

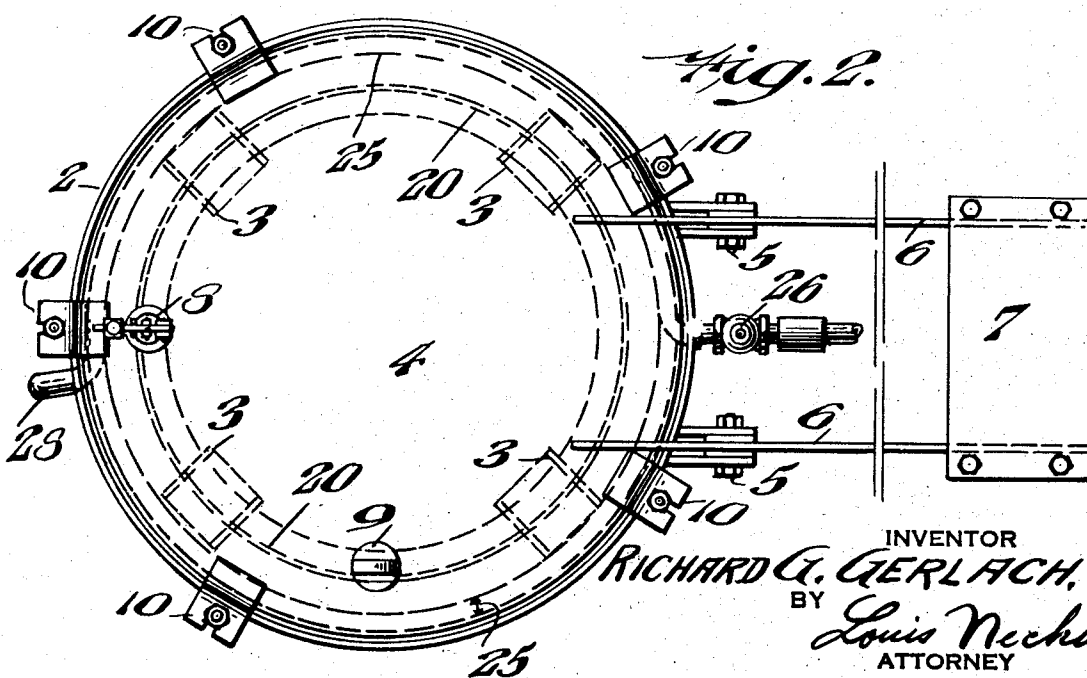
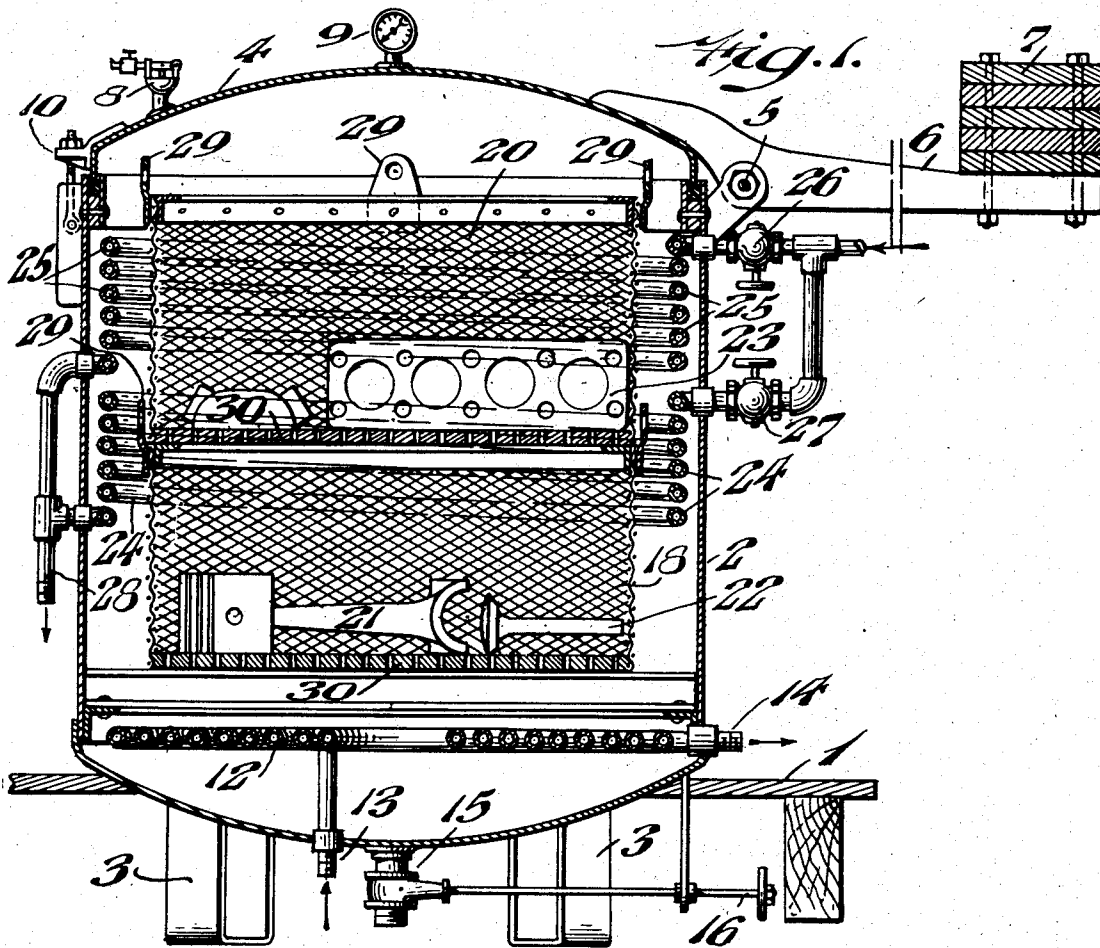
July 2, 1935.

R. G. GERLACH

2,006,636

METHOD OF REMOVING CARBON DEPOSITS FROM ENGINE PARTS

Filed June 30, 1934



INVENTOR
RICHARD G. GERLACH,
BY
Louis Necho
ATTORNEY

UNITED STATES PATENT OFFICE

2,006,636

METHOD OF REMOVING CARBON DEPOSITS
FROM ENGINE PARTS

Richard G. Gerlach, Philadelphia, Pa.

Application June 30, 1934, Serial No. 733,155

2 Claims. (Cl. 87-5)

My invention relates to a new and useful method and apparatus for removing carbon deposits from parts of internal combustion engines in a very thorough manner to permit close inspection of such parts for defects and without in any way damaging or wearing out said parts.

In the operation of internal combustion engines very hard carbon deposits form on the surfaces of certain parts, such as valves, cylinder heads, piston tops, etc., which seriously interfere with the safety and efficiency of the operation of such engines. In the case of automobile engines it is sufficient to remove the cylinder head and scrape off the hard carbon by means of a chisel or other hard instrument and reassemble the engine. In airplane engines this practice is not satisfactory, for the reason that it is necessary that the parts be absolutely and thoroughly cleaned in order to permit close and thorough inspection of parts for defects or cracks, and it has heretofore been the practice to scrape the carbon deposits by means of chisels and wire brushes and finally to sand-blast the parts in order to remove the last traces of the carbon deposits. Due to the extreme accuracy and nicety of fit of the parts of an airplane engine, this practice is most unsatisfactory, since the scraping by means of wire brushes and the sand-blasting result in the wearing out of the metal and alteration of the original dimensions, so that after a few cleanings of the parts according to this method some or all of the parts thus cleaned have to be renewed at a considerable expense.

It is, therefore, the object of my invention to provide a method and apparatus for removing the carbon deposits from such parts without the use of any scraping and without the use of wire brushes or sand-blasting, thereby thoroughly cleaning the parts and at the same time eliminating any damage to or wear of such parts.

It is a further object of my invention to provide a novel method and apparatus for removing carbon deposits from engine parts at a greatly reduced cost in time, labor and material.

My novel method and apparatus will be more clearly understood from the following specification and accompanying drawing, in which:

Fig. 1 represents a vertical sectional view of an apparatus embodying my invention.

Fig. 2 represents a plan view of Fig. 1.

Referring to the drawing in which like reference characters indicate like parts, I design-

nates a table or platform or other support for supporting a tank 2, which is also preferably supported by means of the brackets 3. The tank 2 is provided with a water and air-tight lid or cover 4 which is hinged at 5 to the arm 6, which also carries the counter-weight 7 to facilitate the opening and closing of the cover 4. The cover 4 is provided with a safety valve 8 and a pressure gauge 9 and is secured in the closed position by any desired number of clamps 10. In the bottom of the tank 2, I provide the heating coil 12 which is supplied with live steam through the inlet 13, said coil also having an outlet 14. In connection with the heating coil 12 it is to be understood that any other desired heating element positioned within or without the tank may be used. 15 designates a drain valve which may be operated remotely by the handle 16. Within the tank 2, I position the superimposed baskets 18 and 20 which are adapted to receive the engine parts to be cleaned, such as the piston 21, valve 22, cylinder block 23, etc. In connection with the baskets 18 and 20 it is to be noted that a single basket suitably partitioned or without partitions may be used, if so desired. Surrounding the baskets 18 and 20, I provide one or more cooling coils 24 and 25 which are supplied with cold water or other cooling medium through the inlet valves 26 and 27 and which are provided with the common outlet 28. The baskets 18 and 20 are also provided with suitable handles 29 to facilitate removal thereof from the tank 2. The baskets 18 and 20 are supported within the tank 2 on any suitable perforated false bottom 30, suitably secured within the tank above the heating coil 12. With an apparatus such as I have described I carry out my method of removing carbon in the following manner:

The tank 2 is filled to the desired extent with water and a cleaning composition in the ratio of approximately 1 to 80 parts by volume. The cleaning composition I prefer to use, and which under actual test has given very highly satisfactory results, is composed of about seventy percent of ortho-dichloro-benzene, about nine percent of triethanol amine, and about twenty-one percent of oleic acid. The composition is prepared in liquid form, and in charging the tank one part of this composition to about eighty of water is satisfactory. The parts to be cleaned are then positioned in the baskets 18-20 and the cover 4 is clamped down. Steam is then turned on in the heating coil 12 (or other heating element may be used) until a temperature

of three hundred to four hundred degrees F. is reached within the tank. The temperature causes the liquid contents of the tank to evaporate, thus building up a pressure within the tank which may range from twenty to eighty pounds per square inch. The parts to be cleaned are subjected to the desired degree of temperature and pressure for a period of from one to two hours, depending upon the nature as well as condition of the carbon deposit to be removed. After a sufficient time has elapsed the steam is shut off and cold water is introduced through the inlets 26 and 27 into one or both of the coils 24—25, the purpose of the cold water circulating through the coils being more rapidly to cool the tank and to effect condensation of the vapors therewithin to expedite the removal of the baskets from the tank. When the tank has cooled sufficiently, the cover 4 is opened and the baskets 18 and 20 with their contents are removed by means of the handle 29. The carbon deposit now present on the parts 21, 22, 23, etc., is in the form of a soft, plastic mass, in lieu of the hard, crusty substance which it was before being thus treated. The parts are then subjected to a spray of gasoline, kerosene, or other volatile hydrocarbon, under pressure of ninety to two hundred pounds. The parts are then wiped dry and are thoroughly clean and ready for inspection and reassembling.

It will thus be seen that I have devised a novel method and apparatus whereby the hard, firmly adhering carbon deposits on the surfaces of parts of internal combustion engines may be thoroughly, efficiently, economically and expeditiously cleaned without in any way damaging the parts or subjecting them to any wear or alteration.

It is to be understood that the method and apparatus herein disclosed are equally applicable to the removal of the heat-resisting varnishes with which engine parts subjected to excessive heat are usually coated.

I claim:

1. The method of removing carbon from engine parts which consists in placing said parts in a basket, placing said basket in a pressure tank, submerging said parts within said tank in a solvent comprising one part of a mixture of orthodichlorobenzene as the major ingredient, triethanolamine and oleic acid to eighty parts of water, applying heat to said tank to raise the temperature of the solvent from three hundred to four hundred degrees F. and to develop a vapor pressure within said tank of twenty to eighty pounds per square inch, rapidly condensing said vapors to diminish the pressure within said tank, removing said parts and finally spraying said parts with a volatile hydrocarbon under pressure.

2. The method of removing carbon from engine parts which consists in placing said parts in a pressure tank, submerging said parts with a liquid formed of one part of a solvent composition to eighty parts of water, said solvent composition comprising substantially seventy percent of ortho-dichlorobenzene, nine percent of triethanolamine and twenty-one percent of oleic acid, applying heat to said tank to raise the temperature of said liquid and to develop a vapor pressure within said tank rapidly cooling said vapors to diminish the pressure within said tank, removing said parts from said tank, and finally spraying said parts with a hydrocarbon under pressure.

RICHARD G. GERLACH.