I. S. CREAMER.

PRIMING DEVICE.

APPLICATION FILED MAY 2, 1914.

1,226,191.

Patented May 15, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

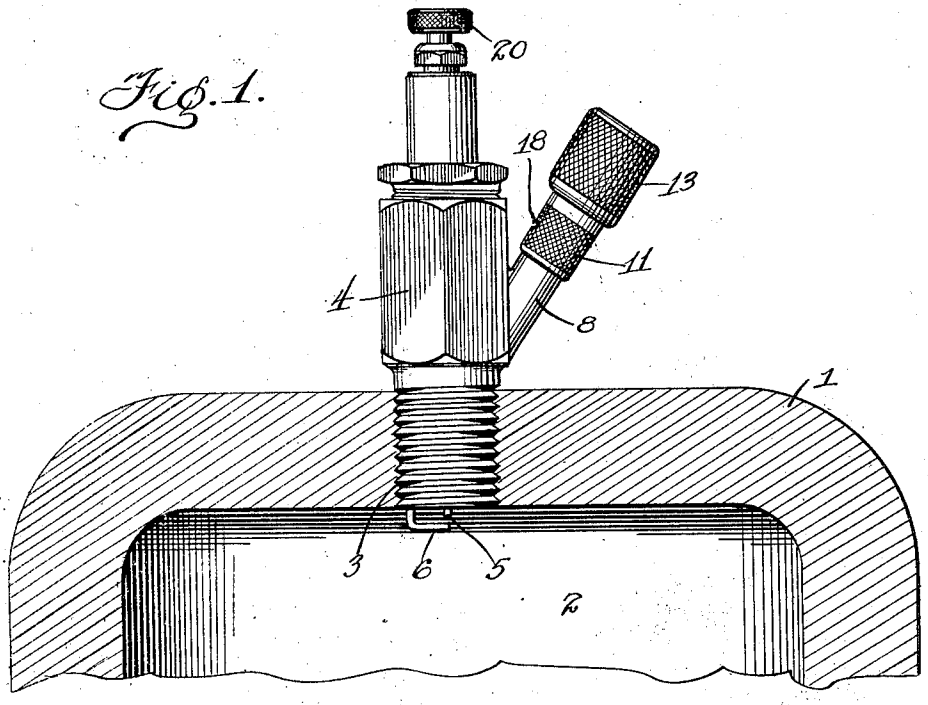
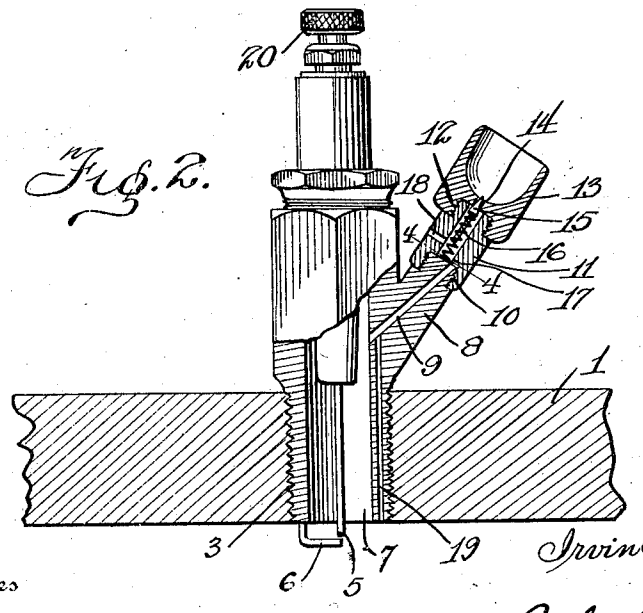


Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

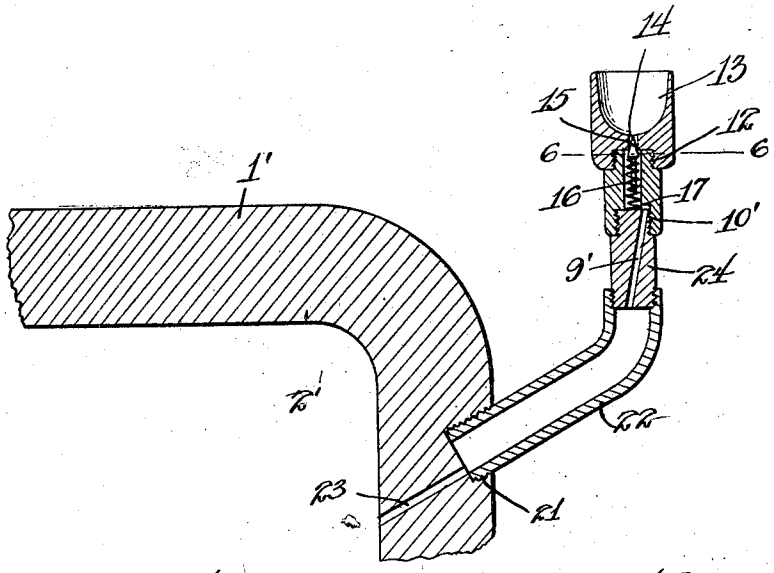


Fig. 5.

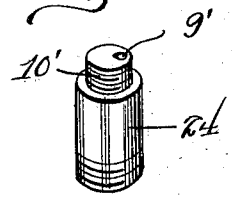


Fig. 4.

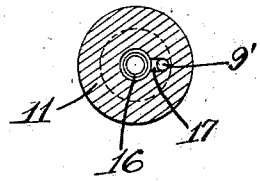
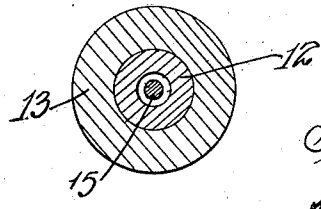


Fig. 6.



Witnesses

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UNITED STATES PATENT OFFICE.

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PRIMING DEVICE.

1,226,191. Specification of Letters Patent. Patented May 15, 1917.

Application filed May 2, 1914. Serial No. 836,023.

To all whom it may concern:

Be it known that I, IRVIN S. CREAMER, a citizen of the United States, residing at Pleasant Hall, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Priming Devices, of which the following is a specification.

The object of my invention is to provide a priming device which can be constructed as an attachment to a spark plug to introduce an explosive charge or a volatile fluid into the explosion chamber in proximity to the sparking terminal, or may be connected with the cylinder as a part separate and distinct from any connection with the spark plug.

A further object is to so construct the priming device that the priming cup may be filled with a volatile liquid and so long as the piston in the cylinder to which the device is connected is on its up or compression stroke no effect is noticeable and the liquid in the priming cup is not disturbed, but immediately the piston starts on its down or suction stroke the liquid in the priming cup is taken into the explosion chamber of the cylinder.

With other objects in view which will be referred to, my invention consists in the peculiar combination and novel arrangement of the parts, such as will be hereinafter more fully described in connection with the accompanying drawing and more particularly pointed out in the appended claims.

In the drawing:—

Figure 1 is a vertical sectional view through the upper part of a cylinder showing in elevation a spark plug with my invention applied thereto.

Fig. 2 is a view similar to Fig. 1 with parts in section to more clearly illustrate the construction and connection of the priming device.

Fig. 3 is a vertical sectional view through the upper part of a cylinder illustrating the use of my invention as a priming device *per se*.

Fig. 4 is a sectional view on the line 4—4 of Fig. 2.

Fig. 5 is a detail perspective view of a part of the structure disclosed in Fig. 3.

Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 3.

In the disclosure in Figs. 1 and 2, the cylinder 1 adjacent the explosive chamber 2 has the usual spark plug opening 3, and the spark plug 4 is screwed into this opening. This spark plug is, in the main, of standard construction and design, it being provided with a central electrode 5 and a branch electrode 6 which are surrounded by the chamber 7.

An arm 8 is formed to extend at an angle from one side of the case of the spark plug 4 and this arm is bored diagonally as at 9, the bore being placed to extend from the end of the arm near one side thereof to communicate with the chamber 7. The end of the arm 8 is reduced and is provided with screw threads at 10 and a valve casing 11 is secured to this screw-threaded portion. The valve casing 11 is in turn provided with a screw-threaded portion 12 and the priming cup 13 is secured thereto, all of the parts being so connected that to all intents and purposes the arm 8 valve casing 11 and cup 13 are one continuous structure. An opening 14 is provided through the bottom of the priming cup 13 and a needle valve 15 is mounted in the valve casing in a position to control the opening 14, this valve being held normally in a closed position by a spring 16 mounted around the stem thereof and bearing against the end of the arm 8.

The opening in the valve casing 11 to receive the valve is a bore formed longitudinally from end to end and at its outer end communicates with the opening 14 through the bottom of the priming cup or liquid cup 13. By reason of the fact that the outer end of the opening 9 through the arm 8 is offset to one side, this passage 9 does not strike the bore through the valve casing, but rather the end of the arm 8 adjacent the bore presents a smooth, flat surface against which the spring 16 bears and to establish communication between the passage 9 and the bore of the valve casing a duct 17, as better shown in Fig. 4, is provided in the valve casing to extend from the bore thereof to a point to establish communication with the passage 9 of the arm 8.

The use of the device is as follows, the spark plug set up as disclosed in Figs. 1 and 2 is connected through the cylinder to extend into the explosive chamber as described. A liquid of a high specific gravity is placed in the priming cup 13, and if the engine be then with the piston on the up or compression stroke, this compression is added to the

tension of the spring 16 to hold the valve 15 closed within the opening 14 and no liquid is permitted to pass down into the chamber 7, but immediately the piston starts on its intake or suction stroke the pressure against the valve 15 is removed and a suction is created up through the chamber 7 and the passages connected therewith to unseat the valve 15 from its closure within the opening 14, thus permitting the liquid in the priming cup 13 to flow down through this opening 14 into the valve casing 11 and thence through duct 17 and passage 9 to the chamber 7 of the spark plug from which it passes to the explosive chamber 2 of the engine. As the down stroke of the piston continues the liquid is exhausted from the cup 13 and air is taken in through the line of passages, the opening of which is controlled by the valve 15, however, under some circumstances, it may be found desirable and even necessary to introduce air through the valve casing at the same time that the volatile liquid is being supplied therethrough and under such circumstances a passage 18 is provided through the side of the valve casing 11 to communicate with the opening through the center thereof, also under certain circumstances it may be found desirable to provide a passage 19 which establishes communication direct from the passage 9 to the explosive chamber 2 of the engine.

It will be understood that the electrical connection will be made with this plug in the usual manner, the one wire being connected by a binding nut 20 with the spark plug and the second wire of the circuit grounded upon the engine structure. The usual priming device will be connected in this circuit and the wires are lead to a magneto or other suitable source of current supply.

In the disclosure in Fig. 3 where the priming device is constructed to be used independently of the spark plug, the cylinder 1′ is provided with a screw-threaded bore 21 into which is screwed the tube 22 which is preferably bent as shown so that the upper end extends in a vertical direction, and a passage 23 is formed through the cylinder of the engine to establish communication between the tube 22 and the explosive chamber 2′. A coupling member 24 which corresponds to the arm 8 in the disclosure in Figs. 1 and 2, is screwed into the upper end of the tube 22 and at its free end has a screw-threaded portion 10′ to receive the valve casing 11 which is identical with that disclosed in Figs. 1 and 2 and the remaining parts also are like unto those in this disclosure, therefore, these parts will not be described. In Fig. 5 the coupling member 24 is shown in perspective, to better disclose the detail construction thereof and it will be understood that this coupling member has the by-pass 9′ formed diagonally therethrough to establish communication between the tube 22 and the duct 17 from the bore of the valve casing. The use and operation of the structure disclosed in Fig. 3 are identical with the operation as above set forth, the one difference being that in this adaptation the explosive mixture is supplied to the explosive chamber at a point away from the spark plug, whereas, with the structure shown in Figs. 1 and 2 the explosive mixture is discharged into the explosive chamber directly at the sparking terminal.

From the foregoing, it will be seen that I have provided a priming device with which an explosive mixture is supplied to the cylinder of the engine and all possibility of the charge or any part thereof being forced back through the priming device by the compression stroke of the piston is absolutely precluded.

While I have herein shown and described substantially but one form of my invention, it will be understood that slight changes might be made in the form and arrangement of the parts without departing from the spirit and scope of my invention, and hence I do not wish to be limited thereto except for such limitations as the claims may import.

I claim:—

1. A priming device for internal combustion engines including a coupling adapted for connection to an engine cylinder, having an outer externally threaded end, and a longitudinal opening in communication at one end with the interior of the engine cylinder, having the other end of said opening disposed offset in the space of the threaded terminal, a valve casing having threaded engagement with said threaded terminal, and provided with a central bore, a lateral bore in said valve casing in communication with the central bore, adapted to have communication with the openings in the couplings, in one position of the valve casing, the valve casing when rotated being adapted to sever such communication, a priming cup on said valve casing having an opening in communication with the valve casing bore, a valve controlling the opening of the cup, and a spring for retaining the valve in normally closed position, said casing being provided with a lateral port in communication with the central bore and the atmosphere.

2. A priming device for internal combustion engines including a valve casing open to the engine cylinder and provided with an attenuated air passage way leading to said casing, a member connected with said valve casing and the explosion chamber of the engine cylinder, said member being provided with a longitudinal bore laterally offset with respect to said valve casing, a liquid cup

connected with the valve casing to establish communication therewith, and a valve located in said valve casing to be held normally closed and to be opened by the intake stroke of the engine piston to permit the liquid in the liquid cup to flow to the explosion chamber and the air introduced through said air passage way to commingle with the engine charge, substantially as described.

3. A priming device comprising a valve casing having a central bore therethrough, a member connecting said valve casing with the cylinder of an engine and provided with a passage offset from the line of the bore of the valve casing to establish communication between this bore and the explosion chamber of the engine, a liquid cup secured to the valve casing and provided with an opening to communicate with the bore of said casing, a valve located in the bore of the valve casing, and a spring received within the bore of the casing to bear against the valve and against the blank surface of said connecting member presented in the bore of the casing to hold the valve at a position to cut off communication from the liquid cup.

4. A priming device comprising a valve casing connected with the explosive chamber of the engine, a liquid cup connected with the valve casing and provided with an opening to establish communication with the casing, an air passage formed through the wall of the valve casing to connect the interior of said casing with the atmosphere, said passage way being of sufficient attenuation to prevent destruction of the vacuum on the intake stroke, and a valve in the valve casing to be normally seated to close the opening from the liquid cup and to be moved by the suction stroke of the engine to a position that the liquid is permitted to flow into the valve casing and commingle with the air drawn through the air passage to form an explosive mixture which is drawn into the explosive chamber of the engine.

In testimony whereof I affix my signature in presence of two witnesses.

IRVIN S. CREAMER.

Witnesses:
S. F. GREENHOE,
C. N. SNOKE.