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AUTOMATIC DECARBONIZER FOR INTERNAL COMBUSTION ENGINES.

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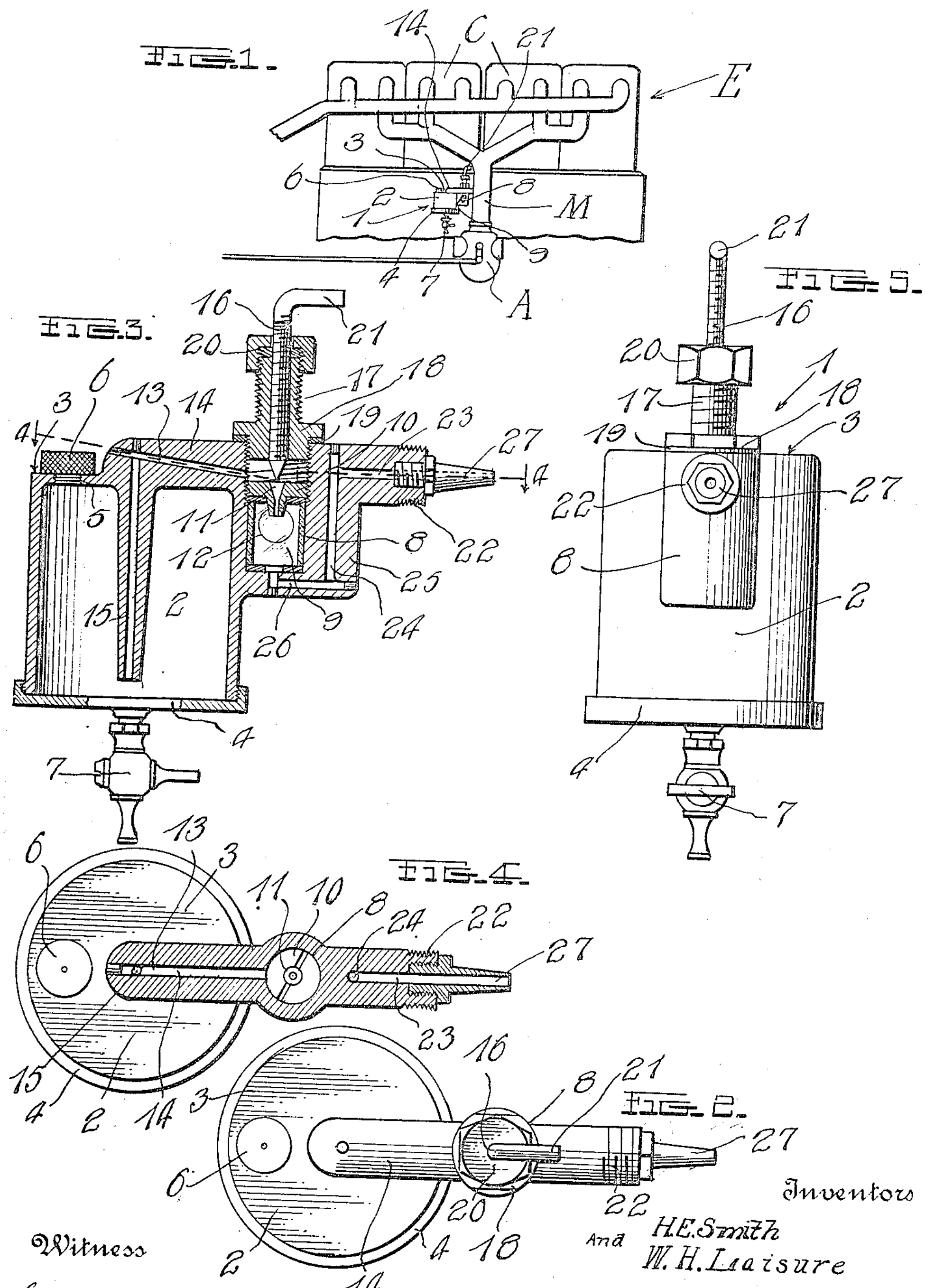
1,225,068. Patented May 8, 1917.



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AUTOMATIC DECARBONIZER FOR INTERNAL-COMBUSTION ENGINES.

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Application filed July 3, 1916. Serial No. 107,410.

To all whom it may concern:

Be it known that we, HARVEY E. SMITH and WILLIAM H. LAISURE, citizens of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Automatic Decarbonizers for Internal-Combustion Engines; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in decarbonizers which are adapted to be attached to the intake manifolds of internal combustion engines, the object being to provide a solution which will act upon the deposits of carbon within the engine cylinders in order to loosen the same so that it may be blown out through the exhaust.

The primary object of the present invention is to provide a simply constructed decarbonizer of this character in which all the parts are assembled in one device in a compact manner.

An additional object is to provide a sight feed in communication with the fluid container in order that the operator may see if the solution is flowing properly or not.

With these and many other objects in view, our invention resides in the novel features of construction, combination and arrangement of parts which will be hereinafter more particularly described and claimed.

In the accompanying drawings:—

Figure 1 is a side elevation of a conventional internal combustion engine showing our improved decarbonizer attached to the intake manifold thereof above the carbureter;

Fig. 2 is a top plan view of the device removed;

Fig. 3 is a central vertical section on the line 3—3 of Fig. 2;

Fig. 4 is a transverse section on the line 4—4 of Fig. 2; and

Fig. 5 is a side elevation of the decarbonizer removed.

Referring more particularly to the drawing in which similar reference characters designate like parts throughout the several views, E denotes an internal combustion engine of ordinary construction having a plurality of cylinders C into which a combustible mixture from the carbureter A is conveyed by the intake manifold M. As shown in Fig. 1, the improved decarbonizer 1 is designed to be constructed with the intake manifold at a point just above the communication of the carbureter therewith.

This decarbonizer comprises a substantially cylindrical fluid container 2 having a flat top and bottom 3 and 4 respectively, the top being provided with a threaded filling opening 5 through which a suitable decarbonizing solution may be poured, and this opening being closed by a suitable screw-plug 6. The top is preferably formed integrally with the sides of the container, but the bottom 4 may be made removable. The bottom has a central opening in which a suitable drain cock 7 is placed so that the liquid within the container may be readily removed at any time. Air may be allowed to enter the interior of the container in order to prevent a vacuum forming therein by any preferred means such as a small vent opening in the top.

Formed integrally with the side wall of the container 2 adjacent the top thereof is a combined vacuum and sight feed chamber 8, the interior of which is preferably cylindrical in order to receive the usual cylindrical sight feed glass 9. The top chamber 8 extends slightly above the top of the container and is internally threaded to receive a threaded disk 10 in the center of which a valve seat 11 is formed. From Fig. 3 it will be noted that the sight feed glass 8 does not extend much above the sight openings 12 in the chamber and that this disk 10 contacts with the upper edge thereof in order to hold it in operative position. Suitable packing is disposed at the top and bottom of the glass in order to prevent the decarbonizing fluid from leaking out through the sight openings. By this arrangement should the glass 9 become broken, it can be readily replaced by unscrewing the disk 10 and substituting a new glass therefor.

The valve disk 10 is placed below the top and the chamber 8 so that fluid from the container 2 may readily flow into the latter through a downwardly inclined port 13 which is formed in an integral rib 14 which is disposed on the top 3. One end of this port opens into the chamber 8 above the valve disk 10, while the other end communicates with the opening in a spray pipe 15,

the latter being formed integrally with and depending from the top 3 to a point adjacent the bottom 4 as illustrated in Fig. 3.

In order to control the flow of liquid from the container 2 to the chamber 8, a needle valve 16 is provided for engagement with the valve seat 11 in the disk 10. The stem of this valve is threaded for engagement with the internal threads on a needle valve holder 17, the latter being threaded into the upper ends of the chamber 8. This holder 17 comprises a sleeve which is both internally and externally threaded and a packing nut 18 which is formed intermediate the ends of the sleeve and is adapted to provide means to facilitate the engagement of a wrench with this holder in order to thread the lower end of the same into the chamber 8, and also to hold a gasket 19 around the upper end of this chamber to prevent any leakage therefrom. The upper portion of the needle valve holder 17 has a packing gland 20 threaded thereon for the usual purpose. A handle 21 is provided on the upper end of the needle valve so as to readily permit the same to be engaged or disengaged with the seat 11.

In order to permit the device to be attached to the intake manifold, a threaded nipple 22 is formed integrally with the side of the chamber 8 opposite its connection with the container 2, this nipple being provided with a port 23 which communicates with a port 24 formed in an enlarged portion 25 of the wall of the chamber 8. Communication is had with the bottom of this chamber by means of a passage-way 26. It is obvious that by providing an opening in the intake manifold above the carbureter and tapping the same, the decarbonizer may be readily attached. Before the communication takes place, however, a spray nozzle 27 is threaded into the enlarged opening in the end of the nipple.

Assuming that the device has been attached to the intake manifold M, the container 2 well filled with a suitable decarbonizing fluid, and after the needle valve 16 has been opened the necessary extent, the automatic operation is as follows:—At each reciprocation of the pistons within the cylinder C a partial vacuum is created in the intake manifold M, thus drawing the requisite quantity of gas from the carbureter, and at the same time a vacuum is created in the vacuum chamber 8 of the decarbonizer, whereupon a quantity of fluid will be sucked up the spray pipe 15 and into the port 13 from whence it flows out onto the disk 10 and drops from the nipple 10′ formed on the lower side thereof. The amount of flow can be readily seen from the sight openings 12 and regulated by means of the needle valve 16. After the fluid drops into the chamber 8 it is drawn through ports to the nipple 22 and from there to the spray nozzle 27. As the drops of liquid hang on the ends of the nozzle 27, the gases from the carbureter as they rush by will tend to atomize the decarbonizing fluid and carry it in the form of vapor to the cylinders, where it acts upon the deposits of carbon, loosening the same and permitting it to be blown out through the exhaust.

After the carbon has been entirely removed, the decarbonizing vapor formed from the fluid in the container 2 will prevent the formation of further deposits, thus keeping the engine clean and allowing it to perform better service. From the foregoing description it will be seen that the device operates automatically, but is only in use during the operation of the engine.

We claim:—

1. A decarbonizer of the class described adapted to be attached to the intake manifold of an internal combustion engine and comprising a fluid container, a vacuum chamber formed integrally with said container, a cut off valve in the upper portion of said chamber, said container having a port opening into said chamber above said valve, a threaded nipple formed integrally with said chamber for engagement with said manifold, said chamber having an outlet port extending through said nipple, and a spray nozzle in the end of said nipple.

2. A decarbonizer of the class described adapted to be attached to the intake manifold of an internal combustion engine and comprising a cylindrical fluid container having a substantially flat top and bottom, said top having a filling opening, an integral spray pipe depending from the top of said container to a point adjacent the bottom, a combined vacuum and sight feed chamber formed integrally with said container, said chamber having sight openings therein, the upper portion of said chamber being internally threaded, a sight feed glass in said chamber, a valve disk threaded into said chamber and engaged with the top of said glass, said disk being spaced from the top of said chamber and having a valve seat therein, a rib formed integrally with the top of said container and having a downwardly inclined passage-way communicating with said chamber above said valve disk, said passage-way also communicating with the bore of said spray pipe, a threaded nipple formed integrally with the side of said chamber opposite its connection with the container, said nipple having a passage-way communicating with the bottom of said chamber, a spray nozzle threaded in the end of said nipple, a needle valve holder threaded in the upper end of said chamber, said holder being internally threaded, and a needle valve disposed in said valve holder and having threads for engagement with the

internal threads thereof, said needle valve being adapted to engage the valve seat in said disk.

3. The combination with an internal combustion engine having an intake manifold, and a carbureter on said manifold, of a decarbonizer comprising a fluid container, a combined vacuum and sight feed chamber formed integrally with said container, said chamber having a sight opening therein, a sight feed glass in said chamber, a member having a valve seat disposed in the chamber and in engagement with said glass to hold the latter therein, a needle valve for coaction with said seat, said container having a port opening into said chamber above said valve seat, a threaded nipple for engagement with the intake manifold, said chamber having a port extending through said nipple, and a spray nozzle in said nipple and disposed within said manifold.

In testimony whereof we have hereunto set our hands in the presence of two subscribing witnesses.

HARVEY E. SMITH.
WILLIAM H. LAISURE.

Witnesses:
C. J. JOHNSON,
T. E. MURPHY.