

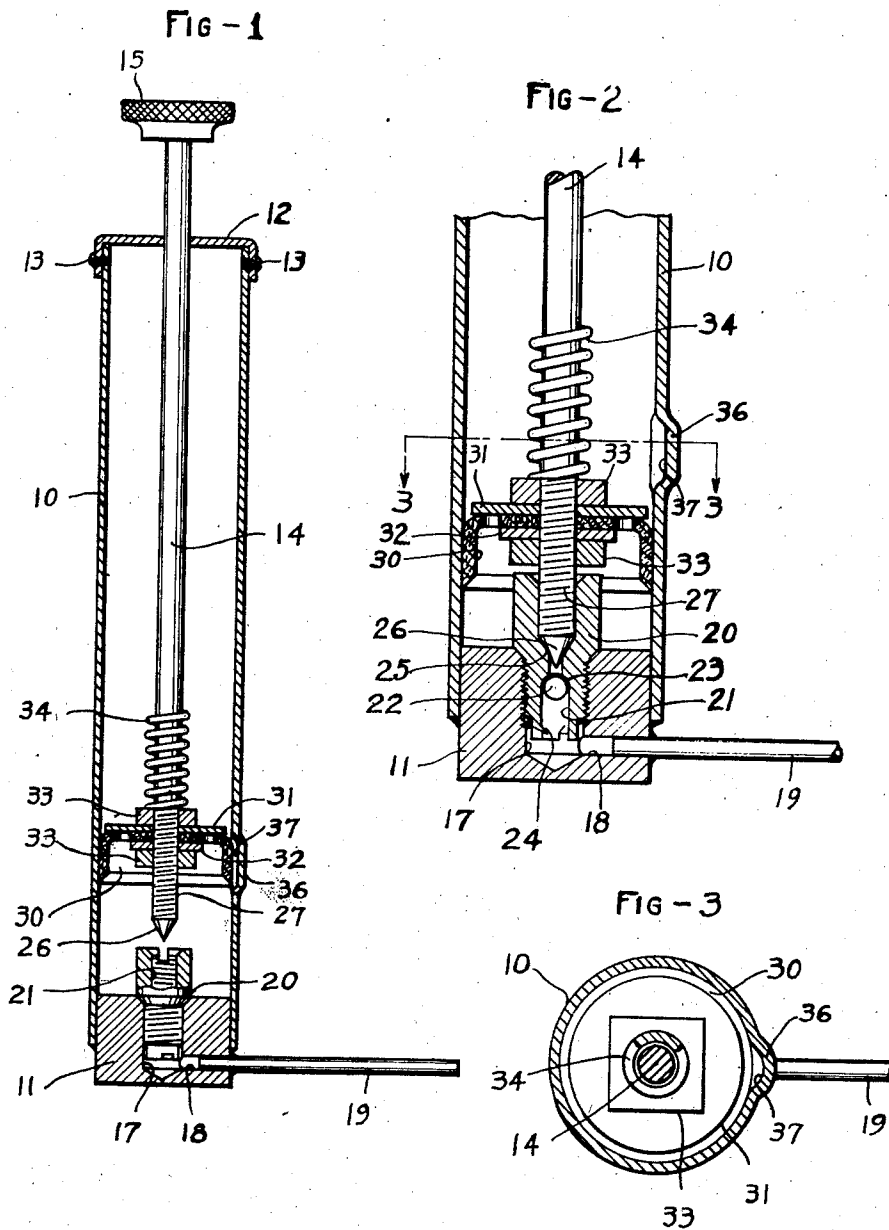
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PUMP

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1 Claim. (Cl. 230—22)

This invention relates to pumps, and more especially it relates to air pumps such as commonly are used in connection with liquid hydrocarbon fuel burning devices, such as stoves, lamps, lanterns and the like.

Liquid fuel burning devices of the character mentioned usually employ a reservoir or tank to contain the liquid fuel, said fuel being maintained under pressure by means of air that is forced into said tank. For supplying air to the tank a pump usually is employed, and said pump may be mounted within the tank, or it may be mounted exteriorly thereof and connected thereto by a suitable pipe.

The improved pump of this invention is of the type that employs a ball check valve and a conical shaped valve, the ball check valve preventing recession of air during the pumping operation, and the conical valve being seated after the pumping operation to provide a positive seal against the escape of air while the burning device is in use, during which time the pressure in the tank gradually diminishes. The conical shaped valve is carried on the forward end of the pump plunger or piston, and is threaded into the check body when the piston is at the limit of its compression stroke. Consequently there is an appreciable space between the confronting sides of the check body and the pump piston and if this space is filled with highly compressed air it retards and renders difficult the proper seating of the conical shaped valve.

Accordingly, it is the chief object of the invention to reduce the amount of air trapped between the check body and the pump piston at the limit of the compression stroke of the latter. Further objects are to provide in an improved manner for venting air from in front of the pump piston; and to facilitate the closing of the conical shaped valve of the pump. Other objects will be manifest as the description proceeds.

Of the accompanying drawing:

Fig. 1 is a longitudinal diametric section of a pump embodying the invention, the conical shaped valve thereof being in unseated position;

Fig. 2 is a fragmentary section, on a larger scale, of a portion of the structure shown in Fig. 1, the conical shaped valve being in seated position; and

Fig. 3 is a section on the line 3—3 of Fig. 1.

Referring now to the drawing, there is shown a pump comprising a tubular barrel 10, a nozzle or base 11 permanently secured in one end thereof, as by welding, and a removable cap 12 on the opposite end of the barrel retained thereon by

screws 13 or the like. The cap 12 is axially apertured to accommodate the plunger rod 14 of the piston or plunger of the pump, said rod having easy sliding fit through said cap. The outer end of the rod 14 is provided with a suitable knob 15 that may be grasped while the pump is being operated.

The pump nozzle or base 11 is formed with an axial recess 17 opening to the interior of the barrel, the lower end of said recess having a radially extending discharge opening or passage 18 to the exterior of the base. Mounted in the delivery end of the discharge passage 18 is a pipe 19 that may be connected in any suitable manner to the fuel tank of a burner for delivering air under pressure thereinto. Threaded into the recess 17 in base 11 is a check body 20 having an axial bore 21 therein in which a ball check 22 is received. The ball check constitutes an outwardly opening valve that is seatable upon a tapered valve seat 23 in the bore of the check body. The ball check 22 has limited movement in said bore, the check body being slightly or locally crimped at 24, at the outer end of said bore, to retain the ball 22 therein. The bore 21 of the check body is formed with a frusto-conical valve seat 25 located inwardly of the ball check 22, and adapted to receive a conical shaped valve 26 formed on the inner end of the pump plunger rod 14. Posteriorly of the valve 26, the plunger rod is threaded at 27, and the bore 21 posteriorly of valve seat 25 is similarly threaded so that the end portion of the plunger rod 14 may be received therein to effect the seating of the valve 26, as shown in Fig. 2, and to retain said valve in seated position.

The threaded portion 27 of the plunger rod 14 also is utilized for mounting the pump piston or plunger on the latter. Said piston or plunger comprises an annular cup leather 30 having a washer 31 on one side thereof and a washer 32 on the other side thereof. The rod 14 extends axially through said cup leather and washers, and nuts 33, 33, threaded onto portion 27 of the rod, bear against the respective washers and retain them firmly against the cup leather. A compression spring 34 is loosely mounted upon the rod 14, between the pump plunger and the pump cap 12 to cushion the retractive stroke of the plunger. The arrangement is such that when the valve 26 is unseated, as shown in Fig. 1, the plunger rod 14 may be reciprocated to force air past the ball check 22 and through pipe 19 into a fuel tank. When the air in the tank attains the desired pressure, the plunger is moved to the limit of its compression stroke, and the rod

14 is rotated to thread the valve end thereof into the check body 20 and thus to seat the conical shaped valve 26 upon the valve seat 25, whereby escape of air from the tank by way of the pump positively is prevented.

In order that the seating of the valve 26 as described is not required to be effected in opposition to a body of highly compressed air located between the nozzle or base 11 and the confronting side of the pump plunger, means is provided for evacuating practically all of the compressed air that remains in the pump barrel before the threaded portion of the rod 14 engages the internal threads in the bore of check body 20. To this end the wall of the pump barrel 10 is formed locally with an outward offset or bulge 36 that presents a concavity 37 to the interior of the pump. The offset 36 preferably is elliptical in shape with its long axis disposed longitudinally of the barrel 10, and is of such length that the concavity 37 formed thereby is longer than the axial width of the perimeter of the cup leather 30 that engages the inner surface of the barrel, as is clearly shown in Fig. 1. The concavity 37 thus constitutes a by-pass by which air may escape from in front of the pump plunger by passing to the rear thereof. The offset 36 is located relatively near the nozzle end of the pump, being so positioned that the cup leather 30 passes the by-pass 37 immediately before the threaded end portion of the plunger rod 14 engages the

internal threads in the adjacent end of the check body 20. Thus there is but a relatively small volume of air in the pump to be compressed by the axial movement of the plunger during the seating of the conical shaped valve 26, and the opposition of said air to the seating of the valve is negligible.

The invention is relatively simple in construction and positive in operation, and achieves the several advantages set out in the foregoing statement of objects.

Modification may be resorted to without departing from the spirit of the invention or the scope thereof as defined by the appended claim.

What is claimed is:

In a pump of the character described, the combination of a pump barrel having a discharge opening at one end thereof, a reciprocable pump plunger in said barrel, said plunger provided with a flexible cup leather packing, and a by-pass enabling the passage of air from the compression side of the plunger to the opposite side thereof near the limit of the compression stroke of the plunger, said by-pass consisting of a local outward bulge in the pump barrel producing a concavity in the inner face of the barrel, said concavity being of slightly greater length, longitudinally of the barrel, than the width of said plunger packing, and being of less width than length.

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