Hints for the Motorist

BY ALBERT L. CLOUGH

BOILING RADIATOR

D. writes: After running five or six miles my radiator water will boil and the engine will begin to miss and jerk. What is the cause of this? There is a little oil coming up through the cylinders. I have tested my cooling system.

Answer: The combination o overheating and oil-pumping bring to mind the possibility that you cylinder oil is not of a sufficient good quality so that it retains its body under heat. If this is the case your overheating is due to excessive piston friction and your missing is caused by oil-fouling of the plugs in combination with poor compression, due to the oil being very thin around the pistons and not making a good gas seat. If your oil remains properly thick when hot, the overheating may be due to weak fan action, too much retarded spark radiator passages clogged or rubber connections closed or rubber connections closed up internally. If there is any question as to the quality and quantity of your engine oil, this better be settled at once.

VALVE TIMING

H. E. N. asks: What is the right way to time a four-cylinder, high-speed engine? What makes an engine knock, when there is no carbon in it and the bearings and pistons are as good as new?

Answer: .All that we can give you is a typical setting, used in high-speed practice: Intake opens 12 degrees past upper dead center, inlet closes 33 degrees after lower dead center, exhaust opens 55 degrees before lower dead center, exhaust closes 12 degrees past upper dead center. Under conditions such as you describe the most common causes of knocking are the following: Too early spark, engine loose on frame, cylinder-block loose on crank-case, loose flywheel, timing-gears loose on shafts or some of their teeth damaged, loose pushrods, worn or loose cams or compression too high for the quality of fuel used.

AS TO SHOCK ABSORBERS

J. H. L. asks: Can you give me any advice as to shock absorbers? If they did not cost so much I should have a set of the air-cushion type put on but I thought that you might be able to suggest something more reasonable in prices.

Answer: Very good results are obtained with shock absorbers of the rubber type, which permit the springs to deflect unhindered on the downward movement of the car but check the severity of the upward motion or "rebond." These are comparatively inexpensive, are readily applied and withstand severe usage.

DEALING WITH THE LEAKY PISTON

It Is A Matter Of Accurate Sizing And Fitting

When loose piston fit has become serious in one or more cylinders, it pays to correct it promptly. If a clinder has become scored or if it has worn much out of round, it is of little use to try to fit a new piston and rings to it. A score can, in some cases be repaired by a special brazing and grinding process but boring or grinding operation must be resorted to and all cylinders f the block must be enlarged to the same diameter, new, "oversize" pistons slightly larger than the original ones being required. If, upon inspection and careful measurement of the cylinder bore, no scoring or serious ovalization is found, it should l determined whether the pistons are seriously undersize and, if their diameter at the head end is less than that of the bore by more than two one thousandths inch for each inch of cylinder boe, the fitting of oversize pistons should be considered. Cast iron pistons are here referred to. It may be that the pistons are still of such size as to be usable and, in that event the securing of tightness is a matter of new piston rngs. Piston-rings wear much more rapidly than pistons—friction being quite severely concentrated upon them—and very often pistons and cylinder bores outwear several of them. In replacing rings, the correctness of their fit to their grooves and to the cylinder walls, is of much more importance than the type of ring used and something on this subject will be furnished later.

AMMETER IN PLACE OF CHARGING INDICATOR

A. McB. asks: What is wrong with a generator that has been set ahead as far as possible, but won't deliver any more electricity to the battery? Can an ammeter be put on my car in place of the charging indicator that came on it? There are three wires leading to this indicator.

Answer: The most common cause of insufficient output from a generator is improper condition of the commutator and brushes. If the former is perfectly cean and true and the latter bear on the commutator with sufficient pressure are well fitted to it, with their ends free from glazing or dirt, you ought to obtain the full output, assuming that all connections are tight and there is nothing wrong with the winding. As a general rule, an ammeter an be installed in plae of a urrent indiator. It would perhaps be well in buying the ammeter to specify the name and year of your car, when you order, so as to obtain an instrument suited to your needs.

CARBONIZATION QUERIES

V. asks: (1) Does carrying oil too high in the crank-case tend to cause carbonizations? (2) Does the use of oxygen to remove carbon insure the cylinders or pistons in any way? (3) Please explain the best method of removing carbon. (4) What is the best way of renewing leather upholstry?

Answer: (1) Yes. It may result in there eing too great a depth of oil for the connecting-rod ends to dip into too much oil being splashed, a greater tendency for oil to work up onto the piston heads and thus more likelihood of rapid carbonization. (2) There are some engines upon which the oxygen methods should not be used, according to their manufacturers and we advise their warning to be heeded. Generally speaking, however, we see no risk in using this method, if it is applied properly. A professonal should do the job. One bad feature of the method is that the incombustible part of the deposits is not fully removed and works down into the engine. (3) Removing the head and scraping all parts is the best method and the oxygen process is the next. (4) Clean it with a sponge moistened in mild soap suds and dry with a chamois. When it is perfectly dry a reliable leather dressing may be sed.

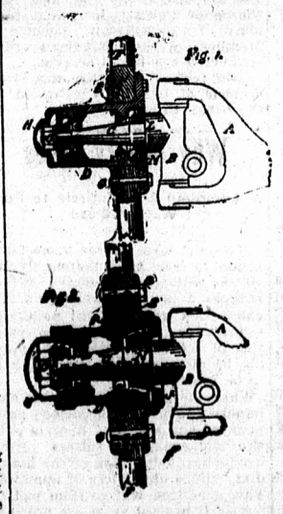
WATER PUMPS GIVES TROUBLE

A. E. M. asks: Why is it that I cannot make my water-pump tight? I have replaced it several times but water still escapes slowly along the shaft?

Answer: You may possibly find that the shaft, where it passes through the stuffing-bore is worn considerably out of round. If so, it may have to be replaced as it is almost impossible to pack a shaft in a badly worn condition. Sometimes it happens that if the radiator is badly clogged, leakage at the stuffing-box occurs, because of the extra pump pressure that acts upon it. Asbestos-graphite string packing is the best material to use and we presume that you have tried it.

THE FRONT WHEELS.

The two accompanying figures illustrate, in principle, typical front wheel construction and bearing support—wood wheels being shown. Here A is the forked end of the axle, B the steering knuckle with its tapered axle stub. C and D a cross section of the wheel hub with the circular flange E between which and hub shell D the inner ends of the spokes are secured by through bolts G forming a wheel of the so-called artillery type. H is the metal hub-cap, which is screwed onto the outer end of the shell for the purpose of excluding dust from this end of the axle, to confine the lubricant and to give finish to the wheel's appearance, but which plays no constructional part. At J, Fig 2 is shown a lubricant retaining dust-shield to protect the inner bearing consisting of rings fast to the axle and an annular felt washer held by them against



the inside of the hub-shell. The road wheel not only has to support its share of the load and to withstand the severe shocks resulting from road irregularities, but it also has to resist the violent side stresses, due to centrifugal force, that result when a car moves in a curved path. These latter forces which tend to "dish" the wheels, that is, to throw the hub out of the plane of the spokes and break or pull out the spokes at the hub are, of course, transmitted through the wheel to the bearings, which must therefore be adapted to resist very severe end trusts in line with the axle as well as the ordinary radical pressures at right angles to the axle, that the weight of the car imposes. Hence it is general practice to employ in front wheels bearings either of the cup-and-cone or of the tapered roller type, both of which are adapted to perform this double duty—two bearings being employed in each wheel, one at the outer and the other at the inner end of the hub. Fig 1 shows a wheel provided with a pair of cup-and-cone bearings, in which L is a section of the cone of the inner bearing and M is a section of its cup, a "cage" of steel balls being confined between the accurately ground inner surfaces of these two parts. The cone L is fitted to the axle and the cup is held against an internal shoulder in the hub. The outer bearing is the same in construction, but reversed on the axle spindle. Nut O, with a washer under it, screws onto the threaded end of the axle spindle and is locked against turning thereon by a cotter pin. To adjust the bearing nut O is screwed on its thread, forcing the outer cone inward and relatively drawing the inner cone outward, until their respective cups are close enough to their cones so that the two sets of balls have just enough freedom of movement to permit their easy rolling, but not enough to allow undue wabbling of the wheel on the axle. If the end of the left wheel were provided with a right hand thread, forward motion of the car would tend to make O work loose and, to guard against this, a left handed thread is generally used on this axle spindle and a righthanded thread on the other. In Fig. 2 tapered roller bearings are shown in use, the bearing parts being exaggerated. Here N is a cross section of the inner race, fitted to the spindle and P is a section of the outer race of the inside bearing, set against an internal shoulder in the hub, and between the ground surfaces of these two parts is a "cage" of tapered steel rollers. The outer bearing is of the same construction but smaller and reversed as to the inclination of its bearing surfaces. To effect adjustment, nut O is turned onto its thread until the required wedge-like action between the inner and outer races of the two bearings, to cause the two sets of rollers to operate with the required freedom, but to avoid any undue end motion of the wheel on the axle, is secured. In both the types of wheel mountings shown, the outer bearings resists stresses acting to crowd it on—both bearings serving to carry the load. Lubrication in both types is by means of lubricant—usually a thin grease—packed into the hub space between the two bearings or applied to the parts of each bearing before it is put into place in the hub.

..Questions of general interest to motorists will be answered in this column, space permitting. If an immediate answer is desired, enclose self-addressed, stamped envelope, Address Albert L. Clough, care of our office.