May 12, 1959 V. G. KLEIN ET AL 2,886,215

LUBRICANT GUN

Filed Feb. 4, 1957

FIG. 5.

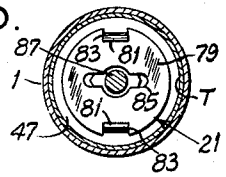


FIG. 2.

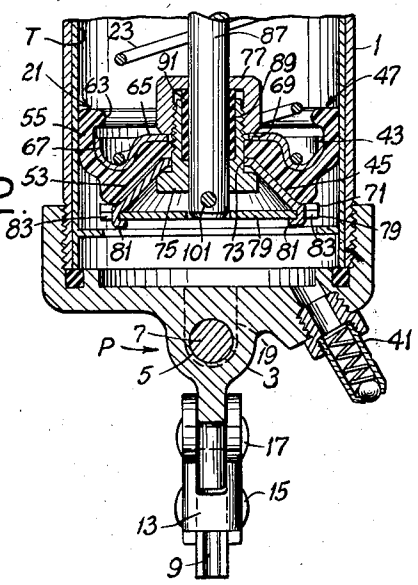


FIG. 1.

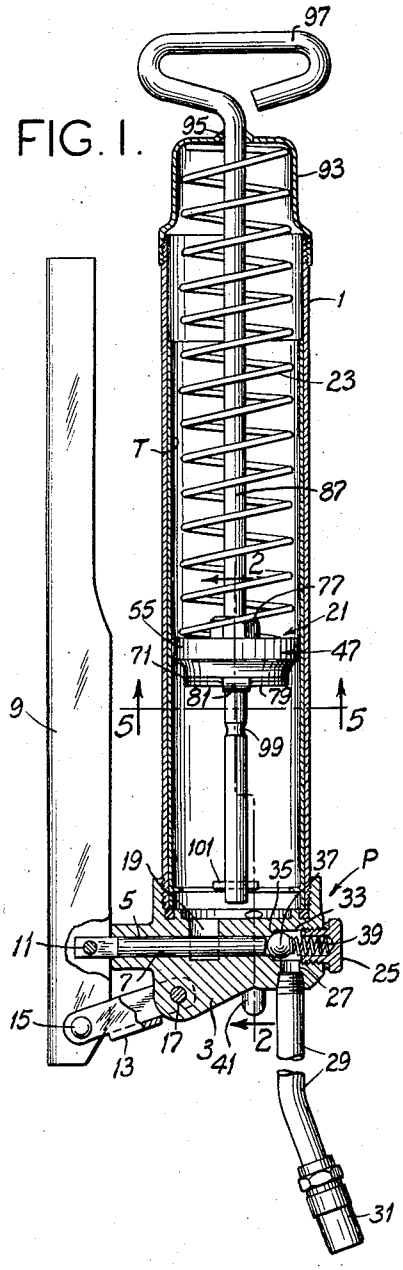


FIG. 3.

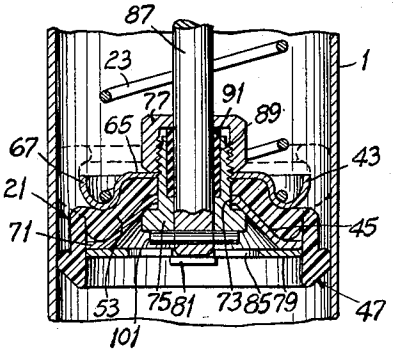
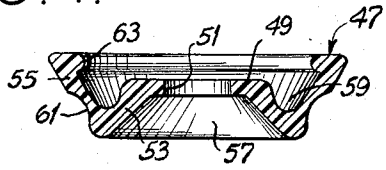


FIG. 4.



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2,886,215

LUBRICANT GUN

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7 Claims. (Cl. 222—256)

This invention relates to lubricant guns, and more particularly to a grease gun of the type having a barrel for containing a supply of grease, a pump at one end of the barrel, and a follower slidable in the barrel for forcing grease toward the pump.

Among the several objects of the invention may be noted the provision of a special follower for a grease gun of the class described which is adapted for easy entry into a grease cartridge such as may be inserted in the barrel of the gun, and for sliding sealing engagement in the cartridge; the provision of a follower which adapts the gun for use either as a cartridge-type grease gun (in which case a grease cartridge is inserted in the barrel) or as a bulk grease gun (in which case there is no cartridge in the barrel and the barrel is loaded by means of a filler pump or by suction), the follower being adapted to make a tight seal to prevent by-passing of grease in either mode of use of the gun; and the provision of a follower having the stated features which is economical to manufacture and reliable in use. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a longitudinal section of a grease gun of this invention, illustrating a cartridge in the barrel of the gun, and illustrating the follower of the gun in an intermediate position in the cartridge;

Fig. 2 is an enlarged section taken on line 2—2 of Fig. 1, illustrating the follower near the pump of the gun;

Fig. 3 is a view similar to Fig. 2, without a cartridge in the barrel, and showing in solid lines a packing member of the follower in position for use of the gun as a bulk grease gun;

Fig. 4 is a section of the packing member per se as it appears when disassembled from the gun and uncompressed; and,

Fig. 5 is a section taken on line 5—5 of Fig. 1.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to the drawings, a grease gun of this invention is shown to comprise a container or barrel 1 for containing a supply of grease. The barrel may consist, for example, of a metal tube. At one end of the barrel 1 (this end constituting the forward end of the barrel) is a pump generally designated P. The pump comprises a head 3 screwed on the forward end of the barrel and having a bore 5 extending transversely with respect to the barrel. This bore constitutes the pump cylinder. A pump plunger 7 reciprocates in the bore or cylinder 5. The plunger extends out of one end of the cylinder 5 (the rearward end of the cylinder). A hand lever 9 is pin-connected at 11 adjacent one end to the end of the plunger which extends out of the cylinder. A link 13 is pin-connected at 15 to this end of the lever and pin-

connected at 17 to the head 3. The arrangement is such that by swinging the lever away from the barrel 1, the plunger 7 is pulled out through a priming or return stroke, and by swinging the lever toward the barrel, the plunger is pushed in through a pressure stroke.

The head 3 is formed with a lateral inlet port 19 for the cylinder 5 through which grease may flow from the barrel 1 into the cylinder 5 when the plunger 7 is fully retracted through a full return stroke. In the barrel is a follower 21 biased toward the head 3 by a spring 23 for forcing grease from the barrel into the cylinder. The forward end of the cylinder 5 is closed by a plug 25. The head is formed with a lateral outlet port 27 adjacent the forward end of the cylinder. Screwed in the outlet port 27 is an outlet pipe 29. On the outer end of the pipe is a conventional hydraulic coupler 31. The forward end portion of the cylinder 5 is enlarged as indicated at 33 to provide a forwardly facing valve seat 35 inward of the outlet port 27. A valve ball 37 is biased toward this seat by a spring 39 reacting from the plug 25. The head 3 is provided with a conventional filler nipple 41 (see Fig. 2) for filling of the barrel 1 with bulk grease by means of a conventional filler pump.

In accordance with this invention, the follower 21 is of special construction, comprising a pair of sheet metal plates or washers 43 and 45 and a resilient packing member 47, which may be made of a suitable flexible grease-resistant synthetic rubber, or the like. The packing member 47 (shown per se in Fig. 4) is of special cup-shaped form, having a base portion which comprises a flat circular central portion 49 in which there is a central opening 51 and an annular conical flange 53 at the periphery of the central portion, this flange flaring out from the central portion, and having an annular wall portion 55 extending back from the periphery of the flange 53. In its unstressed or unconfined condition, this annular wall portion 55 is of conical form, flaring out from the flange 53. The central portion 49 and the flange 53 define a conical recess 57, and the flange 53 and annular wall portion 55 define a circular V-shaped groove 59. The annular wall portion 55 is wider than the flange 53 and projects back of the central portion 49. The annular wall portion is formed with a shallow annular groove 61 of rounded cross-section in its outer periphery and adjacent its juncture with the flange 53, and with an internal integral annular reinforcing bead 63 at its rim. With the groove 61, the annular wall portion 55 is relatively thin at its juncture with flange 53.

The rearward plate or washer 43 has a flat circular central portion 65 which engages the inside face of the central portion 49 of the packing member 47 and an annular peripheral channel-section rim portion 67 engageable in the annular V-shaped groove 59 of the packing member. The central portion 65 of the rearward washer 43 has a central opening 69 coaxial with the opening 51 in portion 49 of the packing member 47. The forward plate or washer 45 is of conical shape fitting in the conical recess 57 of the packing member 47, and has a flat peripheral flange 71 which engages the juncture of flange 53 and the annular wall portion 55 of the packing member. The forward washer 45 has a central opening 73 coaxial with openings 51 and 69. The washers 43 and 45 and packing member 47 are held in assembly by a bushing 75 extending through openings 73, 51 and 69 and a nut 77 threaded on the bushing. A stop plate 79 is secured to the larger end of the conical forward washer 45 as by means of ears 81 formed integrally with plate 79 extending through notches 83 in plate 79 and clinched over on the outside of plate 79. Plate 79 has a slot 85 having the elongate centrally enlarged shape shown in Fig. 5.

At 87 is indicated a follower rod which extends through the follower bushing 75 and nut 77. The bushing has a

counterbore 89 containing packing 91 having a sliding sealing fit on the follower rod. The barrel 1 has a cap 93 threaded on its rearward end. The follower rod has a length somewhat greater than that of the barrel and extends slidably through a central opening 95 in the cap. The outer end of the rod 87 is formed as a handle as indicated at 97. The opening 95 may be circular with a lateral notch as in the gun shown in U.S. Patent 2,394,488, and the rod 87 may have a groove 99 as in said patent for locking the rod in a retracted pulled-out position by angling the rod to bring the groove into the lateral notch. At the inner end of the follower rod 87 is a cross-pin 101. The rod 87 may be turned to align this pin 101 with slot 85 in the stop plate 79 or to disalign it from this slot.

When the gun is to be used as a cartridge gun (i.e., loaded with a cartridge of grease), the packing member 47 of the follower 21 is positioned as shown in Figs. 1 and 2 with its annular wall portion 55 extending in the direction toward the rearward end of the barrel 1 past the rearward washer 43. The latter is of substantially smaller diameter than the internal diameter of the barrel, such as to allow for the accommodation of the annular wall portion 55 between the rim 67 of washer 43 and the internal surface of the cartridge. To load the gun with a cartridge of grease, the pump P is removed from the barrel 1. It will be understood that the cartridge comprises a tube such as indicated at T in Fig. 1 which is filled with grease and which, as supplied, has closure caps (not shown) at its ends. The tube T has a large opening at one end and a small opening at the other. The follower rod 87 is pulled out and locked in pulled-out position by angling it for engagement of groove 99 in the lateral notch of the opening 95 in the barrel cap 93. This pulls the follower 21 back to the rearward end of the barrel and holds it there against the bias of spring 23. The caps having been removed from the tube T, the tube T is inserted into the barrel 1 with the end of the tube T having the large opening being inserted first.

The pump P is then replaced on the barrel 1, and the follower rod 87 unlocked from the barrel cap 93. Holding the follower rod 87 back so that the pin 101 is located between stop plate 79 and the bushing 75, the follower rod is turned to disalign pin 101 and slot 85. Then the follower rod is pushed in. This pushes in the follower 21. The packing member 47 of the follower, being positioned as shown with the annular wall portion 55 extending in the direction toward the rearward end of the barrel, has the form of a hollow nose and the annular wall portion is readily radially compressed to cylindrical form as it enters the end of the tube T so that it easily enters the tube and comes into sliding sealing engagement with the interior surface of the tube to force the grease in the tube toward the pump P without leakage of grease past the packing member. While the annular wall portion 55 is readily compressible for entering the tube T, the bead 63 stiffens the annular wall portion to the extent sufficient to prevent the pressure of the grease from breaking the seal between the annular wall portion and the tube. Pressure is applied by hand to the follower rod to expel any air that may have been trapped by the ball check valve 37, and then the follower rod is disengaged from the follower by aligning the pin 101 and slot 85 and pushing the rod in to the Fig. 1 position. Then the gun is ready for use.

If the gun is to be loaded with bulk grease by means of a filler pump through the filler nipple 41, the annular wall portion 55 of the packing member 47 of the follower 21 is positioned as shown in solid lines in Fig. 3 extending in the direction toward the forward end of the barrel past the forward washer 45. The latter is of substantially smaller diameter than the internal diameter of the barrel, such as to allow for accommodation of annular wall portion 55 between the rim of washer 45 and the internal surface of the barrel. The stated positioning is accomplished, with the follower rod 87 and follower 21 removed from the barrel, by bending the annular wall portion 55

around the flange 71 of the forward washer 45. The groove 61 permits the annular wall portion readily to be bent. Grease is pumped into the barrel through the filler nipple 41 by means of the filler pump, the pressure of the grease forcing back the follower 21. With the annular wall portion 55 extending forward, the pressure of the grease acts to make it expand radially outward and seal tightly against the internal surface of the barrel to prevent leakage past the follower.

If the gun is to be loaded by suction, the pump is removed, the forward end of the barrel inserted into a container of grease, and the follower pulled back to suck grease into the barrel. For such loading, the annular wall portion 55 may be positioned either way, with some preference that it is positioned as shown in solid lines in Fig. 3, particularly in a case where it may have taken a set in the Fig. 2 position as a result of the gun having been used for a long time as a cartridge gun.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

1. In a lubricant gun comprising a cylindrical barrel for containing either a cartridge of lubricant or bulk lubricant, one end of the barrel constituting its rearward end and the other its forward end, and a pump at the forward end of the barrel, a follower for forcing lubricant toward the pump, said follower comprising a resilient cup-shaped packing member having a base portion and an annular wall portion which, when unconfined, is of conical form flaring outward from one face of said base portion, said annular wall portion extending rearward from said base portion when a cartridge is used in said barrel, and being adapted to be flexed around the margin of said base portion to extend forward from said base portion when the barrel is loaded with bulk lubricant, said annular wall portion of said packing member being thinner at its juncture with said base portion than rearward of said base portion for facilitating the flexing thereof.

2. In a lubricant gun as set forth in claim 1, said annular wall portion of said packing member having an integral annular reinforcing bead at its rim which is disposed on the inside of said wall portion when in its rearwardly extending position and on the outside of said wall portion when in its forwardly extending position.

3. In a lubricant gun comprising a cylindrical barrel for containing either a cartridge of lubricant or bulk lubricant, one end of the barrel constituting its rearward end and the other its forward end, and a pump at the forward end of the barrel, means comprising a follower for forcing lubricant toward the pump, said follower comprising a resilient cup-shaped packing member having a base portion and an annular wall portion which, when unconfined, is of conical form flaring outward from one face of said base portion, a rigid mounting for said base portion of said packing member, said mounting being substantially smaller than the internal diameter of said barrel, said annular wall portion of said packing member extending rearward from said mounting when a cartridge is used in said barrel, said annular wall portion being adapted to be flexed to extend forward from said mounting when the barrel is loaded with bulk lubricant, said annular wall portion of said packing member being thinner at its juncture with said base portion than rearward of said base portion for facilitating the flexing thereof, and said mounting being formed to allow for the accommodation of said annular wall portion either

in its said rearwardly extending position or its said forwardly extending position.

4. In a lubricant gun as set forth in claim 3, said annular wall portion of said packing member having an integral annular reinforcing bead at its rim which is disposed on the inside of said wall portion when in its rearwardly extending position and on the outside of said wall portion when in its forwardly extending position.

5. In a lubricant gun comprising a cylindrical barrel for containing either a cartridge of lubricant or bulk lubricant, one end of the barrel constituting the rearward end and the other its forward end, and a pump at the forward end of the barrel, means comprising a follower for forcing lubricant toward the pump, said follower comprising a resilient cup-shaped packing member having a base portion and an annular wall portion which, when unconfined, is of conical form flaring outward from one face of said base portion, a rearward washer engaging said one face of said base portion, a forward washer engaging the other face of said base portion, and means securing said washers together with said base portion therebetween, said washers being of substantially smaller diameter than the internal diameter of said barrel, said annular wall portion of said packing member extending rearward past said rearward washer when a cartridge is used in said barrel, said rearward washer being of such diameter as to allow for the accommodation of said annular wall portion between the rim of said rearward washer and the internal surface of a cartridge, and said annular wall portion being adapted to be flexed around the rim of the forward washer and to extend forward past said forward washer when the barrel is loaded with bulk lubricant. said annular wall portion of said packing member being thinner at its juncture with said base portion than rearward of said base portion for facilitating the flexing thereof, said forward washer being of such diameter as to allow for the accommodation of said annular wall portion between the rim of said forward washer and the internal surface of the barrel.

6. In a lubricant gun as set forth in claim 5, said annular wall portion of said packing member having an integral annular reinforcing bead at its rim which is disposed on the inside of said wall portion when in its rearwardly extending position and on the outside of said wall portion when in its forwardly extending position.

7. In a lubricant gun comprising a cylindrical barrel for containing either a cartridge of lubricant or bulk lubricant, one end of the barrel constituting its rearward end and the other its forward end, and a pump at the forward end of the barrel, a follower for forcing lubricant toward the pump, said follower being made of firm form-retaining resilient material and shaped like a cup, said follower having a portion of circular contour constituting the base of the cup and a single annular wall portion only, said annular wall portion being of conical form flaring outward from said base of the cup in one direction away from the base of the cup when said wall portion is unconfined, said wall portion extending away from the base of the cup in the direction toward the rearward end of the barrel when a cartridge is used in the barrel whereby it may be readily entered in a cartridge in the barrel through the rearward end of the cartridge with accompanying radially inward compression of the rim of said wall portion and resultant sliding sealing engagement of the rim of said wall portion with the internal surface of the cartridge maintained by the stress in said wall portion due to said compression, said follower being sufficiently thin in the region of the juncture of said wall portion and said base for flexure of said wall portion around the margin of said base to extend in the direction toward the forward end of the barrel when the barrel is loaded with bulk lubricant, the rim of said wall portion then being in sliding sealing engagement with the internal surface of the barrel and said wall portion then being adapted for radially outward expansion under pressure of lubricant in the barrel for sealing against the internal surface of the barrel.

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