Dec. 24, 1946. A. L. GRISÉ 2,413,044

GREASE PUMP

Filed June 11, 1945 2 Sheets-Sheet 1

FIG. 3.

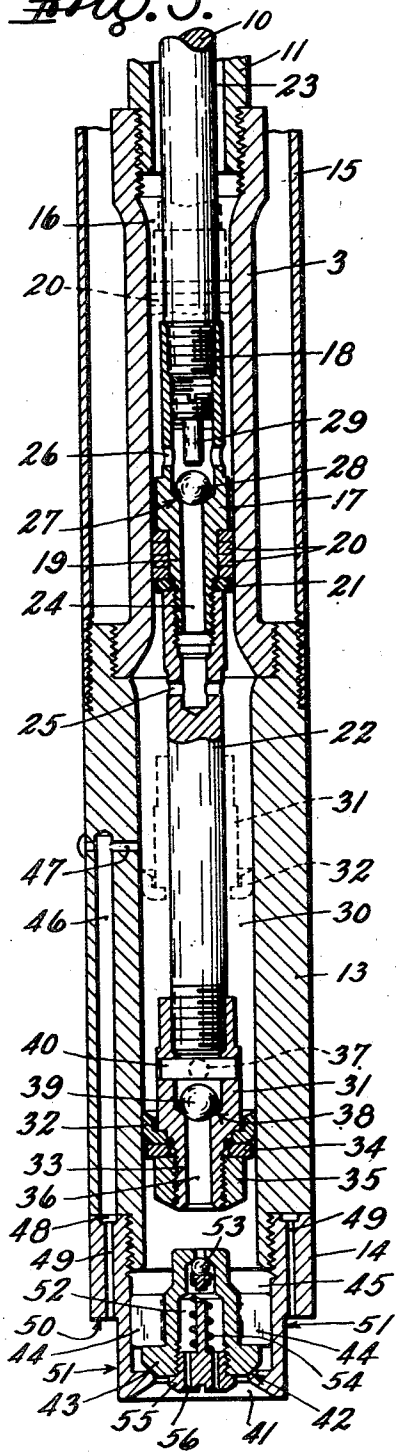


FIG. 1.

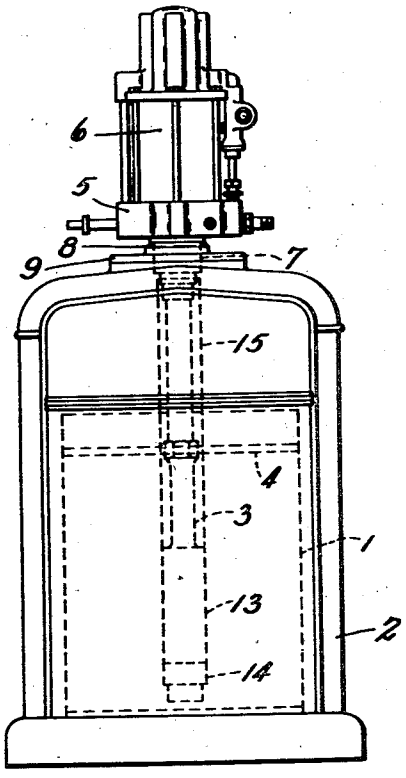
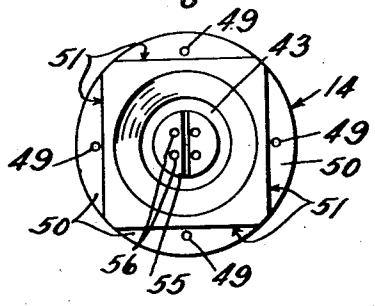


FIG. 4.



INVENTOR,
ALFRED L. GRISÉ
BY. Clapp & Neal
ATTORNEYS

Dec. 24, 1946. A. L. GRISÉ 2,413,044

GREASE PUMP

Filed June 11, 1945 2 Sheets-Sheet 2

Fig. 2.

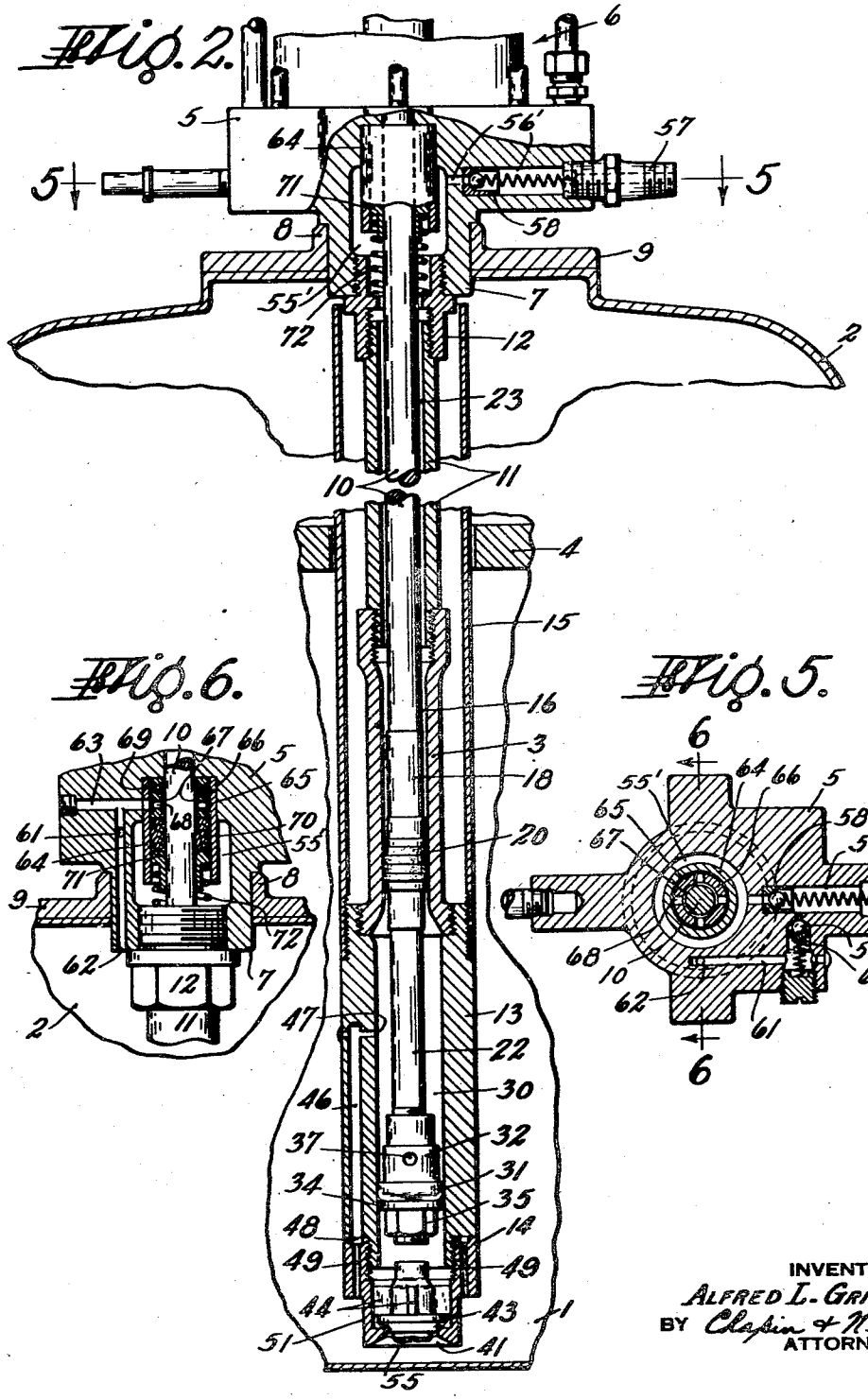


Fig. 6.

Fig. 5.

INVENTOR
ALFRED L. GRISÉ
BY Clapp & Neal
ATTORNEYS

Patented Dec. 24, 1946 2,413,044

UNITED STATES PATENT OFFICE

2,413,044

GREASE PUMP

Alfred L. Grisé, Springfield, Mass., assignor to Gilbert & Barker Manufacturing Company, West Springfield, Mass., a corporation of Massachusetts

Application June 11, 1945, Serial No. 598,776

4 Claims. (Cl. 103—203)

1

This invention relates to improvements in grease pumps and, more particularly, to grease pumps which may be used effectively with greases of various consistencies from light to heavy and with greases at various temperatures.

The invention has for its principal object to provide an improved means for priming the grease pump cylinder and insuring that a full charge is delivered into the latter regardless of whether the grease is warm or cold or whether it is of light or heavy consistency.

More particularly, the invention has for an object to provide a priming pump which is located below and is of larger capacity than the grease pump and which is adapted to force some of the grease which it pumps into the grease pump and to by-pass the rest, the arrangement being such that the heavier the consistency of the grease, for less the amount that is by-passed and vice versa.

The invention has for a further object to provide for the delivery of the by-passed grease into an area surrounding, and closely adjacent to, the intake of the priming pump for the purpose of avoiding, or at least substantially reducing, the tendency to cavitation.

The invention will be disclosed with reference to the accompanying drawings in which,

Fig. 1 is a small scale exterior elevational view showing the manner of mounting the grease pump in a grease dispensing apparatus;

Fig. 2 is a fragmentary view taken in the same direction as Fig. 1 but drawn to a larger scale and showing the complete grease pump with its inlet and outlet passages;

Fig. 3 is a sectional elevational view drawn to a still larger scale and showing in full detail the grease pump proper, its associated priming pump and foot valve;

Fig. 4 is a bottom plan view of the foot valve casing;

Fig. 5 is a sectional plan view taken on the line 5—5 of Fig. 2;

Fig. 6 is a fragmentary cross sectional view taken on the line 6—6 of Fig. 5.

Referring to these drawings; the grease pump is adapted to be applied to an original container of the grease to directly dispense the grease therefrom. That is, the pump is suitably supported from or above the container with its barrel extending downwardly into the same, terminating near the lower end thereof. As one example, a grease drum 1, with its top cover removed, is mounted in cabinet 2 and the pump is contained in a barrel 3 which is supported

2

from the top wall of the cabinet and extends downwardly into the drum, with the intake located close to the bottom of the drum. A follower plate 4 may be used in the drum, when necessary, as it is with the heavier greases, such follower resting on top of the grease and closely fitting the drum and the grease pump. In this case, and as best shown in Fig. 2, the pump barrel is supported from the base or lower head 5 of a fluid pressure motor of the reciprocating piston type, indicated as a whole at 6. The head 5 has a central depending hub 7, fitting into the upstanding hub 8 of a plate 9 which rests on the top wall of the grease cabinet 2 or such plate may equally well rest on the cover of the grease drum. The hub 7 has a shoulder which rests upon the upper end face of hub 8 and supports the pump and its driving motor.

Any form of drive for the pump may be used. The driving motor 6, indicated herein, may for example be of the type shown in my copending application Serial No. 598,775, filed June 11, 1945. The piston rod of the motor is shown at 10 and it extends through the head 5 and a suitable stuffing box and downwardly into the pump barrel 3.

The upper end of the pump barrel 3 is fixed, as by the screw threads shown, to the lower end of an outlet pipe 11, which in turn is fixed, as by the screw threads shown, to an adapter 12, screw threaded into hub 7. Fixed, as by the screw threads shown, to the lower end of the grease pump barrel 3 is the upper end of the barrel 13 of a priming pump. Threaded on the lower end of barrel 13 is a foot valve casing 14. The barrel 13 and casing 14 are of the same diameter and of larger diameter than the barrel 3 or pipe 11. A thin-walled tube 15 of the same outside diameter as the barrel 13 and casing 14 is secured to the upper end of the barrel 13 and extends upwardly encompassing the barrel 3 and pipe 11 and terminating near hub 7. This tube, with the barrel 13 and casing 14, afford a smooth cylindrical surface along which the follower 4 can move up and down and which it can fit with reasonable closeness.

The grease pump cylinder, formed within barrel 3, is shown at 16. Reciprocable within cylinder 16 is a piston comprising a body 17, having a long upwardly-extending hollow hub 18 and a depending hollow stud 19, on which is mounted the packing 20 and a washer 21. The upper end of the piston rod 22 of the priming pump is threaded onto the lower end of stud 19 and clamps the piston packing to its body.

The motor piston rod 10 extends downwardly through pipe 11, leaving an annular space 23, and into the cylinder 16 with its lower end threaded into the upper end of hub 18. Communication between the lower and the upper side of the grease pump piston may be had by way of an axial passage 24, formed partly in the piston and partly in rod 22 and connected by radial openings 25 in rod 22 to the priming cylinder to be described and by radial openings 26 in the hub 18 to the cylinder 16. Intermediate the ends of passage 24 is a seat 27 on which rests a ball valve 28, the upward movement of which is limited by a stop 29, secured, as by the screw threads shown, in the hollow hub 18.

The priming cylinder 30, formed within the barrel 13, is substantially larger in diameter than the cylinder 16. The upper end of cylinder 30 is in constant and valveless communication with the lower end of cylinder 16. In cylinder 30 is a piston comprising a body 31, screwed onto the lower end of rod 22, and packing 32 mounted on the stud-like lower end 33 of the body and held with a washer 34 by a nut 35 to the body 31. There is an axial passage 36 leading from the lower end of stud 33 upwardly into the body 31 and communicating with the cylinder 30 above the piston packing 32 by means of a plurality of radial passages 37 in the piston body. A valve seat 38 is formed in passage 36 intermediate the ends thereof and resting on this seat is a ball valve 39, the upward movement of which is limited by a pin 40 fixed at its ends in body 31 and spanning the upper end of passage 36.

The casing 14 contains the inlet passage 41 which has a seat 42 adapted to be engaged by a foot valve 43, having a plurality of radial guide webs 44, which slidably support it in the cylindrical bore 45 of casing 14. The bore 45 communicates at all times with the lower end of priming cylinder 30. Valve 43 is moved by gravity into closed position and is lifted by suction on the upstroke of the priming piston.

Means are provided to carry away from the upper part of the priming cylinder 30 any excess grease that cannot be taken up by the grease pump piston. Such means includes a passage 46 formed in the barrel 13 and extending from its lower end upwardly to a point above the upper end of the stroke of the priming piston where it opens into the priming cylinder by means of a radial passage 47. In the upper end face of casing 14 is an annular groove 48 with which the lower end of passage 47 communicates. In the casing 14 are formed a plurality of longitudinal passages 49, the upper ends of each communicating with groove 48 and the lower ends with the grease drum at points close to the inlet passage 41. As shown, the lower end of casing 14 is made square to receive a wrench and there are four passages 49 spaced ninety degrees apart and opening through the shoulders 50 one near each wrench engaging face 51.

The foot valve (Fig. 3) has an axial passage 52 therethrough with a valve seat intermediate its ends. A downwardly opening valve 53 is normally held to said seat by a spring 54. The latter acts against a plug 55 threaded into the lower end of passage 52 and provided with a plurality of passages 56. In normal operation, the passage 52 is maintained closed by valve 53 but the latter can open, whenever required, to relieve excess pressure caused by expansion of the grease in that part of the priming cylinder below the priming piston.

The outlet of the grease pump is by way of the annular passage 23 which opens into a chamber 55' formed in the head 5. From this chamber a passage 56' extends radially outward in the head and terminates with the hose connection 57. The passage 56' has a seat intermediate its ends and a spring pressed check valve 58 cooperates with said seat to prevent return flow of the pumped grease.

Relief for excess pressure caused by expansion of the grease in the outlet passage 56' and the hose usually connected thereto, is provided for by a spring-pressed relief valve 59 (Fig. 5) which normally engages a seat in a passage 60, formed in head 5 and leading from the passage 56'. A passage 61 connects passage 60 to a vertical passage 62 (Fig. 6) which extends downwardly to the base of hub 7 and opens into the grease drum. Expansion of grease in the passage 23 and chamber 55' will open valves 58 and 59 and excess grease will escape by way of passages 61 and 62.

Leakage past the piston rod 10 is likewise conveyed to the drum by a passage 63 which empties into the upper end of passage 62. Passage 63 extends through the sleeve-like wall 64 of the stuffing box and communicates with an annular groove 65 in the outer periphery of the central gland element 66. There is an annular groove 67 in the inner periphery of element 66 and the two grooves 65 and 67 are interconnected by a series of radial holes 68 in the element. The stuffing box includes packing 69 above element 66 and packing 70 below such element. A gland 71 in the lower end of sleeve 64 is pressed upwardly by a spring 72 to compress the packing 70 against gland 66 and through the latter to compress the packing 69. Leakage past the piston rod 10 will be collected in groove 67 flow through holes 66 into groove 65 and from the latter by passages 63 and 62 into the upper end of the grease drum.

In operation, on an upstroke of the piston rod 10, the grease pump piston and priming pump piston are simultaneously raised from their lowermost positions shown to the positions indicated by dotted lines. The partial vacuum created below the priming piston in the priming cylinder causes foot valve 43 to open and grease is drawn into the priming cylinder. At the same time, grease which has previously passed through the priming piston into the space above it is lifted upwardly and forced into the lower end of the cylinder 16. So also, grease which has previously passed through the grease pump piston into the space above it is raised upwardly and forced into outlet passage 23 to be eventually delivered through the latter and into chamber 55' and through passage 56' to the dispensing hose. On a succeeding downstroke, the foot valve closes and the piston valves 28 and 39 open so that the pistons pass through the grease, whereby charges of grease are transferred from the lower to the upper sides of each piston.

As the pistons rise, the priming piston forces grease into the lower end of the cylinder 16 and packs it full. The area of the annular space between the wall of cylinder 30 and rod 22 is several times (in this case about four times) that of the area between the wall of cylinder 16 and rod 22. Accordingly, if the priming piston draws in a full charge of grease, only part of that charge can be forced into the grease pump cylinder. The remainder must escape and it does so by way of the passages 47, 46, groove 48 and passages 49

into the grease drum. With the lighter greases, unless cold, the priming piston will draw in a charge more nearly equal to the amount that is theoreticaly possible and the greater part of this charge will be by-passed back to the grease drum. While the by-pass is of relatively small cross sectional area, it will present much less resistance to light greases and warm greases than to greases which are cold or which are of heavy consistency. As to cold greases and heavy greases, much less than the theoretical charge of such greases will be taken in by the priming piston and less of the charge will have to be by-passed. The small by-pass presents so much resistance to the flow of heavy or cold greases therethrough that grease will not by-pass unless and until the grease pump cylinder has been packed full. The arrangement thus assures that the grease pump cylinder receives a full charge of any kind of grease that may be in the drum or other grease container.

While the by-passed grease may be ejected into the drum in various locations, it is preferred to do so in the manner herein disclosed. That is, the by-passed grease is delivered downwardly around the lower end of the foot valve casing close to the intake passage 41. There is a tendency for cavitation adjacent this passage. While at the start of a dispensing operation grease may be packed solidly around and beneath the casing 14, especially when a follower such as 4, is used, after the pump has been operating a while a pocket of air develops around the intake. The colder the grease or the greater the consistency of the grease, the greater is this difficulty from cavitation. The delivery of the by-passed grease is so directed as to fill any cavities that exist and, in fact, so as to prevent or at least substantially reduce the tendency to their formation by forcing the by-passed grease into the area where the cavities are most likely to form.

The invention thus provides an all-purpose grease pump for use in dispensing greases of various consistencies and capable of efficient use irrespective of the consistency of the grease dispensed.

I claim:

1. A pump, comprising, a pump cylinder, a priming cylinder having its outlet end connected to the inlet end of the pump cylinder, an inlet valve opening into the other end of the priming cylinder, interconnected pistons one in each cylinder, each piston having a passage interconnecting opposite sides thereof, a valve for each passage, each valve closing on the delivery stroke of its piston and opening on the return stroke to permit grease to be transferred from the suction to the discharge side of its piston, the effective area of the priming cylinder being greater than the effective area of the pump cylinder, and a by-pass of relatively small area extending from the outlet part of the priming cylinder in a direction parallel with the axis of the priming cylinder to the intake end thereof.

2. A pump, comprising, a pump cylinder, a priming cylinder having its outlet end connected to the inlet end of the pump cylinder, an inlet valve opening into the other end of the priming cylinder, interconnected pistons one in each cylinder, each piston having a passage interconnecting opposite sides thereof, a valve for each passage, each valve closing on the delivery stroke of its piston and opening on the return stroke to permit grease to be transferred from the suction to the discharge side of its piston, the effective area of the priming cylinder being greater than the effective area of the pump cylinder, and a by-pass of relatively small area extending from the outlet part of the priming cylinder and delivering the by-passed grease in a series of jets surrounding the inlet of the priming cylinder.

3. A pump, comprising, a pump cylinder, a priming cylinder having its outlet end connected to the inlet end of the pump cylinder, an inlet valve opening into the other end of the priming cylinder, interconnected pistons one in each cylinder, each piston having a passage interconnecting opposite sides thereof, a valve for each passage, each valve closing on the delivery stroke of its piston and opening on the return stroke to permit grease to be transferred from the suction to the discharge side of its piston, the effective area of the priming cylinder being greater than the effective area of the pump cylinder, and a by-pass of relatively small area connected to the priming cylinder at a point which at all times is on the discharge side of the priming piston and extending to the area outside the priming cylinder and adjacent the inlet end thereof.

4. A pump, comprising, a pump cylinder, a priming cylinder having its outlet end in open and unrestricted communication with the inlet end of the pump cylinder, an inlet valve opening into the other end of the priming cylinder, interconnected pistons one in each cylinder, each piston having a passage interconnecting opposite sides thereof, a valve for each passage, each valve closing on the delivery stroke of its piston and opening on the return stroke to permit grease to be transferred from the suction to the discharge side of its piston, the effective area of the priming cylinder being greater than the effective area of the pump cylinder, and a by-pass of relatively small area connected to the priming cylinder at a point which at all times is on the discharge side of the priming piston and extending to the area outside the priming cylinder and adjacent the inlet end thereof.

ALFRED L. GRISÉ.