

Hints for the Motorist

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ENGINE "FALTERS" AT HIGH SPEED

H. M. Y. writes: My Ford pulls the hills well enough and I have little fault to find with it when running slowly, but when I try to get it above a certain speed, it misses, sputters and will not go any faster. Where is the trouble most likely to be found?

Answer: The following are a few of the possible causes: The timer may be so worn that, while the roller makes reliable connection with the contact segments at low speed, its track is so uneven that, at high speed, it tends to jump and no longer makes infallible contact with the segments. Some of the valves may be inclined to stick in their guides, owing to roughness or warping of their stems and they may fall to seat in time when the speed exceeds a certain value. Weakness of some of the valve springs may aggravate this behavior. It is also barely possible that the gasoline line is somewhat obstructed and not quite enough fuel can be supplied to keep the mixture up to normal strength, when the engine is drawing charges fast. You better inspect the timer, test the valves and their springs and see that the gasoline pipe is clear.

TESTING SHOE FOR WEAK SPOTS

W. W. G. asks: How can I tell whether an old casing has yet developed any special points of weakness. I don't want to put any casing in service, if it is likely to blow right out.

Answer: By feeling it over with the hands, you can detect any bad fabric break that will soon lead to a blowout. By turning the casing

wrong side out and bending the wall at all points with the hands, one can readily detect any limp place, where one or more canvas plies have actually broken or are far on the way to failure. If you carry this examination all around the inside circumference of the casing and find the fabric wall firm and spring, at all points, it is probable there is no weak spot yet developed.

CLEANING MUFFLER

O. W. B. asks: What is the best way of cleaning out the muffler? I am giving my car a general overhauling and am told that this should not be neglected.

Answer: The only effective way of cleaning the muffler is to take it entirely apart and scrape the surface, but sometimes it is difficult to do this because all the joints become burned and rusted tight. Some scale and soot can usually be dislodged by tapping the muffler all over vigorously with a hammer, while the engine is run with considerable throttle and very late spark so as to blow out the material that becomes loosened. It used to be a common practice to remove a muffler and place it upon a fire, built out of doors, until it became red hot and then to hammer it all over and empty out the scale, but this method is not to be recommended. We doubt if your muffler requires attention unless it is pretty old and has been used with an engine giving a very oily or sooty exhaust.

HOW CYLINDERS WEAR OUT

Cylinders and pistons made of the best metal and originally well fitted, wear with extreme slowness if only

they are kept continuously well lubricated. Very often they still remain in perfectly usable condition when the car which carries them is discarded, because its style has become obsolete or because of mechanical defects external to the engine. Mileages well up in the ten thousands may be expected to good cylinders — always assuming conscientious lubrication. The motor car engine piston acts not only to receive and transmit gaseous pressure but also to guide the motion of the connecting rod, the piston itself functioning as a cross-head and the cylinder walls as a guide and thus all the bearing pressure imposed upon these parts cause friction and wear on their opposing surfaces.

All these forces act on one plane, namely in that at right angles to the crank shaft with the result that piston cylinder wear is almost entirely in the plane of connecting rod motion and practically absent in the plane perpendicular thereto. When new, the cross sections of the cylinder bore and the piston are perfect circles, but their wear being all in one plane, both wear elliptical, the cylinder bore diameter in the connecting rod plane becoming elongated and the piston diameter in this plane becoming shortened, so that finally the cylinder bore and piston cross sections become those of two ellipses with their longer diameters at right angles.

The inaccuracy is, of course, relatively slight, but sufficient to leave two crescent shaped spaces on opposite sides of the piston which finally cannot be packed. Gas tightness being the essential condition for successful operations, when it becomes impossible to pack the piston tightly in its bore, the parts are no longer usable. Moreover, the ellipticity or

ovalization, prevents the perfect functioning of piston and cylinder as cross-head and guide and the piston, as it moves up and down, vibration from one side of the bore to the other or "cocks up" so as to fill the waste space, producing the noise common, known as "piston slap." Piston tightness is entirely dependent upon the piston packing rings and the oil which collects around them and, as these rings are circular in form, with a tendency to expand against the cylinder wall, it is not to be expected that they can pack a bore which is ovalized to any marked extent.

CYLINDER PUMPS OIL

H. W. C. asks: Will drilling one-eighth inch holes in the bottom of a Ford piston stop the oil working past it and, if so, where is the best place for them? The cylinder is not scored and I have tried an oversize piston and rings.

Answer: We doubt it. When this expedient is tried, however, the procedure is usually as follows: Remove the lowest ring cut a bevel on its upper outer edge, drill several small holes through the ring, starting the drill in the beveled surface and also drill through the piston several times, starting the drill in the ring grooves. The bevel is supposed to catch oil scraped from the cylinder walls, which is returned to the crank-case through the holes. If it is the front cylinder that gives trouble, you might try drilling a small hole in the oil supply pipe, so that part of the oil will be delivered to the second crank-case compartment, in case this engine is rather an old one, we fear that the troublesome cylinder has worn somewhat oval, so that rings cannot make it tight, in which case boring out the block and fitting new pistons is the only thing likely to give you permanent relief.

DEALING WITH THE WORN CYLINDER

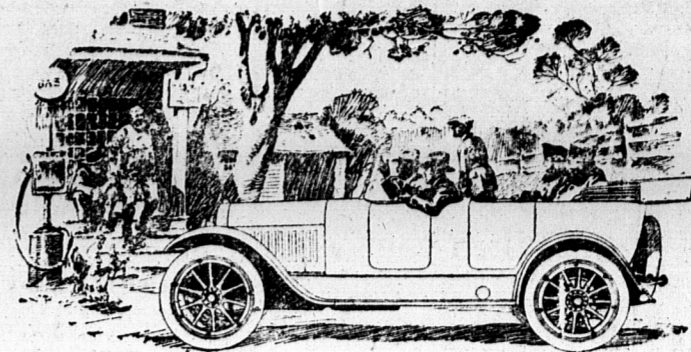
Circular Rings Cannot Pack Elliptical Cylinders

The first sign of wear between a cylinder and its piston is lack of tightness between them, which results in the escape of the gases, when the compression stroke is being performed. When this leakage cannot be attributed to imperfect seating of the valves, faulty piston fit is indicated. Installing new rings is the natural resource and it may restore the original tightness in case the old rings have so worn that their ends do not nearly meet, if they have become loose in their grooves or have lost their spring or have broken, but it will not give satisfactory results if piston and cylinder wear have progressed so far as to have resulted in considerable ovalization. If the piston, when removed, does not show large areas where it fails to follow the bore (as indicated by blackened portions) and, when cleaned of oil, cannot be wabbed in its bore by force applied to the connecting rod, while, at the same time, the rings are loose, weak in spring and blackened over parts of their faces, it may be hoped that new rings of good construction and of slightly larger size may improve compression.

If they fail to do so, the next step is to install pistons that are as much oversize as can be used without causing binding when they become hot. The new pistons are, of course, truly circular in section and their use reduces the total ovalizing effect — rings of the full allowable oversize being used with them. It should have been remarked that unless the cylinder bore possesses a mirror like polish and is free from scratches or scores, the above mentioned expedients are of little value. Finally, in the history of a cylinder a time may come when oversize pistons and rings do not restore compression or prevent excess oil from reaching the combustion space.

The piston then usually shows large blackened areas and noticeable bright, worn areas one toward the top and one toward the bottom on opposite sides in the connecting rod plane. It can usually be wabbed in its bore, when all oil is cleaned off. Measurements taken by micrometer callipers will then show that the bore diameter in the connecting rod movement plane is decidedly greater than in that at right angles thereto and piston slap may have become noticeable. When measurements show more than 0.003 or 0.004 inch difference in the bore diameter, it is generally considered that first-class results as to tightness cannot be obtained without having the cylinder (and its mates) rebored, which is the only means of restoring a truly circular cross section and insuring operative tightness.

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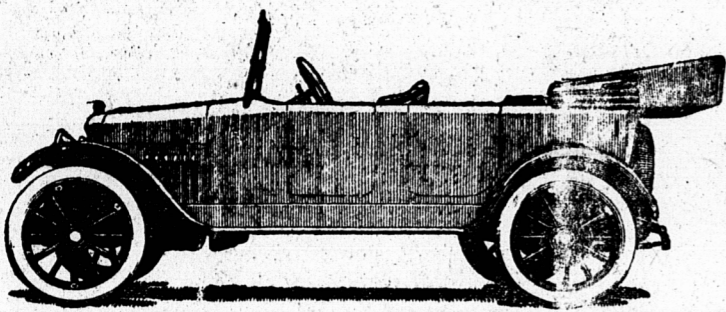
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