Feb. 2, 1960 E. P. SUNDHOLM 2,923,443

GREASE GUN DISPENSING HEAD ASSEMBLY

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Fig. 1

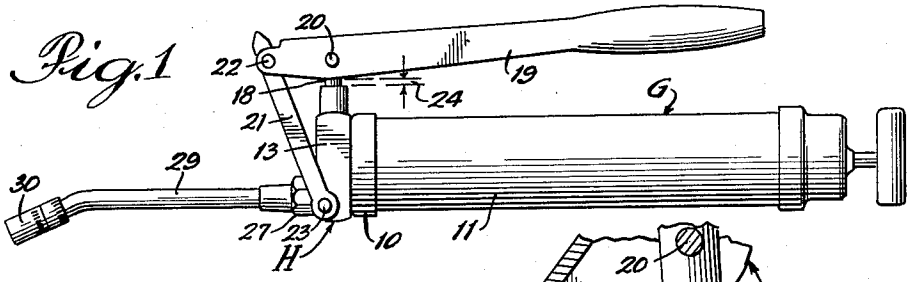


Fig. 2

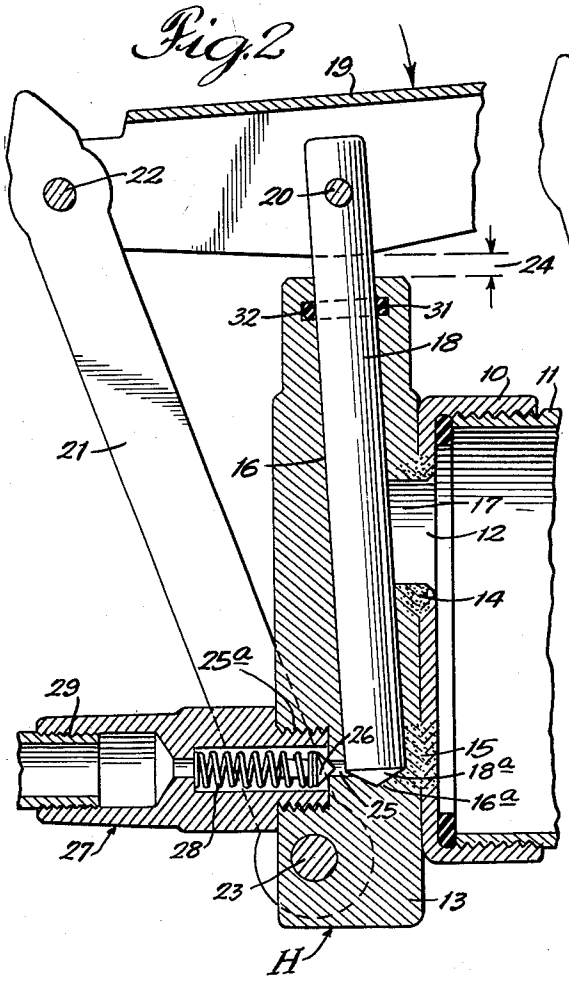
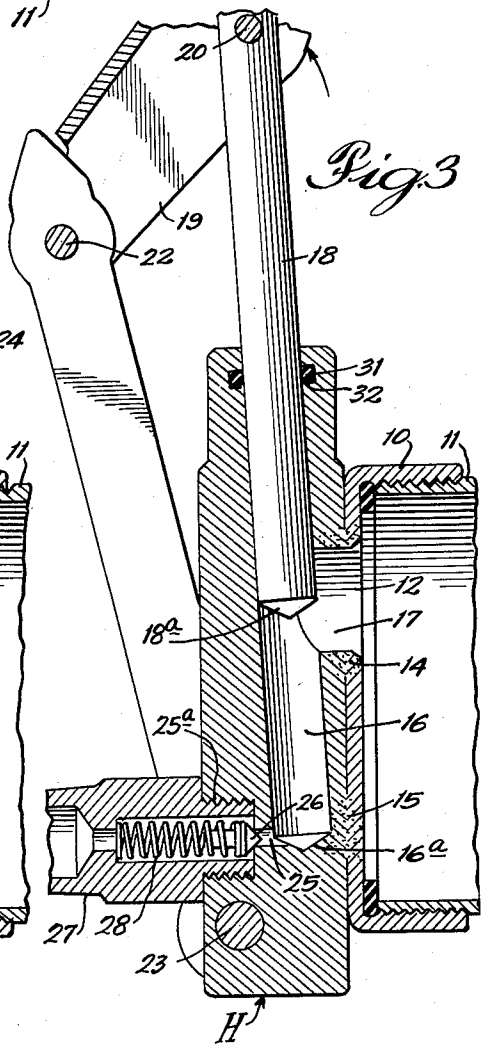


Fig. 3



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GREASE GUN DISPENSING HEAD ASSEMBLY

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2 Claims. (Cl. 222—380)

This invention relates to a grease gun dispensing head assembly which is characterized by a "positive displacement" action, thereby avoiding "air locks" and related difficulties.

The grease gun head construction described in my Patent 2,436,701 issued February 24, 1948, has great advantages from the standpoint of manufacturing simplicity and economy. Such construction is characterized by the fact that the mounting cap and cylinder block are formed of separate pieces of metal which are attached by some metal fusing process like spot welding or brazing. Until the making of the present invention, however, I did not know how to adapt this type of head construction for a "positive displacement" action. Consequently, this type of head construction, although highly advantageous from the manufacturing standpoint, has been subject to certain operational difficulties. For example, if the grease being dispensed contains entrapped air, the accumulation of air in the residual volume between the end of the dispensing stroke and the outlet check valve may lead to an air lock.

It is therefore the principal object of the present invention to improve the grease gun head construction as shown in my Patent 2,436,701 so as to adapt it for a "positive displacement action" while still retaining the advantages of simplicity and economy of manufacture. Further objects and advantages will appear as the specification proceeds.

The present invention is shown in an illustrative embodiment in the accompanying drawing, in which—

Figure 1 is a side elevational view of a grease gun embodying the dispensing head assembly of the present invention; Figure 2 is an enlarged side sectional view of the dispensing head assembly of the grease gun of Figure 1, showing the dispensing plunger at its innermost position after the completion of the dispensing stroke; and Figure 3, a view similar to Figure 2, showing the dispensing plunger as it is being moved outwardly on the return stroke preparatory to another dispensing stroke.

Looking first at Figure 1, there is shown a grease gun G of conventional construction, with the exception of the dispensing head assembly H, which forms the subject of the present invention. Figures 2 and 3 show the details of the dispensing head assembly more clearly than in Figure 1, and so these figures will be referred to mainly in the following discussion.

The dispensing head assembly H includes a cap **10** which is adapted for attachment to the front end of the grease gun G, or more specifically for being threadedly received on the forward end of the grease gun container or barrel **11**. The front of cap **10** is provided with an opening **12** extending therethrough for the outflow of grease from within grease container **11**. A cylinder block **13** extends across the front face or outside of cap **10** and is disposed to completely cover cap opening **12**.

Cylinder block **13** and cap **10** are formed of separate pieces of metal connected by fused areas, as shown more clearly in Figures 2 and 3. Preferably, one of the fused areas extends around cap opening **12** as indicated at **14**.

In the illustration given, there is another fused area at **15**, the location of which also has a special function in connection with the present invention, as will be subsequently described.

Cylinder block **13** is provided with a bore **16** extending inwardly from one end thereof across cap **10**. In accordance with the present invention, the axis of bore **16** is inclined inwardly toward cap **10** in the manner shown in Figures 2 and 3.

Passage **17** extends through the wall of block **13** adjacent cap opening **12** and provides communication between the interior of grease container **11** and the intermediate portion of bore **16**.

A plunger rod **18** is slidably received within bore **16**, the rod being dimensioned to extend from the innermost end of the bore outwardly beyond the cylinder block. A lever arm **19** is pivotally connected at **20** to the projecting end of rod **18**, the arm being arranged for actuating the rod. In the illustration given, the forward end of lever arm **19** is pivotally connected to a pair of links **21** at **22**, which in turn are pivotally connected to block **13** at **23**.

In accordance with the present invention, lever arm **19** and rod **18** are dimensioned and arranged so that the innermost portion of the arm is spaced outwardly from the adjacent end of said cylinder block when the plunger is extending to the innermost end of bore **16**, as indicated in Figures 1 and 2, the desired spacing being designated by the reference number **24**. The specific purpose of this spacing will subsequently be described.

Cylinder block **13** is also provided with a grease outlet passage **25** which communicates with the innermost end of bore **16**. Within passage **25** there is interposed an outlet check valve **26**, the check valve in its closed position being as closely adjacent as possible to the wall of bore **16**. In the illustration given, valve **26** is carried by a grease discharge fitting **27** which is threadedly received within the enlarged portion **25***a* of passage **25**. Valve **26** is urged to closed position by spring **28**. A grease applicator part **29** is detachably connected to the outer end of fitting **27** and terminates in a coupling **30**.

With the inward inclination of bore **16**, it will be noted that the thickness of the portion of the cylinder block that lies between the front face thereof and the nearest wall of bore **16** progressively increases toward the inner end of the bore. Consequently, the thickest portion is adjacent the inner end of bore **16**, which is the position where it is desired to locate outlet passage **25** and check valve **26**. As shown in Figure 2, when plunger **18** has reached the bottom of its stroke, there is substantially no residual volume between check valve **26** and plunger **16**. This will result in the desired "positive displacement" action referred to previously.

Since the portion of the cylinder block between the inner end of bore **16** and the outer face of cap **10** is relatively thin, it is desirable to add additional strength at this point by locating fusion area **15** thereat. As shown in Figures 2 and 3, the fusion area **15** is approximately adjacent the innermost end of bore **16**, and this location is preferred for the reason indicated.

To provide an end seal for plunger **18**, an O-ring **31** is seated within an annular recess **32** adjacent the outer end of cylinder block **13**. This type of seal has been found particularly advantageous in combination with the use of an inclined bore, as previously described.

Grease guns are normally used for many years and during the course of such use the various parts will tend to wear. With the construction of the present invention, however, the wearing of the plunger and the pivotal connection between the plunger and the lever arm is substantially compensated for. By providing for a space, such as space **24**, between the innermost portion of lever arm

19 and the outer end of cylinder block 13, even though the pivotal connection 20 becomes substantially looser, it will still be possible to drive the plunger 18 completely to the inner end of bore 16. In this connection, it has also been found desirable to provide the inner end of plunger 18 with a conical taper as indicated at 18*a* and to provide the inner end of bore 16 with a corresponding conical recess, as indicated at 16*a*, for snugly receiving the plunger inner end.

While in the foregoing specification this invention has been described with reference to a specific embodiment thereof wherein certain details have been discussed for purpose of illustration, it will be apparent to those skilled in the art that some of the details described herein can be varied without departing from the basic principles of the invention.

I claim:

1. A grease gun dispensing head assembly, comprising a cap adapted for attachment to the front end of a grease gun, said cap having an opening therethrough for the outflow of grease, a cylinder block extending across the outside of said cap and covering said opening, the central longitudinal axis of said block being substantially parallel to the outside face of said cap, said cylinder block and cap being formed of separate pieces of metal connected by fused areas, said cylinder block having a bore extending inwardly from one end thereof across said cap and having an axis inclining inwardly toward said cap, one of said fused areas being adjacent the inner end of said bore, said cap opening communicating with said bore at an intermediate point, a plunger rod slidably received within said bore and dimensioned to extend from the innermost end of said bore outwardly beyond said cylinder block, a lever arm pivotally connected to the outer end of said plunger rod for actuating said plunger rod, said lever arm and said plunger rod being dimensioned and arranged so that the innermost portion of said arm is spaced outwardly from the adjacent end of said cylinder block when said plunger rod is extending to the innermost end of said bore, said cylinder block providing a grease outlet passage communicating with the innermost end of said bore and extending laterally therefrom toward the front face of said block, said outlet passage extending through the thickest portion of said cylinder block that lies between the front face thereof and the nearest side of said bore, and an outlet check valve interposed in said passage within the confines of said cylinder block.

2. A grease gun dispensing head assembly, comprising a cap adapted for attachment to the front end of a grease gun, said cap having an opening therethrough for the outflow of grease, a cylinder block extending across the front of said cap and covering said opening, the central longitudinal axis of said block being substantially parallel to the front face of said cap, said cylinder block and cap being formed of separate pieces of metal connected by fused areas, said cylinder block having a bore extending inwardly from one end thereof across said cap and inclining toward said cap, one of said fused areas being adjacent the inner end of said bore, said cap opening communicating with said bore at an intermediate point, one of said fused areas extending around said cap outlet opening and another of said fused areas being positioned adjacent the inner end of said bore, a plunger rod slidably received within said bore dimensioned to extend from the innermost end of said bore outwardly beyond said cylinder block, a lever arm pivotally connected to the outer end of said plunger rod for actuating said plunger rod, said lever arm and said plunger rod being dimensioned and arranged so that the innermost portion of said arm is spaced outwardly from the adjacent end of said cylinder block when said plunger rod is extending to the innermost end of said bore, said cylinder block providing a grease outlet passage extending through the thickest portion of said cylinder block that lies between the front face thereof and the nearest wall of said bore, the inner end of said plunger rod having a conical taper and the inner end of said bore having a corresponding conical recess for snugly receiving said plunger rod inner end, and an outlet check valve interposed in said grease outlet passage within the confines of said cylinder block.

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