F. D. MALTBY.

PRIMING DEVICE FOR INTERNAL COMBUSTION ENGINES.

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1,264,954.

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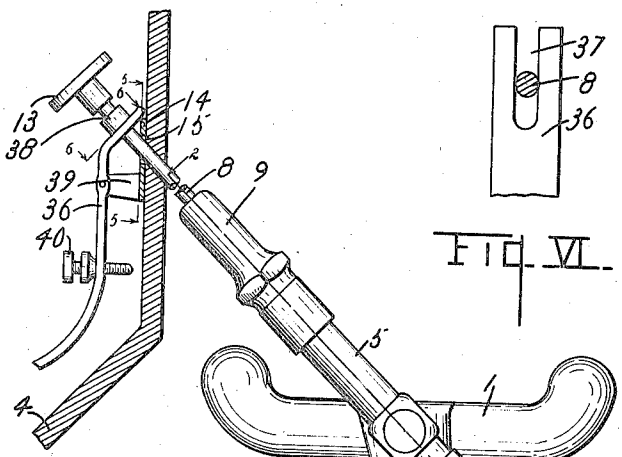


FIG. I.

FIG. III.

FIG. VI.

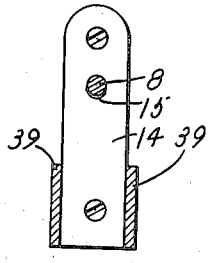


FIG. V.

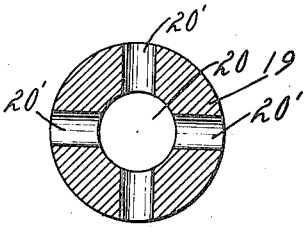


FIG. IV.

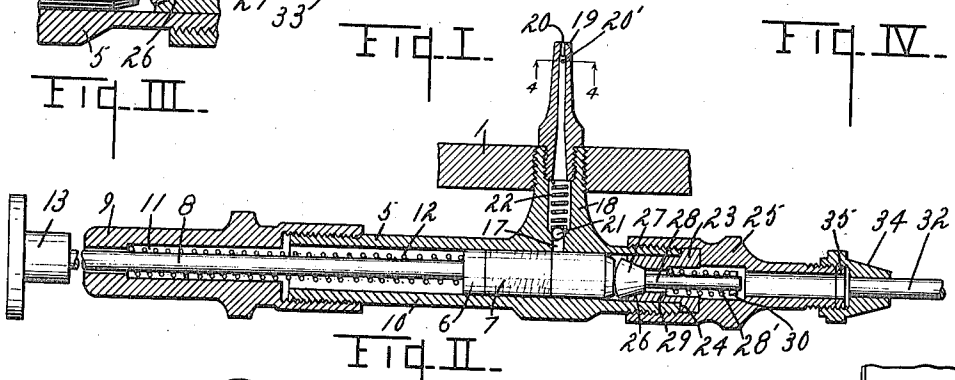


FIG. II.

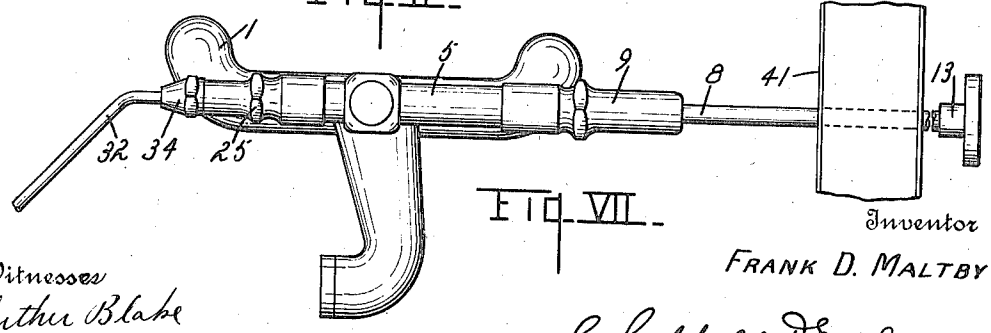


FIG. VII.

Witnesses

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PRIMING DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,264,954. Specification of Letters Patent. Patented May 7, 1918.

Original application filed December 30, 1916, Serial No. 139,837. Divided and this application filed April 21, 1917. Serial No. 163,623.

To all whom it may concern:

Be it known that I, FRANK D. MALTBY, a citizen of the United States, residing at the city of Battle Creek, county of Calhoun, State of Michigan, have invented certain new and useful Improvements in Priming Devices for Internal-Combustion Engines, of which the following is a specification.

This invention relates to improvements in priming devices for internal combustion engines.

This application is a division of my copending application Serial No. 139,837, filed December 30, 1916.

The main objects of this invention are:

First, to provide an improved priming device for internal combustion engines which may be quickly and easily operated.

Second, to provide an improved priming device for internal combustion engines which may be applied to be operated from the dash or from the front of a motor vehicle.

Third, to provide an improved priming device for internal combustion engines which does not interfere with the normal operation of the carbureter.

Fourth, to provide an improved priming device for internal combustion engines which may be adjusted for the constant running of the engine in the event of the carbureter becoming inoperative or to supplement the carbureter as occasion may require.

Fifth, to provide an improved priming device which is comparatively simple in its parts and not likely to get out of repair or become inoperative.

Further objects, and objects relating to structural details, will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure which is a preferred embodiment of my invention is clearly illustrated in the accompanying drawing forming a part of this specification, in which:

Figure I is a detail side elevation of a structure embodying the features of my invention, a carbureter and manifold being shown in their operative relation therewith but on a greatly reduced scale as compared with the scale of the priming pump.

Fig. II is an enlarged detail partially in longitudinal section on line corresponding to line 2—2 of Fig. I.

Fig. III is an enlarged detail section showing structural features of the inlet valve.

Fig. IV is an enlarged transverse section on line 4—4 of Fig. II showing details of the sprayer tip.

Fig. V is an enlarged detail section on line 5—5 of Fig. I, showing the support for the plunger rod.

Fig. VI is an enlarged detail section on line 6—6 of Fig. I.

Fig. VII is a detail side elevation of a slightly modified construction showing my improved priming device mounted to be operated from the front of a motor vehicle.

In the drawing, similar reference characters refer to similar parts through the several views, and the sectional views are taken looking in the direction of the little arrows at the ends of the section lines.

Referring to the drawing, 1 designates the manifold of an internal combustion engine and 2 the carbureter, 3 designates the fuel connection to a carbureter and 4 the dash or front of a motor vehicle. These parts are shown largely in conventional form, the manifold being that of a Ford motor car.

I provide a priming pump cylinder 5 and a coacting plunger 6 provided with a suitable packing 7 and a rod 8 which is slidably mounted in the cap 9 which is threaded upon the barrel 10 of the pump. The cap 9 is provided with a longitudinal recess 11 for receiving a compression spring 12 surrounding the rod 8, one end of the spring bearing against the plunger 6 and the other against the end of the cap 9. The rod 8 is provided with a suitable head or finger piece 13 by means of which it may be reciprocated. In the adaptation shown in Fig. I, the rod 8 is arranged to project through a plate 14 mounted on the dash 4 and having a slot 15 therein for the rod 8. The cylinder is provided with a discharge port 17 in its side and a laterally projecting passage arm 18

threaded into the manifold 1 at the branching point thereof, as shown in Fig. II. The delivery nozzle 19 is threaded into the end of the arm to project into the manifold at a central point and is provided with discharge and atomizing perforations 20 and 20′. The discharge port 17 is provided with a return check valve 21 held to its seat by the coiled spring 22 which is supported by the nozzle 19.

A tube-like inlet valve seat member 23 is arranged in the end of the cylinder 10 and provided with a flange 24 engaging the end of the cylinder. This valve seat member is secured in place by means of a threaded coupling 25 threaded upon the cylinder to clamp the valve seat member in place. The valve seat member 23 is provided with a central conical seat 26 for the conical valve 27 which is provided with a stem 28. A compression spring 28′ is arranged on the stem with one end seated against a shoulder 29 in the member 24 and the other end bearing against a pin 30 through the end of the stem. This spring acts to maintain the valve 27 seated. The end of the stem 28 of the inlet valve projects into the coupling 25 which constitutes a housing for the spring 28′.

The fuel supply pipe 32 is connected to the supply pipe 3 by the union 33. The fuel pipe 32 is connected to the externally threaded end of the coupling 25 by means of a threaded union 34, a suitable gasket 35 being interposed between the flanged end of the fuel pipe 32 and the end of the coupling member 25 to insure a liquid tight connection.

When the plunger 6 is in its inner position as shown in Fig. II, it closes the discharge port 17 and also holds the inlet valve 26 on its seat thereby preventing any fuel being drawn to the manifold through the priming device, the spring 12 acting to return and normally hold the plunger at its inner position.

It is found under certain conditions to be desirable in starting the engine to furnish a supply of fuel in addition to that supplied by the carbureter, which can be done by retracting the plunger to permit feeding of the fuel through the priming device. To assist in locating the plunger at the desired point for this purpose, I provide a retracting lever 36 which is forked at 37 to receive the plunger rod 8, the plunger rod being provided with a collar 38 with which the lever engages. The lever is pivoted on ears 39 on the plate 14 and is provided with an adjustable stop 40 adapted to engage the dash, thereby stopping the plunger when the lever is actuated in the desired position.

In the operation of the device in starting the engine the plunger is retracted which draws a charge into the cylinder and the charge is forced out when the plunger is actuated and the fuel is forced through the atomizing nozzle in a fine spray or atomized condition so that when the engine is cranked a good explosive mixture is provided. As the nozzle is disposed centrally in the manifold, the charge is delivered so the cylinder may draw uniformly therefrom.

The plunger, when in its inner position, closes the port 17, as stated, and also when in its inner position holds the inlet valve to its seat, thereby preventing the suction of the engine from opening the inlet valve or drawing fuel into the manifold through the priming device unless the piston is adjusted to permit this.

In the adaptation illustrated in Fig. I, I show the plunger rod adapted to be operated from the driver's seat which is the desired arrangement when the vehicle is equipped with a self-starter. In the modification shown in Fig. VII, the plunger rod 8 projects through the radiator 41 of the vehicle so that it may be adjacent the starting crank of a vehicle which is not provided with a self starter. This is of very great advantage as it enables the cranking of the car before the atomized fuel condenses.

It should be noted that the screw threaded connection of the passage arm 18 provides a pivot means about which the priming pump may be rotated so that it may be operated either from the dash or from the front of the vehicle as may be desired.

My improved priming device is simple in structure and easily installed or applied to engines as commonly constructed and it may be readily adapted to meet the conditions of the particular engine to which it is applied.

I have illustrated and described my improvements in the form in which I have embodied and adapted the same in use. I have not attempted to illustrate or describe various modifications which might be desirable for adapting my improvements to meet different conditions as I believe the disclosure made will enable those skilled in the art to which my invention relates to embody or adapt the same as conditions may require. I desire, however, to be understood as claiming my invention specifically in the form illustrated as well as broadly within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a priming device, the combination with the manifold of an internal combustion engine, of a cylinder having a delivery port in its side and a laterally projecting delivery and supporting arm threaded into said manifold, an atomizing nozzle threaded into said delivery arm and projecting into said manifold, a ball check valve for said delivery port arranged in said arm, a spring

for said valve, the outer end of said spring being supported by said nozzle, an inlet valve disposed at the inner end of said cylinder, and a plunger reciprocating past said delivery port and in its inner position constituting a valve therefor so that on the instroke of the plunger a quantity of liquid is temporarily trapped above the inlet valve forcibly seating it, said plunger being adapted when in its inner position to engage the inlet valve and being provided with a packing disposed in spaced relation to its inner end, so that the packing is at the rear of said discharge port when the plunger is in its inner position permitting the trapped liquid to escape.

2. In a priming device, the combination with the manifold of an internal combustion engine, of a cylinder mounted on said manifold and having a delivery port in its side and a laterally projecting delivery arm arranged in an opening in said manifold, an atomizing nozzle mounted on the inner end of said delivery arm and supported in said manifold thereby, a check valve for said delivery port arranged in said arm, an inlet valve disposed at the inner end of said cylinder, and a plunger reciprocating past said delivery port and in its inner position constituting a valve therefor so that on the instroke of the plunger a quantity of liquid is temporarily trapped above the inlet valve forcibly seating it, said plunger being adapted when in its inner position to engage the inlet valve and being provided with a packing disposed in spaced relation to its inner end so that the packing is at the rear of the delivery port when the plunger is in its inner position permitting the trapped liquid to gradually escape.

3. In a priming device, the combination with the manifold of an internal combustion engine, of a cylinder having a delivery port in its side and a laterally projecting delivery and supporting arm threaded into said manifold, an atomizing nozzle threaded into said delivery arm and projecting into said manifold, a ball check valve for said delivery port arranged in said arm, a spring for said valve, the outer end of said spring being supported by said nozzle, an inlet valve, and a plunger arranged in said cylinder.

4. In a priming device, the combination with the manifold of an internal combustion engine, of a cylinder having a delivery port and a delivery and supporting arm engaged in an opening in said manifold, an atomizing nozzle mounted directly on said delivery arm and supported in said manifold thereby, a check valve for said delivery port arranged in said arm, a cylinder inlet valve, and a plunger reciprocating past said delivery port and in its inner position constituting a valve therefor, said plunger being adapted when in its inner position to engage the inlet valve, and a spring urging said plunger to its inner position.

5. In a priming device, the combination with the manifold of an internal combustion engine, of a cylinder mounted on said manifold and having a delivery port, an atomizing nozzle disposed in said manifold and connected directly to said port, a cylinder inlet valve, and a plunger, all coacting as specified.

6. In a priming device, the combination with the manifold of an internal combustion engine, of a cylinder having a delivery port in its side and a laterally projecting delivery and supporting arm arranged in an opening in said manifold, an atomizing nozzle supported by said delivery arm projecting into said manifold, an inlet valve for said cylinder, and a plunger arranged in said cylinder.

7. In a priming device, the combination with the manifold of an internal combustion engine, of a cylinder having a delivery port in its side, an atomizing nozzle projecting into said manifold, a return check valve for said port, an inlet valve for said cylinder, a plunger arranged in said cylinder to reciprocate past its said delivery port and constituting when in its inner position a closing valve therefor, said plunger being adapted to be adjusted so that it constitutes a regulating valve for said discharge port, a plunger rod, and a retracting lever for said plunger rod provided with an adjustable stop, said plunger rod being adapted for manipulation independently of said lever.

8. In a priming device, the combination with a manifold for an internal combustion engine, of a priming pump having a discharge outlet passage arm extending therefrom and threaded into the manifold and constituting a pivot about which the priming pump may be rotated to the desired position, and an operating connection for said pump adapted to be disposed through the radiator or through the manifold or dash of a motor vehicle.

9. In a priming device, the combination of a manifold of an internal combustion engine, and a priming pump having a discharge outlet passage arm extending therefrom and screw threaded into said manifold, the passage arm acting as a pivot about which the priming pump may be rotated to any desired position.

10. In a priming device, the combination with the manifold of an internal combustion engine, of a priming pump comprising a cylinder provided with a supporting and delivery arm threaded into said manifold, said delivery arm being provided with an atomizing nozzle supported in the manifold thereby, and a plunger for said pump whereby fuel may be discharged directly from the

cylinder into the manifold through said atomizing nozzle.

11. In a priming device, the combination with the manifold of an internal combustion engine, of a priming pump mounted on said manifold, and an atomizing nozzle projecting into said manifold and connected directly to said pump whereby the priming fuel is delivered directly from said pump into said manifold through said atomizing nozzle.

In witness whereof, I have hereunto set my hand and seal in the presence of two witnesses.

FRANK D. MALTBY. [L. S.]

Witnesses:

E. LUCILE PARSHALL,

M. W. WENTWORTH.