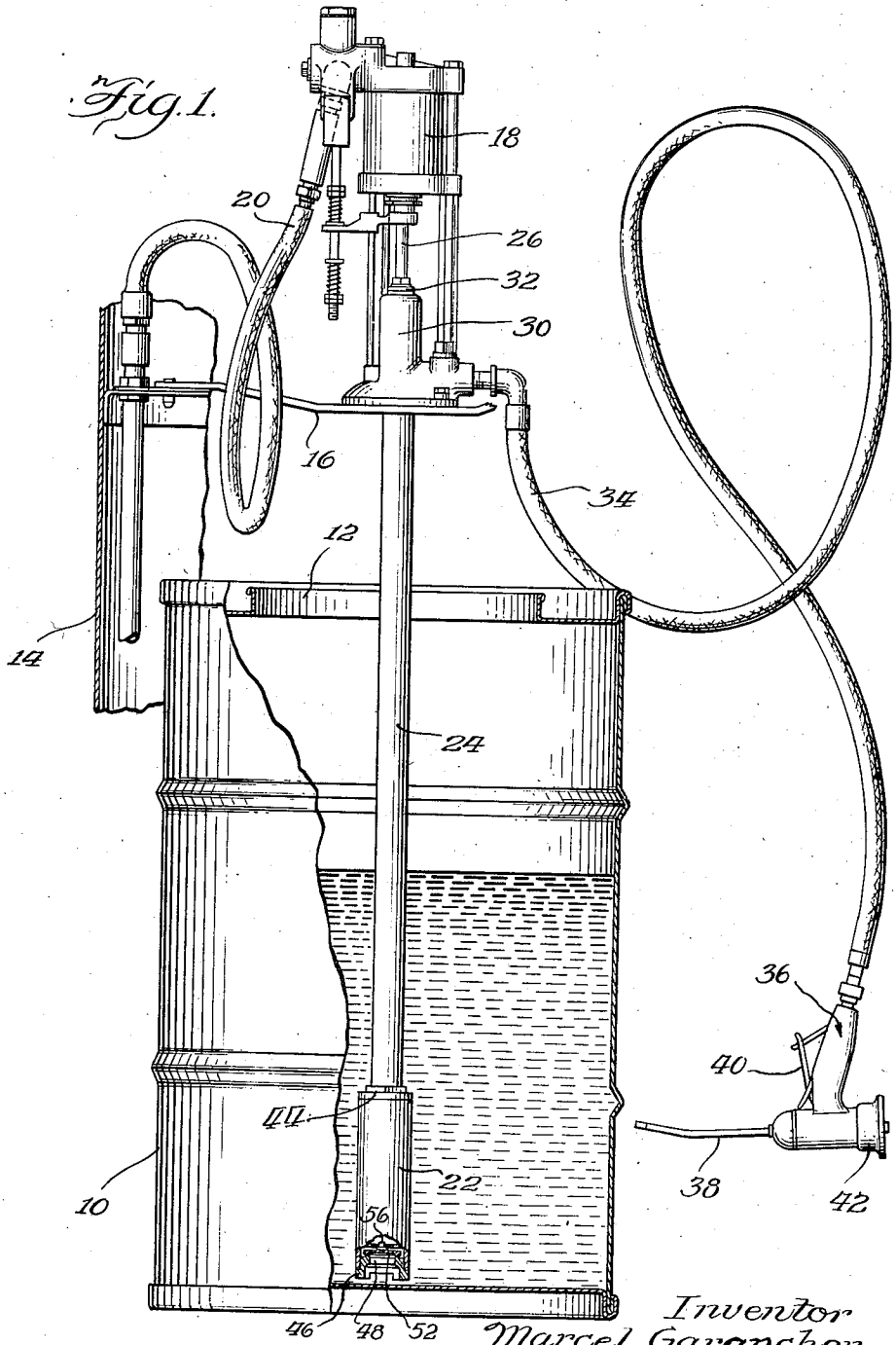
Jan. 28, 1941. M. GARANCHER 2,229,844

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Fig. 1.



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Fig. 2.

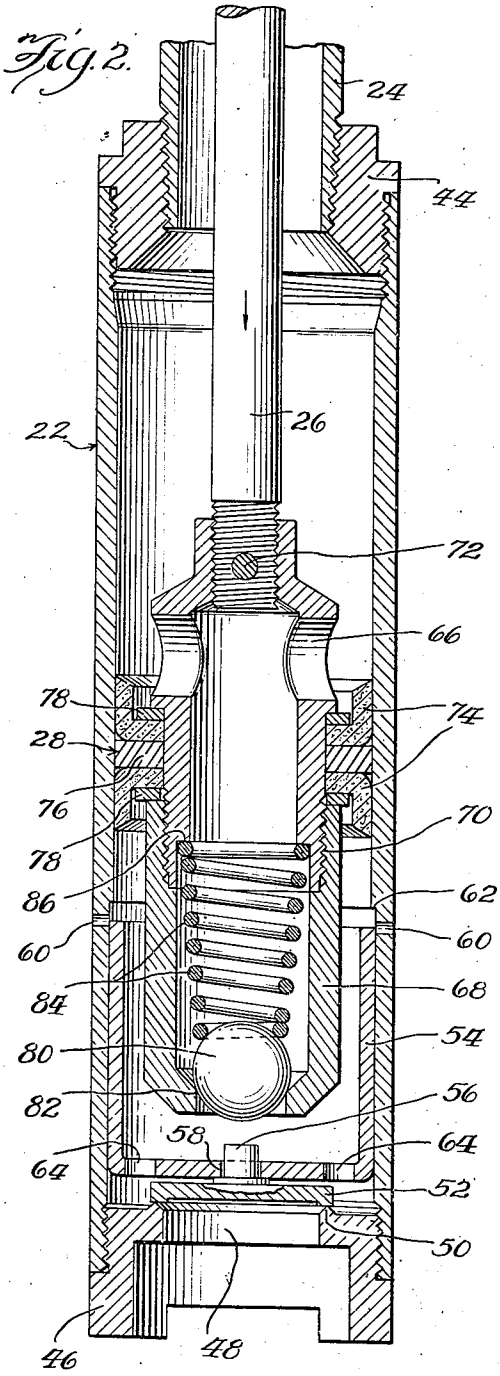
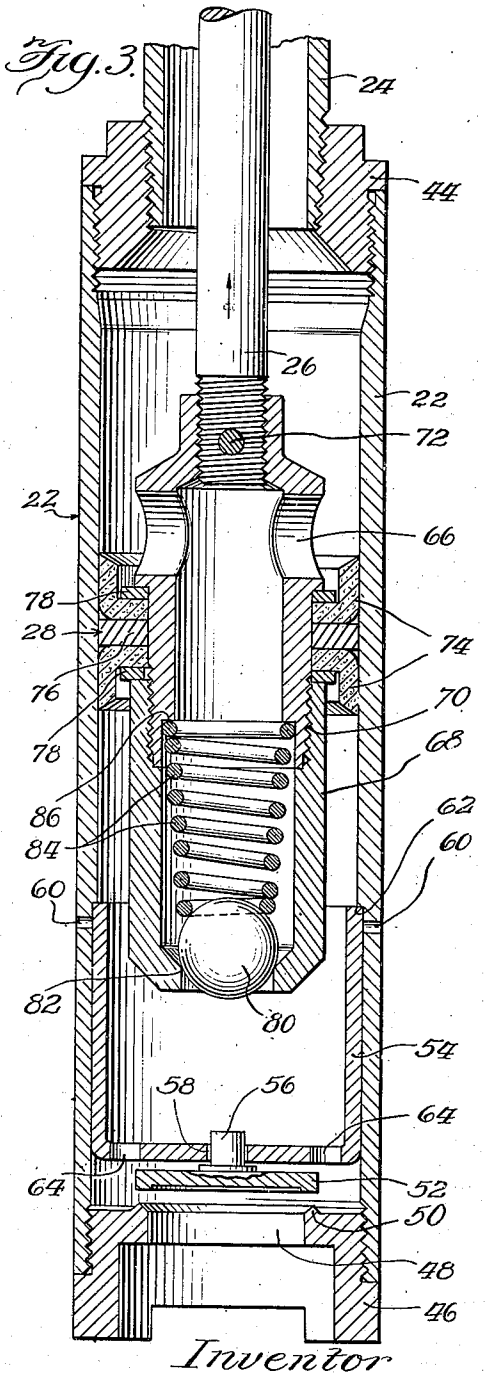


Fig. 3.



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UNITED STATES PATENT OFFICE

2,229,844

PUMP

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Application July 3, 1939, Serial No. 282,676

6 Claims. (Cl. 103—203)

My invention relates to pumps and is more particularly concerned with a pump of the type used in dispensing lubricants to motorists and for similar purposes.

It is now a common practice to dispense motor oils and other lubricants to motorists by means of pumps which are inserted directly in the container in which the lubricant is shipped and which are provided with flexible discharge conduits having outlets which can be inserted in the inlet opening of an automobile crank case, differential housing, or similar receptacle. The discharge conduit of such a pump is provided with a meter which measures the quantity of lubricant passing through the discharge conduit on each sale and the charge made to each customer depends upon the quantity of lubricant supplied him as shown by this meter.

If the pump used is of a type which permits the entrapment of air in the lubricant dispensed or pumps air through the discharge conduit after the lubricant in the container has become exhausted, the meter reading does not accurately represent the quantity of lubricant supplied the customer and the latter is over-charged.

An object of my invention is to provide a new and improved dispensing pump which will not entrap air in the lubricant or other material dispensed and will not pump air after the supply of lubricant or other material has been either partly or completely exhausted.

Another object of my invention is to provide an air rejecting pump which is simple in construction and operation, inexpensive to manufacture, and reliable in service.

Other objects and advantages will become apparent as the description proceeds.

Figure 1 is a view partly in section showing a lubricant container mounted in a housing provided with a lubricant dispensing pump embodying my invention;

Figure 2 is a vertical section of the pump mechanism showing the position of the parts during the downward stroke of the pump piston; and

Figure 3 is a view similar to Figure 2 but showing the positions of the parts during the upward stroke of the pump piston.

Referring to Figure 1, I have illustrated a metal container 10 of the type commonly used for shipping oils and greases. This container has an opening 12 capable of being closed by a removable cover (not shown). In Figure 1 this cover has been removed and the container 10 has been placed in a housing 14 provided with suitable pump mechanism for withdrawing the lubricant from the container 10 and supplying it to automotive customers or similar users. The housing 14 and pump mechanism are illustrated as being of the type disclosed and claimed in the copending application of Charles A. Fine, Serial No. 289,209, filed August 9, 1939.

The pump mechanism is mounted on a supporting plate 16 and comprises an air-operated motor 18 for driving the lubricant-dispensing pump. The motor 18 is supplied with air under pressure through a suitable conduit 20 which may be connected with any convenient source of compressed air. The pump cylinder 22 is adapted to be located adjacent the bottom of the container 10 and is suspended from the plate 16 by a tube 24 which forms a discharge outlet for the pump cylinder.

A piston rod 26 extends lengthwise of the tube 24 and connects the motor piston with the pump piston indicated generally by reference character 28 in Figures 2 and 3. The lubricant discharged from the pump cylinder passes upwardly through the tube 24 into a housing 30 which is sealed about the piston rod 26 by means of a packing gland 32. A flexible discharge conduit or hose 34 connects the housing 30 with a manually controlled valve unit 36 provided with a spout 38 which may be inserted in the inlet opening of the engine crank case, differential housing, transmission housing, or other lubricant receptacle. The valve unit 36 contains a normally closed valve which remains open as long as the operator exerts manual pressure on the trigger 40. A meter 42 is formed integrally with the valve unit and measures the quantity of lubricant or other material passing to the spout 38.

Referring particularly to Figures 2 and 3, it will be noted that the pump cylinder 22 is threadedly secured at its upper end to a ferrule 44 which in turn is threaded to the lower end of the tube 24. A plug 46 is threadedly secured to the lower end of the pump cylinder 22 and has an inlet opening 48 surrounded by a knife edge 50 adapted to seal against the cooperating surface of an inlet valve 52 interposed between the seat 50 and a metal cup 54. The valve 52 has a projection 56 extending through an opening 58 in the cup 54 whereby the valve 52 is prevented from being laterally displaced relative to its seat 50.

The metal cup 54 is slidably mounted in the lower end of the cylinder 22 and controls the small vents 60. These vents are of such size as

to permit relatively free flow of air therethrough, but materially retard any discharge of lubricant therethrough. Upward movement of the cup **54** is limited by shoulder **62** or equivalent means and downward movement of this cup is limited by valve **52**. The cup **54** has inlet openings **64** of such size as to offer some slight resistance to the inflow of lubricant therethrough.

The pump piston **28** comprises a body formed of complementary members **66** and **68** threadedly connected as indicated at **70**. The upper member **66** is threaded to the lower end of the piston rod **26** and a pin **72** prevents accidental separation of the piston and rod. A pair of oppositely disposed cup washers of leather or other suitable material are clamped between the members **66** and **68**. Each cup washer is confined between a metal disk **76** and a metal washer **78**.

The body of the piston is hollow and forms a passage whereby lubricant may bypass the cup washer **74**. This passage is normally closed by a ball valve **80** cooperating with a seat **82** forming a part of the lower member **68**. A spring **84** is confined between the ball valve **80** and a shoulder **86** and urges the former against its seat **82**.

Referring particularly to Figure 3, it will be noted that during a normal upward stroke of the piston, the valve **52** is raised from its seat and the resistance to flow of lubricant offered by the opening **64** in the cup **54** causes this cup to be raised to the upper limit of its stroke, thereby closing the vents **60**. As the piston continues its upward movement, that part of the cylinder below the cup washers **74** is completely charged with lubricant, even though the level of the lubricant in the container **10** has dropped below the vents **60**. During this movement of the piston, the ball valve **80** is closed and lubricant in that part of the cylinder **22** above the cup washers **74** is forced upwardly into the discharge tube **24**.

On the succeeding downward stroke of the piston, the valve **52** closes and the cup **54** moves downwardly to its lower position, thereby uncovering the vents **60**. A slight amount of lubricant is discharged through these vents, but due to the restrictive nature of these vents, the amount thus discharged is negligible. Continued downward movement of the piston results in opening of the ball valve **80** against the tension of its spring **84** and the lubricant trapped in the cylinder below the cup washers **74** flows past the valve **80** and bypasses the cup washers **74** by way of the passage provided in the hollow piston body.

If, perchance, a mixture of lubricant and air is drawn into the lower end of the pump cylinder by the upward stroke of the piston **28**, the air thus drawn into the cylinder rises therein to a point adjacent the lower cup washer **74** and on the succeeding down stroke of the piston is discharged back into the container through vents **60**. This inhibits the discharge of a mixture of lubricant and air into the engine crank case or other lubricant receptacle and prevents inaccurate reading of the meter **42**.

When the lubricant level in the container **10** has dropped below the inlet at the lower end of the pump cylinder, the next upward stroke of the pump piston draws only air into the lower end of the pump cylinder. On the succeeding down stroke of the piston, however, no air is forced past the ball valve **80** due to the tension of the spring **84**. Instead, the air in the lower end of the pump cylinder is discharged through the vents **60** and has no effect on the reading of the meter **42**. The operator will be promptly apprised of the exhaustion of lubricant from the container **10** by the continued operation of the pump mechanism without any corresponding change in the reading of the meter **42**.

After the empty container **10** has been replaced by a full container, any air trapped in the lower end of the pump cylinder **22** is likewise discharged through vents **60**. During the operation of changing containers, valve **80** prevents any backflow of lubricant from the upper end of the pump cylinder and also inhibits ingress of air thereto. Valve **52** similarly prevents any backflow of liquid from the lower part of the pump cylinder.

An important feature of my invention lies in the fact that my improved pump operates effectively when the lubricant level in the container is between the vents **60** and the inlet at the lower end of this cylinder. It will further be noted that the structure of my novel pump is simple and may be economically manufactured.

Although my invention has been illustrated and described as applied to mechanism for dispensing lubricants, it is equally useful in dispensing other liquids and semi-liquids. While I have illustrated and described only a single embodiment of my invention, my invention may assume numerous forms and the scope of my invention is defined by the following claims.

I claim:

1. In a dispensing pump of the class described, the combination of a cylinder having an inlet adjacent one end thereof, a valve controlling said inlet, a piston reciprocable in said cylinder, vent means in said cylinder spaced from said inlet, a cup shaped member having a bottom interposed between said piston and inlet and a sleeve-like portion slidable lengthwise of said cylinder to open and close said vent means, the bottom of said cup having passage means therein offering sufficient resistance to liquid flow therethrough to insure movement of said cup to close said vent means during the suction stroke of said piston, said vent means being of such size as to permit relatively free flow of air therethrough but offering material resistance to liquid flow therethrough, and a discharge valve for said cylinder openable only under a fluid pressure greater than that required to discharge any air in said cylinder through said vent means.

2. In a pump for dispensing lubricant, the combination of a cylinder having a smaller bore and a larger bore, vent means for said larger bore, said vent means permitting relatively free discharge of air therethrough but resisting discharge of lubricant therethrough, a tubular piston reciprocal in the smaller bore, a valve slidable in the larger bore for controlling communication between said cylinder and said vent means, means for moving said valve to alternately open and close said vent means, an inlet for said cylinder, a valve for said inlet, said tubular piston constituting an outlet for said cylinder, and valve means for said outlet openable only under a fluid pressure greater than that required to force any air in said cylinder through said vent means.

3. In a pump for dispensing liquid or semi-liquid material, the combination of a cylinder having a smaller bore and a larger bore, vent means for said larger bore, said vent means permitting relatively free discharge of air therethrough but resisting discharge of said material therethrough, a piston reciprocal in the smaller bore, a sleeve slidable in the larger bore for con-

trolling communication between said cylinder and said vent means, means for moving said sleeve in the same direction as said piston, an inlet for said cylinder, a valve for said inlet, an outlet for said cylinder, and valve means for said outlet openable only under a fluid pressure greater than that required to force any air in said cylinder through said vent means.

4. In a pump for dispensing liquid and semi-liquid material, the combination of a cylinder, a piston reciprocable in said cylinder, a recess in said cylinder, vent means for said cylinder communicating with said recess, a sleeve slidable in said recess to control communication between said cylinder and vent means, means for moving said sleeve in the same direction as said piston, said vent means being so constructed as to provide relatively free discharge of air therethrough but resisting discharge of said material therethrough, an inlet for said cylinder, a valve for said inlet, an outlet for said cylinder, and valve means for said outlet openable only under a fluid pressure greater than that required to force any air in said cylinder through said vent means.

5. In a pump for dispensing liquid and semi-liquid material, the combination of a cylinder, a piston reciprocable in said cylinder, a recess in said cylinder, vent means for said cylinder communicating with said recess, a member slidable in said recess to control communication between said cylinder and vent means, fluid pressure operated means for moving said member in the same direction as said piston, said vent means being so constructed as to provide relatively free discharge of air therethrough but resisting discharge of said material therethrough, an inlet for said cylinder, a valve for said inlet, a discharge passage in said piston, a valve for said passage, and a spring for closing said discharge valve, the latter being openable only under a fluid pressure greater than that required to force any air in said cylinder through said vent means.

6. In a pump for dispensing liquid and semi-liquid material, the combination of a cylinder, a piston reciprocable in said cylinder, a recess in said cylinder, vent means for said cylinder communicating with said recess, a cup slidable in said recess to control communication between said cylinder and vent means, a restricted passage in the base of said cup, said vent means being so constructed as to provide relatively free discharge of air therethrough but resisting discharge of said material therethrough, an inlet for said cylinder, a valve for said inlet guided by said cup, an outlet for said cylinder, and valve means for said outlet openable only under a fluid pressure greater than that required to force any air in said cylinder through said vent means.

MARCEL GARANCHER.