

UNITED STATES PATENT OFFICE.

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PROCESS FOR REMOVING CARBON.

1,034,713.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, WILLIAM W. JOHNSTON, a citizen of the United States, residing at Marshalltown, in the county of Marshall and State of Iowa, have invented a certain new and useful Process for Removing Carbon, of which the following is a specification.

My invention relates to processes for removing caked carbon from the cylinders of explosive engines.

It is well known that in an explosive engine a coating or layer of carbon is formed on the interior of the cylinder and on the piston head and around the valve which, after it has come to be of a certain thickness, interferes seriously with the operation of the engine. Many methods for removing this carbon deposit have been employed and experimented with. Liquid carbon removers are only partially successful for the reason that the carbon does not readily pass out through the exhaust ports when in soft or moist form. It is desirable in the carbon remover that it shall break up the carbon into small particles and to take all moisture out of it. These results are difficult to accomplish with a liquid carbon remover and with such removers the carbon forms into small chunks, or balls which do not readily pass out of the cylinder.

In some cases chains or other hard substances have been placed in the cylinder for the purpose of pounding the carbon and breaking it up. This method is unsatisfactory for the reason that it does not touch the carbon in many places in the cylinder and it frequently results in serious injury to the valves.

Probably the most satisfactory method of cleaning carbon from the cylinders is to take the machine apart and scrape off the carbon deposit. This is expensive and necessitates the employment of an expert mechanic.

The object of my invention is to provide a process for removing the deposit of carbon from the cylinders of an explosive engine which does not require that the engine be taken apart.

A further object is to provide such a process which thoroughly and completely removes the carbon without any injury to the cylinder, piston or valves.

A further object is to provide such a process which is rapid in operation and which entails a comparatively slight expense.

A further object is to provide such a process in which is employed certain materials which are inexpensive and easy to prepare for use; and further which can be readily obtained in any locality.

My process is designed especially for removing carbon from the cylinders of explosive engines but it may be used for other purposes. I shall describe it with relation to explosive engines in order to thoroughly illustrate the way in which it is carried out.

In carrying out my improved process for removing carbon I first melt together, lead, zinc and mercury in approximately the respective proportions of twelve pounds of lead, four pounds of zinc and four ounces of mercury. This proportion of the ingredients may be varied considerably but I have found that I get the best results with approximately these relative amounts. I cool and form the resulting compound into bars or rods and cut these bars or rods into small particles, preferably not thicker than one fourth of an inch in any dimension. The size of these particles may be varied somewhat but for engine cylinders I have found the size mentioned the most satisfactory.

The composition just described will accomplish the results desired but I prefer to coat the small particles or pieces with oxid of zinc as I find that I get somewhat better results by using the composition coated with zinc oxid in this way.

Having prepared my composition, as hereinbefore described, I place a small quantity of the particles or pieces in an engine cylinder and start the engine. The operation of the piston gradually pounds the small particles to pieces and they are discharged from the exhaust port of the cylinder in gases and ash. The pounding and the heat resulting from combustion causes the disintegration of the carbon which also passes out of the exhaust port. I find that the carbon deposit around the valve also disintegrates and passes out with the gases although they are practically free from any concussion from the particles of my composition.

I shall not attempt to describe the exact chemical process that takes place within the cylinder after my composition has been placed therein and the engine started. I do know that after my composition has been placed in the cylinder and the engine has

been operated for from two minutes to half an hour the deposit of carbon within the cylinder and on the piston head and valves will be removed and on examination the cylinder will be found perfectly clean. During the earlier part of the operation a fine dark colored dust comes from the exhaust port of the cylinder. The principal function of the pounding of the composition by the cylinder is to break up the composition into small particles which are driven out of the cylinder with the gases therein. I find that the carbon is dried during the process so that it readily passes out through the exhaust port. I also find that the carbon dries more rapidly when I use the composition coated with zinc oxid than when I use it without the zinc oxid.

My improved process for removing carbon has numerous advantages among which are that it does not require the engine to be taken apart. It thoroughly cleans the cylinder and does not in any way injure the cylinder, piston head or valves. The carbon and the composition placed in the cylinder are discharged therefrom through the exhaust port during the operation of the engine in a comparatively short time.

I ordinarily put into the cylinder a tablespoonful of the small pieces of the composition. This amount may be varied considerably without affecting the final result. The time required for the operation of the engine to cause the disintegration of the composition and the deposited carbon varies and is dependent upon the amount of the carbon deposit, the amount of the composition in the cylinder and the location of the cylinder. It takes longer to clean a horizontal cylinder than it does to clean a vertical one probably because the more frequent concussion causes the more rapid disintegration of the composition and allows it more rapidly to affect the carbon.

After my combination has been used it leaves a smooth clean surface in the interior of the cylinder. The process may be employed any number of times without injury to any of the parts. The composition is entirely discharged through the exhaust port and requires no work to remove it from the cylinder.

I claim as my invention:

1. The process of removing deposits of carbon consisting in subjecting the carbon, and a composition composed of zinc, lead and mercury, when in the vicinity of each other, to heat.

2. The process of removing deposits of carbon, consisting of subjecting the carbon and a composition of lead, zinc and mercury placed in proximity to the carbon within a receptacle and applying heat to the interior of the receptacle.

3. The process of removing deposits of carbon consisting of subjecting the carbon and a composition of lead, zinc and mercury when in proximity with each other to great heat as in the cylinder of an explosive engine, said heat being intermittently applied.

4. The process of removing deposits of carbon consisting of subjecting the carbon and a composition of lead, zinc and mercury, when in proximity with each other, to great heat as in the cylinder of an explosive engine, said heat being intermittently applied, and by subjecting said carbon deposits to repeated concussion from small pieces of said composition.

5. The process of removing deposits of carbon from the cylinder of an explosive engine, consisting of placing small particles of a composition of lead, zinc and mercury in approximately the relative proportions of twelve, four and one-fourth, in said cylinder, and running the engine until said pieces disappear.

6. The process of removing deposits of carbon from the cylinder of an explosive engine, consisting of placing approximately a tablespoonful of small pieces, approximately one fourth of an inch thick at their greatest dimension, of a composition of lead, zinc and mercury, in the relative proportions of twelve, four and one fourth, in said cylinder, and running the engine until said pieces disappear, and continuing said process until said carbon deposits are removed.

Des Moines, Iowa, October 25, 1911.

WILLIAM W. JOHNSTON.

Witnesses:

M. WALLACE,
B. E. DEAL.