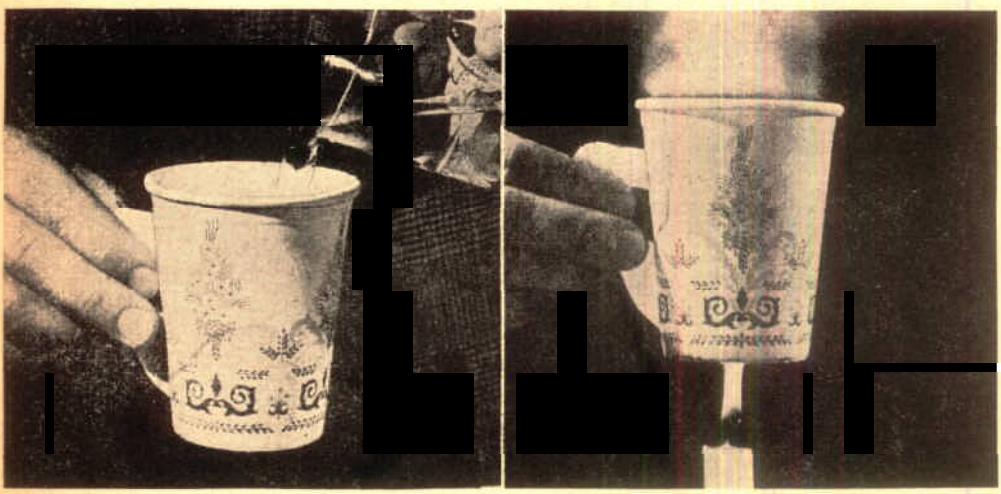
Three simple home experiments suggested by Kenneth M. Swezey.



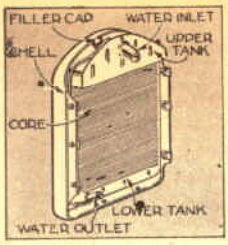
ALTHOUGH heat makes your car go, too much would quickly bring it to a halt. Left unchecked, the intense heat of combustion would soon warp and burn the valves, break down the oil, overheat the bearings, and "freeze" the pistons to the cylinders.

Part of this excess heat passes out the exhaust. The cooling system takes care of the rest. A typical system is shown in the drawing above. Urged on by the pump, water circulates through the jacket, picking up heat from the combustion chambers, valves, and cylinders. Then it carries the heat to the radiator, releases it to the air, and returns again to the water jacket.

To learn at first hand a few more facts about the cooling system of your car, try the simple demonstrations on these pages.

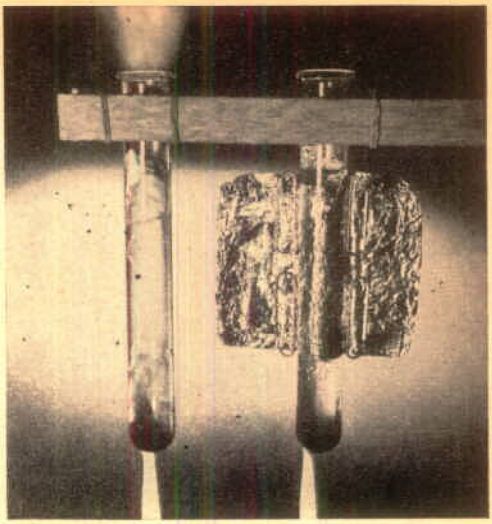


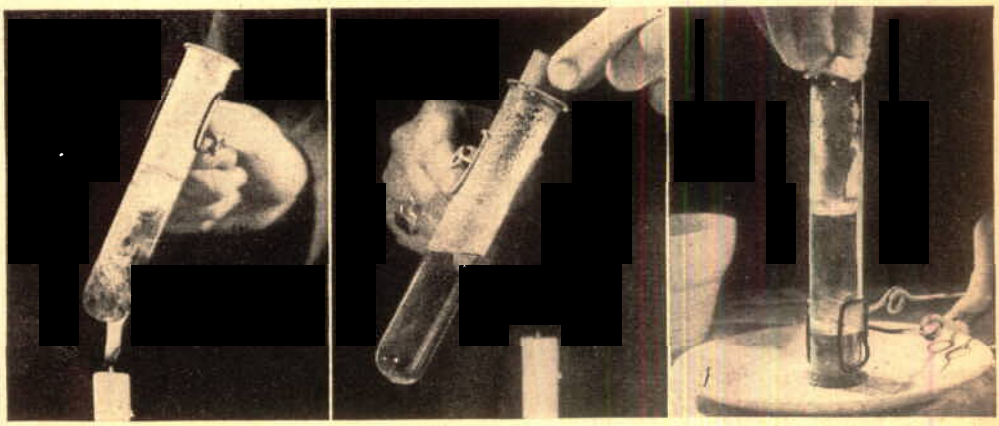
How can plain water keep your engine at a safe working temperature despite much higher temperatures inside the cylinders? Partly for the same reason you can bring water to a boil in a paper cup without setting the cup afire. If you don't believe this can be done, try it. Use a single-bottom cup, about a quarter full of water. Hold it over a candle flame, and the water will soon boil. Why doesn't the paper burn? Because the hot water keeps it cool. The paper gets hot, it is true, but the water carries off the heat before it rises to kindling temperature. In like manner, water circulating through the engine carries off heat from the working parts, preventing them from being distorted, or even melted, by the combustion heat.



How does the radiator transfer heat to the air? After collecting in the top tank, hot water from the engine passes down through the core. The core's function is to divide the water into many small streams and expose each to air drawn through the radiator by the fan and forward movement of the car. As the air rushes past copper fins on the water tubes, it takes up heat from the water inside the tubes.

How fins help cool water can be shown with the setup in the photo at right. Attach broad fins of heavy aluminum foil to one of two identical test tubes. Put the same amount of water in each tube and hold them over identical candle flames. The water in the plain tube will soon steam. The other will take longer because it loses heat to the air through the fins.





Why are pressure cooling systems now used in most cars? Strangely enough, you can find the reason on a mountaintop. A few years ago, when all cars had nonpressure systems, radiators often boiled at high altitudes. Why? Because of the drop in atmospheric pressure.

At sea level, the boiling point of water is 212° F. When you climb a mountain, atmospheric pressure drops and the boiling point drops. The experiment above shows this.

Fill a test tube half full of water. Bring it to a vigorous boil, quickly stopper the tube, invert it, and apply cold water with a wad of wet paper. This condenses the steam inside, causing a partial vacuum and reducing the pressure. Although cooled, the water begins boiling again. In a pressure cooling system, this works in reverse. Since the system is airtight, the steam that's generated exerts pressure on the water, raising its boiling point above 212°. This permits the engine to operate at a more efficient higher temperature without boiling.

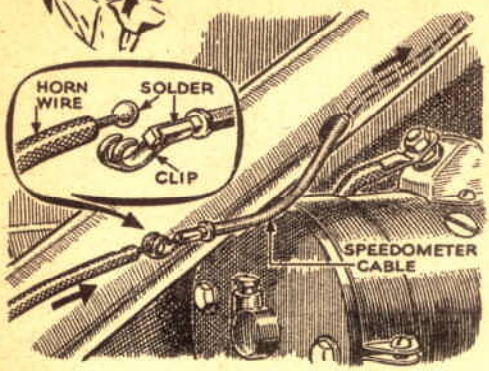
Waxed Nails Hold Securely

Some nails that you buy are wax-coated for better holding qualities. Recently, unable to buy a supply, I coated some common nails myself. Dissolving 1½ lb. of rosin in a pint of liquid paint drier, I dumped this solution and two kegs of nails into a tumbler made from an old oil drum. Then I gave the tumbler a few turns and took out the nails.—*John E. Heisson, Fitchburg, Mass.*

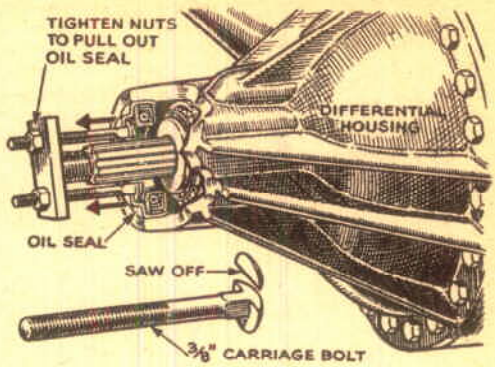
White-Lead Putty Won't Bleed

If you have trouble with ordinary putty "bleeding" through your paint and showing up as yellow spots, try a homemade putty that is free of this trouble. Into a small can of white lead stir some powdered whiting. Add a little at a time until the mixture has the consistency of putty. The whiting can be worked in best with a spatula or knife.—*Joseph E. Bird, Carrollton, Ill.*

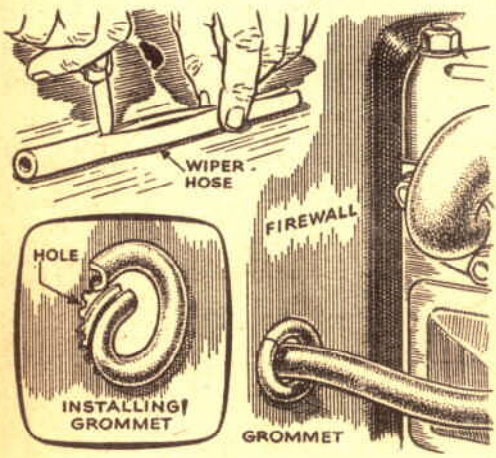
Hints from the Model Garage



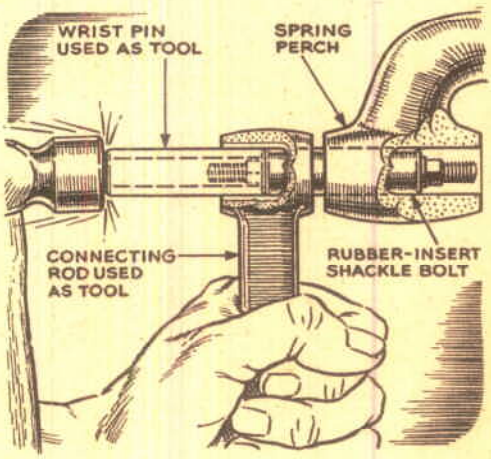
Speedometer Cable Fixes Horn. A good way to replace defective horn wiring is reported by Lester L. Haberman, of Hartford, Conn. Instead of fishing wire through the steering column, he uses a broken piece of speedometer cable as a leader. A bent clip soldered to the end, small enough to pass through the hole in the column, hooks the horn wire to pull it through. A blob of solder on the tip will engage it securely.



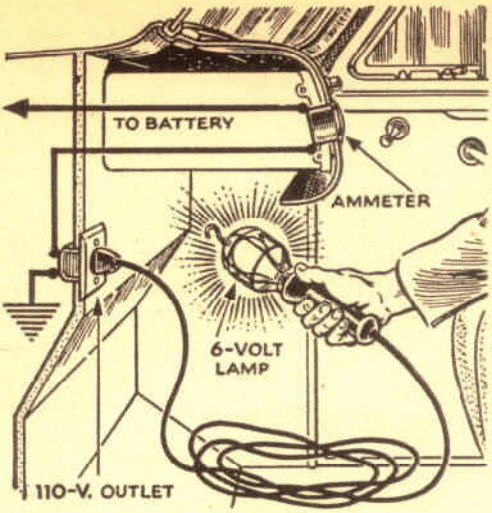
Bolts Pull Oil Retainer. The oil seal on the differential housing of one Plymouth seemed to be in for good, but Stanley T. Lusas, Woodbury, Conn., found a way out. Sawing a flat on two 3/8" carriage bolts, he was able to slip the altered boltheads into the groove from which the felt ring was removed. By alternately tightening nuts against a simple bar yoke, he drew out the seal. Different bolts may be needed on other cars.



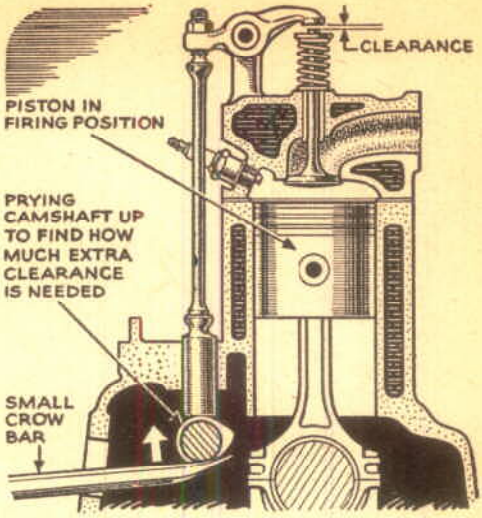
Grommet Guards Heater Hose. In making a hole in the firewall for heater hose you may have to drill a circle of holes and chisel out between them. Protect the heater hose from the jagged edges by slitting a piece of windshield-wiper hose and cementing it around the rough inside edge.



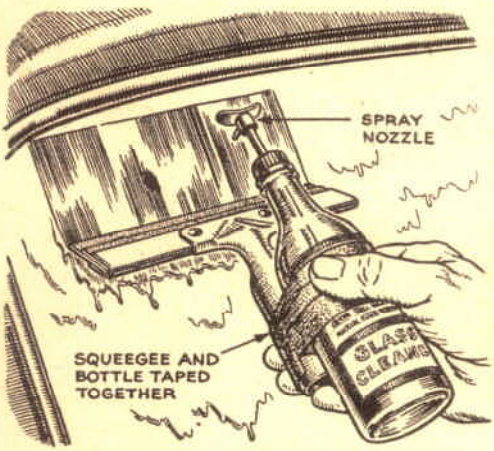
Wrist Pin Drives Shackle. When installing rubber-insert shackle bolts, George Pedley, of N. Grosvenordale, Conn., uses two other parts as tools. A wrist pin, annealed by heating, is employed for driving the bolt, and a connecting rod is used as a guide to keep the rubber from expanding.



Trouble Light Doubles in Car. One extension cord kept in the car is always available for use as a trouble light with the accessories added by W. M. Dierks, of Chicago. He installed a standard 110-volt outlet in the car, wiring it from the ammeter to ground. At the other end is a 6-volt bulb with a standard screw base. For use on house current it is only necessary to replace the bulb with a 110-volt one.



Wear Alters Clearance. Worn camshaft bushings may cause burned valves by reducing the apparent tappet clearance. Caral Lee, of Weld, Me., suggests this test for Chevrolets: Set the No. 1 tappet, remove the fuel pump, pry up the camshaft, and recheck the clearance. Since the camshaft tends to ride at the top of its bushings during rotation, the measured difference should be added to the normal clearance.



Unit Windshield Cleaner. Tape a rubber squeegee to a bottle of glass-cleaning fluid fitted with a spray nozzle, writes Sally Mills, of Syracuse, N. Y. When the windshield needs cleaning you only have to dig out the one unit to spray the fluid and wipe it off immediately.

Stool Built of Brake Drums. One mechanic made his job easier by welding two discarded brake drums together. Four casters on the bottom and a sheepskin buffing pad on top make it a serviceable rolling stool. It's particularly good for jobs for which you'd ordinarily have to kneel.