April 18, 1933. R. L. BACHER ET AL 1,903,750

GREASE GUN

Filed March 15, 1932

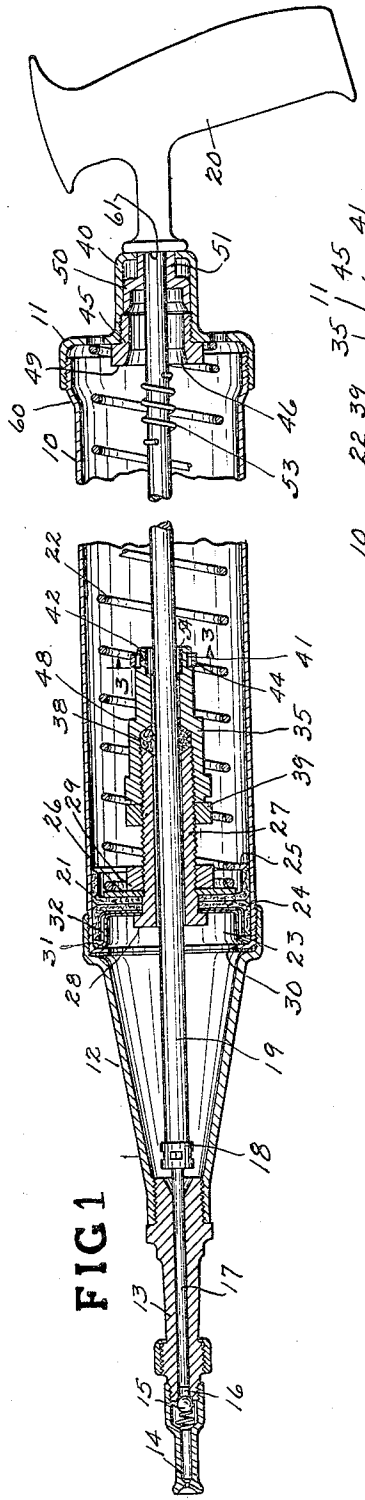

FIG 1

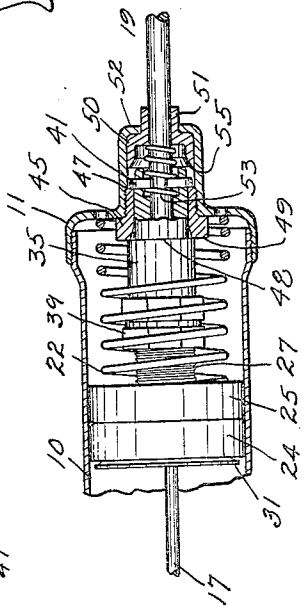

FIG 2

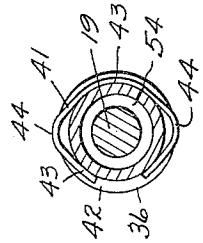

FIG 3

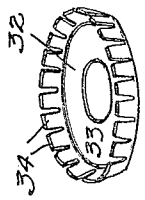

FIG 5

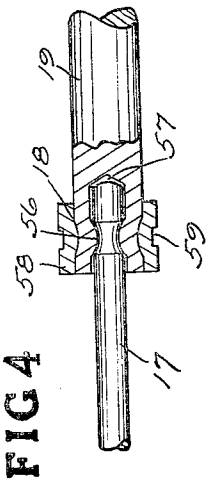

FIG 4

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Patented Apr. 18, 1933

1,903,750

# UNITED STATES PATENT OFFICE

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## GREASE GUN

Application filed March 15, 1932. Serial No. 598,944.

This invention relates to grease guns and is illustrated in connection with a hand-gun in which initial pressure is placed upon the grease by a spring, and in which a booster pump is employed for producing the discharge pressure on the lubricant. Guns of this type are usually charged by removing the spout and withdrawing the plunger rod into the barrel. This action moves the piston into the barrel, and loads the spring, which is normally used for placing initial pressure upon the grease. At the completion of the loading operation, it is necessary to lock the plunger in the rearmost position, until the spout is connected to the barrel or otherwise the charge will be expelled as soon as the pressure is released on the hand-grip. This lock also takes the form of a latch, which is released by operation of a thumb button that is disposed at the rearward end of the cylinder. This latch has not only been difficult to operate, but has increased the manufacturing cost for the presence of the latch casing has made an uneven surface that has prevented the polishing of a cap by a machine operation.

Accordingly, it is an object of the present invention to provide a construction, which will automatically lock the piston in the rearmost position and thereafter release it by a forward motion of the plunger, after it has been moved a pre-determined degree in the forward direction. In this connection we propose to provide a latching construction, which will enable the barrel cap to be made in an economical manner, and which will result in the cap having a smooth exterior, whereby it may be polished on a machine in an expeditious manner.

A further problem in connection with the use of grease guns is that the lubricant has a tendency to leak past the cup leathers, particularly when the gun is laid in a place that is sufficiently warm to liquefy the lubricant. To increase the frictional contact between the cup leather and the cylinder wall, we propose to insert an expander within the leather. This solves the leakage problem but prevents the insertion of the piston into the barrel without the use of special tools. Accordingly, it is an object of our invention to so construct the barrel that the piston may be inserted without the use of special tools, notwithstanding the fact that an expander is used in connection with the cup leather.

Still another difficulty, which has been experienced in the manufacture of grease guns having a booster plunger in alignment with the operating rod, is the alignment of the booster plunger in its cylinder simultaneously with the alignment of the plunger rod in its bearings. Unless this alignment is accurately maintained, the booster plunger binds against its cylinder wall and not only increases the difficulty of operating the plunger, but also that of maintaining a true cylindrical wall in the booster end of the gun. We propose to overcome this difficulty by making what we term a floating booster plunger that has universal movement with reference to the end of the rod to which it is attached. Thus, the booster plunger is free to find its own bearing, regardless of slight variations in alignment between the barrel and the booster cylinder.

A further objection, which has been observed in the operation of grease guns of the type hereinbefore referred to, is the provision of adequate packing between the slidable plunger and the spring pressed piston, through which the rod moves. Our invention therefore, is directed to the provision of a special mechanism by means of which the packing may be adequately adjusted at such point.

In the drawing, Fig. 1 is a general sectional view of the grease gun with the follower in an extended position; Fig. 2 is a partial sectional view of one end of the gun with the follower in a retracted position;

Fig. 3 is a section on the lines 3—3 of Fig. 1; Fig. 4 is an enlargement partly in section of the flexible coupling between the booster plunger and the plunger operating rod, and Fig. 5 is a perspective view of the cup-leather expander.

The grease gun which we have illustrated comprises a storage cylinder 10 which is closed at one end by a cap 11. A spout 12 is disposed at the opposite end of the cylinder for conducting the grease to a booster cylinder 13 at the discharge end of which is shown a connectional fitting 14 with the usual check valve 15 for preventing a back-flow of grease into the gun. These parts may be assembled with the usual threaded connections. The booster cylinder has a central bore 16 in which a plunger 17 may reciprocate to expel the grease. The plunger is attached by a flexible connection 18 to a plunger operating rod 19 at the opposite end of which is a hand grip 20. The follower indicated generally by the number 21 closely contacts the interior walls of the cylinder 10 and is urged toward the discharge end of the gun by a helical spring 22 which is held between the follower and the end cap 11.

The follower has been shown as an assembly comprising a cup-shaped member 23, for which we prefer to use a steel stamping, a cup leather 24 surrounding the member 23, a second cup leather 25 facing the opposite direction from the cup leather 24 and a reinforcing and clamping disc 26 lying against the bottom of the cup leather 25. These members are all perforated at the center to take a tubular assembling bolt or gland 27. This bolt is shown, as provided with a central bore sufficiently large to slide easily upon the rod 19, and having a shoulder 28, to bear against the member 23. The outer surface of the bolt shank may be threaded to receive a nut 29 to securely hold the various members of the follower assembly against the shoulder 28.

To prevent the follower escaping from the cylinder 10 when the spout is removed therefrom, there is provided at the discharge end of the cylinder an inwardly extending annular flange 30. The follower member 23 has at the periphery of the cup, an outwardly flaring portion 31 which is adapted to abut against the flange 30. This flared portion of the follower member also prevents the other parts thereof from becoming jammed against the end of the cylinder.

To prevent leakage of the grease past the follower, the cup leather 24 is maintained in firm contact with the interior walls of the cylinder preferably by means of an expander member 32, which is shown more in detail in Fig. 5. This expander is preferably made of some yielding metallic material, with spring characteristics, and in our preferred embodiment, we use a brass member. The flat portion 33 is provided with a hole like the other members of the follower and may be clamped on the assembly bolt 27 between the members 23 and 24. On its periphery the expander is provided with a skirt portion having fingers 34, flaring slightly outwardly, so as to press the cup leather 24 firmly into contact with the walls of the cylinder.

The insertion of the follower within the cylinder would be somewhat difficult without special tools where the follower includes an expander that presses the cup leather 24 outwardly against the wall of the cylinder. To facilitate this assembly therefore, the cylinder is shown with a flared portion 60 at the rearward end thereof. This permits the expanded cup leather to be easily inserted within the flared portion and then gradually contracted, as it is forced forwardly into the cylinder.

To prevent leakage along the rod 19, we have shown a stuffing box adjacent the follower on the rearward side thereof. This box preferably comprises an exteriorly threaded member 27 which in effect, constitutes an extension of the follower, and a coacting member 35, which is internally threaded to coact with the threads on the member 27. Suitable packing material 38 is then disposed between the members, and the pressure thereon may be adjusted by turning the member 35 with reference to the member 27. A suitable lock nut 39 then enables the parts to be locked in the desired adjusted position.

In filling the grease gun, the spout is disconnected from the cylinder, the end of the cylinder is inserted into a drum of lubricant and the follower 21 is retracted by pulling the handle outwardly. During this operation, the spring 22 is compressed so that it is necessary to lock the follower in the rearmost position until the spout is again attached to the cylinder.

For locking the follower in its retracted position, we prefer to utilize a flat spring 41 which is disposed in a groove 42 adjacent the rearward end of the packing nut 35. The spring may have portions 43 thereof adapted to lie within this groove and other portions 44 projecting slightly outside the groove. The other member of the locking mechanism may comprise a ring 45, which has a screw connection with the cup extension 40, where it joins the cap 11, and which has a flared portion 46 at the forward end thereof and an internal diameter that is suitable to accommodate the end of the packing nut. As the follower is drawn back, the portions 44 of the spring 41 enter the flare 46 and are gradually compressed until the spring has passed through the ring 45, whereupon they spring outwardly again and are retained against the rearward end 47 of

the ring, thus locking the follower in its retracted position. A shoulder 48 on the packing nut 35 stops the follower at this point by making contact with the forward face 49 of the ring 45. Thus the follower is locked in its rearmost position merely by pulling the plunger rod outwardly.

The unlocking member is shown as having a cup-shaped portion 50 with a rearwardly extending sleeve 51. Internally this sleeve is slidable upon the rod 19 while externally it is slidable in an opening in the end wall 52 of the cup member 40. The longitudinal movement of the unlocking member is so restricted by the ring 45 that the sleeve portion 51 thereof always lies between the rod 19 and the end 52 of the cylinder, thus furnishing a bearing for the rod 19. When the follower is in its retracted position, the sleeve 51 of the unlocking member is held in its extended position outside the end wall 52 by means of a small spring 53. This spring rides upon the rod 19, and in this retracted position, is received within a recess 54 of the packing nut 35, and presses at its other end against the unlocking member.

For releasing the locking mechanism, the unlocking member is provided with a flaring lip 55. When it is desired to unlock the follower a slight pressure upon the sleeve 51 will move the lip 55 into contact with the portions 44 of the locking spring, and further movement of the unlocking member against the compression of the spring 53 will serve to compress the portions 44 of the spring 41 inwardly until they will pass through the ring 45. The pressure on the sleeve 51 occurs automatically when the rod is pushed forwardly by the handle on the first stroke after the gun has been charged.

In the prior art, the booster plunger and the plunger operating the rod have been rigidly connected and due to the difficulty of keeping the rod properly aligned in its bearings and the booster plunger properly aligned in the cylinder, there has been a binding action of the booster plunger in its cylinder with the resultant difficulty of operation and wear on the booster cylinder walls, thus reducing the efficiency of the grease gun. To overcome this difficulty, we provide a coupling 18 which provides a universal movement between the plunger 17 and the rod 19 thus compensating for any slight disalignment.

In our preferred embodiment of this flexible joint, a groove 56 is formed near the end of the plunger 17. A hole 57 is formed in the end of the rod 19, this hole being such as to give a slight clearance for the plunger 17. The plunger is then placed in the hole 57, a ferrule 58 placed about the rod 19, and portions 59 of the ferrule and rod are forced inwardly, thus locking portions of the wall of rod 19 in the groove 56 of the plunger. The plunger 17 is thus attached to the rod 19 in such manner that the plunger may be moved universally with reference to the rod. This motion is relatively slight, yet it is sufficient to permit the plunger to move smoothly in its cylinder notwithstanding any variations in axial alignment of the bearings for the rod.

An advantage of our invention is that the follower may be locked merely by withdrawing the handle from the barrel, and thereafter the lock may be released merely by forcing the handle forwardly toward the barrel. This obviates the necessity for the use of exposed latches that must be thumb-operated and enables the end of the barrel to have a smooth exterior, which facilitates the polishing operation. A further advantage is the fact that the cup leather is firmly held in contact with the wall of the barrel and provision is made for the expeditious insertion of the follower into the barrel without the need for special tools. Moreover, the utilization of a flexible connection between the booster plunger and the operating rod therefor facilitates the entrance of the plunger into its cylinder, and not only minimizes the effort required to operate the gun, but also reduces the friction between the booster plunger and its associated cylinder to a minimum.

We claim:—

1. In a lubricant dispensing device, the combination of a storage chamber, pumping means at the forward end of the chamber, a rod for operating the pumping means, a follower slidable upon the rod, a latch associated with the follower, and means for locking the latch at the rear end of the cylinder, means operable to release the latch solely by the movement of the rod with reference to the chamber.

2. In a lubricant dispensing device, the combination of a storage cylinder, a follower extending transversely of the cylinder and adapted to engage the lubricant therein, a rod for the follower, and means for locking the follower at one end of the cylinder, said means comprising a member connectd with the follower and carrying a latch urged yieldingly in a radial direction, a shoulder associated with the cylinder and behind which the spring is adapted to lie, and a sleeve on the rod for engaging the latch and releasing it upon forward movement of the rod with reference to the cylinder.

3. In a lubricant dispensing device, the combination of a storage chamber, pumping means at one end of the chamber, a rod for operating the pumping means, a follower within the chamber and slidable upon the rod, means operable by a backward movement of the rod for locking the follower at one end of the chamber, and means operable

by a forward movement of the rod for releasing the locking means.

4. In a lubricant dispensing device, the combination of a storage chamber, pumping means at the forward end of the chamber, a rod for operating the pumping means, a follower slidable upon the rod, yieldable means on the follower for locking it to the rear end of the chamber, and means operable solely by a forward movement of the rod for releasing the follower.

5. In a lubricant dispensing device, the combination of a storage chamber, a follower extending transversely of the chamber, and adapted to engage the lubricant therein, and means for locking the follower at one end of the chamber, said means comprising a cylindrical member rigidly connected to the follower and having an annular groove therein, a spring having portions thereof lying within the groove and other portions projecting from the member, a ring within the storage chamber in alignment with said cylindrical member, the ring being adapted to receive said member, and having a flared portion adjacent one end thereof for depressing the spring and having a shoulder adjacent the other end thereof for engaging the spring.

6. In a lubricant dispensing device, the combination of a storage chamber, pumping means at one end of the chamber, a rod extending longitudinally of the chamber for operating the pumping means, a shoulder on the rod outside the chamber, a follower within the chamber and slidable upon the rod, means for locking the follower against movement with reference to the chamber, and means movable along the rod and engageable by the shoulder for releasing the locking means.

7. In a lubricant dispensing device, the combination of a storage chamber, pumping means including a rod, a follower extending transversely of the chamber and adapted to move longitudinally thereof along the rod, means for locking and unlocking the follower at one end of the chamber, comprising a cylindrical member associated with the follower and carrying a latch projecting therefrom yieldingly in a radial direction, and an annular member secured to the end of the chamber, the central opening of the annular member flaring outwardly toward the latch-carrying cylinder to compress the latch upon entering the opening by movement of the follower rearwardly, and a shoulder at the other end of the annular member extending radially outward for engaging the latch, and means to re-compress the latch radially to lie within the diameter of the annular ring, upon forward movement of the rod.

8. In a lubricant dispensing device, the combination of a storage chamber, a follower, pumping means therein including a rod, a latch carried by the follower, said latch extending radially outward, a locking ring secured to one end of the chamber and having a shoulder behind which the latch is adapted to lock, and a cup-shaped unlocking member, having the cup opening in the direction of the locking ring, the walls of the lip of the cup being adapted to encompass the expanded latch, and said walls converging inwardly, and means for moving the cup-shaped member towards the locking ring upon forward movement of the rod, whereby the latch is compressed radially inward by the converging walls of the cup lip.

9. In a lubricant dispensing device, the combination of a storage chamber, pumping means at one end of the chamber, the other end wall of the chamber having an opening therein, a follower within the chamber, a rod extending axially of the chamber and follower for operating the pumping means, means for locking the follower to the end of the chamber, and means for releasing the locking means, upon forward movement of the rod, said releasing means comprising a sleeve portion slidable internally upon the rod and slidable externally in the opening in the end wall of the chamber.

10. In a lubricant dispensing device, the combination of a storage cylinder, pumping means therein including a rod, a follower adapted to contact the internal walls of the cylinder and to press upon the lubricant therein, a cap closing one end of the cylinder, and locking means comprising a latch carried by the follower on the side towards the cap, said latch extending radially and yieldingly outward, means connected with the cap to compress the latch radially inward when the latch is moved toward the cap longitudinally, a shoulder extending radially outward behind which the latch is adapted to lock, and an unlocking member slidable longitudinally of the cap and adapted to compress the latch radially inward of the shoulder upon forward movement of the rod.

11. In a device of the character described, the combination with a lubricant storage cylinder, of pumping means attached to one end of the cylinder, a follower extending transversely of the cylinder and adapted to force the lubricant toward the pumping means, said follower having three interfitting cups opening toward the pumping means, the inner cup being rigid, the outer cup being flexible, and the intermediate cup pressing yieldingly outward against the outer cup, and all three cups being secured together at their central portions.

12. In a grease gun, the combination of a storage chamber, pumping means therein including a rod, a follower within the cham-

ber, means at one end of the chamber for locking the follower to the wall of the chamber, and means upon forward movement of the rod for releasing the locking means, the locking and releasing means being enclosed within the chamber, whereby the exterior surface of the chamber is free from obstruction.

In testimony whereof, we hereunto affix our signatures.

ROLLIN L. BACHER.
PAUL I. SCHULTZ.