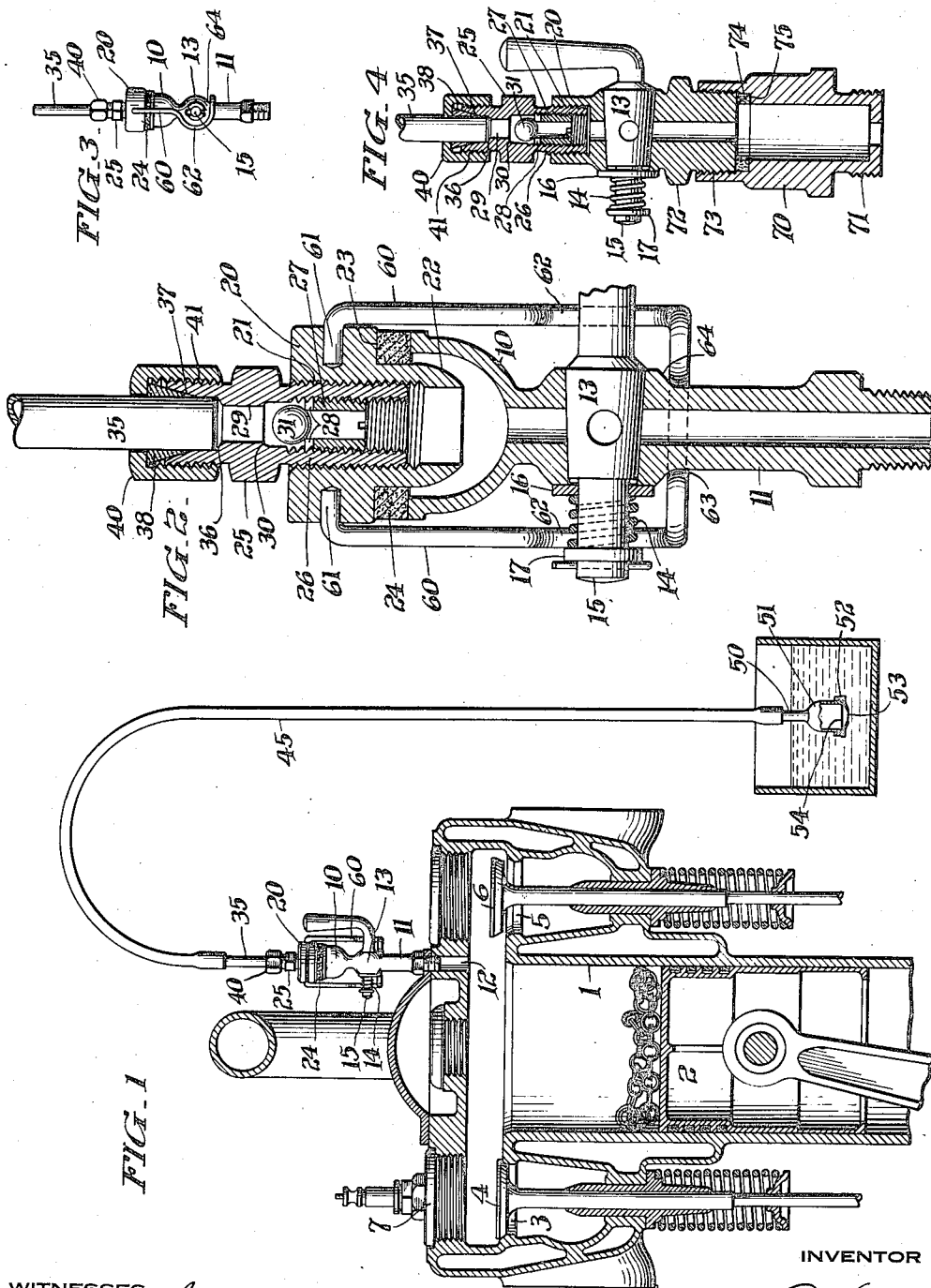


G. P. HORN,
 MEANS FOR REMOVING CARBON FROM EXPLOSIVE ENGINE CYLINDERS.
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WITNESSES
Daniel Webster, Jr.
C. E. Kleinfelder

INVENTOR
George P. Horn
 BY *Cyrus W. Anderson*
 ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE P. HORN, OF LANSDOWNE, PENNSYLVANIA.

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To all whom it may concern:

Be it known that I, GEORGE P. HORN, a citizen of the United States, and a resident of Lansdowne, Delaware county, State of Pennsylvania, have invented certain new and useful Improvements in Means for Removing Carbon from Explosive-Engine Cylinders, of which the following is a specification.

10 My invention relates to improvements in means for cleansing the interiors of the cylinders of explosive engines such means comprising devices whereby a liquid cleansing medium may be supplied continuously or
15 intermittently as desired to the interior, that is, to the combustion chamber of the cylinder.

One of the objects of my invention is to provide an improvement in the means for
20 supplying a cleansing fluid to the combustion chamber of the engine cylinder, such means coöperating with a member which moves freely in the cylinder as the piston reciprocates therein and contacts with the
25 sides of the chamber of the cylinder to cause the detachment of carbon deposits therefrom.

A further object of my invention is to provide an improvement in the method of
30 cleansing and removing the carbon from the surfaces of the combustion chambers of explosive engines consisting in the supply of cleansing material, such as kerosene, either continuously in such quantities as may be
35 desired, or intermittently to supply such desired quantities.

Other objects and advantages of my invention will be specifically referred to in the detailed description thereof which follows
40 or will be apparent from such description.

In the accompanying drawings, I have illustrated convenient forms of embodiment of my invention, but it will be understood
45 that the same is susceptible of embodiment in other forms of construction and that changes in the details of construction may be made within the scope of the claims without departing therefrom.

In the drawings:—

50 Figure 1 is a vertical longitudinal sectional view of a portion of a cylinder of an explosive engine showing the inlet and outlet valves associated therewith and said figure also showing the devices embodying my

invention partly in elevation and partly in 55 section;

Fig. 2 is a central longitudinal sectional view of a portion of the device embodying my invention;

Fig. 3 is a side elevation of the same, reduced in size;

Fig. 4 is a central longitudinal sectional view of a modified construction of a portion of the same.

Referring to the drawings, 1 designates a 65 cylinder of an explosive engine and 2 a piston operating therein. The gaseous fuel for operating the engine is admitted through the valve opening 3, the said opening being controlled by the valve 4 in known manner. 70 5 is the exhaust opening controlled by the exhaust control valve 6. 7 designates a plug carrying the ignition means. 10 designates a priming cup having connection through a stem 11 and an opening 12 in the head of 75 the cylinder 1 with the interior of the latter. The stem 11 is tubular and the passageway therethrough is controlled by means of a valve 13. In order to hold the valve 13 in
80 any position to which it may be adjusted a spring 14 is coiled about a stem 15 projecting from the valve and is interposed between washers 16 and 17, the former being seated
85 and pressing against a flattened surface upon the tubular stem 11 leading from the priming cup 10. The friction between the
90 washer 16 and such flattened surface upon the stem of the priming cup prevents accidental turning of the valve 13 from any position to which it may be adjusted.

The use and purpose of the priming cup is well known and its use for the purpose of introducing a cleansing fluid, such, for instance, as kerosene, does not in any way affect or destroy its usefulness or function as 95 a priming cup.

For the purpose of introducing the cleansing fluid into the priming cup and thence into the combustion chamber of the engine cylinder I provide a device comprising a 100 nozzle, which nozzle includes the member 20 having a screw-threaded opening 21 and also having a reduced end portion 22. A shoulder 23 is formed between the reduced end portion 22 and the main body portion 105 of the said member 20. A washer 24 of suitable material is placed in position around the upper or inner part of the re-

duced end portion 22 against the shoulder 23 so that when the reduced end portion 22 is inserted into the priming cup 10, as shown in Fig. 2 of the drawing, the said washer 24 is seated against the upper edge of the priming cup so as to form an air-tight joint between the same and the nozzle.

25 designates a tubular plug member having a screw-threaded end portion 26 which is adapted to engage the internal screw-threads 21 in the member 20. The interior of the screw-threaded portion 26 is also screw-threaded for the reception of a screw-threaded tubular member 27 the upper end of which is slotted as indicated at 28. The tubular screw-threaded member 27 is adjustable within the tubular plug 25, as is apparent from an inspection of Fig. 2. The bore of a part of the upper end portion of the tubular member is reduced as indicated at 29 to provide for the formation of inclined shoulders 30, as indicated, to form a seat for a ball valve 31 situated in the tubular member 25 between the upper end of the adjustable tubular member 27 and the lower end of the reduced portion 29.

35 designates a hollow stem one end of which projects into the upper or outer end of the tubular member 25. The lower end of the stem 35 abuts against a shoulder 36 interiorly of the upper end portion of the member 25. The upper end portion of the bore through the member 25 is flared outwardly as indicated at 37 for the reception of packing 38 which is forced into position and held tight against the stem 35 by means of a cap 40 having screw-threaded connection with the upper screw-threaded end 41 of the member 25.

45 designates a tube, which may be of rubber, which is detachably secured to the upper or outer end of the stem 35 by inserting the end of the latter into the said tube in known manner. The outer end of the tube 45 is extended over a stem 50 having connection with a cup-like member 51 having a cap 52 the bottom of which is provided with a central opening 53. A strainer 54 of wire gauze or similar material is clamped between the edge of the said cup-like member 51 and the top of the said cap 52.

When it is desired to use the device the reduced end portion 22 of the nozzle is inserted into the priming cup 10, as shown in Fig. 2 of the drawings, and is fastened and held in such position by means of the swinging spring bail 60 which is pivotally connected at 61 to the member 20. The outer swinging end of the spring bail 60 is provided with laterally curved portions 62, the lower ends of which are connected by the transversely extending portion of the wire forming the bail. The central part of the transversely extending portion is bent lat-

erally, as indicated at 63. Such laterally bent portion 63 is adapted to extend around the stem 11 immediately below the shoulder 64 formed thereon. The presence of the laterally bent or curved portions 62 not only permits the bail 60 to swing into position with the portion 63 thereof extending partially around and in contact with the stem 11 but such bent or curved portion 62 also constitutes springs which hold the outer swinging end portion of the bail in detachable engagement with the shoulder 64 of the stem.

In Fig. 4 of the drawings I have shown a modified construction of device which is adapted to be connected to the engine cylinder in a manner different from that of the device heretofore described. The device shown in Fig. 4 is adapted to be substituted for a plug, such as the plug 7.

In the said device shown in Fig. 4, 70 designates a plug the lower reduced end portion 71 of which is screw-threaded for engagement with the screw-threads in the opening from which the plug 7 may have been removed. The valve carrying plug or member 72 is adapted to be screwed into the interiorly screw-threaded portion 73 of the member 70. The connection between the said valve carrying portion 72 and the member 70 is rendered air tight by means of a packing ring 74 interposed between the lower end of the said member 72 and a shoulder 75 formed within the member 70.

The parts 13, 14, 15, 16, 17, 20, 21, 25, 26, 27, 28, 29, 30, 31, 35, 36, 37, 38, 40 and 41 in Fig. 4 correspond to the parts designated by the same numbers in Figs. 1 to 3 of the drawings.

When in use the ignition device of the cylinder to be cleansed should be thrown out of operation or should be removed, as in the case of the employment of a device constructed as in Fig. 4. The piston in the cylinder being cleansed is operated by the power from the explosions taking place in other cylinders of the engine. Simultaneously with the operation or reciprocation of the piston 2 in the cylinder the cleansing fluid is introduced being drawn from the receptacle 75 through the tube 45, as is apparent, such passage of the cleansing fluid into the combustion chamber of the cylinder being caused by the creation of a partial vacuum therein by the receding or outward movement of the piston 2. Coöperating with the cleansing fluid is a chain 76 which is situated in the piston and is moved back and forth therein by the movements of the piston 2. This chain operates to cause the removal of the carbon from the sides of the interior of the cylinder which carbon is thereafter removed from the piston through the exhaust port 5 by the action of the cleansing fluid, such as kerosene. By rea-

son either of the continuous or the intermittent supply of cleansing fluid, as may be desired, the cylinder is completely washed out and cleansed and the undesirable particles of carbon and other foreign matter therein removed. This is not practicable or possible unless the cleansing fluid is supplied either continuously or intermittently in such quantities as may be necessary to wash out and remove the detached carbon particles or other substances which may be in the cylinder and which should be removed.

The ball valves 31, as is apparent, permit the passage of the cleansing fluid forward into the engine cylinder but automatically prevent its passage in the opposite direction.

I claim:—

1. The combination of the priming cup for the cylinder of an explosive engine, a nozzle having an end adapted to be inserted into the said priming cup, means in said nozzle which permits the passage of a liquid therethrough into the said priming cup and thence into said cylinder, means for detachably connecting the said nozzle to the said priming cup and a conduit having connection with the said nozzle, and communicating with a source of supply of liquid.
2. The combination of the priming cup for the cylinder of an explosive engine, a nozzle adapted to have an end projected into the said cup, a bail having swinging connection with the said nozzle and adapted to engage a portion of the priming cup structure whereby the said nozzle is adapted to be detachably connected to the latter, means in

said nozzle which permits the passage of liquid in one direction therein to enter the cylinder and which acts automatically to prevent the return outward passage of the said liquid and a conduit having connection with the said nozzle and communicating with a source of supply of liquid.

3. The combination of a priming cup for a cylinder of an explosive engine, said cup having a stem by means of which it is connected with the cylinder, a valve for closing the passage-way through said stem, a nozzle having an end portion which is adapted to project into the said cup, a spring bail having pivoted connection with the said nozzle and being adapted to engage a part of the priming cup structure when the nozzle is placed in position with its end portion in the said priming cup to hold the said nozzle in detachable engagement with the said priming cup, means for permitting the passage of a liquid in a direction to enter the said cylinder, said means acting automatically to prevent a return passage of the said liquid, and a flexible tubular conduit having connection with the said nozzle and communicating with the source of supply of liquid whereby the latter may be conducted to the said cylinder.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 19th day of February, A. D. 1915.

GEORGE P. HORN.

In the presence of:

C. E. KLEINFELDER,
FLORENCE DEACON.