

# HOW TO REMOVE CARBON AND GRIND VALVES

The Twenty-sixth of a Series of Articles by an Expert for the Automobile Owner.

By WALTER SHIELDS.

It is an inherent characteristic of internal combustion engines to carbonate, that is, to have a deposit of carbon form on the piston tops, cylinder heads and around the valves, as a result of the breaking down of the oil and the fuel. Each of these contains carbon and that which is not burned into a gas to flow out with the exhaust deposits itself upon the parts of the engine. At first the deposit is a mere dust, but the addition of a small amount of oil, further depositing more oil, results in time in the piston tops and cylinders becoming caked with carbon. This deposit may in time become so hard that it can barely be re-

grade of fuel and the less the ability of the engine to handle it correctly the greater the carbon deposit. When- ever there is incomplete combustion that portion which is not fully exploded has an opportunity to burn more slowly, leaving behind carbon in greater quantity.

Recently there have come to the market a number of so-called steam injection devices, which on the whole are quite effective in preventing carbon from depositing. They have as their object the introduction of steam into the combustion chamber so that the resulting action will cause any carbon to be removed from a chemical combination with gases of the explosion, thus leaving nothing in the cylinder. Upon application to THE SUN the names of makers of these steam injection devices will be given.

The removal of carbon once formed is a comparatively easy matter and as mentioned previously in these columns there are numerous methods in use for doing the work. There are proprietary compounds, some of which are good, there is the time-honored method of using an oil solvent, such as kerosene, in the hope of dissolving the oil which keeps the carbon caked. Oxygen forced into the cylinder from a tank causes the carbon in the presence of a lighted match to catch fire and burn to carbon dioxide. The carbon may be scraped out by hand by means of scraping tools, or if badly caked with the further assistance of a chisel.

An engine with detachable cylinder heads and with badly carbonized cylinders should have the carbon removed by scraping as a cheap means and by far the most effective. It is so because practically every particle of carbon can be removed and the pistons and cylinders left perfectly clean. The average owner can do this work without any difficulty if he will remember the assembly so that if any engine accessories are removed he can replace them. The oxygen method is in use by most garages having much transit trade. While oxygen does cause the carbon to burn, when the cylinders are badly caked it is a hope-

less task trying to do a good job with a few protruding particles because the workman cannot see what he is doing, and under certain conditions a slightly roughened surface may be left, thus offering good footing for carbon which falls down when the engine is again operated. On the whole this method is not advised unless the owner is in a hurry and the carbon deposit is so slight as not to make driving miserable.

It often has been said, though incorrectly so, that there are compounds offered which dissolve carbon. They do not dissolve the carbon, but merely get it into such a state that it will easily blow out with the exhaust. They act in such a way as to make the carbon re-lease its hold on the metal parts.

Though there is no apparent connection between carbon and valve grinding the two go hand in hand. After removing carbon it is always advisable to grind the valves. The valves which control the fresh and exhaust gas flow to and from the engine must of course make a gas tight joint when closed, and in order to do this they must fit their seats perfectly. If there is the slightest opening anywhere around the valve when it is closed it will permit gas to leak past. It is to make the valve face perfect all around that a light abrasive is used between it and its seat so as to grind the two surfaces to a perfect finish.

In grinding valves the first step is to remove the valves from the cylinders. This is done by first removing the supporting pin underneath the valve spring support. In order to be able to do this the spring must be compressed and as requires a spring compressor, which may be bought at any supply store. With the spring compressed the support, of which there are many forms, is removed. This permits the valve to be taken out of its guide. Regardless of the type of poppet valve the valve must be freed of the spring and seat. In removing these valves it always is best to mark them with chalk so that you will know where each belongs. It is not good practice to put it in a strange seat.

Before beginning operation on a valve plug the opening to the cylinder by means of some clean cloth so there will be no chance of any grinding compound getting inside, and in the case of L and T head engines see that the tappet is down as far as it will go. The face of the valve then is lightly covered with grinding compound, the coarse grade if the valve is badly pitted and the fine if it is not. The valve then is placed into its guide and seated. It then is oscillated by hand or by a screwdriver, brace or special grinder until the valve seat and face have an even gray color with no small black spots.

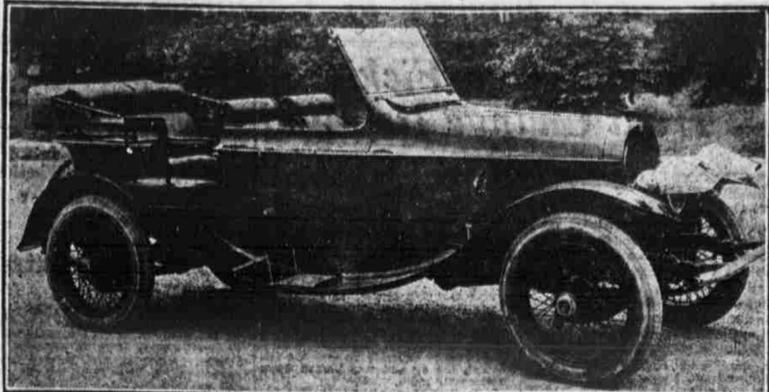
Grinding a valve in an engine with a removable cylinder head. After grinding compound has been spread over the face of the valve the latter is placed in its regular position and oscillated by means of a screwdriver, brace or special grinder until the valve seat and face have an even gray color with no small black spots.

may be caused by any of a dozen derangements. However, the combination of lack of power, overheating and knocking is an unmistakable sign of an excess of carbon. In a new car these symptoms may come after as little as 500 miles running, usually the figure is 500 miles, but as the oil feed is reduced the carbon deposit is likewise reduced. The deposition of carbon is of course accentuated when an excess of oil is fed or when the fuel mixture is too rich in gasoline. In the case of the gasoline the excess of fuel burns in the cylinder, leaving a great deal of its carbon content behind, due to incomplete combustion. In the case of too much oil in the crank case an excess makes its way past the pistons into the combustion chamber, where it burns, leaving some of its carbon behind.

It often has been mentioned that an appreciable carbon deposit is the result of the sucking into the cylinders of a certain amount of road dust, but I hardly believe that the burning of the dust in the air compares in any but small degree with the carbon which comes from the oil and gasoline.

The driver of an automobile car, to a great extent, control excessive carbon depositing. The oil feed should be just enough to lubricate the pistons and cylinder walls, but as the oil feed is reduced the carbon deposit is likewise reduced. The deposition of carbon is of course accentuated when an excess of oil is fed or when the fuel mixture is too rich in gasoline. In the case of the gasoline the excess of fuel burns in the cylinder, leaving a great deal of its carbon content behind, due to incomplete combustion. In the case of too much oil in the crank case an excess makes its way past the pistons into the combustion chamber, where it burns, leaving some of its carbon behind.

## Moon Four Passenger Sport Model.



Here is one of the most striking cars "on the Row." The Coghlan brothers are showing it at Moon headquarters in West Fifth-street. It has 66 horse-power. The rear doors hinge at the bottom and when opened outward form two very comfortable seats. The car is painted a dark plum and upholstered in morocco leather of the same color.

## CHALMERS BREAKS 24 HOUR RECORD

Stock Car Driven by Dawson Covers 1,900 Miles at Sheephead Bay.

### Here's a Prophet.



CHARLES GOMPREDIT.

Five million automobiles in America before 1919, or an increase of 1,000,000 over the number now in use, is the prophecy of Charles Gomprecht, sales manager of the Times Square Auto Supply Company of New York and Chicago, known far and wide as an expert automobile man.

The United States has about one car to every thirty persons. On a like basis throughout the rest of the civilized world there would be more than 55,000,000 cars in use. There are now in this country 1,400,000 owners of passenger automobiles that cost at the time of original purchase \$500 or less each, 760,000 owners who paid between \$500 and \$1,000 for their cars, 1,319,000 in the \$1,000 to \$2,000 class and 211,000 having cars of which the cost price was between \$2,000 and \$3,000. There are also in use thousands of cars that originally cost more than \$3,000 each. At present there are in use in the world 4,216,943 cars.

"At the conclusion of the war automobile production in this country will be larger than ever before in order to meet domestic and foreign demand. Governed by the cost of material and labor, the tendency will be toward lower priced cars, as Europe will want large quantities of inexpensive machines.

"The American manufacturers who have standardized materials, methods and mounting dimensions of parts, decreased the cost of production and improved the quality will naturally be in an advantageous position in the world-wide trade even if competition will be greater than ever."

Whirling around the two mile Sheephead Bay Speedway in a most sensational drive, Joe Dawson, the famous speed pilot, guided his Chalmers stock chassis to a new world's twenty-four hour record Wednesday and Thursday, August 1 and 2. With his team mate, Joe Gardham, reliable as a clock, for a few hours, the remarkable little car covered 1,900 miles, breaking the former official mark by eighty-one miles. The former record of 1,819 miles was made by Ralph Mulford in a Hudson car at the same track some months ago. It merely remains for the American Automobile Association to O.K. this record officially at the board's next meeting to have it stand, for the trial was made under official contest board supervision and timed with automatic electric timing device.

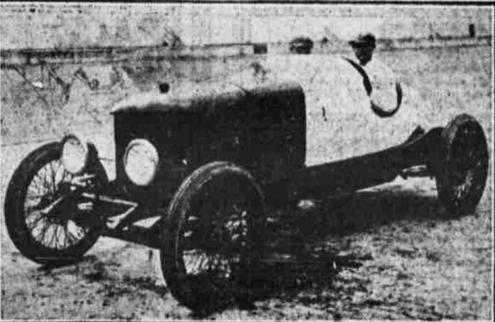
Dawson frequently averaged between 82 and 83 miles an hour, his average for the entire distance being 79 1-8 miles an hour, stops included. The average for actual running was just under 82 miles an hour. In his first hour he covered just 82 miles, and throughout the entire two around the clock grind the car maintained practically the same speed while running, and it was only the stops for oil, gasoline and tires which cut the average down. There were no mechanical replacements or adjustments, and the fact that the test was made on two of the hottest days recorded in the history of the weather bureau, the two hottest in the last quarter of a century, speaks volumes for the car. A motor that could run at this terrific speed and still keep cool and properly lubricated for a whole day and night is beyond question an exceptional motor. And it is the regular stock Chalmers L-head motor, 3 1/4 inch bore by 4 1/2 inch stroke, with a piston displacement of 24 cubic inches.

In fact, aside from the racing body and such features necessary for the driver's safety, the car is practically the regular Chalmers speedster stock model. United States Royal Cord tires were the equipment, and the left front shoe went the entire distance without replacement.

C. E. King, vice-president and general manager of the Chalmers Sales Co., Inc., is being congratulated by hundreds of his friends and Chalmers owners upon the remarkable showing.

A noticeable feature of the driving of Dawson and Gardham was that the car held the track perfectly at all times and was never noticed to skid perceptibly, indicating that the balance is as perfect as is possible to build an automobile. That its stamina was all that could be expected is proved by the fact that in the last hour Dawson did 83 and a fraction miles, almost as fast as his fastest hour. Furthermore, the car showed a wealth of reserve power, as was indicated in the last few laps of his journey, when Dawson speeded down the stretch close to 100 miles an hour in order to register an even 1,900 miles.

### Record Breaking Chalmers Car.



Joe Dawson, the well known race driver, is shown here at the wheel of the car which covered 1,900 miles in twenty-four hours of continuous running at the Sheephead Bay Speedway.

## TIRE BARGAINS

Great savings on your Tires and Tubes, in all standard makes, with a 5,000-mile guarantee in writing on your bill. We want your business and we guarantee your money's worth.

Table with columns for Plain, Non-skid, Tubes, and prices. Includes text: WE SHIP C. O. D. MAIL ORDERS GIVEN PROMPT ATTENTION. TRANSPORTATION CHARGES PREPAID ON ORDERS ACCOMPANIED BY CASH AND MONEY ORDERS. Kindly state whether you use Clincher, Q. D. or S. S. Dunlop.

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## ONE SHOULD BUY CAR NOW.

Shortage of Material May Handicap You Later.

"The Hudson Motor Car Company has a large supply of raw material on hand, enough possibly for another month or six weeks of operation," says Harry S. Houpt, president of the Hudson Motor Car Company of New York. "At the end of that time it will have to take its chances, as will every other motor manufacturer."

wholly cut off materials from the automobile companies. They will have to manufacture trucks and automobiles for the army. They are a necessary part of war equipment. But should the shortage become so acute that the United States required all metal available for her own and her Allies' war needs, then the general motor market would be deprived. It is not wholly absurd to surmise that the automobile you buy now or within the next few weeks may be your last until the end of the war. Others may not be obtainable. More than ever you will want an enduring car—one that has proved it can stand the service of years. More urgent than ever is the need for those who are

thinking of buying cars to buy them now, because a little later they may not be able to obtain the car they want, or any car in fact. "Another matter in which war may interfere with delivery of cars before long is through the commandeering of freight and express cars to haul huge quantities of supplies. At present we have even a greater shortage of freight cars than ever before. Troops and their effects and goods, fuel and supplies for the military service will take precedence for movement over any articles of internal trade. "Many people realize these conditions and the sale of cars now is more active than at any other time of the year."

# The Six That Saves You Money!!



Not just a Six for less money—but a Six that in dollar for dollar value compares with cars costing from \$300 to \$400 more!

The Sixes that compare in value with the New Willys Six cost around \$1600.

Run over the list of Sixes in the \$1600 range and make your own comparison.

Anything prettier than this New Willys Six with its smart new double cowl body, slanting windshield and long, low racy lines?

And then compare performance.

The livelier feel of the Willys Six is due to a new balance we have worked out between greater power and sturdier lightweight.

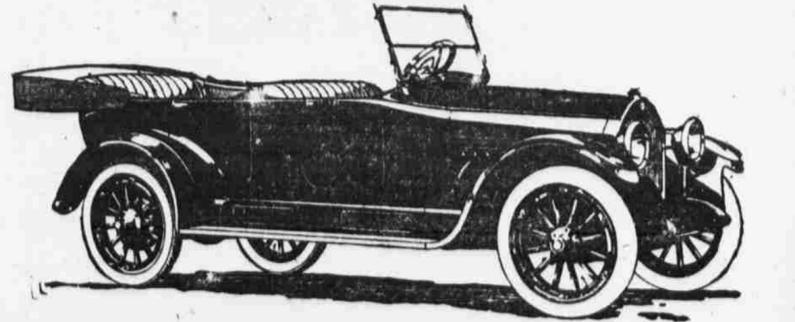
It gives the Willys Six more snap and life—makes it easier to handle.

Then there's the saving of \$300 to \$400 in favor of the Willys Six.

45-horsepower motor, L-head type of high power 120-inch wheelbase 48 x 2 1/2-inch cantilever rear springs 33 x 4 1/2-inch tires, non-skid rear Two disappearing auxiliary seats in tonneau

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