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PRIMER FOR INTERNAL COMBUSTION ENGINES

Original Filed April 9, 1925 2 Sheets-Sheet 1

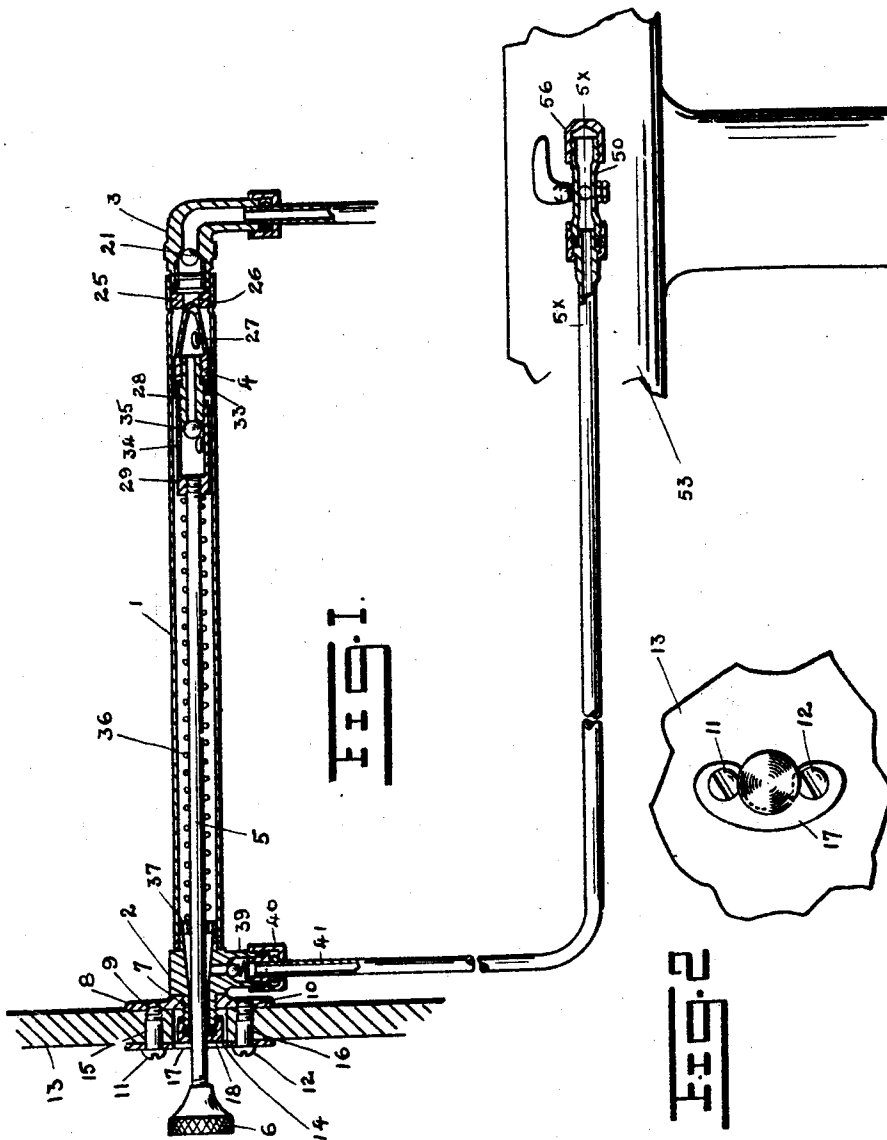


Fig. 1

Fig. 2

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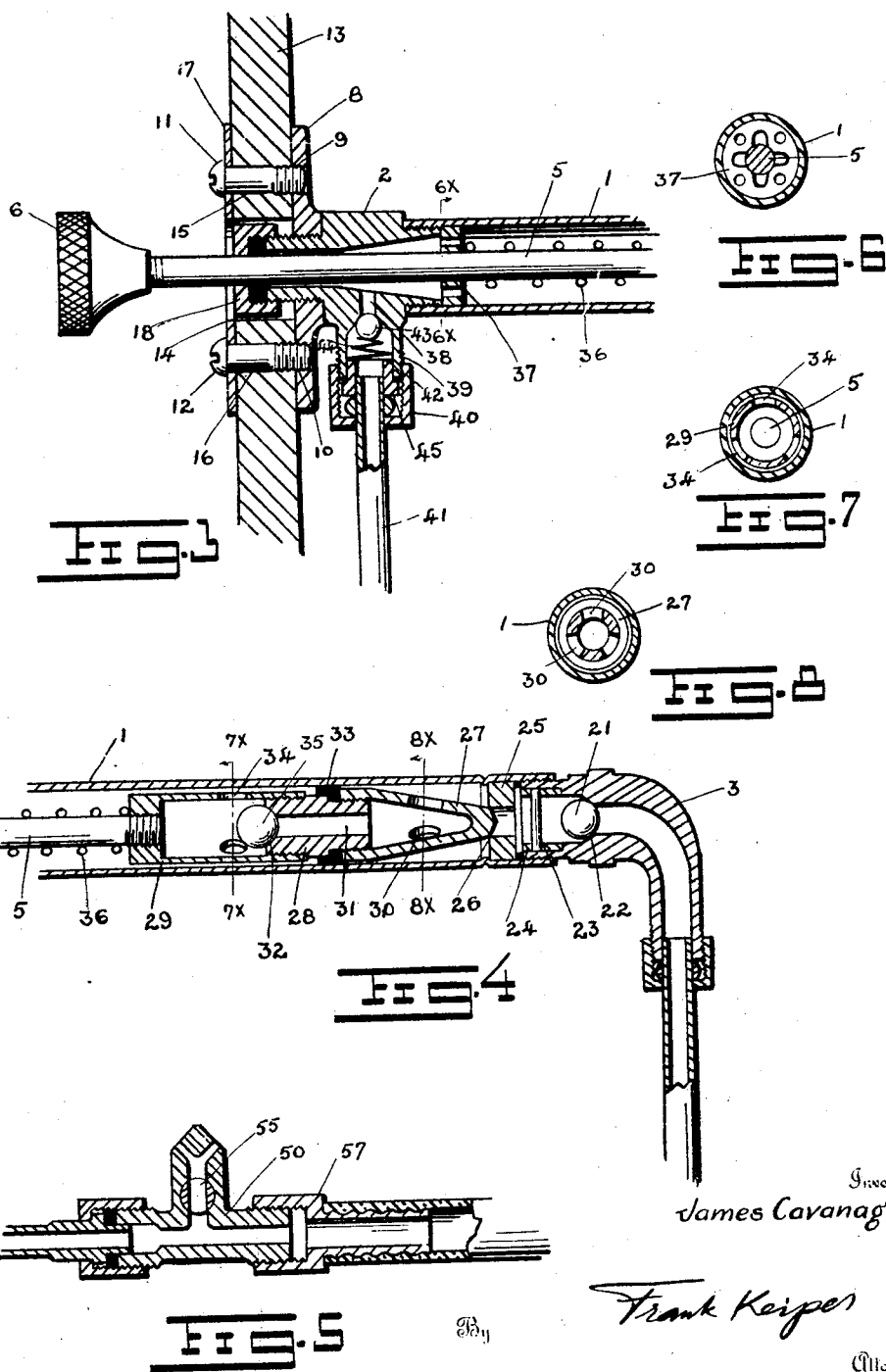
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UNITED STATES PATENT OFFICE.

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PRIMER FOR INTERNAL-COMBUSTION ENGINES.

Application filed April 9, 1925, Serial No. 21,824. Renewed July 19, 1926.

The object of this invention is to provide a new and improved device for priming internal combustion engines especially those used in driving vehicles.

5 This and other objects of this invention will be fully illustrated in the drawing, described in the specification and pointed out in the claims at the end thereof.

In the accompanying drawing:

10 Figure 1 is a longitudinal sectional view of the primer showing also the connection of the primer with the manifold of the engine.

Figure 2 is a front elevation of the primer as it will appear when mounted to the dash board.

Figure 3 is an enlarged sectional view of the front portion of the primer.

Figure 4 is enlarged sectional view of the rear portion of the primer.

Figure 5 is a horizontal sectional view of the spraying nozzle adapted to spray the gasoline from the primer into the manifold the section being taken on the line 5*-5* of Figure 1.

Figure 6 is a vertical cross section of the primer, the section being taken on the line 6*-6* of Figure 3.

Figure 7 is a cross section of the primer, the section being taken on the line 7*-7* of Figure 4.

Figure 8 is a cross section of the primer, the section being taken on the line 8*-8* of Figure 4.

35 In the several figures of the drawing like reference numerals indicate like parts.

The primer forming the subject matter of this invention is shown in connection with an automobile engine and is adapted to feed gasoline from the tank or feed line direct into the manifold of the engine without first passing thru the carburetor. In this way a certain amount of gasoline is fed to the intake of the engine that will give it a charge having a so-called rich mixture that will insure a quick starting of the engine.

As illustrated in the figures of the drawing the primer comprises a cylinder 1 having the head 2 at the front end and the head 3 at the rear end. Mounted to slide in the cylinder is the piston or plunger 4 which is carried on the end of the piston rod 5. The piston rod passes thru the head 2 of the cylinder and has the handle or knob 6 attached to the outer end thereof. The head 2 is provided with the threaded nipple 7 on

which the flange 8 is threaded. This flange rests against the head and forms a shoulder in which two threaded holes 9 and 10 are provided one above and the other below the head 2 of the cylinder. Suitable clamping bolts 11 and 12 are adapted to be threaded into these holes to mount the cylinder in place on the dash board 13 of the automobile. For this purpose the dashboard 13 is perforated in three places at 14 to allow the nipple 7 of the head 2 to project there-thru and at 15 and 16 to allow the clamping bolts 11 and 12 to pass therethru to be threaded into the flange 8. A semi-circular or curved washer 17 is provided and placed under the head of the clamping screws 11 and 12. For this purpose the washer 17 is provided with two holes thru which the bolts 11 and 12 can pass while its semi-circular shape encircles one side of the opening 14 in order to clear the portion of the primer projecting from it.

Threaded to the outer end of the threaded nipple is the stuffing box 18 which holds suitable packing around the piston rod and prevents leakage from the cylinder thru the nipple. Both of the heads 2 and 3 are preferably castings and have a thread on the outside to which the ends of the cylinder can be threaded. The head 3 in the right hand end of the cylinder is illustrated as L-shaped. To the outer end of this head is attached the pipe which leads to the main feed pipe or gas line connecting the gas tank of the car with the carburetor. On the inner end of the head 3 is provided a ball valve comprising the ball 21 and the valve seat 22. The seat is formed in the head at the point where the gasoline enters the cylinder. The ball is prevented from entering the cylinder by the pin 23 supported in the sleeve 24, that is threaded into the inner end of the head 3. A washer 25 is placed against the inner end of the head 3 and is held in place thereon by the annular ridge formed on the inside of the cylinder. In this washer is provided the valve seat 26 that is opened or closed by the end of the plunger or piston 4.

The piston or plunger 4 is made in three sections, the tapered or conical outer section 27, the connecting or middle section 28 and the inner section 29. The conical outer section has the ducts 30 leading from the tapered side to the hollow center thereof. The connecting or middle section 28 is threaded

into the inner end of the conical outer section. A central duct 31 is provided in the connecting or middle section and has a valve seat 32 formed on the left hand end thereof.

Between the conical outer section and the middle section of the plunger is clamped the leather washer 33 that forms a tight joint with the cylinder and prevents the liquid from leaking past the plunger from one side to the other side thereof.

The inner section 29 of the plunger is made up in the form of a cap that is threaded over the left hand end of the middle section. The cap is hollow and has ducts 34 leading out thru the side thereof. Within the cap is located the ball 35 forming a ball valve with the seat 32 provided on the end of the middle section 28. The piston rod 5 is threaded into the end of the cap or end section 29 of the plunger 4. Surrounding the piston rod is the coil spring 36. This spring is located between the inner end of the plunger 4 and the washer 37 located on the inside of the head 2 of the cylinder. The head 2 forms a cone shaped chamber behind the washer 37, from which the duct 38 leads to the feed pipe leading to the manifold of the engine. This duct is provided in the nipple 39 projecting from the side of the head 2. This nipple is threaded and is provided with the stuffing box 40 which holds the end of the feed pipe 41 in place in the nipple 39.

In the nipple is formed the valve seat 42 against which the ball 43 is held by the spring 44. The spring 44 is supported on the end of the bushing 45 that is slipped into the nipple after the spring has been inserted and surrounds the end of the feed pipe 41 held in place in the nipple by the stuffing box 40.

The feed pipe 41 leads from the primer above described to the spraying valve 50. This valve is shaped in the form of a T connection having a continuous duct leading thru it from one end to the other end and a short duct branching off from the middle of the valve and at right angles thereto. The outer end of the short duct is divided into two outlets that instead of pointing straight ahead branch out to one side and direct the flow of the liquid passing there thru in two opposite directions. The spraying valve is thus threaded into the middle of the manifold 53 of the internal combustion engine and the conical end with its two outlets forces an equal amount of liquid in two opposite directions in the manifold.

In the duct of the spraying valve leading into the manifold is provided the valve 55. This valve is adapted to close the duct leading to the manifold. This is done when it is desired to pump gasoline from one car to another or into a suitable vessel. After the valve is closed, the cap 56 is taken off from

the end of the spray valve 50 and a suitable coupling with a hose 57 is threaded in its place. The operation of the primer then pumps the gasoline thru the hose 57 instead of thru the duct which is now closed by the valve 55.

From the foregoing it will be seen that the primer can be used to inject gasoline from the feed line or tank direct into the manifold to give the engine a rich mixture for starting purposes. It can also be used for taking gasoline out of the tank or feed line and pump it either into a vessel or into the gas tank of another car that has run out of gasoline.

The action of the primer is as follows:

On the outward stroke of the plunger gasoline is drawn thru the head 3 past the ball valve located therein. Then on the downward stroke, the gasoline thus admitted into the cylinder is forced thru the plunger or piston by passing in thru the ducts 30 at the tapered end thereof and then thru the middle section thru the duct 31 and past the valve into the inside of the cap section of the plunger. From there it passes out thru the ducts 34 into the cylinder ahead of the plunger. The pressure on the gasoline exerted by the downward movement of the plunger seats the valve in the head 3 and prevents any gasoline from being forced out of the cylinder and back into the feed pipe and makes all of the gas previously admitted in the cylinder below the plunger pass thru the plunger into the cylinder ahead of the plunger. On the next upward stroke more gasoline is drawn into cylinder thru the head 3 while the gasoline within the cylinder and ahead of the piston is forced thru the holes in the washer 37 into the head 2 and out thru the valve in the nipple 39. From there it passes thru the feed pipe 41 to the spraying valve and is either forced thru the nozzle thereof into the manifold or when the valve 55 is closed thru the hose connected to the spraying valve. This cycle of operation is repeated at every stroke of the plunger until the desired quantity of gasoline has been pumped out of the feed line into either the manifold of the engine or into the place where the gasoline is desired.

The valve in the head operates to prevent the gasoline from being forced back into the feed line while the valve in the plunger prevents the gasoline at the left of the plunger from flowing back to the right of the plunger to make it flow out thru the valve in the nipple 39. This valve is a check valve which prevents a pressure created by backfiring in the manifold from forcing the gasoline in the pipe 41 back into the cylinder of the primer.

As appears from Figure 1, it is obvious that the cylinder 1 of the pump is long and the gasoline passes through the whole length

of the cylinder of the pump from one end thereof to the other. In this way a considerable quantity of gasoline is stored in the pump. The intake valve is at one end of the pump cylinder and the outlet valve is at the other end of the pump cylinder. The pump and valves and tube are arranged in this way for a definite purpose. The ball, spring, and bushing that is in the nipple 39 can be removed and the nipple can be connected up again to the pipe 41 so that the apparatus can be operated without the valve. The piston and the plunger can then be held away from the seat 25 and the apparatus can then be used as an emergency carburetor. By making the spring under the ball in the nipple 39 weak enough to reduce its pressure, the removal of the ball, spring and bushing can be made unnecessary. When the valve 55 is open the suction on the manifold of the engine will cause the gas to flow continuously through the apparatus and in this way gas can be fed to the engine sufficient to secure the operation of the car a short distance, at least far enough to get to a service station where the necessary repairs can be made.

I claim:

1. In a priming device for internal combustion engines, the combination of a cylinder, a plunger mounted to reciprocate in said cylinder, said plunger having a conical hollow end section, an intermediate connecting section and a hollow cap section, ducts leading into said conical end section, a central duct thru said intermediate connecting section, a valve seat formed on the end of said central duct, a ball located within said hollow cap section and adapted to seat itself on said valve seat, ducts leading out of said cap section and a soft washer projecting from between the conical and intermediate section.

2. In a priming device for internal combustion engines, the combination of a cylinder, a head at each end of said cylinder, a self seating ball intake valve in one of said heads and a self seating ball outlet valve in the other of said heads, a washer having a valve seat located on the inside of one of said heads, a plunger mounted to reciprocate in said cylinder, a valve on the end of said plunger adapted to engage said seat on said washer, a valve within said plunger adapted to allow liquid to pass thru the plunger in but one direction.

3. In a priming device for internal combustion engines, the combination of a double acting pump, a T-shaped spraying nozzle connected to said pump, the right angle section of said T-shaped spraying nozzle being threaded into the manifold of the engine, a bifurcated duct leading from the right angle section into the engine manifold, a valve in said right angle section of said spraying

valve, an interchangeable hose connection adapted to be fastened to said spraying nozzle, said hose connection being adapted to carry off the liquid pumped by said primer when said valve in said spraying nozzle is closed.

4. In a priming device for internal combustion engines, the combination of a cylinder, a head at each end of said cylinder, a washer having a valve seat on the inside of one of said heads and a washer forming a guide on the inside of the other of said heads, a plunger reciprocating in said cylinder, a piston rod for said plunger, said piston rod passing thru said guide washer at one end of said cylinder, a valve formed on the end of said plunger and adapted to engage the valve seat formed on said washer on the other end of said cylinder, a spring surrounding said piston rod and adapted to normally hold said valve of said plunger in engagement with the valve seat on said washer.

5. In a priming device for internal combustion engines, the combination of a cylinder, an intake and an outlet for said cylinder, said intake being placed at one end of the cylinder and the outlet being placed at the other end of the cylinder, a plunger mounted to reciprocate in said cylinder to pump fuel through it, a piston rod rigidly connected to said plunger, said plunger having a tapered forward end, a seat at one end of the cylinder, said seat having an opening therein on which the plunger is normally adapted to rest to close the opening, a nipple formed on the end of the cylinder, a washer threaded on said nipple, clamping bolts threaded into said washer, a curved washer connecting said clamping bolts by curving around said nipple.

6. In a priming device for internal combustion engines, the combination of a cylinder, an intake and an outlet for said cylinder, said intake being placed at one end of the cylinder and the outlet being placed at the other end of the cylinder, a plunger mounted to reciprocate in said cylinder to pump fuel through it, a piston rod rigidly connected to said plunger, said plunger having a tapered forward end, a seat at one end of the cylinder, said seat having an opening therein on which the plunger is normally adapted to rest to close the opening, a nipple formed on the end of said cylinder, a connection between said nipple and the manifold of the engine, the apparatus being so arranged that when the plunger of the cylinder is held off of its seat the engine can draw fuel through the pump, thereby using the apparatus as an emergency carburetor.

7. In a priming device for internal combustion engines, the combination of a cylinder, an intake and an outlet for said cylinder, said intake being placed at one end of the cylinder and the outlet being placed at

the other end of the cylinder, a plunger mounted to reciprocate in said cylinder to pump fuel through it, a piston rod rigidly connected to said plunger, said plunger having a tapered forward end, a seat at one end of the cylinder, said seat having an opening therein on which the plunger is normally adapted to rest to close the opening, the parts being so arranged that when the piston is held off of its seat, fuel can be drawn continuously through the pump by the suction of the engine. 10

In testimony whereof I affix my signature.
JAMES CAVANAGH.