This invention relates to a grease gun head assembly, and more particularly to the assembly of the high-pressure cylinder body with the piston actuating means for the dispensing head of a hand-operated grease gun.

Grease guns of the kind which include a handle or lever for manual operation are commonly referred to as hand-operated grease guns. Such grease guns as presently manufactured include three principal components or assemblies; namely, a barrel or grease container for holding the supply of grease, a plunger assembly which includes a cap for attachment to the rear of the barrel, and a dispensing head providing a high pressure cylinder and including a cap for attachment to the front end of the barrel.

In my copending application Serial No. 192,395 filed May 4, 1962, entitled "Hand-Operated Grease Gun Head," there is described a new kind of construction for a high pressure cylinder and piston for a hand-operated grease gun head. The principal object of the present invention is to provide an actuating mechanism for the piston and high pressure cylinder construction described therein. One special problem which arises in connection with the construction of said application is that the assembly includes components, such as a compression spring and a O-ring, which are located within the confines of the cylinder body, but which require field servicing and replacement from time to time. Therefore a specific objective of the present invention is to provide an actuating mechanism which permits the internal components of the grease gun head to be readily removed and disassembled by a user of the grease gun, and without requiring special tools or techniques. Further objects and advantages will be indicated in the following detailed specification.

The invention is shown in an illustrative embodiment in the accompanying drawings, in which:

FIG. 1 is a side elevational view of a grease gun embodying the present invention;

FIG. 2 is an enlarged sectional view of the cylinder body and lever link of the grease gun head of FIG. 1, taken on line 2—2 of that figure;

FIG. 3 is an enlarged sectional view of the cylinder body and stationary handgrip of the same grease gun head, taken on line 3—3 of FIG. 1;

FIG. 4 is a side elevational view showing how the parts of the grease gun head of FIG. 1 are assembled, some of the parts being shown in separated relation for clarity of illustration;

FIG. 5 is a top plan view of the grease gun head of the preceding figures; and,

FIG. 6 is a perspective view of the cylinder body employed in the grease gun head of the preceding figures.

Looking first at FIG. 1 there is shown a hand-operated grease gun having the usual barrel 10 for holding a supply of grease. Within the barrel there is provided a plunger assembly, such as the one described in copending application Serial No. 18,709, filed March 30, 1960, Patent No. 3,059,980, and entitled "Grease Gun Plunger Assembly." Since the particular plunger assembly does not form a part of the present invention, it is not believed it will be necessary to further describe it herein. Its function is to assist in moving the grease toward the dispensing head on the front end of the barrel. The grease gun of FIG. 1 also includes the usual handle-equipped rod 11 which cooperates with the plunger assembly, as also described in the cited copending application.

The present invention is concerned with the construction of part of the dispensing head, which head is designated generally by the number 12. As shown, the dispensing head includes a front end cap 13 which is threadedly connected to the front end of barrel 10. The head also includes an elongated tubular body 14 which extends across the outside of cap 13 and is secured thereto by welding or other suitable procedures. For example, cap 13 and body 14 may be brazed by resistance welding, such as projection welding, around the juncture between the intake port 15 in the wall of body 14 and the connecting opening 16 through cap 13. The weld zone is indicated in FIG. 1 by the number 17.

The internal construction of body 14 is described more fully in copending application Serial No. 192,395, filed May 4, 1962, entitled "Hand-Operated Grease Gun Head." For the purpose of the present invention, it is believed sufficient to point out that body 14 has a first bore 18 which is immediately positioned within the confines of the body. Intake port 15 communicates with bore 18 for supplying grease to the high pressure cylinder which is provided by the bore 18. Body 14 can be formed from solid rod or bar stock. In the illustration given, body 14 is formed of stock having a cylindrical cross-section but such having a square or rectangular cross-section can also be used. Preferably, the stock is free-machining steel.

As described in greater detail in the cited copending application, body 14 also provides a second bore 19 of larger diameter than the first bore 18. Bore 19 extends inwardly from the actuating end 14c of body 14 to the adjacent end of bore 18. Body 14 also provides a bore which extends inwardly from the dispensing end 14b to the adjacent end of bore 18, and may include an outlet check valve. An outlet pipe 20 extends from the outlet end of body 14, and terminates in an appropriate coupler 21.

A guide 23 which is received in bore 19 for reciprocation therein, and piston 22 extends into bore 19, as shown in FIG. 1. There is also provided a piston extension or guide which is received in bore 19 for reciprocation therein. Guide 23 extends outwardly beyond end 14a to permit actuation of the piston means, which includes piston 22 and extension 23. As described in the cited copending application, piston 22 and guide 23 are connected to each other at 24.

The construction just described is adapted for spring-biasing of the piston, and also permits an auxiliary seal to be employed. As shown in FIG. 1, body 14 provides an annular shoulder 25 at the inner end of bore 19 surrounding the outer end of bore 18. An O-ring 26, formed of a flexible, resilient material such as synthetic rubber, is received on piston 22 for bearing against the face of shoulder 25. A compression spring 27 is also received on piston 22 outwardly from O-ring 26. The inner end of spring 27 bears against O-ring 26 and urges it into contact with shoulder 25. This assists in maintaining a seal at that point. The outer end of spring 27 bears against the inner end of piston guide 23, thereby biasing piston 22 and piston guide 23 toward the actuating end 14a. In the illustration given, the outer end 28 of guide 23 has a square or rectilinear shape, and is thereby adapted for cooperation with a movable handgrip or operating handle 29.

Movable handgrip 29 at an intermediate point 30 is pivotally connected to the outer end of guide 23. The
upper end of handgrip 29 is pivotally connected at 31 to a lever link 32 which has its forward end pivotally connected to body 14, as will be more fully described hereinafter.

In accordance with the present invention, the portion of body 14 adjacent end 14e projects outwardly beyond cap 13. A stationary handgrip 33 is rigidly attached to the projecting end portion of the body. It will be noted that stationary grip 33 and movable grip 29 are arranged in opposed relation to permit both of these handgrips to be grasped simultaneously by the hand of the operator. By squeezing the handgrips together the piston member, including piston 22 and extension 23, can be forced inwardly against compression spring 27 to create pressure within cylinder bore 18, and dispense the grease.

In the illustration given and preferably, stationary handgrip 33 at its upper end provides a pair of opposed, spaced-apart flanges 33a and 33b, as shown more clearly in FIG. 3. In this embodiment, the projecting end portion of body 14 provides a pair of opposed flat areas 34 and 35. Where rod stock is used to form body 14, these areas can be formed by milling out portions of the rod stock. If desired, in the same operation projections 34a, 35a, and 35b can be formed. Similar milling operations can be used to provide projections on flat areas where body 14 is formed of bar stock having a square or rectangular cross-section. This permits flanges 33a and 33b to be secured to body 14 respectively against flat areas 34 and 35 by projection welding, as indicated more clearly in FIG. 3. In that figure the flange 33a shown after completion of the resistance welding operation, while flanges 33b is shown as it would appear prior to welding. Instead of projection welding, other resistant welding procedures can be employed, such as spot welding. Flanges 33a and 33b can also be attached to body 14 by other means.

The preferred means for pivotally connecting lever link 32 to body 14 will now be described. The embodiment shown and preferably, the discharge end portion of body 14 is provided with a pair of opposed flattened areas 36 and 37. These can be formed from the bar stock by a milling operation, using a rotating milling head. In the same operations, a pair of aligned outwardly-projecting cylindrical studs 38 and 39 can be formed. Studs 38 and 39 provide the pivotal mounting means for the forward end of lever link 32.

As shown more clearly in FIG. 2, the forward end portion of lever link 32 provides a pair of opposed, spaced-apart attachment tabs 40 and 41 having aligned circular openings 42 and 43 therein. Tabs 40 and 41 extend respectively over the flattened areas 36 and 37 and the studs 38 and 39 extend respectively through openings 42 and 43, thereby permitting link 32 to pivot on the studs.

Preferably, the inside surfaces of tabs 40 and 41 are normally spaced apart by substantially the same distance as between flattened areas 36 and 37, and tabs 40 and 41 are formed of a resilient material which permits the distance between the tabs to be increased by a spring action so that the tabs can be attached to and separated from body 14. Providing the tabs have sufficient resiliency to permit them to be passed over the outer faces of studs 38 and 39, the tabs can normally be spaced apart by a distance slightly less than that between flattened areas 36 and 37 thereby, causing the tabs to press against the flattened areas in the assembled construction, as shown in FIG. 3. However, this has not been found to be necessary. Preferably, the normal position of the tabs is as shown in FIG. 2 where the tabs are in substantially parallel relation.

If desired, the resilient spring action of tabs 40 and 41 can be improved by forming them as integral extensions of the side walls of channel-shaped link manner 32. In the illustration given, channel member 52 has a U-shaped cross-section, as shown more clearly in FIG. 2, the sides of the channel-shaped body extending toward cap 13, and at the forward end thereof being connected integrally to the tabs 40 and 41. This construction provides a lever link of great rigidity while at the same time permitting tabs 40 and 41 to be readily separated by a resilient spring action for insertion on studs 38 and 39. Furthermore, once assembled the parts will remain connected during the pivoting of lever 32 until the tabs 40 and 41 are forced apart to permit their separation from body 14.

The manner of assembly is indicated in FIG. 4. After the attachment of body 14 to cap 13, the stationary handle 33 can be positioned over the piston member, including piston 22 and extension 23, and secured thereto by welding, as previously described. As also shown in FIG. 4, after the movable handle 29 has been connected to the piston assembly, including piston 22, piston guide 25, spring 27, and O-ring 25, and with the lever link 32 pivotally connected to handgrip 29, piston 22 is inserted through the actuating end 14c and into bore 19. This insertion is continued so that O-ring 25 is forced against shoulder 25 with piston 22 entering bore 18. The forward end of lever link 32 is then moved toward the dispensing end of body 14, as indicated by the arrow in FIG. 4. The tabs 40 and 41 are forced apart sufficiently to permit them to slide over studs 38 and 39 and so that the studs can enter their respective openings 42 and 43. As will be understood, this is essentially a snap-on type of assembly, which can be carried out very rapidly and easily.

When it is desired to inspect any of the internal components of the grease gun head, such as piston 22, O-ring 25, or spring 27, it is only necessary to unsnap the tabs 40 and 41. This can be done by forcing them apart sufficiently to permit the tabs to be withdrawn over studs 38 and 39. The components of the piston means can then be withdrawn through actuating end 14c. After withdrawal, O-ring 25 or spring 27 can be replaced as desired.

While in the foregoing specification this invention has been described in relation to a specific embodiment thereof and many details have been set forth with respect to this embodiment, it will be apparent to those skilled in the art that the invention is susceptible to other embodiments and that certain of the details set forth herein can be varied considerably without departing from the basic principles of the invention.

I claim:

1. In a head for a hand-operated grease gun having a cap for attachment to the front end of the grease gun barrel, an elongated tubular body rigidly fixed to the front side of said cap and extending therefrom, said body having an actuation end and a discharge end and providing a high pressure cylinder between said ends, the actuation end portion of said body projecting outwardly beyond said cap, a stationary handgrip rigidly attached to the projecting end of said body, said means slidably received in said high pressure cylinder and having an actuating extension projecting through and beyond the actuation end of said body, a movable handgrip pivotally connected at an intermediate point to the projecting extension of said piston means, one end portion of said movable handgrip being opposed to said stationary handgrip for cooperation therewith, and a lever link pivotally connected at one end to the other end portion of said movable handgrip, said link extending forwardly toward the discharge end of said body and being pivotally connected to said body, the improvement characterized by said lever link extending over one of the flattened areas of said discharge end portion and said studs extending through said openings to permit said link to pivot on said studs, said tabs being separable by a resilient spring action to permit them
to be passed over the outer faces of said studs for the assembly and disassembly of said lever link and body, said tabs being held by such resilient spring action in engagement with said flattened areas.

2. The grease gun head of claim 1 wherein the projecting end portion of said body provides a pair of recessed opposed flattened areas, and wherein said stationary handgrip provides a pair of opposed spaced-apart flanges, each of said flanges extending over one of the flattened areas of said projecting end portion and being rigidly secured thereto by resistance welding.

3. In a head for a hand-operated grease gun having a cap for attachment to the front end of the grease gun barrel, an elongated tubular body rigidly secured to the front side of said cap and extending there across, said body having an actuation end and a discharge end and providing a high pressure cylinder between said ends, the actuation end portion of said body projecting outwardly beyond said cap, a stationary handgrip rigidly attached to the projecting end of said body, piston means slidably received in said high pressure cylinder and having an actuating extension projecting through and beyond the actuation end of said body, a movable handgrip pivotally connected at an intermediate point to the projecting extension of said piston means, one end portion of said movable handgrip being opposed to said stationary handgrip for cooperation therewith, and a lever link pivotally connected at one end to the other end portion of said movable handgrip, said link extending forwardly toward the discharge end of said body, the improvement characterized by, the discharge end portion of said body providing a pair of aligned outwardly-projecting cylindrical studs on the opposite sides of said end, the forward end portion of said link providing a pair of opposed, spaced-apart attachment tabs having aligned circular openings therein, said studs extending through said openings to permit said lever link to pivot on said studs, said tabs being separable by a resilient spring action to permit them to be passed over the outer faces of said studs for the assembly and disassembly of said lever link and body.

References Cited by the Examiner

UNITED STATES PATENTS

1,619,126 3/27 Hundemer ............... 222—324 X
1,949,761 3/34 Rea .................. 222—324
2,094,423 9/37 Bernhardt ............... 222—384
2,977,824 4/61 Rueb .................. 29—453 X

Raphael M. Lupo, Primary Examiner.

Louis J. Dembo, Examiner.
UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,209,958

Edwin P. Sundholm

October 5, 1965

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 43, strike out "guide 23 which is received in bore 19 for reciprocation", and insert instead as the beginning of a new paragraph -- A piston 22 is received in bore 18 for reciprocating --; line 46, after "guide" insert -- 23 --.

Signed and sealed this 24th day of May 1966.

SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents