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FUEL FEEDING APPARATUS
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Fig. 1.

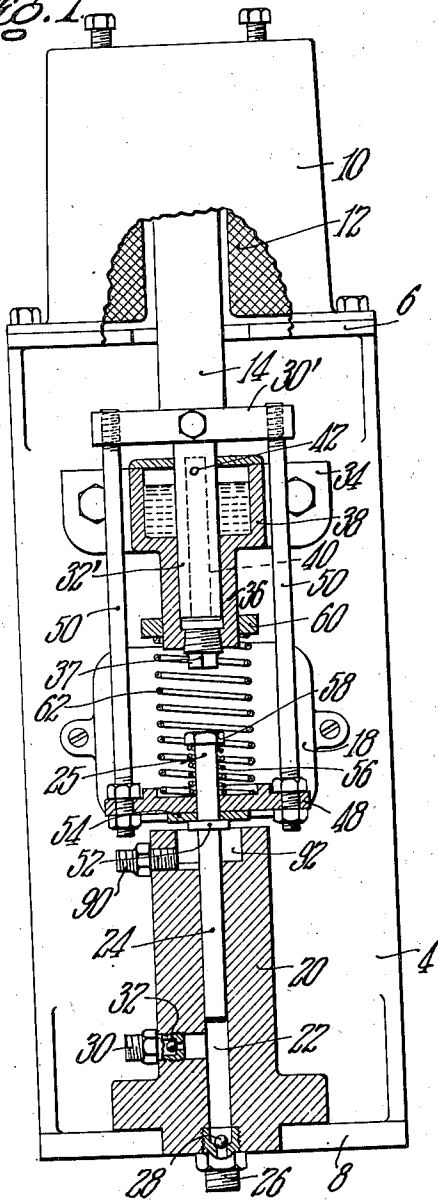


Fig. 2.

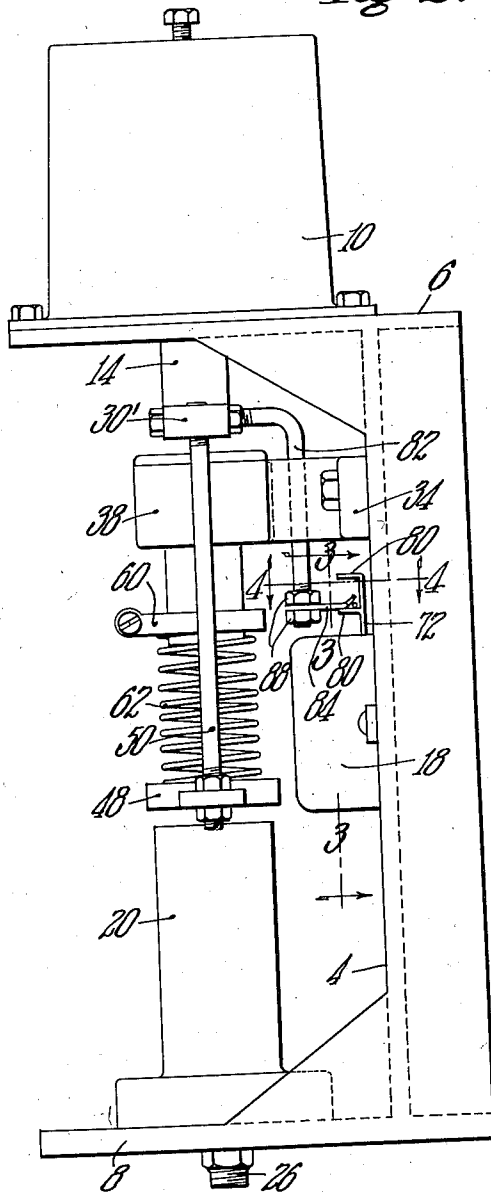


Fig. 3.

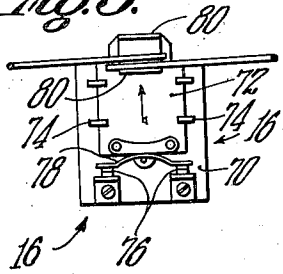
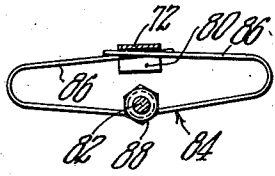


Fig. 4.



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FUEL FEEDING APPARATUS

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7 Claims. (Cl. 103—53)

This invention relates to improvements in pumping apparatus and is directed more particularly to improvements in apparatus for pumping fuel and the like.

5 The principal objects of the invention are directed to the provision of an apparatus adapted to pump fuel, such as oil, for feeding it to an oil burning apparatus. The novel construction of the invention contemplates the provision of
10 an apparatus which is simple in form and efficient in its operation and is accomplished by the provision of the novel combination and arrangement of parts to be hereinafter more fully described in connection with the accompanying
15 drawing which shows the preferred form of the invention.

In the drawing:

Fig. 1 is a front elevational view of a pumping apparatus of the invention, with parts in
20 section for clearness.

Fig. 2 is a side elevational view of the pumping apparatus shown in Fig. 1.

Fig. 3 is an elevational view on the line 3—3 of Fig. 2 to show certain details of construction,
25 and

Fig. 4 is a sectional plan view on the line 4—4 of Fig. 2 showing the mechanism illustrated in Fig. 3.

Referring now to the drawing more in detail,
30 the invention will be fully described.

A support member is represented at 2 and this includes an upright member 4, an upper plate member 6 and a lower plate member 8.

A housing 10 is supported by the upper plate
35 member 6 and it encloses a solenoid coil 12 in which is reciprocable an armature such as 14.

A switch, or circuit-opening and closing device, 16 is carried by the upright 4 and preferably enclosed in a casing 18. A pump body
40 member 20 is supported in some suitable manner by the base 2 and it includes a cylinder bore 22. A piston plunger 24 is reciprocable in the cylinder bore 22.

A connection such as 26 is provided at the
45 lower end of the cylinder bore so that the pump may be connected to a fuel supply. This connection has a check valve device 28 of some form associated therewith so that when the piston 24 is elevated to draw fuel into the cylinder bore,
50 the fuel will be checked against flowing back into the source of supply.

A connection 30 is also provided and this has a check valve 32 associated therewith arranged to prevent or to check the flow of fuel back
55 into the cylinder.

A cross-head member 30' is associated with the lower end of the armature 14. A guide 32' depends from the under side of the member 30'. A bracket or support member 34 is carried by the upright 4 and is arranged to have a part
5 36 associated therewith which is bored out to slidably receive the guide member 32'. In this way, the armature 14 is accurately guided for its up and down movements.

A lubricating reservoir or well 38 is disposed
10 at the upper side of the guideway 36 for lubricating the guide in its reciprocating movements. In its preferred form, the guide 32' is bored as at 40 and an outlet 42 is provided which extends through a side of the guide. In this way, any
15 fuel accumulating in the guideway below the guide 32' may find its way out and into the oil reservoir.

A lower cross-head member 48 is supported by a rod or rods 50 which depend from the upper
20 cross-head member 30'. This member 48 slidably receives the upper end 25 of the piston plunger 24.

A collar 52 is preferably provided on the piston plunger and it underlies a washer 54 associated with the member 48. A spring 56 is disposed
25 around the upper end 25 of the piston plunger 24 and is preferably arranged between the upper side of the lower cross-head member 48 and a member 58 provided on the upper end of the part 25 to yieldingly urge the member 24 up-
30 wardly so the collar 52 urges the washer 54 against the lower side of the cross-head member 48.

A collar member 60 is adjustable up and down on the part 36 and a spring 62 is disposed be-
35 tween the collar 60 and the upper side of the lower cross-head member 48. This spring 62 is adapted to urge the cross-head 48 and the piston downwardly and the upper cross-head member 30 and armature 14 are moved downwardly by the
40 rods 50.

As stated, the inlet connection 26 is connected to a fuel supply and the connection 30 is connected to an oil burner or the like. Thus, as the solenoid is energized, the armature 14 is drawn
45 upwardly to move the piston 24 upwardly in its cylinder for the pumping action. When the solenoid is disconnected from its source of energy, the spring 62 forces the cross-head member 30' downwardly so that the piston forces oil past
50 the outlet connection 30.

As above mentioned, the collar 60 is adjustable and it may be moved up and down on the part 36. In this way, the tension of the spring 62 may
55 be varied. The member 58 may abut the lower

side of the guide 32' when the parts move upwardly or it may abut a plug 37 provided on the lower end of the guide 32'. The spring 55 is adapted to act as a cushion to eliminate shocks.

It is desired that the solenoid be connected and disconnected from a source of energy accordingly as the parts move up and down and this is accomplished in the following manner.

A switch device, such as is shown in Figs. 3 and 4, is provided and is preferably enclosed in the casing 18. The switch device includes a plate 70 on which a member 72 is slidable. A guide 74 is provided to accurately guide the member 72.

Contact or contacts 76 are provided on the lower end of the member 70 and they are engaged by a more or less yieldable contact member 78 which is carried on the lower end of the slidable member 72. When the member 72 is in its lowermost position, the contact member 78 engages the contacts 76 to close the circuit which includes the solenoid and its source of energy. When the member 72 is in its uppermost position, the contact member 78 is, of course removed from engagement with the contacts 76.

A rod 82 is provided to depend from the cross-head member 30'. It is slidable in a suitable slot in the bracket or support 34, which, incidentally, serves to prevent the armature and other parts from rotating. A pair of spaced lugs 80 extend outwardly from the member 72.

A spring-like member 84 has arm parts 86 which lie between the lugs 80 and it is secured to the rod 82 in any suitable manner, as between nuts 83 provided in threaded engagement with the rod 82.

In the drawing, the reciprocating parts are shown in their lowermost position wherein the contact member 78 is in contact with the contacts 76 and whereby the solenoid is energized to draw the armature upwardly. As the armature moves upwardly, the spring arm or arms 86 engage the upper lug 80 to open the circuit-controlling device and thereby disconnect the solenoid from its source of energy. The spring 62 then causes the parts to be moved downwardly.

However, the armature is moved upwardly as the solenoid is energized and when the armature is in its uppermost position, the circuit including the solenoid switch is opened so that the parts then move downwardly.

A connection 90 is provided adjacent the upper side of the cylinder and this is in communication with a well 92 provided around the piston substantially as shown. This well 92 and connection 90 are utilized to facilitate the return of any fuel oil which may get by the piston. In ordinary use, the connection 90 will be connected to the fuel tank from which the apparatus is pumping fuel.

It will be noted that the switch or interrupter device is actuated by movements of the armature and that the connection is of a resilient nature, yet at the same time the operation of the switch device is positive.

The pump apparatus of the invention is characterized by its simplicity in form and construction and yet it is efficient in its operation. While we have described the invention in the form at present preferred, it will be understood that various changes and modifications may be made in the form of the apparatus without departing from the spirit and scope thereof.

What we desire to claim and secure by Letters Patent of the United States is:

1. An apparatus of the class described comprising, a solenoid and an armature, a cylinder and a piston, the said armature and piston being reciprocable in said solenoid and cylinder, a guide member between said solenoid and cylinder, a member associated with said armature guided in said guide member, connections between said armature and piston, a circuit closing device including an operating member a yieldable member associated with said armature for engaging said operating member as the armature reciprocates, the said connections including a cross-head carried by said armature having depending rods and a lower cross-head thereon connected to said piston, a spring urging the piston upwardly relative to said lower cross-head, and a spring between said guide member and said lower cross-head to urge said piston in an opposite direction.

2. An apparatus of the class described comprising in combination, an upright member supporting upper and lower plate members, a solenoid supported by said upper plate member having an armature, a cylinder having an outlet, a piston in said cylinder, the said armature and piston being reciprocable in said solenoid and cylinder, means for connecting said cylinder to a fuel supply, an upper cross-head on said armature, a lower cross-head on said piston, a guide member between said solenoid and cylinder, a member depending from said upper cross-head guided in said guide member, means to urge the piston in one direction relative to said lower cross-head, connections between said cross-heads, a circuit closing device including an operating member and means associated with said armature for operating said member as the armature reciprocates, the said means including a yieldable member engageable with said operating member, and a spring between said guide member and said lower cross-head to urge said piston in an opposite direction.

3. An apparatus of the class described comprising in combination, a spaced cylinder and solenoid coil in vertical alignment, an armature and a piston reciprocable respectively in said coil and cylinder, a cross-head on the lower end of said armature, a pair of rods fixed to and extending downwardly from said cross-head, a lower cross-head fixed to the lower ends of said rods slidably receiving said piston, means to urge said piston upwardly relative to said lower cross-head and yielding means urging said cross-heads and rods downwardly.

4. An apparatus of the class described comprising in combination, a cylinder and a solenoid coil spaced therefrom, an armature reciprocable in said coil and a piston reciprocable in said cylinder, a cross-head fixed to the lower end of said armature and a guide extending therefrom, a bracket having a guideway slidably receiving said guide, rods extending from said cross head towards said cylinder, a lower cross-head fixed on the lower ends of said rods slidably receiving the upper end of said piston, a spring between said bracket member and said lower cross-head urging said cross heads and rods downwardly and spring means associated with said piston and lower cross-head urging said piston upwardly.

5. An apparatus of the class described comprising in combination, a cylinder and a solenoid coil spaced therefrom, an armature reciprocable in said coil and a piston reciprocable in said cylinder, a cross-head fixed to the lower end of said armature and a guide extending therefrom, a bracket having a guideway slidably receiving said guide,

rods extending from said cross-head towards said cylinder, a lower cross head fixed on the lower ends of said rods slidably receiving the upper end of said piston, a spring between said bracket member and said lower cross-head urging said cross-heads and rods downwardly, spring means associated with said piston and lower cross head urging said piston upwardly, and a well associated with the upper side of said guideway and the said guide being bored axially and provided with a vent thereinto adjacent said upper cross-head.

6. An apparatus of the class described comprising in combination, a support, a solenoid coil and a cylinder at upper and lower ends of said support, an armature and a piston reciprocable in said coil and cylinder, an upper cross-head and a guide at the lower end of said armature, a guideway closed at its lower end in which said guide is reciprocable, a well at the upper side of said guideway, rods extending downwardly from said upper cross-head, a cross-head fixed to the lower end of said rods through which the upper end of the piston extends and is reciprocable, means to yieldingly urge the piston upwardly of said lower cross-head, means to limit the upward movement

of said piston relative to said lower cross-head and spring means to urge the cross-heads, rods and piston downwardly.

7. An apparatus of the class described comprising in combination, a support, a solenoid coil and a cylinder at upper and lower ends of said support, an armature and a piston reciprocable in said coil and cylinder, an upper cross-head and a guide at the lower end of said armature, a guideway closed at its lower end in which said guide is reciprocable, a well at the upper side of said guideway, rods extending downwardly from said upper cross-head, a cross-head fixed to the lower end of said rods through which the upper end of the piston extends and is reciprocable, means to yieldingly urge the piston upwardly of said lower cross head, means to limit the upward movement of said piston relative to said lower cross-head, and spring means to urge the cross heads, rods and piston downwardly, the said spring means including a member adjustable on said guideway and a spring disposed between said member and said lower cross-head.

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