

May 21, 1940.

G. HOFELE
 APPARATUS FOR REMOVING CARBON AND OTHER DEPOSITS
 FROM INTERNAL COMBUSTION ENGINES
 Original Filed Dec. 2, 1938

2,201,774

FIG. 1.

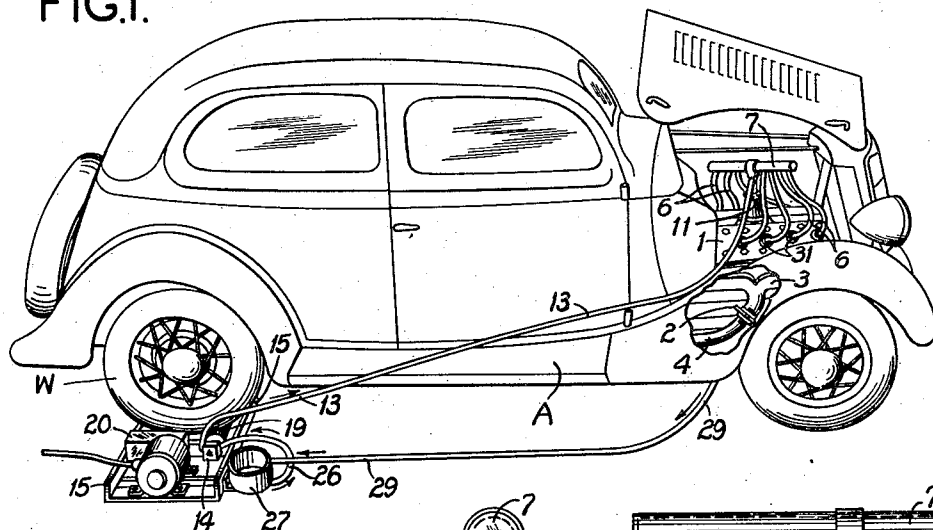


FIG. 3.

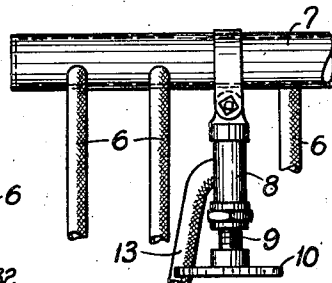
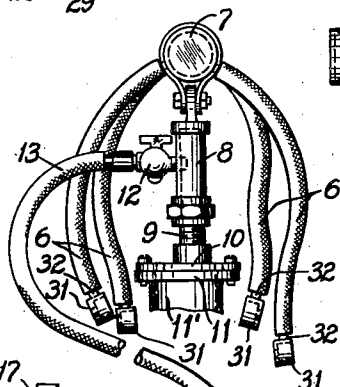
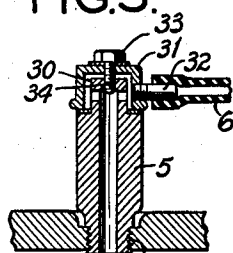


FIG. 4.

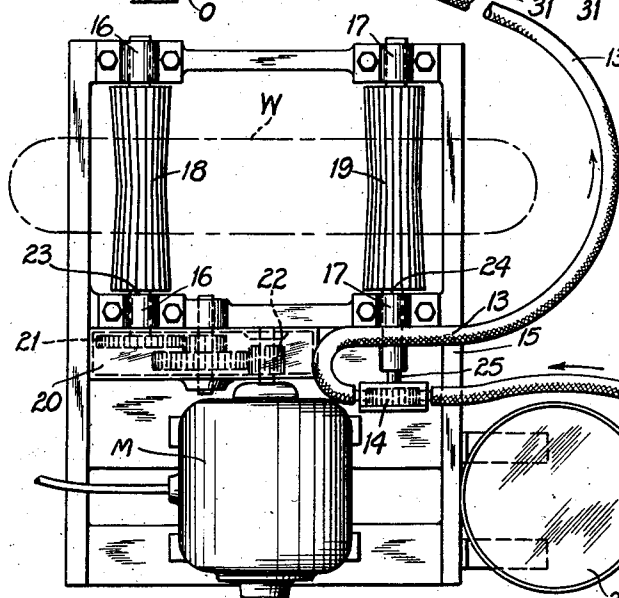
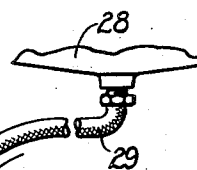


FIG. 2.



INVENTOR:
 GEORGE HOFELE

BY *Harry S. Reimes*
 ATTORNEY

UNITED STATES PATENT OFFICE

2,201,774

APPARATUS FOR REMOVING CARBON AND
OTHER DEPOSITS FROM INTERNAL COM-
BUSTION ENGINESGeorge Hofele, St. Louis, Mo., assignor to Albert
Wehmeier, St. Louis, Mo.Original application December 2, 1938, Serial No.
243,579. Divided and this application Janu-
ary 9, 1939, Serial No. 249,985

3 Claims. (Cl. 141-1)

My invention has relation to improvements in apparatus for removing carbon and other deposits from internal combustion engines, and consists of the novel features of construction more fully set forth in the specification and pointed out in the claims.

The present application is a division of that filed by me on December 2, 1938, under Serial No. 243,579, in which claims are presented for the method practiced.

The principal object of the invention is to remove carbon deposits and other accretions from the cylinders, pistons and valves of the engine without the removal of the head therefrom. Heretofore the common practice in removing carbon deposits has been either to scrape such deposits from the parts affected or to burn the deposits with a blowtorch. The scraping process is slow and consequently expensive, while the use of a blowtorch requires considerable skill in order to avoid damage to the engine.

I have discovered that the accumulations within the engine may be removed by pumping a suitable fluid into the engine and circulating this fluid under pressure by the action of the engine pistons. The particular fluid that is used is immaterial so long as it has the property of loosening the deposits and there are many such preparations on the market. The simplicity of my improvement in cleaning engines and the ease with which it may be performed makes the operation both economical and available for general use since it does not require the services of a skilled mechanic.

The advantages will be better apparent from a detailed description of the invention in connection with the accompanying drawing, in which:

Figure 1 is an outline perspective view of an automobile with the hood raised and parts broken away so as to show the application of the apparatus with which my improved method is practiced; Fig. 2 is a composite plan and elevation of the entire apparatus; Fig. 3 is a middle vertical longitudinal section through a connector that is inserted in the engine block in lieu of the spark plug when practicing the method hereinafter described; Fig. 4 is a side elevation of what I choose to term a fluid distributor with parts broken away.

Referring to the drawing, A represents a conventional automobile having an eight-cylinder V-type engine 1, from which the carburetor has been removed and in which a blocking plate or shim 2 has been inserted between the exhaust manifold 3 and the exhaust pipe 4. The spark

plugs have also been removed and replaced by special plugs or connectors 5 from which the flexible tubes 6 lead to a fluid distributing head or manifold 7 mounted on a special fitting 8, which is connected by a nipple 9 and flange 10 to flange 11 of intake manifold 11' which normally serves to receive the carburetor which, as stated, has been removed. It will be observed that there is a tube 6 connecting each cylinder through the spark plug opening to the fluid distributor or manifold 7, and said manifold 7 has no connection with the engine except through said tube 6.

A control cock 12 is tapped into the fitting 8 and a flexible tube 13 leads from said cock to a standard gear pump 14 mounted on a suitable frame 15. The frame 15 is provided with two sets of bearings 16, 16 and 17, 17, in which are mounted concave rollers 18 and 19 properly spaced to support the rear wheel W of the automobile A. A gear case 20 housing a train of gears 21 is mounted adjacent to the roller 18 and connects said roller with a motor M which drives said roller through the motor shaft 22 and stub shaft 23 of the roller. The inner stub shaft 24 of the roller 19 is suitably coupled to shaft 25 of gear pump 14 so that the pump will be operated through the roller 19.

The intake side of pump 14 is connected by a flexible tube 26 to a container 27, which serves as the receptacle for the fluid that is pumped through the engine. The container 27 is also connected to the crankcase 28 of the engine by a flexible tube 29 so that any fluid that accumulates in the crankcase may drain back into the container 27.

The connectors 5 whereby the tubes 6 are connected into the spark plug openings each have a threaded inner end for this purpose, while the outer end 30 is of reduced diameter to receive a cap 31 to which the tubing 6 is connected by means of a nipple 32. The cap 31 is held onto the connector 5 by a cap screw 33 screwed into a tapped opening 34 in the end of the reduced extremity 30 of connector 5.

The apparatus now having been described and the parts explained in detail, the manner of its use is as follows:

As heretofore stated, the engine carburetor is removed and the special fitting 8 secured in place of it, and the spark plugs are also removed and the connectors 5 secured in place of them so that all of the cylinders are connected by the tubes 6 and manifold 7. The exhaust manifold 3 is also blocked off by the plate 2 as stated. The rear wheel W of the automobile A,

having previously been positioned on the rollers 18 and 19, may now be driven by the motor M so as to set the pistons of the engine in motion.

The pump 14 obviously forces the fluid from the container 27 through the tube 26 and tube 13 through the special fitting 8 and into the intake manifold 11'. As the intake valves are opened by the external driving of the engine, the fluid will pass through them into the cylinders and as the exhaust valves are opened the fluid will pass through the exhaust valves into the exhaust manifold 3. However, since the exhaust manifold is blocked off, as stated, the fluid cannot discharge from the engine but must accumulate therein until the predetermined amount necessary to perform the cleaning operation has been pumped into the engine. As the pistons of the engine continue to operate the fluid will be pumped back and forth through the cylinders and valves under pressure by the action of the pump 14, and any excess of fluid accumulated in any one cylinder will be expelled therefrom through the tube 6 leading from that cylinder into the manifold 7 and be distributed to other cylinders having a deficiency of fluid. Thus, as the pistons continue to operate, the manifold or distributing head 7 will distribute the fluid among the respective cylinders so as to maintain a substantially continuous flow in each cylinder.

After the cylinders have been actuated awhile some of the fluid will be washed past the piston rings and through the valve guides, cleaning the accumulations therefrom, and drain into the crankcase, from which it is removed and discharged into the container 27 through the tube 29.

The cleaning operation is continued as long as in the judgment of the operator it is necessary in order to remove all deposits from the various parts of the engine, after which the sludge and soiled fluid may be drained out by disconnecting the manifold 3. Obviously, no fixed time of effecting a thorough cleaning of the engine by my improved method can be set for all jobs as

the amount of carbon deposits and other accumulations in the engine would determine the length of time necessary for the effective treatment thereof.

If desired the fluid distributing manifold 7 may be dispensed with and the cylinders may be directly connected in pairs through the spark plug openings. When this arrangement is adopted the cylinders of each connected pair would have their pistons in opposite relation so that when one piston is on its up-stroke the other piston would be on its down-stroke and the fluid would be forced from one cylinder to the other.

Obviously the apparatus is susceptible to modification and the details of construction may be varied without departing from the spirit of the invention.

Having described my invention, I claim:

1. In combination with an internal combustion engine, apparatus for circulating cleaning liquid through the engine comprising a pump in communication with the intake manifold of the engine, means for driving the engine by external power and a device for connecting two or more of the cylinders to enable the flow of liquid from one cylinder to another.

2. In combination with an internal combustion engine, apparatus for circulating cleaning liquid through the engine comprising a pump in communication with the intake manifold of the engine, means for driving the engine by external power and a liquid distributing manifold in communication with the cylinders to enable the flow of liquid from one cylinder to another.

3. In combination with a motor vehicle, apparatus for cleaning the cylinders, pistons and associated parts thereof, said apparatus comprising rollers for supporting and driving a wheel of the vehicle, means for actuating said rollers, means for charging a cleaning liquid into the engine cylinders, and means for distributing the liquid among the cylinders during the actuation of the engine by the aforesaid rollers.

GEORGE HOFELE.