

Dec. 1, 1959

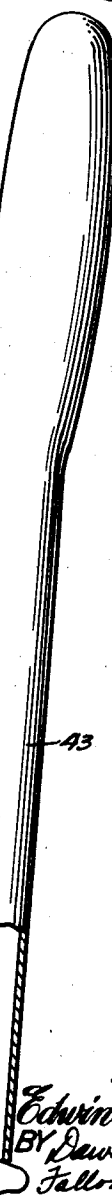
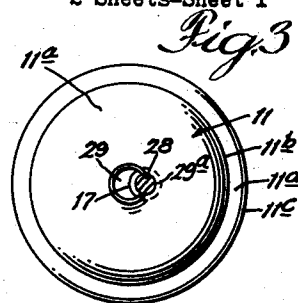
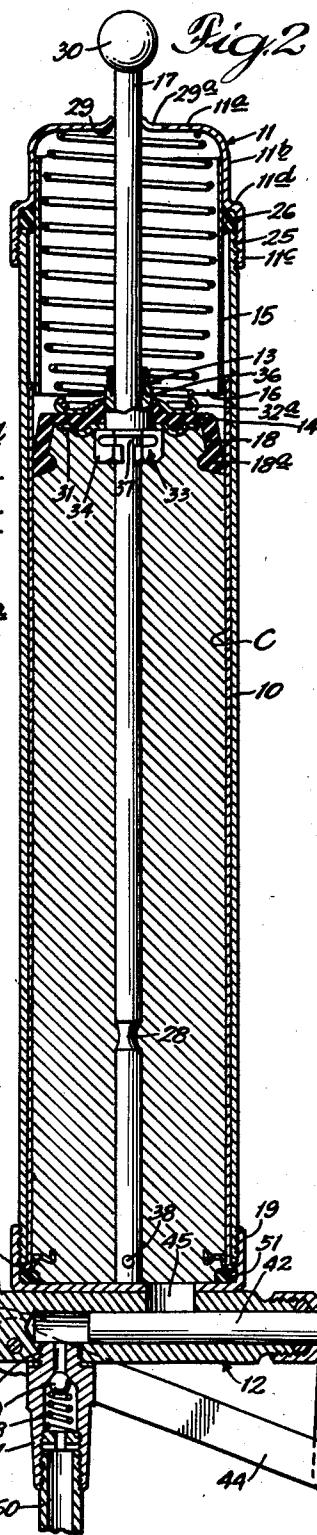
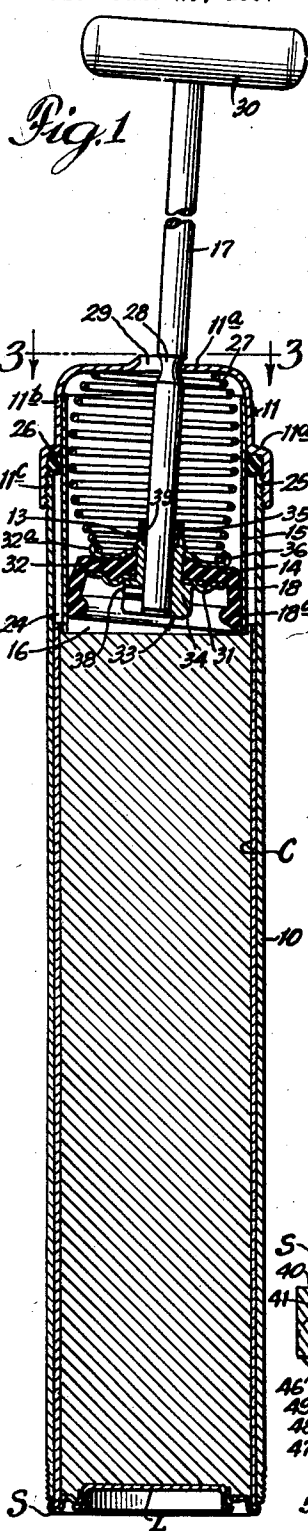
E. P. SUNDHOLM

2,915,226

GREASE GUN

Filed Jan. 29, 1957

2 Sheets-Sheet 1



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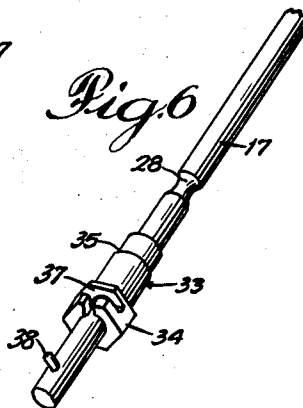
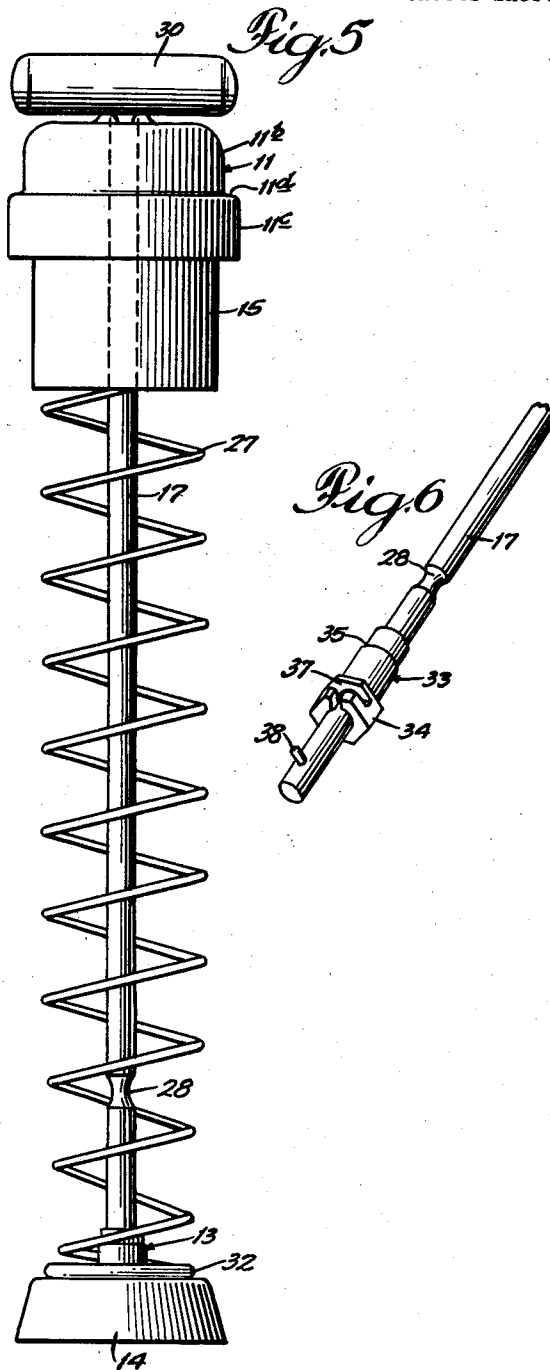
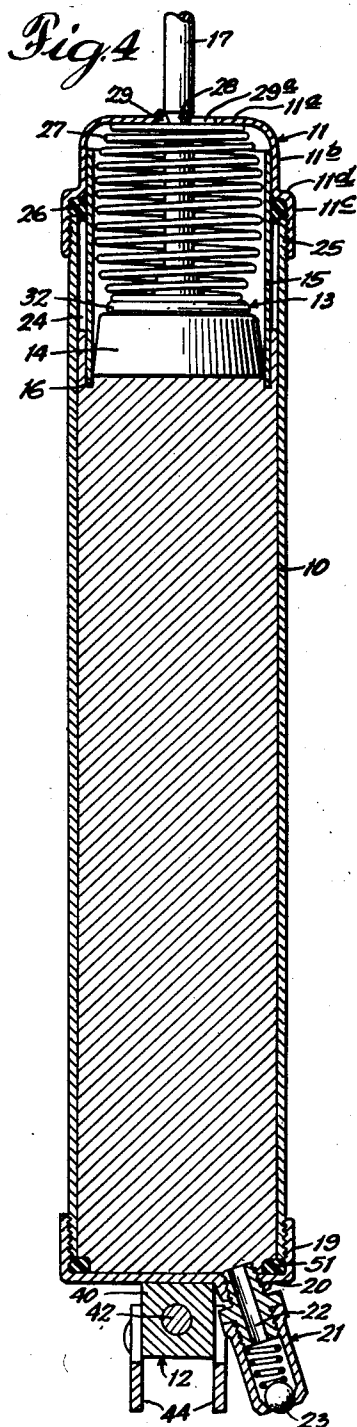
E. P. SUNDHOLM

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GREASE GUN

Filed Jan. 29, 1957

2 Sheets-Sheet 2



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2,915,226

## GREASE GUN

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Application January 29, 1957, Serial No. 636,971

6 Claims. (Cl. 222—340)

This invention relates to a grease gun, and more particularly to a grease gun which is adapted for use selectively with both cartridge-packaged greases and bulk-filled greases.

Heretofore grease guns have been of two separate types with reference to the method by which the grease is loaded into the gun. The most generally used type of grease gun is that which is filled prior to use with grease supplied in large drums or bulk packages. The bulk grease may be sucked or pumped into the barrel of the grease gun. Still another type of grease gun, which seems to be increasing in commercial popularity at the present time, employs grease packaged in the form of cartridges for individual insertion into the barrel of the gun. In this practice, the cartridge in which the grease is supplied, which is usually made of cardboard, remains within the barrel of the gun during the dispensing of the grease from the gun.

The commercial availability of cartridge-packaged greases in addition to bulk greases has created a desire on the part of users to employ first one type of packaged grease and then another. Heretofore, it has not been practical to use the same gun with cartridge greases as with bulk greases. Thus, a filling station operator or other user may be required to maintain duplicate sets of grease guns. It has been suggested that a cartridge loading type of grease gun might be adapted for use with bulk greases by leaving one of the empty cartridges within the barrel of the gun, and then introducing grease into the gun to refill the cartridge for the next dispensing operation. This is not a very practical suggestion, however, since the lightweight cardboard cartridges are not suited for repeated dispensing operations, and there would be no way to replace the cartridges without reverting to loading the gun with a new grease cartridge instead of continuing using the desired bulk-filled grease.

It is therefore an object of this invention to provide a cartridge-type grease gun which can be used with bulk-filled grease without the necessity of leaving an empty cartridge within the barrel of the grease gun. A further object is to provide a combination grease gun of the type described which requires no change in parts or other adjustments in varying the loading from cartridge greases to bulk greases or vice versa. Further specific objects and advantages will appear as the specification proceeds.

This invention is shown in the accompanying drawings in which:

Figure 1 is a side sectional view of a grease gun embodying the present invention, the dispensing head being removed, and a grease cartridge shown inserted within the barrel; Fig. 2, another side sectional view of the grease gun of Fig. 1 showing the gun in use with a grease cartridge; Fig. 3, a plan view of the rear end of the grease gun taken on line 3—3 of Fig. 1; Fig. 4, a side sectional view of the grease gun of the prior figures as it would appear after being completely filled with bulk grease, the section being taken through the filler fitting

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of the dispensing head; Fig. 5, an elevational view of the assembly which is removable from the rear end of the grease gun, including the elements associated with the plunger and the rear closure cap; and Fig. 6, a fragmentary detailed view showing the construction of the forward end of the plunger rod by means of which it can be engaged and disengaged from the plunger head.

In one of the preferred embodiments of the grease gun of this invention, the slidable plunger within the cylindrical grease container provides a head portion of normally slightly greater diameter than the internal diameter of the cylindrical container, and a ferrule or sleeve is disposed substantially concentrically in the rearward portion of the container. The sleeve has an open forward end facing the plunger head portion, and the plunger head portion is made resiliently contractible to snugly engage the inner walls of the container and still further resiliently contractible for withdrawal into the sleeve. It is then only necessary to provide means for retracting the plunger head portion into the sleeve in order to adapt the grease gun for use selectively with both cartridge-packaged greases and bulk-filled greases. All this will be further explained in connection with the details of the specific embodiment illustrated in the drawing.

Referring now to the specific embodiment shown in the drawings, as shown most completely in Figs. 2 and 4 thereof, it can be seen that the grease gun includes a cylindrical grease container 10, a closure cap 11 threadedly connected to the rear end of the container, and a grease dispensing head 12 removably mounted on the front end of the container. Within container 10 is a slidable plunger assembly 13 having a head portion 14 arranged for urging grease toward dispensing head 12. A ferrule or sleeve 15 of slightly smaller diameter than the internal diameter of container 10 is disposed in the rearward portion of the container. The open forward end 16 of sleeve 15 is preferably arranged substantially concentrically with cylinder 10. Means are also provided for retracting plunger 13 and more particularly head portion 14 thereof into the forward end 16 of sleeve 15, which in the illustration given includes a plunger rod 17 extending from plunger head portion 14 through the rear wall 11a of cap 11.

In accomplishing the purposes of the present invention, certain relative dimensions between the parts just described are quite critical. More specifically, head portion 14 of plunger assembly 13 should provide a portion which is normally of slightly greater diameter than the internal diameter of cylindrical container 10. Further, plunger head portion 14 (e.g. the part thereof of normally slightly greater diameter than the internal diameter of cylinder 10) should be resiliently contractible to snugly engage the inner walls of the container and still further resiliently contractible for withdrawal into sleeve 15. In the specific illustration given, plunger head portion 14 consists of a cup-shaped rubber member opening toward dispensing head 12 and providing an annular flange 18 extending in the direction of the dispensing head. Preferably, as illustrated, annular flange 18 flares outwardly toward the walls of container 10. It has also been found desirable to provide the terminal or free end portion of flange 18 with an enlarged lip 18a, as shown more clearly in Figs. 1 and 2.

In the illustration given, dispensing head 12 includes a cap portion 19 which is threadedly received on the outside of the forward end of container 10, as shown more clearly in Figs. 2 and 4. In achieving the full advantages of the present invention, it is desirable to provide the transverse wall of cap 19 with an inlet opening 20 (Fig. 4), which in the illustration given, is internally threaded to receive a filler fitting 21 and thereby

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mount the same on the outside of head 12 to provide a passage 22 extending from the outside to the inside of container 10. Preferably, fitting 21 includes a spring-biased check valve 23 arranged to permit only inflow through passage 22 of fitting 21.

Preferably, sleeve 15 is dimensioned and arranged within the rearward portion of container 10 so that the outer walls of the sleeve are spaced inwardly from the adjacent portions of the inner walls of the container, thereby providing an annular space 24 therebetween. In the illustration given, annular space 24 extends rearwardly from the forward end of sleeve 15 to the inside end of the threaded connection 25 between closure cap 11 and the rear end of container 10. Where the annular space 24 is provided, as preferred, it is important that a sealing gasket 26 be interposed in the annular passage between the forward end thereof and the inside end of threaded connection 25.

For convenience of assembly and operation, as shown in the specific embodiment of the drawings, rear cap 11 can be formed to provide rearwardly-extending tubular portion 11b of substantially the same internal diameter as the external diameter of sleeve 15, thereby permitting the rearward portion of the sleeve to be received within the tubular portion of the cap in tight frictional engagement therewith. The mounting of sleeve 15 within the tubular portion cap 11 by means of a "press fit" will serve the purpose of holding sleeve 15 in fixed, concentric relation to container 10, while providing the desired annular space 24 between the outside of the forward portion of sleeve 15 and the inside of the rearward portion of container 10. In the illustration given, cap 11 also provides a skirt portion 11c of larger internal diameter than tubular portion 11b, the skirt portion being forwardly of the tubular portion for being threadedly received over the outside of the rear end portion of cylinder 10. Cap 11 also preferably provides an inwardly-extending shoulder portion 11d between tubular portion 11b and skirt portion 11c. With this construction, the sealing gasket 26 can be arranged to be clamped between cap shoulder portion 11d and the rear edge of container 10 to seal off the threaded connection 25 from the interior of cylinder 10.

If desired, a compression spring, such as spring 27, can be disposed about plunger rod 17 between plunger head portion 14 and rear end 11a of closure cap 11, the spring being constructed and arranged for urging plunger head portion 14 toward dispensing head 12. For the purpose of the present invention, the spring 27 must be retractable within sleeve 15 behind plunger head portion 14, as illustrated in Figs. 1 and 4. In other words, spring 27 is compressible from the extended condition illustrated in Fig. 5 to the compressed condition illustrated in Fig. 1 or Fig. 4. Most of the benefits of the present invention, however, can be obtained even though the plunger head portion 14 is not spring-urged.

When the plunger head portion 14 is backed by a compression spring as illustrated in the embodiment of the drawings, it is desirable to provide a releasable locking means for temporarily securing plunger 17 to the rear of cap 11 for restraining forward movement of the plunger head portion after it is withdrawn within sleeve 15. Various locking means may be employed. In the illustration given, rod 17 is provided with an annular recess or notch 28 near the forward end thereof, and the central opening 29 in cap portion 11a connects with an offset slot portion 29a adapted to receive recessed portion 28 of rod 17, as indicated more clearly in Figs. 1 and 3. It is also preferred to provide rod 17 at its rear end with a transverse handle portion 30.

Plunger head assembly 13 may take various forms while still achieving the benefits of the present invention. In the illustration given, the transverse wall of plunger head portion 14 is secured between front washer 31 and rear washer 32 by means of a headed plug 33 which

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extends through aligned central openings in washers 31, 32 and in the transverse wall of plunger head 14. The enlarged head portion 34 of plug 33 seats on washer 31 while the reduced tubular portion 35 is locked to washer 32 by means of formed lateral projections 32a, as shown more clearly in Figs. 1 and 2. To serve as a retainer for the forward end of compression spring 27, upper washer 32 is provided with an upwardly and inwardly turned rim 32a.

For the purpose of permitting plunger rod 17 to be moved downwardly into container 10 independently of the downward movement of plunger head assembly 13, it is desirable to provide for a releasable attachment between the forward end of rod 17 and piston head assembly 13. One means by which this result may be accomplished is illustrated more particularly in Fig. 6 of the drawings. The head portion 34 of plug 33 is provided with a T-shaped slot 37, and the outer end of rod 17 is provided with a laterally-extending pin 38. Since the plug member 33 is slidable with respect to rod 17, pin 38 can be drawn into T-slot 37 and seated in either the right-hand or left-hand branch thereof. In either of these positions, plug 33 and thereby plunger head assembly 13 will be locked to rod 17 for either inward or outward movement of the rod. On the other hand, when pin 38 is turned to the central position of the T-slot 37, it can be moved outwardly with respect thereto, thereby separating plug 33 from pin 38, as illustrated in Fig. 6, and permitting rod 17 to be moved inwardly without a corresponding movement of plug 33 or plunger head 13. If desired, a packing gland 39 may be positioned within the upper end of tubular portion 35 of plug 33 to bear against rod 17, as indicated in Figs. 1 and 2.

Any suitable means can be associated with dispensing head 12 for the ejection of the grease under pressure. In the illustration given, dispensing head 12, as shown more clearly in Fig. 2, includes a body 40 having a bore 41 therein for slidably receiving a piston plunger 42 that extends outwardly beyond body 40 and is pivotally connected to a lever arm 43. The forward end of lever 43 is pivotally connected to a pair of links 44 (Fig. 4), which in turn are pivotally mounted on body 40, thereby permitting piston 42 to be reciprocated by the corresponding reciprocation of lever 43. The bore 41 communicates with an inlet opening 45 which extends through cap portion 19 and the adjacent wall of body 40 to provide for communication between bore 41 and the interior of container 10 when the piston rod 42 is withdrawn sufficiently to uncover inlet opening 45. Body 40 also provides an opening 46 communicating with the end of bore 41 towards which piston rod 42 advances. A grease discharge fitting 47 is threadedly received within opening 46 and provides a passage 48 therethrough for the outflow of grease from within bore 41. Fitting 47 provides a spring-biased check valve 49 which is arranged to permit outflow only through passage 48. As shown in Fig. 2, the outer end of fitting 47 is adapted to receive a grease applicator pipe 50.

#### Operation

In accordance with the present invention, the embodiment thereof illustrated in the drawings is adapted for use selectively with both cartridge-packaged greases and bulk-filled greases. The procedure for loading the gun with a grease cartridge is illustrated in Fig. 1, and the use of the gun after cartridge loading is illustrated in Fig. 2. Figure 4 illustrates the appearance of the gun after it has been filled with bulk grease.

In using the gun with cartridge-packaged greases, plunger rod 17 is drawn outwardly by means of handle 30 with the forward end of the rod locked to the plunger head assembly 13 by the means previously described. When the rod has been drawn back sufficiently to dislodge the annular recess 28 in rear cap opening 29, the rod is moved slightly to the side to seat recess portion

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28 of the rod within slot 29a of the cap. As illustrated in Fig. 1, the plunger head assembly 13 and more particularly the head portion 14 is then completely withdrawn within the forward end portion of sleeve 15. Dispensing head 12 is then removed from the front end of container 10 by unscrewing cap portion 19. The open end of a grease cartridge, such as cartridge C, is then inserted within container 10. Preferably, the grease cartridge has a length corresponding to the position of sleeve 15 relative to container 10 so that when the cartridge C is fully inserted its inner end will slightly overlap the forward end of sleeve 15, being received within the forward end portion of annular space 24. A predetermined establishment of the desired positioning of the cartridge C is particularly easy where the forward end of the cartridge C provides an annular outwardly extending shoulder portion S for engagement with the forward edge of container C, as illustrated in Figs. 1 and 2. If the cartridge C is provided with a movable closure at its forward end such as lid L, this is removed after the insertion of the cartridge, and then dispensing head 12 is replaced, as shown in Fig. 2. To provide a tight seal a compressible washer, such as washer 51, can be seated within cap portion 19 for sealing engagement between the rim portion S of cartridge C and cap portion 19 inwardly of its threaded connection with container 10.

After the replacement of the dispensing head 12, rod 17 will be released from locking engagement with rear cap 11. This will permit compression spring 27 to force plunger head portion 14 out of the forward end of sleeve 15 and into the rear end portion of cartridge C, as illustrated in Fig. 2. The piston head portion and more particularly the outwardly flared flange 18 will form a tight sealing engagement with the inner walls of the grease-holding container of cartridge C. The action of compression spring 27 will continue to feed the grease forwardly as it is dispensed through a head 12 by the intermittent pumping action of lever 43. The piston head assembly 14 can also be urged forwardly by means of handle 30, but this is not necessary, and in fact the piston head assembly will continue to advance forwardly during the pumping ejection of the grease due to suction created within container 10 even if compression spring 27 were omitted. To make the gun more compact for use, it may be desirable to disengage the forward end of rod 17 from plunger assembly 13 and run it downwardly as far as possible into container 10, as shown in Fig. 2.

When it is desired to use the gun with bulk grease, any empty cartridge which might be within the gun is removed, and the gun is filled with head 12 in place, as illustrated by Fig. 4. The grease is pumped into container 10 through filler fitting 21 by means of any of the various standard grease filling pumps. This pumping can be continued until container 10 is so completely filled with grease that plunger head assembly 13 and head portion 14 thereof are forced within the forward end of sleeve 15. Any grease which is thereby permitted to pass around the outside of sleeve 15 and into annular space 24 cannot escape from the container 10 through threads 25 due to the sealing gasket 26 at the outer end of passage 24. Alternatively, the introduction of the grease can be discontinued at the point at which plunger head portion 14 just begins to enter the forward end of sleeve 15. Since a considerably greater amount of force is required to squeeze the plunger head portion 14 into the reduced cross section of sleeve 15 than to advance it a corresponding distance along the interior of container 10, the operator filling the gun will be able to detect the point at which the filling should be discontinued to avoid the introduction of any grease into annular space 24. This would have the advantage in that the exterior of sleeve 15 would remain clean and free from grease so that on the removal of rear cap 11 there would be much less chance of an operator getting grease on this hands

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or clothes. For the purpose of inspecting the interior mechanism of the gun and to otherwise determine its condition, it is necessary to remove rear cap 11 from time to time. It is therefore of importance that the exterior sleeve 15 may also be kept entirely free from grease when the gun is used with grease cartridges as previously described. This is true because as soon as the plunger head portion 15 enters the rear end of the cartridge C, as illustrated in Fig. 2, it forms a tight seal with the inner walls of the cartridge and thereby prevents any grease from escaping around head portion 18 and entering the annular space 24 around the outside of sleeve 15. Similarly, plunger head portion 14 is effective for making a tight seal with the inner walls of container 10 so that no grease can escape around the plunger head portion and into annular space 24. These advantages stem from the fact that plunger head portion 14 is effective as a plunger of variable cross sectional area.

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

I claim:

1. In a grease gun adapted for use selectively with both cartridge-packaged greases and bulk-filled greases, the combination comprising a cylindrical grease container, a closure cap threadedly connected to the rear end of said container, a grease dispensing head removably mounted on the front end of said container, a slidable plunger within said container providing a head portion of normally slightly greater diameter than the internal diameter of said cylindrical container and arranged for urging grease toward said dispensing head, a sleeve of slightly smaller diameter than the internal diameter of said container disposed in the rearward portion of said container, said sleeve having an open forward end and being arranged substantially concentrically with said cylinder, said cap providing a rearwardly-extending tubular portion of substantially the same internal diameter as the external diameter of said sleeve and the rearward portion of said sleeve being received within said tubular cap portion in tight frictional engagement therewith, said plunger head portion being resiliently contractible to snugly engage the inner walls of said container and still further resiliently contractible for withdrawal into the open end of said sleeve, and means for retracting said plunger head portion into said sleeve including a plunger rod extending from said plunger head portion through said closure cap, said dispensing head providing an inlet opening for the introduction of bulk grease into said container without removing said head, said cap also providing a skirt portion of larger internal diameter than said tubular portion and positioned forwardly of said tubular portion for being threadedly received over the outside of the rear end portion of said cylinder, said cap providing an inwardly-extending shoulder portion between said tubular portion and said skirt portion, and a sealing gasket arranged to be clamped between said cap shoulder portion and the rear edge of said container to seal off the threaded connection between said cap and said cylinder from the interior of said cylinder.

2. The grease gun combination of claim 1 in which the outer walls of said sleeve are spaced inwardly from the adjacent portions of the inner walls of said container, thereby providing an annular space therebetween, the upper end of said annular space being blocked by said sealing gasket when said gasket is clamped between said cap shoulder and said container rear end.

3. In a grease gun adapted for use selectively with

both cartridge-packaged greases and bulk-filled greases, the combination comprising a cylindrical grease container, a closure cap mounted on the rear end of said container, a grease dispensing head removably mounted on the front end of said container, a slidable plunger within said container providing a head portion of normally slightly greater diameter than the internal diameter of said cylindrical container and arranged for urging grease toward said dispensing head, a sleeve of slightly smaller diameter than the internal diameter of said container disposed in the rearward portion of said container, said sleeve having an open forward end and being arranged substantially concentrically with said cylinder, said plunger head portion being resiliently contractible for withdrawal into the open end of said sleeve, means for retracting said plunger head portion into said sleeve including a plunger rod extending from said plunger head portion through said closure cap, said dispensing head providing an inlet opening for the introduction of bulk grease into said container without removing said head, said cylindrical container and said closure cap having a threaded connection rearwardly of the forward end of said sleeve, the outer walls of said sleeve being spaced inwardly from the adjacent portions of the inner walls of said container, thereby providing an annular space therebetween, said annular space extending rearwardly from the forward end of said sleeve to the inside end of said threaded connection between said closure cap and said cylinder, and a sealing gasket interposed in said annular passage between the forward end thereof and said inside end of said threaded connection.

4. A grease gun adapted for use selectively with both cartridge-packaged greases and bulk-filled greases, comprising a cylindrical grease container, a closure cap removably connected to the rear end of said container, a grease dispensing head removably mounted on the front end of said container, a slidable plunger within said container providing a head portion of normally slightly greater diameter than the internal diameter of said cylindrical container, a sleeve of slightly smaller diameter than the internal diameter of said container disposed substantially concentrically in the rearward portion of said container, said sleeve having an open forward end facing said plunger head portion, said plunger head portion being resiliently contractible to snugly engage the inner walls of said container and still further resiliently contractible for withdrawal into said sleeve, and means for retracting said plunger head portion into said sleeve, said dispensing head providing an inlet opening for the introduction of bulk grease into said container without removing said head, said plunger head portion comprising a cup-shaped member of flexible, resilient material having a transverse base portion and side walls extending at substantially right angles to the plane of said base portion, said side walls flaring outwardly slightly toward the walls of said container, the forward portion of the outside surface of said walls contacting and sealingly engaging the walls of said container when said grease gun is used with bulk-filled greases and the rearward portion of the outside surface of the side walls of said cup-shaped member being spaced inwardly from the walls of said container, whereby said plunger cup-shaped member is operable within a grease cartridge for dispensing grease therefrom.

5. In a grease gun adapted for use selectively with both cartridge-packaged greases and bulk-filled greases, a cylindrical grease container, a closure cap removably connected to the rear of said container, a grease dispensing head removably mounted on the front of said container, and a slidable plunger within said container providing a head portion of normally slightly greater diameter at its maximum cross-section than the internal diameter of said cylindrical container, said plunger head

portion being resiliently contractible to a substantially smaller maximum cross-section than that of said container for being received within a cylindrical member disposed within said container, the resiliently contractible part of said plunger head portion comprising a cup-shaped member of flexible, resilient material having side walls flaring outwardly towards the walls of said container, the outside surface of the walls of said cup-shaped member having an outer portion in contact with the walls of said container and an inner portion spaced from the walls of said container, said dispensing head providing an inlet opening for the introduction of bulk grease into said container without removing said head, said cup-shaped member terminating in an enlarged lip around the inside surface of said walls thereof, said cup-shaped member having a transversely-extending base portion, said plunger head portion also including clamping washers on each side of said base portion, said washers and said base portion having complementary, interlocking depressions and projections to prevent lateral shifting of said base portion independent of said washers.

6. In a grease gun adapted for use selectively with both cartridge-packaged greases and bulk-filled greases, the combination comprising a cylindrical grease container, a closure cap threadedly connected to the rear end of said container, a grease dispensing head removably mounted on the front end of said container, a slidable plunger within said container providing a head portion of normally slightly greater diameter than the internal diameter of said cylindrical container and arranged for urging grease toward said dispensing head, a sleeve of slightly smaller diameter than the internal diameter of said container disposed in the rearward portion of said container, said sleeve having an open forward end and being arranged substantially concentrically with said cylinder, said plunger head portion being resiliently contractible to snugly engage the inner walls of said container and still further resiliently contractible for withdrawal into the open end of said sleeve, means for retracting said plunger head portion into said sleeve including a plunger rod extending from said plunger head portion through said closure cap, said dispensing head providing an inlet opening for the introduction of bulk grease into said container without removing said head, a compression spring disposed about said plunger rod between said plunger head portion and the rear end of said closure cap for urging said plunger head portion toward said dispensing head, said compression spring being arranged for retraction within said sleeve behind said plunger head portion, and releasable locking means provided for temporarily securing said plunger rod to the rear of said cap and restraining forward movement of said plunger head portion after it is withdrawn within said sleeve.

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