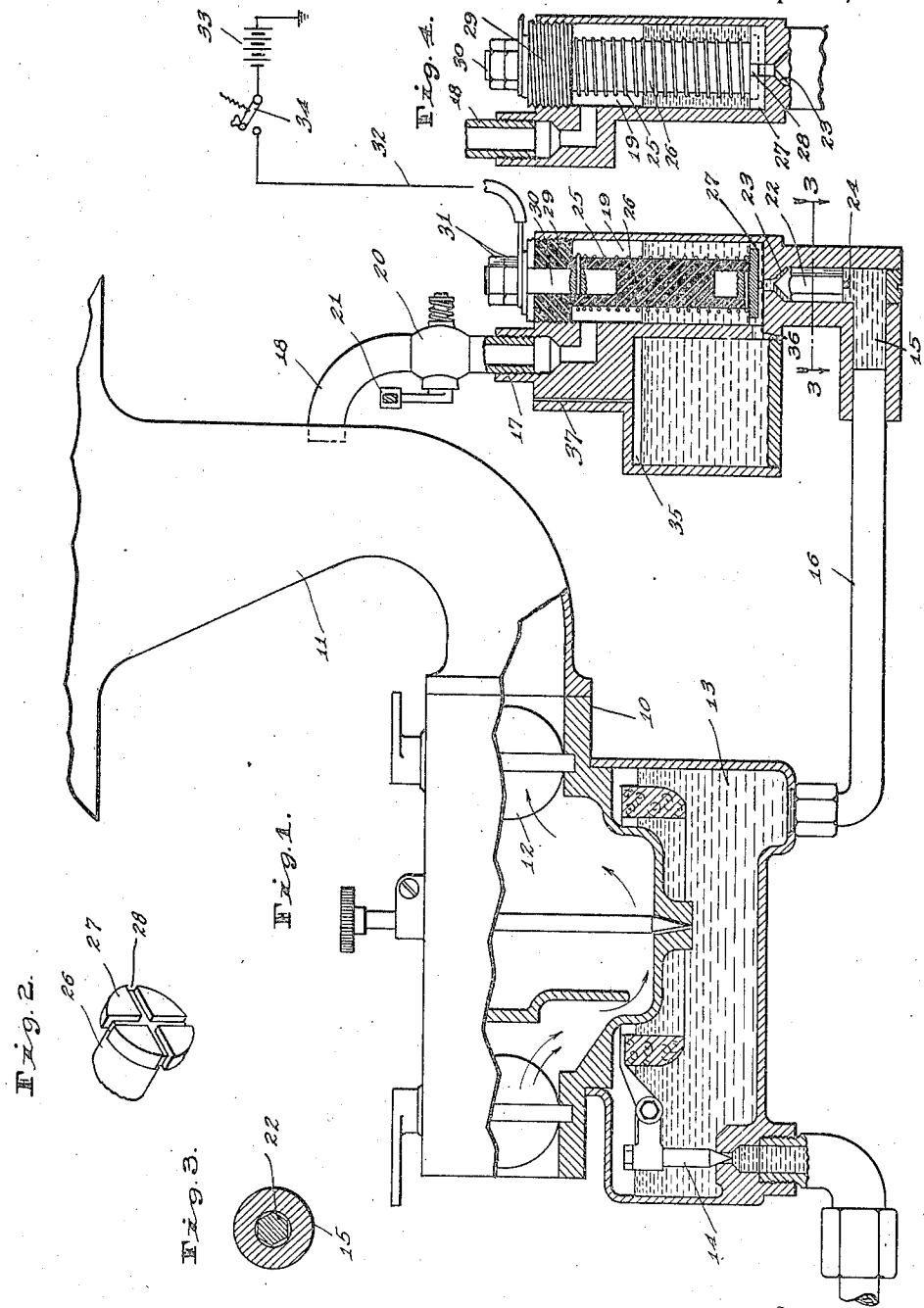
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PRIMER.

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Patented Apr. 29, 1919.



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PRIMER.

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To all whom it may concern:

Be it known that I, LOUIE H. OBERREICH, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Primer, of which the following is a specification.

It is the object of my invention to provide a primer for internal combustion engines, particularly for automobiles, which is reliable and effective in operation, and which is inexpensive in construction. It is a further object in the preferred form of my invention to provide a uniform priming charge, to heat this priming charge if desired so as to produce better vaporization, and to make automatic the priming action.

The accompanying drawing illustrates my invention. Figure 1 is a vertical section through the preferred form of my primer, showing it in connection with the associated carbureter and intake manifold; Fig. 2 is a perspective view of the lower end of the heating element; Fig. 3 is a section on the line 3—3 of Fig. 1; and Fig. 4 is a vertical section through a slightly modified form of primer, in which the auxiliary reservoir is omitted.

My primer is applicable to any style of carbureter and engine. It is shown in connection with a carbureter 10 of one well-known type, supplying an intake manifold 11 and having a throttle 12 by which the intake to the intake manifold is controlled. This carbureter 10 has a float chamber 13 in which a constant fuel level is maintained by a float valve 14, controlling the supply to the float chamber in any suitable manner.

My primer has a fuel supply inlet 15 connected by a pipe 16 to the float chamber 13 of the carbureter, and a discharge outlet 17 connected by a pipe 18 to the intake manifold 11 of the engine at a point between the engine and the throttle valve 12 of the carbureter 10. The primer has a tubular chamber 19 connected at the bottom to the inlet 15 and at the top to the discharge outlet 17, and in this tubular chamber 19 the fuel normally stands (when the engine is at rest) at the same level as in the float chamber 13. In the connection from the float chamber 13 to the intake manifold 11 through the primer, I may provide either an automatic valve or a manually operated valve, or both. If the valve is manually operated, I prefer to use the valve 20 in the pipe 18 above the normal fuel level, so as to avoid loss of fuel in case of leakage at the valve. This valve 20 is preferably operated by a rod 21 leading to any suitable control point, such as the dashboard of the associated automobile. If the valve is automatic, I prefer to make it a check valve, which fits in the vertical part of the fuel inlet 15 and is provided with a tapered upper end which seats upwardly against a valve seat 23 which is below the entrance to the chamber 19. The valve 22 opens by gravity but is closed by suction, its opening movement being limited by a cross wire 24 on which it rests when the engine is stationary. The valve 22 is conveniently formed of a piece of hexagonal bar with a conical end, and is of proper size so that the hexagon of its cross section is inscribed in the circle of the bore of the vertical part of the fuel inlet 15, as is clear from Fig. 3; so that the fuel passage is provided through the narrow spaces between the chords formed by the flat sides of the hexagonal bar and the arcs intersected by such chords. The check valve 22 opens by gravity, but is lifted against its seat 23 when suction is developed in the intake manifold 11 by the associated engine.

I prefer to provide within the tubular chamber 19 an electric heating element 25, which when energized heats the fuel in such chamber so that it passes as a vapor through the pipe 18 into the intake manifold, thus facilitating starting. I prefer to make this heating element as a helical coil of wire wound on an insulating cylinder 26, on the lower end of which cylinder is mounted a metal disk 27 provided with cross slots 28 (see Fig. 2) for permitting the passage of the fuel although the disk 27 bears against the bottom and fits fairly closely against the sides of the chamber 19 so that it acts as a spacer for the heating element. The lower end of the wire coil 25 is attached to this metal disk 27, and is grounded by the engagement thereof with the metal of the primer, such engagement being made firm by an insulating plug 29 which is screwed into the upper end of the chamber 19 to force the heating element downward so that the disk 17 firmly engages the bottom of the chamber. A metal rod 30 is set in the upper end of the insulating cylinder 26, and passes through the insulating plug 29, and this rod 30 at its lower end is connected to the upper end of the heating coil 25 and at

its upper end is provided with threads to receive nuts 31 to form a binding post to permit the connection of the coil to a wire 32 from any suitable battery 33. Any suitable push button 34 may be provided in the circuit. This heating element is not always essential, but it is desirable, especially in cold weather, for the lower grades of gasolene which are now on the market.

Preferably, I provide an auxiliary reservoir 35, which is connected to the tubular chamber 19 by a port 36. Such a reservoir is shown in Fig. 1, but is not provided in the arrangement shown in Fig. 4. The upper part of the auxiliary reservoir 35 is provided with a capillary air vent 37, which opens into the auxiliary reservoir 35 above the fuel level therein and opens to the atmosphere at a considerably higher point, so as to allow for some slight variation in the vertical position of the primer.

In operation, when the engine is at rest, the check valve 22 has dropped to its lowermost position by gravity, and the valve 20 may be either open or closed. The liquid in the chamber 19 and the auxiliary reservoir 35 stands at the same level as that in the float chamber 13 of the carbureter, which level is determined by the float valve 14. In case the auxiliary reservoir 35 is not provided, the primer only contains fuel in the chamber 19, as shown in Fig. 4.

When it is desired to start the engine, the valve 20 is opened if it is not already open, and the engine is cranked manually or by a starter in the usual manner. At this time, the throttle 12 of the carbureter is preferably nearly or wholly closed, so that considerable suction is developed in the intake manifold 11. This suction is communicated to the chamber 19, and causes fuel to be drawn therefrom through the discharge outlet 17 and the pipe 18 and discharged into the intake manifold 11 to make a rich mixture. The suction also lifts the check valve 22, so as to prevent inflow of fuel into the primer, so that the primer supplies fuel until the fuel which is stored in the chamber 19, and in the auxiliary reservoir 35 if it is provided, is substantially exhausted. In the arrangement shown in Fig. 1, the fuel is drawn from both the chamber 19 and the auxiliary reservoir 35, air entering the auxiliary reservoir by way of the atmosphere vent 37, and the fuel being discharged in at least partly liquid form into the intake manifold. In the arrangement shown in Fig. 4, if the valve 22 is provided, practically no liquid is discharged into the intake manifold in liquid form, but only that which is vaporized under the diminished pressure, save as there may be some slight leakage past the check valve 22. If the starting is difficult, as because the weather is cold or the fuel is low grade, the push button 34 is depressed, preferably before the engine is cranked, so that the heating coil 25 will heat the liquid fuel in the tubular chamber 19; this promotes vaporization and facilitates starting, and also facilitates the discharge of the fuel into the intake manifold 11 in the form shown in Fig. 4 by reason of the expansion due to the vaporization. When the fuel contained in the chamber 19 and auxiliary reservoir 35 is exhausted, the engine will ordinarily continue running with the fuel supply from the carbureter 10, and the check valve 22 will remain in uppermost or closed position so as to prevent any further supply of fuel through the primer; the manual valve 20 may also be closed when the engine is running. Though I prefer to provide both valves 20 and 22, it is necessary to provide only one. If the engine will not continue running with the fuel supply from the carbureter 10, and stops so that the suction condition in the intake manifold 11 is destroyed, the check valve 22 drops open to allow another charge of fuel to enter the chamber 19 and auxiliary reservoir 34, whereupon the starting operation can immediately be repeated with a new starting charge, heated if desired, from the primer. Ordinarily the engine will start on the first charge; but if it does not the provision of the second or subsequent charges is automatically provided immediately upon the stopping of the engine after its failure to start.

I claim as my invention:

1. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer by-pass connected to said fuel chamber and to said intake manifold around said throttle, a reservoir connected to said by-pass and to the atmosphere respectively below and above the liquid level in the fluid chamber, and a valve in said by-pass between its connection to said reservoir and the fuel chamber.

2. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer having a chamber connected to said fuel chamber and to said intake manifold so as to form a by-pass around said throttle, and a check valve in the connection between said fuel chamber and said primer chamber, said check valve being arranged so that it normally tends to open but is closed by suction developed in the intake manifold.

3. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer having a chamber connected to said fuel chamber and to said intake manifold so as to form a by-pass around said bottle, a check valve in the connection

between said fuel chamber and said primer chamber, said check valve being arranged so that it normally tends to open but is closed by suction developed in the intake manifold, and a manually operated valve in the connection between the primer chamber and the intake manifold.

4. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer having a chamber connected to said fuel chamber and to said intake manifold so as to form a by-pass around said throttle, said primer having an auxiliary reservoir which is connected with the primer chamber below the normal fuel level and has an atmospheric vent above the normal fuel level, and a valve in said by-pass between the constant level fuel chamber and the primer chamber.

5. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer having a chamber connected to said fuel chamber and to said intake manifold so as to form a by-pass around said throttle, and a check valve in the connection between said fuel chamber and said primer chamber, said check valve being arranged so that it normally tends to open but is closed by suction developed in the intake manifold, said primer having an auxiliary reservoir which is connected with the primer chamber below the normal fuel level and has an atmospheric vent above the normal fuel level.

6. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer by-pass connected to said fuel chamber and to said intake manifold around said throttle, a reservoir connected to said by-pass and to the atmosphere respectively below and above the liquid level in the fluid chamber, a valve in said by-pass between its connection to said reservoir and the fuel chamber, and a heating element in said by-pass.

7. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer having a chamber connected to said fuel chamber and to said intake manifold so as to form a by-pass around said throttle, a check valve in the connection between said fuel chamber and said primer chamber, said check valve being arranged so that it normally tends to open but is closed by suction developed in the intake manifold, and a heating element in said primer chamber.

8. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer having a chamber connected to said fuel chamber and to said intake manifold so as to form a by-pass around said throttle, said primer having an auxiliary reservoir which is connected with the primer chamber below the normal fuel level and has an atmospheric vent above the normal fuel level, a valve in said by-pass between the constant level fuel chamber and the primer chamber, and a heating element in said primer chamber.

9. In combination, a carbureter having a throttle and a constant level fuel chamber, an intake manifold to which said carbureter is connected, a primer having a chamber connected to said fuel chamber and to said intake manifold so as to form a by-pass around said throttle, a check valve in the connection between said fuel chamber and said primer chamber, said check valve being arranged so that it normally tends to open but is closed by suction developed in the intake manifold, said primer having an auxiliary reservoir which is connected with the primer chamber below the normal fuel level and has an atmospheric vent above the normal fuel level, and a heating element in said primer chamber.

10. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, and a check valve in one of said connections, said check valve being arranged so that it normally tends to open but is closed by the suction developed in said intake manifold.

11. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, and a check valve in the connection between said chamber and said fuel source, said check valve being arranged so that it normally tends to open but is closed by the suction developed in said chamber.

12. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, said primer having an auxiliary reservoir which is connected with the primer chamber below the normal fuel level and has an atmospheric vent above the normal fuel level and a valve in the connection between the fuel source and the connection between the primer chamber and the auxiliary reservoir.

13. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, and a check valve in the connection between said chamber and said fuel source, said

check valve being arranged so that it normally tends to open but is closed by the suction developed in said chamber, said primer having an auxiliary reservoir which is connected with the primer chamber below the normal fuel level and has an atmospheric vent above the normal fuel level.

14. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, a check valve in one of said connections, said check valve being arranged so that it normally tends to open but is closed by the suction developed in said intake manifold, and a heating element in said primer chamber.

15. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, a check valve in the connection between said chamber and said fuel source, said check valve being arranged so that it normally tends to open but is closed by the suction developed in said chamber, and a heating element in said primer chamber.

16. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, said primer having an auxiliary reservoir which is connected with the primer chamber below the normal fuel level and has an atmospheric vent above the normal fuel level, a valve in the connection between the fuel source and the connection between the primer chamber and the auxiliary reservoir, and a heating element in said primer chamber.

17. A primer, comprising a chamber arranged for connection to a fuel source of substantially constant level and to an intake manifold, said chamber being at substantially the fuel level of said fuel source, a check valve in the connection between said chamber and said fuel source, said check valve being arranged so that it normally tends to open but is closed by the suction developed in said chamber, said primer having an auxiliary reservoir which is connected with the primary chamber below the normal fuel level and has an atmospheric vent above the normal fuel level, and a heating element in said primer chamber.

In witness whereof, I have hereunto set my hand at Indianapolis, Indiana, this 17th day of December, A. D. one thousand nine hundred and seventeen.

LOUIE H. OBERREICH.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."