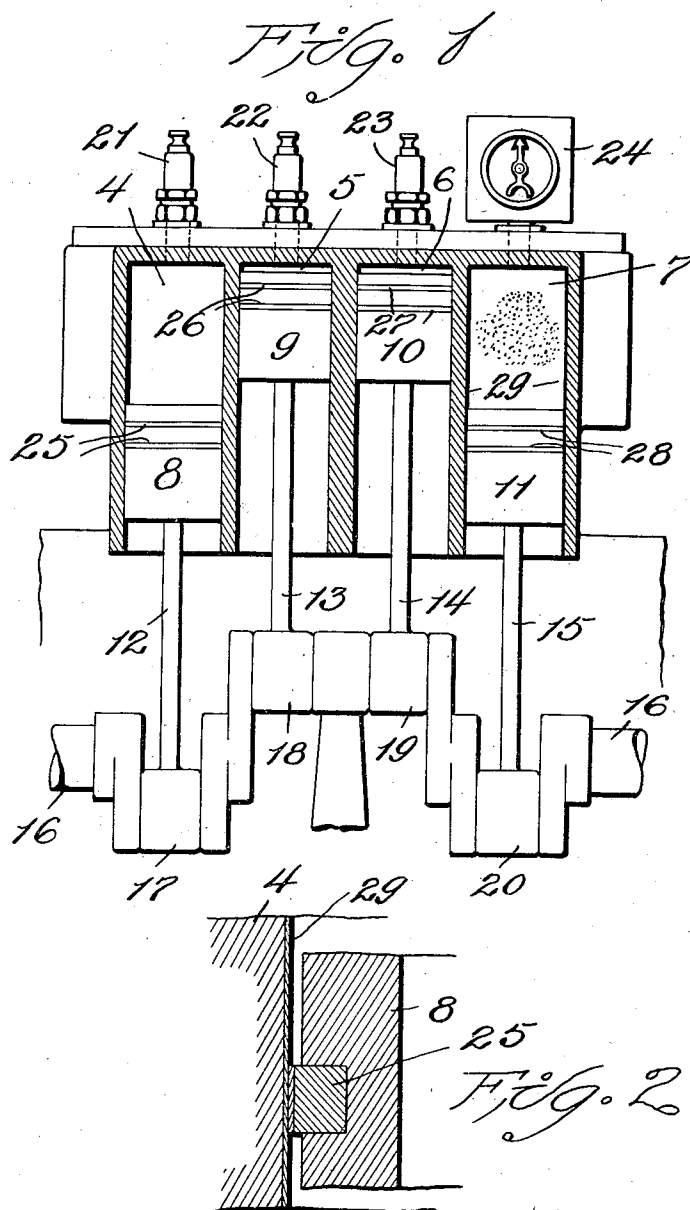


O. W. GERLEMAN.
METHOD OF TREATING CYLINDERS AND PISTONS.
APPLICATION FILED APR. 5, 1920.

1,398,775.

Patented Nov. 29, 1921.



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UNITED STATES PATENT OFFICE.

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METHOD OF TREATING CYLINDERS AND PISTONS.

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To all whom it may concern:

Be it known that I, OSCAR W. GERLEMAN, a citizen of the United States, residing at 110 South Tenth street, St. Louis, State of Missouri, have invented certain new and useful Improvements in Methods of Treating Cylinders and Pistons, of which the following is a specification.

The object of my invention is to produce a method of treating cylinders and pistons of combustion engines.

Inasmuch as the pressure produced by an explosion in the cylinder of an internal combustion engine varies directly with the pressure to which the gas is compressed before it is exploded, it is highly advantageous to procure high compressions.

In a multi cylinder engine it is also of extreme importance to have the compressions of all the cylinders equally high *i. e.* to have the compression in all the cylinders the same.

The difficulty does not exist in producing the compression but in keeping it after it is produced. The piston ring in the piston is designed to prevent loss of compression. In the conventional motor this is accomplished only approximately. What actually happens is that the compressed gases leak past the piston into the crank case thereby lessening the compression and hence the power and that since the leakage varies in the different cylinders the uniformity of compression is not maintained.

Furthermore the oil leaks from the crank case past the piston rings into the cylinders and combustion chamber in the conventional motor causing foul plugs, the necessity of grinding valves and reboring cylinders. Likewise the unburnt gasoline from the cylinder leaks past the piston into the crank case, making the oil unfit for lubricating purposes in the conventional motor.

My invention consists in a method of preventing compression losses, preventing the oil from leaking past the piston rings, preventing the necessity of valve grinding and carbon cleaning in the cylinders; preventing a mixture of gasoline with the oil in the crank case, without a mechanical appliance, or adding any foreign matter to the gasoline or overhauling or mechanically changing the motor.

With the above purposes in view, my invention consists in certain novel methods of operation, as will be hereinafter more fully

described, pointed out in the claims and illustrated by the accompanying drawings in which,

Figure 1 is a diagrammatic sectional elevation of four cylinders and pistons together with a crank shaft of a conventional internal combustion motor.

Fig. 2 is an enlarged sectional elevation of a portion of one cylinder wall, piston and piston ring showing their relative positions.

Numeral 3 designates a portion of an engine frame, numerals 4, 5, 6, and 7, four conventional cylinders, having four conventional pistons, 8, 9, 10, and 11 and four conventional connecting rods 12, 13, 14, and 15. Numeral 16 designates a portion of a crank shaft having the journals 17, 18, 19, and 20 to which the connecting rods 12, 13, 14, and 15 are rotatively secured in the conventional manner. Numerals 21, 22, and 23 designate three conventional spark plugs and numeral 24 designates a conventional compressometer. Operatively secured to the pistons 8, 9, 10 and 11, are positioned the piston rings 25, 26, 27, and 28. The spark plugs and compressometer are secured selectively in the cylinder heads in the conventional manner.

No valves, etc., are shown because they are not necessary to disclose my invention which may be fully disclosed by reference to the figure thus far described.

Consider cylinder 7, that is to be treated according to my method. The ignition of the engine is made inoperative. The spark plug is removed and through the spark plug opening a small amount of pure flake graphite is inserted when the cylinder is commencing its compression stroke. The compressometer is then inserted in place of the spark plug. The crank shaft is then manually revolved so as to move piston 11 in its upward or compression stroke almost to the end, but not sufficient to open the exhaust port of the cylinder. The piston is then moved down to the beginning of its upward or compression stroke and the process is continued until the compression losses for the cylinder are reduced until the proper compression is registered on the compressometer.

Only the purest form of flake graphites may be used and only in small amounts. If too much is used, the piston will be caused to stick or freeze to the cylinder. The amount varies with the size and condition of the cyl-

inder and piston rings. An average amount to be used in one cylinder of ordinary size is three grains by weight. Usually one application is sufficient but never more than three
5 are necessary. I mean by additional applications, the removing of the compressometer and the insertion of more graphite. This same operation is repeated with each cylinder until all the compressions are alike and
10 a maximum pressure which is practically obtainable in such engines is obtained.

The reasons for these results are resident in the fact that when the graphite is inserted as described, it is split up into fine
15 particles and is held in suspension in the air. The movement of the piston rubs the graphite into the cylinder walls and into the external surface of the piston rings forming an absolutely smooth and solid surface
20 29 on both. Within the range of temperature in such cylinders as described the graphite will act as a perfect lubricant, decreasing the coefficient of friction between the cylinder wall and the piston rings and at
25 the same time preventing leakage of the gases or oil or gasoline past the piston. The success of the operation depends principally on the amount of flake graphite employed and on its purity. The graphite fills
30 up the pores of the surfaces on which it lodges and brings about the results claimed principally for that reason.

Between two and three grains per cylinder must be used and no more. This process forms a film over the cylinder walls and the piston rings which I have shown by shaded
35 lines (enlarged). The graphite in suspension in cylinder 7 is indicated by small dots.

What I claim and mean to secure by Letters-Patent is,

1. A method of the character described which consists in introducing relatively small amounts of flake graphite into a cylinder, and moving the piston in reciprocating
40 manner, until the graphite has impregnated the cylinder walls and piston ring surfaces until proper pressure is obtained.

2. A method of the character described which consists in introducing through the spark plug aperture of a cylinder three
50 grains or less by weight of chemically pure flake graphite into a cylinder when the piston is at the beginning of its compression stroke, inserting pressure registration means in the spark plug aperture and moving the
55 piston in a reciprocating manner in the cylinder in such a way as not to open the exhaust valve in the cylinder and until the proper compression is obtained and the cylinder walls and piston ring surfaces are
60 thoroughly impregnated with the flake graphite.

In testimony whereof I affix my signature.
OSCAR W. GERLEMAN.