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 upon 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 threaded onto 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 fusion 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 inwardly 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 25a 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 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 18. 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 pivot rod 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 18o and to provide the inner end of bore 16 with a corresponding conical recess, as indicated at 16o, 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 outer 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 side of said bore, and an outlet check valve interposed in said passage within the confines of said cylinder block.

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