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PRIMING DEVICE.

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1,240,080.

Patented Sept. 11, 1917.

Fig. 1.

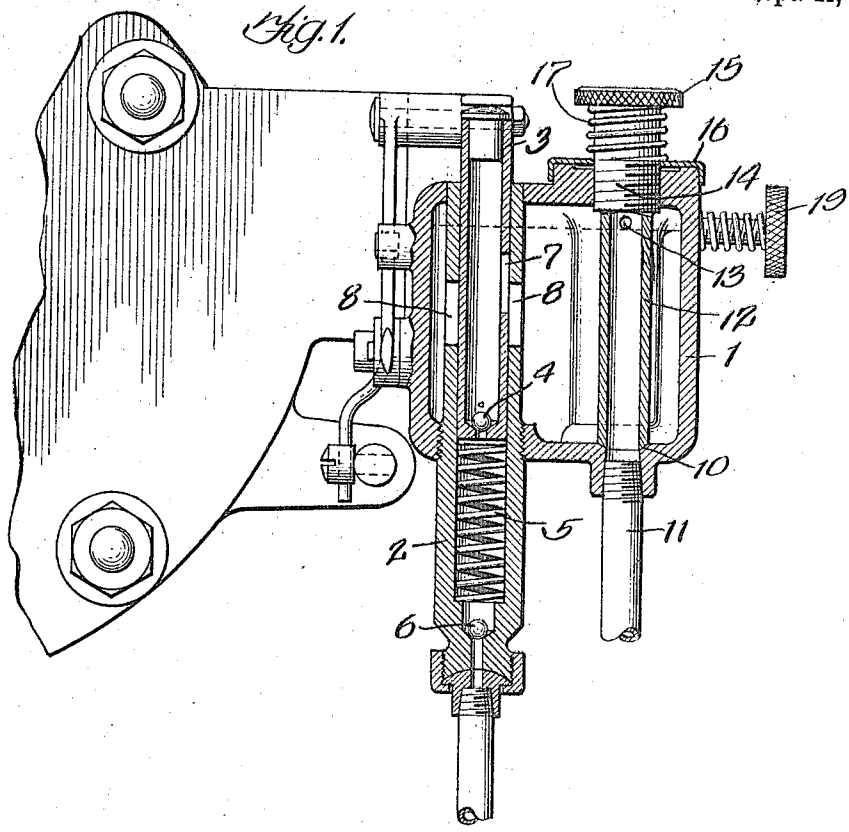
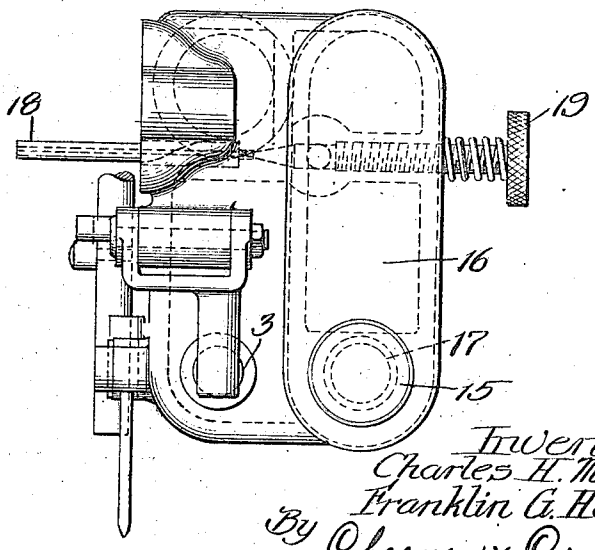


Fig. 2.



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UNITED STATES PATENT OFFICE.

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PRIMING DEVICE.

1,240,080. Specification of Letters Patent. Patented Sept. 11, 1917.

Original application filed October 22, 1915, Serial No. 57,314. Divided and this application filed June 30, 1916. Serial No. 106,756.

To all whom it may concern:

Be it known that we, CHARLES H. MORSE, Jr., residing at Chicago, in the county of Cook and State of Illinois, and FRANKLIN G. HOBART, residing at Beloit, in the county of Rock and State of Wisconsin, both citizens of the United States of America, have invented a certain new and useful Improvement in Priming Devices, of which the following is a specification.

Our invention relates to priming devices of the type commonly used in connection with internal combustion engines. It is quite common, where internal combustion engines operate upon comparatively heavy oil, such as kerosene, to start the engine upon a lighter and more highly volatile liquid, such as gasolene. The general object of the invention is to provide simple and efficient means whereby the engine can be started on the lighter liquid and a heavier liquid may be afterward substituted. Contributory to the general object, it is one of the purposes of the invention to provide means whereby the fuel reservoir, which supplies the liquid to the carbureter, may be drained and the contents run back into the regular overflow pipe preliminary to refilling with a lighter starting liquid. Another contributing purpose of the invention is to provide means whereby it becomes possible to dispense with a stuffing box for the valve which controls the flow from the reservoir to the drain pipe. These objects are accomplished by the mechanism illustrated in the accompanying drawings in which:

Figure 1 is a vertical section of the reservoir and associated parts taken through the center of the hollow valve or plug which controls the flow to the drain pipe.

Fig. 2 is a top view of the reservoir and associated parts.

The fuel pump and other parts shown in these drawings form the subject of a copending application, filed by us October 22, 1915, Serial No. 57,314.

Referring to the accompanying drawing in which like reference numerals denote like parts in both views, the reservoir 1 is constantly supplied with liquid fuel by means of a pump, which, in the present case, has a cylinder 2 provided with a plunger 3. The plunger is hollow and is provided with a check valve 4 at the lower end. The plunger rests upon a compression spring 5, and a check valve 6 is provided at the lower end of the cylinder. The plunger has a delivery port 7, which discharges into the reservoir through the ports 8 in the sides of the cylinder. For the present purpose it is sufficient to say that when the engine is running it reciprocates the plunger fast enough to cause the pump to deliver to the reservoir an amount of liquid fuel somewhat in excess of the amount required by the engine.

At the bottom of the reservoir 1 is a valve seat 10, located at the upper end of a drain pipe 11, which conducts the surplus liquid back to the source of supply, where it will subsequently be re-pumped into the reservoir. Coöperating with the valve seat is a valve which consists of a tube 12, having a constant level aperture 13 near its upper end at the point where the liquid level is to be maintained. The lower edge of this aperture may be regarded as a dam or weir or an overflow for determining the level of the fuel. At the upper end this tube, which, for convenience, may be referred to as a "hollow plug," is a threaded stem 14, which screws into the top of the reservoir and is rotated by a knurled head 15.

The reservoir is provided with a cover 16 for closing at the top, and this is yieldingly held in place by an overlying helical spring 17, which encircles the stem 14 and is retained by the head 15 which overlies it.

The fuel passes from the reservoir into the engine through a vapor tube 18, see Fig. 2, and the rate of flow into this tube from the reservoir is controlled by a needle valve 19, mounted in the reservoir approximately at the level of the aperture 13.

In operation, the plug 12 normally remains closed, that is, seated upon the valve seat 10. The fuel pump supplies liquid to the reservoir at a rate somewhat in excess of the requirements of the engine, and the surplus liquid flows through the aperture 13 into the hollow plug and through said plug past the valve seat and into the drain pipe 11. Thus, the level of the liquid in the reservoir remains constant and the surplus overflows into the pipe 11. Let it be assumed that the engine has not been running for

some time and is therefore "cold" and had previously been running on kerosene or other comparatively heavy liquid. Under these conditions, when it is desired to start up, the attendant first rotates the head 15 in a direction to cause the hollow plug 12 to rise from its seat 10, thus permitting the liquid in the reservoir to flow down into the drain pipe 11. As soon as the reservoir has been drained, the operator or the attendant screws the hollow plug down again to its seat and then pours gasolene, or other highly volatile fluid into the reservoir from the top. He then starts up the engine, which, being now supplied with highly volatile liquid, will be able to keep itself going until it has become hot enough to maintain its speed when supplied with the heavier liquid. When this time comes the attendant permits the pump to deliver the heavier liquid to the reservoir and the engine thereafter continues to operate upon it.

It will be observed that in our device a single pipe 11 serves both as an overflow pipe for taking care of the surplus liquid and as a drain pipe through which the reservoir may be emptied preparatory to refilling with lighter starting liquid. It will also be noted that the hollow plug is supported from a part of the reservoir, which is always above the level of the liquid, and hence there is no possibility of leakage and no stuffing box is required. Furthermore, the device is of very simple construction for the hollow plug may be, and preferably is, made of a single piece with the stem 14 and head 15, and this combination element screws directly into the reservoir.

Attention is directed to the fact that this application is a division of our original application, filed October 22nd, 1915, Serial Number 57,314.

We claim as our invention:

1. A reservoir for liquid fuel having means for supplying a surplus of fuel to the reservoir, an overflow fixing the fuel level, a drain opening into the lower portion of the reservoir adapted when open to lower the level of the fuel below the top of the overflow, a waste duct, said drain and said overflow connecting to said waste duct, and a valve controlling said drain.

2. A reservoir for liquid fuel having a drain opening, a delivery duct for delivering the fuel to an internal combustion engine, means for supplying a surplus of fuel, a valve for closing said opening, said valve consisting of a vertical tube having an overflow opening in it for fixing the level of the fuel and maintaining it at the proper elevation for delivery to said delivery duct, and means for opening and closing said valve.

3. A reservoir for liquid fuel, said reservoir having means for supplying a surplus of fuel, a delivery duct for delivering the fuel to an internal combustion engine, said reservoir having a drain opening near the bottom, a valve for closing said opening, said valve consisting of a vertical tube movable toward and from the drain opening, said tube having an overflow opening in it for fixing the level of the fuel at the proper elevation for said delivery duct, and means for opening and closing said valve consisting of a thread on the outside of the tube working through a tapped hole in a part rigid with the reservoir and a handle for rotating said valve.

4. A priming device for internal combustion engines comprising a reservoir having an inlet for supplying liquid fuel thereto, an outlet for conducting the fuel from the reservoir to the engine, a drain pipe leading out from a point near the bottom of the reservoir for draining it and thus lowering the level below the outlet, means for maintaining the level of liquid in the reservoir constant, and means for opening and closing the mouth of said drain pipe.

5. A priming device for internal combustion engines comprising a reservoir having an inlet for supplying liquid fuel thereto, an outlet for conducting the fuel from the reservoir to the engine, a drain pipe separate from the inlet and outlet for carrying away surplus fuel, a tube in the reservoir communicating directly with the drain pipe, so that when the tube is in closed position fuel cannot flow directly from the reservoir to the drain pipe, said tube having an opening above the mouth of the drain pipe whereby the fuel may be maintained at a constant level in said reservoir, and the surplus fuel conducted off into the drain pipe, said tube being movable away from the mouth of the drain pipe to permit the fuel, which may be of relatively low grade, to be drained off and, after the tube is returned to closed position, a more volatile fuel to be substituted.

6. A reservoir for liquid fuel, having means for supplying a surplus of fuel to the reservoir, an overflow fixing the fuel level, a drain opening in the lower portion of the reservoir, a waste duct, said drain and said overflow connecting to said waste duct, and a valve controlling said drain, said valve having an operating stem projecting above the liquid whereby no stuffing box is required to prevent leakage around the valve operating stem.

7. A reservoir for liquid fuel, said reservoir having an outlet leading to an internal combustion engine, means for supplying a surplus of fuel to the reservoir, a valve seat near the bottom of said reservoir, a valve coöperating with said seat, said valve consisting of a vertical tube having an opening in the side for fixing the liquid level,

and means for opening and closing said valve for the purpose described.

8. A reservoir for liquid fuel, said reservoir having an outlet leading to an internal combustion engine, means for supplying a surplus of liquid fuel to the reservoir, said reservoir having a drain opening near the bottom guarded by an angular valve seat, a valve coöperating with said seat and consisting of a vertical tube having an overflow opening for fixing the liquid level in the reservoir, means for opening and closing said valve, consisting in a thread formed on the outside of the tube and working through a tapped hole in a part rigid with the reservoir, and a handle for rotating said valve.

9. A reservoir for supplying liquid fuel to an internal combustion engine, said reservoir having a delivery duct for delivering the fuel to the engine, means for supplying a surplus of fuel to the reservoir, a weir or dam over which the surplus fuel flows, said weir or dam thereby maintaining the level of the fuel in the reservoir constant and at a proper elevation for supplying said delivery duct, a second duct for conveying from the weir or dam the fuel flowing over it, a third duct opening out of the lower portion of the reservoir, said second and third ducts communicating with each other, and a valve for opening and closing said third duct to thereby determine whether the reservoir shall be drained or the level maintained at a height suitable for supplying the delivery duct.

10. A reservoir for liquid fuel having a delivery duct for delivering to an internal combustion engine, means for supplying a surplus of fuel to the reservoir, a dam or weir over which the surplus fuel flows, whereby a proper level is maintained for supplying the delivery duct, the reservoir having a drain opening in the lower portion adapted, when open, to lower the level of the fuel below the top of the dam or weir, a waste duct, said dam or weir and said drain both communicating with said waste duct, and a valve controlling said drain.

In witness whereof we have hereunto subscribed our names.

CHARLES H. MORSE, JR.
FRANKLIN G. HOBART.