May 8, 1956 G. E. FRANCK 2,744,512

PRIMING DEVICE

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Fig. 2.

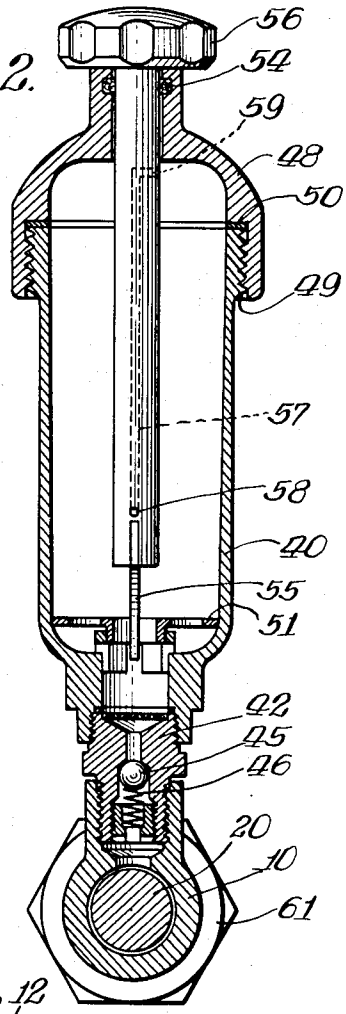
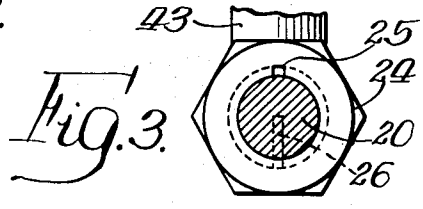


Fig. 1.

Fig. 3.



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PRIMING DEVICE

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5 Claims. (Cl. 123—187.5)

This invention relates to a priming means and more particularly to a priming device particularly adapted to dispense priming fluid provided in capsule form.

It is the general object of this invention to provide a new and improved priming device.

It is a more specific object of this invention to provide a priming device capable of dispensing priming fluid supplied in a gelatin capsule.

A further object is to provide a priming means with a compartment attached thereto in gastight manner so as to receive a capsule of priming fluid for priming an engine.

Another object is to provide a unitarily assembled device having a priming pump means and a source of priming fluid connected therewith in such a manner as to be a part of the priming device and so constructed and arranged to receive successive charges of priming fluid.

Other and further objects of the invention will be readily apparent from the following description and drawings, in which:

Figure 1 is a vertical sectional view from approximately the center of the priming device of this invention;

Figure 2 is a vertical sectional view taken substantially along line 2—2 in Figure 1; and

Figure 3 is a fragmentary sectional view taken substantially along line 3—3 in Figure 1.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail one specific embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

The priming of engines and particularly diesel engines has been done by hand by pumping a highly explosive volatile fluid into the cylinders while the engine is still cold. The priming fluid used is generally diethyl ether which is the well known hospital variety of ether. The liquid has a boiling point of 90° F., is highly explosive in volatile form and is easily volatilized because of its low boiling point. Ordinarily the priming devices force the diethyl ether through the fuel supply nozzles in the cylinders of the diesel engine. The pumps for forcing the priming fluid into the cylinders are usually operated by hand prior to starting the engine so that the compression within the cylinders renders the diethyl ether very highly explosive.

The particular invention illustrated is adapted for use of priming fluid provided in capsule form. The capsules are of a gelatin nature filled with liquid diethyl ether which will volatilize on some occasions when released, depending upon certain surrounding conditions, and will in any event be volatilized when forced through the fuel nozzles on the engine.

In the figures of the drawings, a primer casing 10 is provided with an axial bore 11 having a restricted portion

12 at the forward end thereof forming a double valve seat 13. A nipple member 14 is provided with threads 15 for attachment to the casing 10 and provides a means for connecting tubing 16 which comes from the fuel injection nozzles of the engine to the priming device, by the use of an ordinary sleeve type connector 17.

A priming fluid is prevented from flowing from the engine to the priming device by a ball check valve member 18 pressed against the restricted portion 13 by a spring member 19 resting within a bore in the nipple 14. The compression on spring 19 is not great so that priming fluid may easily be forced past the ball 18 and into the line 16 to the engine.

The pump is formed by a plunger 20 reciprocally mounted within the bore 11 of the casing 10. A handle 21 is securely mounted on the plunger for hand operation. A guide ring 22 at the forward end of the plunger has an outer diameter slightly greater than the diameter of the plunger but slightly less than the bore 11. This difference is provided to prevent the plunger from being withdrawn entirely out of the bore 11 by contact between the seal 23 and packing ring 22 within the retaining nut 24 at the rear end of the casing 10. A bayonet slot 25 in the retaining nut 24 is provided to receive a pin 26 secured in the outer portion of the plunger. The handle 21 is so secured to the plunger that it may be used to turn the same about its own axis.

A valve is provided to prevent the flow of priming fluid or air during the period when the engine to which the primer is connected is running. This valve is carried by the plunger 20 and is in the form of a finger member 27 having a conical-shaped end 28 adapted to seat against the valve seat 13 when the plunger is near its inward limit of travel within the bore. The finger 27 slides within a central opening 29 in the packing ring 22. At its inner end, a compression spring 30 bears against an integral sleeve 31 to force the finger member outwardly from the plunger. This spring 30 also serves to lock the plunger in its innermost position by maintaining the pin 26 in a retaining slot portion 32 of the bayonet slot 25.

The priming fluid, which in the instant application is intended to be provided in capsule form, is placed within a generally cylindrical container 40. This container has a threaded lower end 41 adapted to receive a similarly threaded portion of a nipple member 42 which is fastened in a boss 43 formed integrally with the casing 10. The nipple member 42 serves to provide a relatively small passage 44 through which the priming fluid may pass into the bore 11 and in conjunction therewith carries a ball 45 pressed by compression spring 46 against one end of the passage 44 to act as a check valve. A screen 47 prevents any part of the capsule from entering the small passage 44.

The container 40 is arranged to permit insertion of successive capsules of priming fluid. A cover member 48 is threaded at 49 for ready attachment and removal from the container casing 40. A sealing ring 50 is positioned between the cover and main container body so that a gastight seal may be maintained at all times.

When the cover 48 is removed, a gelatin capsule of priming fluid may be placed within the container and when so placed will rest upon a perforate plate 51 near the bottom of the casing. This plate supports the capsule and permits the fluid to pass below the plate and into the passage 44. The capsule is pierced to release its fluid after it is so placed within the container. In order to pierce the capsule, a rod 52 is centrally disposed within a bore 53 formed within the cover member 48. A seal 54 in the cover member closely fits about the rod 52 but permits the rod to be moved axially. A spear-like element 55 is fastened to the inner end of the rod and

an operating handle **56** is secured to the outer end. Ordinarily the rod will be retracted out of the cover while the cap **48** is threaded into position on the container **40**, after which the rod may be depressed to break through the capsule and thus release the priming fluid.

When the priming pump is to be used for forcing the ether into the engine cylinders, the rod **52** may be retracted a short distance out of the container in order to permit vent passage **57** to have communication between the interior of the container and the exterior. The inner end **58** of the passage is adjacent the cutter element **55** while the outer end **59** is close to the handle **56**. Thus by retracting the handle a short distance, the outer end **59** of the passage could extend above the cover member **48** and thus allow the plunger to draw the contents of the container into the bore.

The priming device is usually mounted in a position to be readily accessible to the engine operator. The forward end of the casing **10** is provided with threads **60** upon which a pair of nuts **61** and **62** are threadably mounted for the purpose of clamping the device in position in an ordinary control plate, a dashboard or a similar structure. The device will be so mounted that it assumes substantially the position shown in Figure 1 with respect to horizontal. A single capsule of priming fluid will ordinarily be used for one charge or one priming operation.

I claim:

1. An engine priming device, comprising: a primer casing having an axial cylindrical bore and a restricted portion at the forward end forming a valve seat; means providing communication between the bore and the engine for passage of priming fluid; a check valve yieldingly urged against said valve seat to prevent passage of fluid from the engine into said bore; passage means communicating with the bore intermediate its ends for providing a source of priming fluid; and a plunger reciprocally mounted in said bore for pumping priming fluid therethrough, said plunger having a generally uniform cylindrical shape to displace fluid from within the bore by movement into the bore while being of less diameter than the bore to provide a passage at all times from the inlet passage means past the plunger to the outlet means communicating with the engine so that fluid may enter the bore during movement of the plunger out of the bore.

2. In an engine priming device having a primer casing with a bore adapted to be connected with engine cylinders to be primed and a plunger reciprocally mounted within said bore forming a pump for priming fluid; a hollow container having means adapted to secure the container to the primer casing with a passage providing communication between the bore and the interior of the container, said container having means for holding a capsule of priming fluid therein; a cover member on the container; and a capsule puncturing rod movably mounted in the cover member and having a vent passage with an inner end in communication with the interior of the container and an outer end arranged to communicate alternatively with the interior and exterior of the container by movement of said rod.

3. In an engine priming device having a primer casing with an axial bore adapted to be connected with engine cylinders to be primed and a plunger reciprocally mounted within said bore forming a pump for priming fluid; a hollow container having means adapted to secure the container to the primer casing with a passage providing communication between the bore and the interior of the container, said container having means for holding a capsule of priming fluid therein; a removable cover member on the container; and a capsule puncturing rod provided with a central passage extending along a portion of its length with terminating end portions extending laterally from the central passage through the side of the rod, said end portions being spaced with one adjacent the inner end of the rod and both so located as to be within the container when the rod is in its innermost position, said passage providing a vent from the interior of the container to atmosphere when the rod is withdrawn from the container a distance to move one of the end portions outside of the container.

4. In a diesel engine priming device adapted to place a highly explosive priming fluid in the engine cylinders having a primer casing with an axial bore and a plunger in the bore adapted to draw priming fluid into the bore from a source and expel the same fluid into the engine cylinders; means providing a source of priming fluid including a generally cylindrical container having a closure at one end and threads at the opposite end and being adapted to hold a capsule of priming fluid; a nipple member adapted to secure threadably the container to the primer casing and provide communication therebetween; and reciprocably movable rod means for puncturing the capsule to permit escape of the fluid into the interior of the container and passage means providing continuous communication between the exterior and interior of said container when the rod is spaced from the capsule.

5. An engine priming device, comprising: a primer casing having a longitudinal bore therethrough with a restricted portion at the forward end forming a valve seat; means providing communication between the bore and the engine for passing of priming fluid; a check valve yieldingly urged against said valve seat to prevent passage of fluid from the engine into said bore; passage means communicating with the bore intermediate its end for providing a source of priming fluid; and a plunger reciprocally mounted in said bore for pumping priming fluid therethrough, said plunger having its periphery spaced inwardly from the bore wall and adapted to displace fluid from the bore by movement into the bore while providing a passage at all times from the inlet passage means past the plunger to the outlet means communicating with the engine so that the fluid may enter the bore during movement of the plunger out of the bore.

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