June 30, 1925. 1,544,306

E. T. FRANZEN

PRIMER

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Fig. 1.

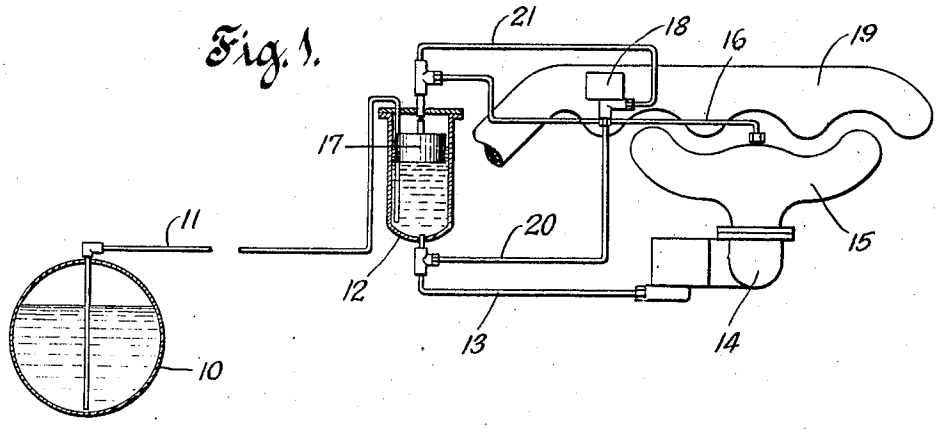

Fig. 2.

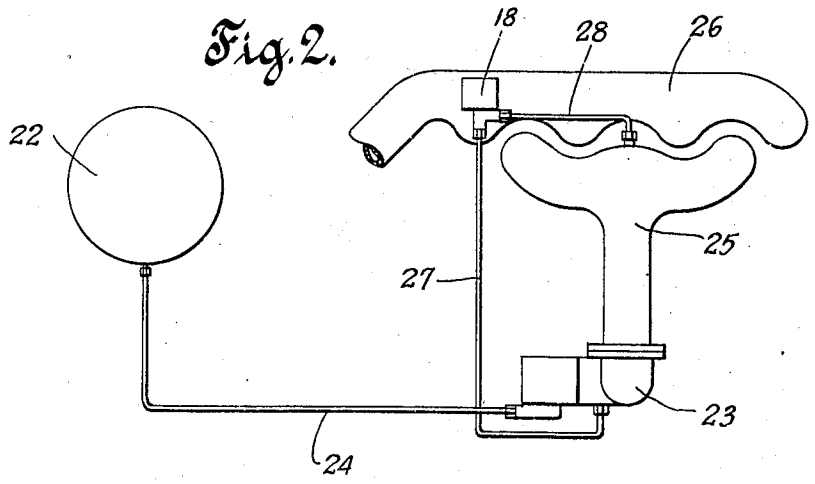

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Fig. 9.

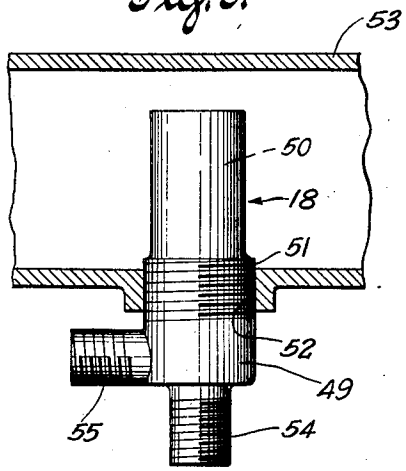

Fig. 10.

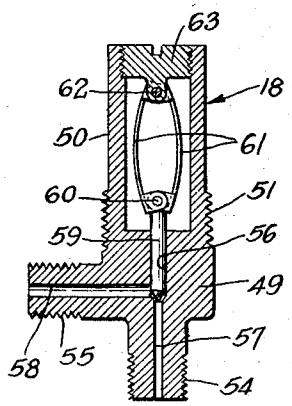

Fig. 3.

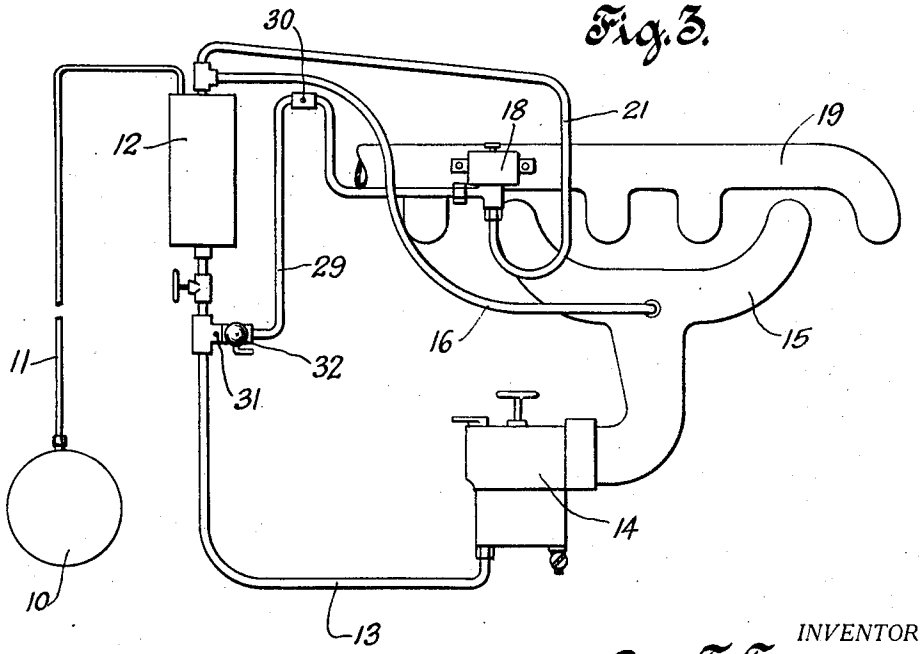

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Fig. 4.

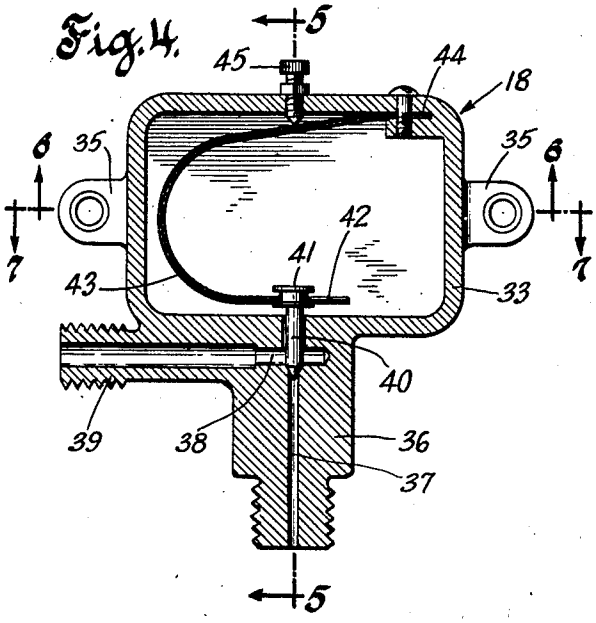


Fig. 5.

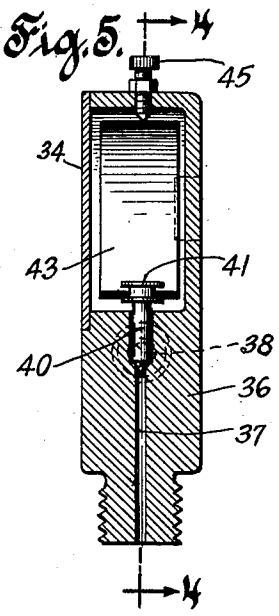


Fig. 6.

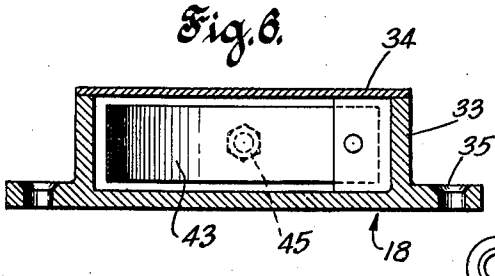


Fig. 7.

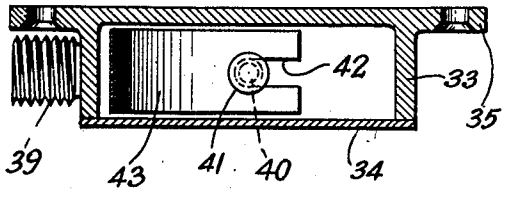
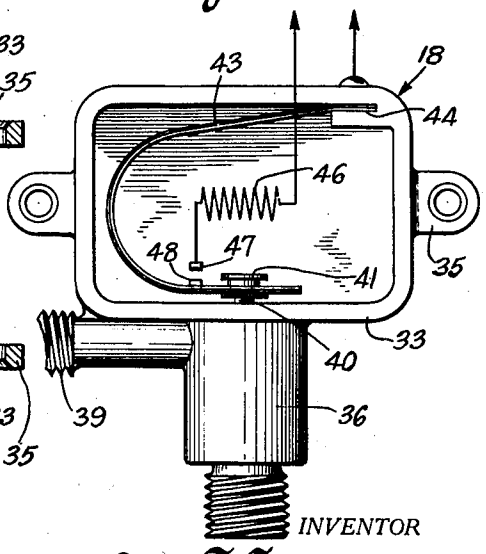


Fig. 8.



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Patented June 30, 1925. 1,544,306

UNITED STATES PATENT OFFICE

ERIC T. FRANZEN, OF MAPLEWOOD, NEW JERSEY.

PRIMER.

Application filed March 5, 1923. Serial No. 622,767.

To all whom it may concern:

Be it known that I, ERIC T. FRANZEN, a citizen of the United States of America, residing at Maplewood, in the county of Essex and State of New Jersey, have invented new and useful Improvements in Primers, of which the following is a specification.

This invention relates to improvements in primers for internal combustion engines and one of its objects is to provide an automatically controlled device for admitting gasoline to the engine cylinders for starting.

It is well known that adjustment of the carburetor to produce a rich mixture capable of easy starting of a motor when cold, is not only wasteful of fuel, but has many other drawbacks, such as loss of power in hill climbing and formation of a deposit of carbon within the cylinders which ultimately causes much engine trouble.

To obviate these objections, it has been customary to adjust the carburetor for ordinary running conditions, and provide auxiliary priming devices, such as priming cups or other hand operated primers of various designs.

It therefore remains to develop a primer operating automatically so that when the engine is cold, the primer will function to admit a rich mixture to the motor, and as soon as the motor attains its normal running temperature automatically cuts off the additional source of supply, permitting the motor to operate as under normal conditions.

Another purpose of the invention is in the provision of a primer which may be connected in the ordinary fuel supply system without necessitating any material changes, thereby producing a device that may be manufactured and distributed as an accessory.

As a further aim the invention contemplates the provision of a thermally controlled valve arranged in such manner as to admit atomized gasoline directly into the intake manifold when the motor is started while cold, and which, when the motor becomes heated, will close and cut off the primary charge.

With the above and other objects in view, which will become more apparent as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts set forth in the following specification, claimed, and illustrated in the accompanying drawings, in which:—

Figure 1 is a diagrammatic view, illustrating the primer as applied to a vacuum fuel system.

Figure 2 is a view similar to Figure 1 showing its application to a gravity or pressure fuel system.

Figure 3 is a view similar to Figure 1, showing the arrangement of pipes, bleed valves and the like where the valve is of necessity lower than the fuel level in the vacuum tank.

Figure 4 is a vertical sectional view through a thermostatic valve of the preferred type.

Figure 5 is a vertical sectional view taken on line 5—5 of Figure 4.

Figure 6 is a horizontal sectional view taken on line 6—6 of Figure 4.

Figure 7 is a view similar to Figure 6 taken on line 7—7 of Figure 4.

Figure 8 is a side view of the valve with the cover removed, illustrating the valve equipped with an auxiliary heating coil.

Figure 9 is a side view in elevation of a modified form of valve.

Figure 10 is a longitudinal sectional view through the same.

Referring to the drawings in detail, the numeral 10 designates the fuel tank of a motor vehicle, usually arranged at the rear and below the level of the carburetor.

Leading from the tank 10 is a pipe 11, the discharge end of which empties into the auxiliary fuel tank 12, arranged above the level of the carburetor and usually on the dashboard of the vehicle.

This auxiliary tank 12 is connected by pipe 13 to the float chamber of the carburetor 14, so that the liquid within the tank will be fed by gravity into the carburetor.

Connected as usual to the carburetor 14 is the intake manifold 15 of the motor, and connected to the intake manifold 15 and to the tank 12 is the customary vacuum pipe 16 by means of which the tank 12 is partially exhausted, so that liquid fuel from the tank 10 will flow into the tank 12, the liquid level in tank 12 being maintained by the customary float 17, as clearly illustrated in Figure 1.

In attaching this primer a thermally controlled valve 18 is secured in any suitable manner to the exhaust manifold 19 and one side of said valve is connected by means of

pipe 20 to the fuel supply pipe 13, the opposite side of said valve being connected by a pipe 21 to the vacuum pipe 16, so that fuel passing through said valve will be discharged directly into the intake manifold 15.

It is to be understood that the thermostat controlling the operation of the valve 18 must be set so that when the motor is cool, the valve will open and as the motor becomes heated the valve will close.

In the gravity or pressure fuel system, illustrated in Figure 2, the fuel tank 22 is mounted above the level of the carburetor 23 and is connected directly thereto by means of fuel pipe 24.

As shown, the carburetor 23 is connected to the intake manifold 25 in the customary manner and the complications of the vacuum system dispensed with.

The valve 18 is secured to the exhaust manifold 26 in the manner previously described and one side of said valve is connected by means of pipe 27 to the carburetor opposite the side carrying the float.

The opposite side of the valve is connected by a vacuum pipe 28 to the intake manifold and it will be seen that when starting a cold motor the exhaust from the manifold will create a vacuum within the pipes 28 and 27, causing the atomized gasoline to rise through said pipes and directly enter the manifold 26.

In some instances, the vacuum tank 12 must be so disposed on the vehicle as to bring the fuel level therein above the level of the valve 18, as shown in Figure 3.

In this arrangement the pipes and connections are essentially alike except in place of pipe 20, there is substituted a pipe 29 bent in the form of an inverted U, the bight of which is disposed above the level of the fuel in the tank 12 and provided with a minute bleed opening 30 to overcome any tendency to syphon.

In order to prevent too free a flow of fuel into the pipe 20 or 29 it may be found desirable to install a metering plug 31 at the point where the pipe 20 or 29 join the pipe 13.

It is to be understood that a cut-off cock 32 of any suitable type may be interposed between the valve 18 and fuel supply tank 12, so that the user may at discretion render the primer inoperative.

The preferred type of automatic control valve heretofore designated by the numeral 18, comprises a hollow body 33 provided with an open side normally closed by a cover plate 34.

Formed at opposite ends of the body are longitudinally extending ears 35 for the accommodation of fastening devices by which the valve is secured to the exhaust manifold.

Formed on the underside of the valve body is an angularly extending boss 36 provided with a longitudinal bore 37 intersecting a transverse bore 38 near the upper end of the boss, in alinement with a nipple 39.

It will thus be seen that a right angle passage is formed, and arranged at the upper end of the bore 37 is a valve seat for cooperation with the valve 40.

This valve is provided with a flanged head 41, adapted to be received within the bifurcation 42 of the thermostatic unit 43, which is substantially U-shaped and rigidly supported in a slot 44 in the body. An adjusting screw 45 is threaded through one wall of the body and its inner end impinges on the thermostatic unit 43 to vary the operation of the valve.

In some instances it may be found desirable to cut off the primary charge prior to bringing the motor up to normal running temperature and in order to permit of such operation, an electrical heating coil 46 is arranged within the body, one terminal being connected through a manually controlled switch to a source of electric energy, while the opposite terminal is connected to a contact 47.

Secured to the thermostatic couple 43, near the valve 40, is a contact 48 which, when the valve is open, engages the contact 47.

It is to be understood that the body 33 is connected to the opposite terminal of the power source and thus it will be seen that when the switch is closed and the valve open, the current will flow through the coil 46, thereby causing the same to become heated and the radiation therefrom will eventually effect the operation of the thermostatic couple, causing the same to seat the valve 40 and simultaneously break contact through the coil.

In the modified form of valve shown in Figs. 9 and 10, a body 49 is provided with a hollow cylindrical housing 50 having external screw-threads 51 received in the threaded opening 52 formed in an exhaust manifold designated generally by the numeral 53.

Formed in axial alinement with the cylindrical housing on the opposite end of the body 49, is an externally threaded nipple 54 and extending radially from the body is a similar nipple 55.

As shown in Figure 10, the body 49 is provided with an axial bore 56, its inner end communicating with the passage 57 formed in the nipple 54. A similar passage 58 is formed in the nipple 55 and communicates with the bore 56 as shown in Figure 10.

Slidably fitted in the bore 56 is a valve 59, its inner end seating on the shoulder formed where the bore 56 meets the passage 57.

Pivotally connected, as at 60, to the outer

end of the valve 59 are bowed thermostatic elements 61, the opposite ends of which are pivotally connected, as at 62, to a plug 63 forming the end closure for the housing 50.

Obviously in this type of valve, the heated gases passing through the exhaust manifold 53 will impinge directly upon the wall of the housing 50, thereby bringing the valve into rapid action.

While in the foregoing there has been shown and described the preferred embodiments of this invention, it is to be understood that certain minor changes in the details of construction, combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as disclosed.

Having thus described my invention and set forth the manner of its construction, application and use, what I claim as new and desire to secure by Letters Patent, is:—

The combination with an internal combustion engine including an intake manifold, an exhaust manifold and a fuel supply tank, of a hollow casing juxtaposed on the wall of said exhaust manifold, said casing having extensions provided with passages, one of the passages communicating with said tank and the other passage with the intake manifold, a valve plug controlling the passages, said plug having a recessed head extending into said casing, a thermopile fixed at one end rigidly in the casing and bowed therewithin to act as a spring, the free end of said thermopile being forked to engage the head of said valve plug, and means for adjusting said thermopile.

This specification signed and witnessed this 19th day of February, 1923.

ERIC T. FRANZEN.

Witnesses:

F. NOLL,

FRED'K C. FISCHER.