

Nov. 1, 1960

W. A. JESSE

2,958,445

PLUNGER MEANS FOR MORTAR GUN

Filed Oct. 30, 1958

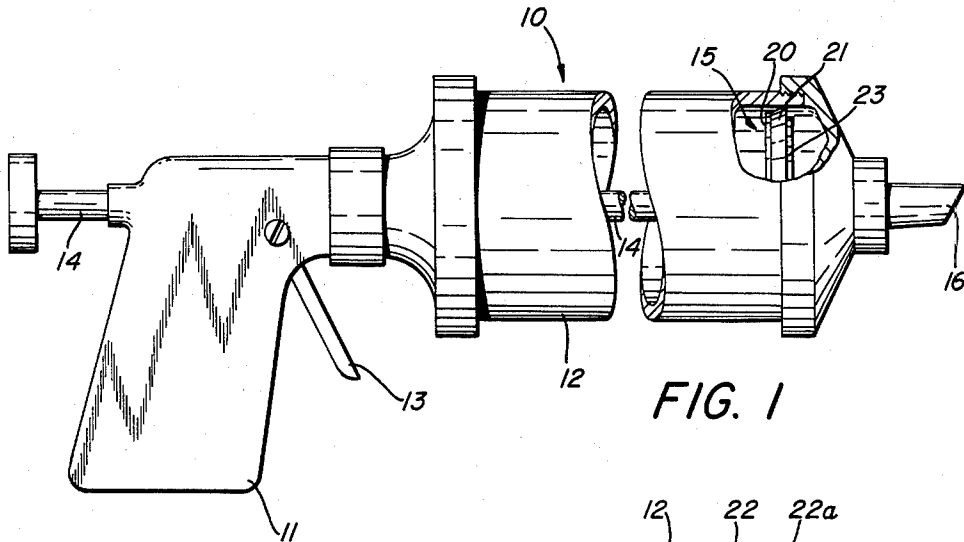


FIG. 1

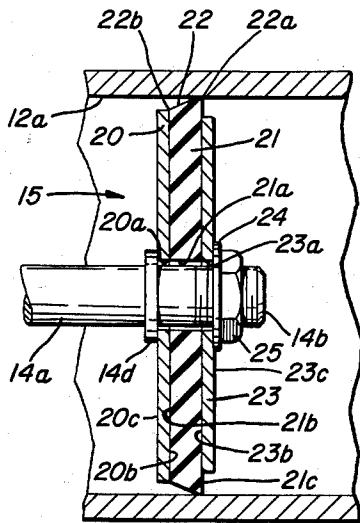


FIG. 2

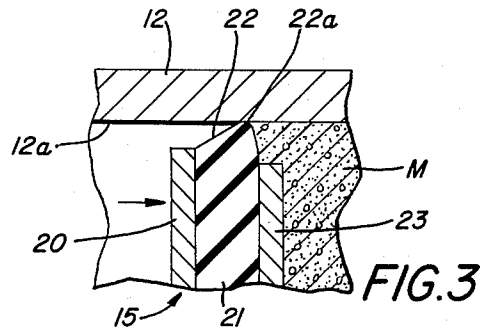


FIG. 3

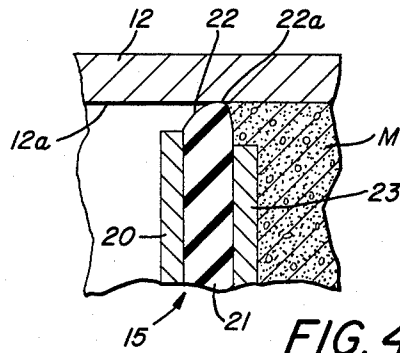


FIG. 4

INVENTOR.
WALTER A. JESSE

BY

W. A. Jesse
ATTORNEY

1

2,958,445

PLUNGER MEANS FOR MORTAR GUN

Walter A. Jesse, 450 Hickory St., Akron, Ohio

Filed Oct. 30, 1958, Ser. No. 770,622

6 Claims. (Cl. 222—386)

This invention relates to caulking guns in general and in particular has reference to improvements in guns of this type which are used for dispensing mortar for the purpose of pointing up masonry joints for example.

It has long been known in the prior art that a semi-fluid medium, such as caulking compound, can be received within a barrel and discharged through a spout thereof upon advancement of a plunger mechanism relatively of the storage barrel. In the majority of instances, devices of this kind contemplate the provision of a trigger mechanism that serves to progressively index a piston head axially of the barrel so as to cause the passage of compound through discharge opening, with the piston or plunger means serving to reduce the volume of the barrel and, accordingly, push the contents thereof through the discharge opening. In the prior art, devices of this type normally employ a leather washer or packing between rigid plates, with the peripheral edge of the packing rubbing against the internal wall of the barrel to permit relative axial movement to occur.

While devices of this general type have been found to be satisfactory in connection with the dispensing of certain compounds such as caulking compounds, it has been found that certain disadvantages exist when a gun of this type is attempted to be used for the purpose of dispensing cement mortar of the type used in repointing masonry work of a building. Specifically in this regard, it has been found that the entire amount of mortar within the barrel cannot effectively be discharged due to the fact that as the plunger moves axially a certain amount of water will escape by the edge of the piston or plunger, with the result that as the plunger advances further into the barrel, the compound remaining will have hardened due to the aforesaid water loss, with the result that the same will not be capable of being readily forced through the discharge spout. Upon occurrence of such hardening, it is necessary that the gun be disassembled and the hardened material chipped or otherwise removed from the interior of the barrel. It is believed manifest that attempts to compensate for the above water loss by adding more water would not be successful, since the initial mortar discharge would have too high a fluid content for the same to be satisfactory.

It has been found, however, that if the conventional leather packing is replaced by a resilient rubber disc having a tapered peripheral edge, that improved results will occur. It has further been found that if the maximum diameter of the peripheral edge of the disc is disposed adjacent the forward edge of the plunger, that an effective seal, or barrier against water flow, will be created, with the result that minimal water escapement will occur during the dispensing operation. Consequently, the consistency of all mortar dispensed will be substantially uniform due to the lack of water loss during discharge.

It accordingly becomes a principle of this invention to provide an improved type of dispensing gun that is designed primarily for use in dispensing a cement type of mortar, with the gun being characterized by the provision

2

of resilient sealing means between the plunger or piston portion of the device and the interior of the supply barrel thereof.

Production of a dispensing gun having the above characteristics accordingly becomes the principal object of this invention, with other objects becoming more apparent upon a reading of the following brief specification, considered and interpreted in the light of the accompanying drawings.

Of the drawings:

Figure 1 is a side elevational view partly broken away and in section and illustrating the improved mortar gun.

Figure 2 is a fragmentary vertical section showing the relationship between the plunger and the barrel portion of the gun.

Figures 3 and 4 are fragmentary vertical sections showing the position of the component parts during various stages of operation.

Referring now to the drawings and in particular to Figure 1 thereof, the improved dispensing gun, generally designated by the numeral 10, is shown including a handle portion 11 and a barrel portion 12; the arrangement being such that actuation of trigger member 13 will cause axial shifting of shaft 14 within barrel 12, with plunger or piston means 15 moving with shaft 14 to reduce the volume of barrel 12 and, accordingly, force compound within barrel 12 into discharge opening 16. In this regard, it is to be understood that any conventional handle, barrel, trigger and shaft assembly may be employed as long as the actuation of trigger member 13 serves to axially advance the shaft 14 to the right of Figure 4. Accordingly, the conventional ratchet and dog arrangement between trigger 13 and shaft 14 may be employed, although the same is not illustrated since the same, per se, does not form a part of the invention.

Referring next to Figures 2, 3 and 4 for a detailed description of the plunger means 15, it will be seen that the same are, as previously indicated, concentrically received over the projecting end 14a of shaft 14, with shaft 14 further including a bolt 14b and a threaded portion 14c for purposes to be described. Accordingly and referring to Figure 2, it will be seen that a circular backup plate 20 has the aperture 20a thereof received over threaded portion 14c of shaft 14 so as to have a face 20c thereof abutted against enlarged portion 14d of shaft 14. A resilient disc 21, preferably of rubber and having a central aperture 21a, is similarly passed over threaded portion 14c so as to have the face 21b thereof abut the face 20b of backup plate 20, and additionally, a pressure plate 23 has aperture 23a thereof received over shaft 14 so that face 23b thereof may abut face 21c of disc 21 as shown in Figure 2.

In this manner the inherent resiliency of the resilient rubber disc 21 will constantly exert a separating pressure so as to constantly urge the pressure plate 23 towards a condition of maximum separation from the backup plate 20 during the time that the disc 21 is compressed. Compression of this disc 21 is effectuated by tightening of the nut 25 and the position of this nut limits the axial separation of the pressure plate 23.

For the purpose of creating a seal between plunger 15 and the interior cylindrical wall 12a of barrel 12, the peripheral edge surface 22 of disc 21 is shown axially tapered between a maximum diameter feathered edge portion 22a and a minimum diameter dimension 22b, with the minimum diameter portion 22b of edge 22 being illustrated disposed adjacent plate 20, while the maximum diameter portion 22a thereof is shown disposed adjacent pressure plate 23. In this regard, the surface 23c of pressure plate 23 is preferably engaged by washer 24, while at least one nut 25 is threaded on threaded portion 14c to retain the piston members in the position of Figure 2.

3

In use or operation of the improved dispensing gun, the component parts are first assembled to the position as shown in Figure 1, with plunger means 15 being assembled on end 14a of shaft 14. To fill the interior of the barrel 12, it is merely necessary that the cap and spout member 16 be removed and the handle moved to the left of Figure 1 so that the plunger 15 is disposed adjacent the left end of barrel 12. At this time, mortar may be placed in the empty barrel 12 and the same filled and then recapped for use. Accordingly, at this time, movement to the right of plunger 15, by moving trigger 13, will cause ejection of mortar through spout 16.

Accordingly, and referring now to Figure 3 wherein mortar M is shown positioned ahead of the piston 15, it will be seen that upon moving of the disc 21 in the direction of the arrow in Figure 3, that a reaction force will be exerted by mortar M against surface 21c, which will cause a deflection of the peripheral edge surface 22a of the condition of Figure 3, with such distortion being exaggerated for the purpose of illustration. In Figure 3, it will be noted, however, that the point of the feathered edge surface 22a has now been deformed into wiping contact with surface 12a as a result of the pressure applied and, accordingly, even as continued axial pressure is applied on the plunger 15 by advancing trigger 13, it will be difficult for water content in mortar M to escape around the deformed and compressed peripheral edge 22 of the disc 21. In this regard, it is to be noted that the disc 21 will have a greater degree of sealing contact with the internal wall 12a when acting under pressure than when the same is in the normal position shown in Figure 2. Accordingly, in the operation of the device during discharge, the situation exists where the pressure of the mortar being compressed causes a reaction against the disc to deform the same into greater sealing contact with the surface 12a, with the result that the sealing pressure of edge 22 will be increased in direct proportion to the increase in sealing pressure applied against the mortar. In this manner, adequate sealing pressure will be automatically maintained at all times so as to preclude escape of water from the mortar.

Accordingly, as the plunger 15 advances towards the right of Figure 1, the volume within barrel 12 will be progressively reduced so that mortar will be forced out of spout 16 for application as desired.

With reference to Figure 4, it is to be noted that the same illustrates a still further advantage of the invention.

In this regard, the pressure plate 23 has been axially moved towards the backup plate 20, with the result that the disc 21 has been axially compressed to result in a corresponding overall radial expansion thereof. As a result of this radial expansion, a greater sealing contact is initially obtained between edge 22a and interior wall surface 12a. It follows, however, as before that a progressive increase in sealing beyond this point will occur as additional axial pressure is applied by mortar M against surface 21c of disc 21 so that as greater pressure is applied on the mortar, an equivalent increase in the degree of sealing between disc 21 and barrel 12 will also occur.

The preferred embodiment also contemplates that the diameter of the pressure plate 23 be less than the diameter of either the backup plate 20 or the resilient disc 21. This feature has been found to have the particular advantage of permitting the mortar M to exert an axial force against surface 21c. As this axial force increases, a corresponding increase in radial dimension will occur, with the result that a greater degree of sealing contact will be automatically obtained upon an increase of axial pressure during ejection of the mortar M. While best results have been obtained by using the diameters shown in the drawings, it is to be understood, however, that the inventive concept is not limited to the particular diameter shown, since it is believed manifest that the mortar M also exerts an axial pressure against face

4

23c, which would, in turn, be directed against face 21c of disc 21 to accordingly cause radial expansion of the same.

While a full and complete disclosure of the invention has been set forth in accordance with the dictates of the patent statutes, it is to be understood that the invention is not intended to be so limited.

Accordingly, where appropriate, modifications of the invention may be resorted to without departing from the spirit hereof or the scope of the appended claims.

What is claimed is:

1. In combination with a mortar gun having a barrel, a discharge spout and a shaft reciprocal interiorly of said barrel; a backup plate received on said shaft; a rubbery disc received on said shaft in concentricity with said backup plate and having one face thereof abutted against a face of said backup plate while the peripheral edge thereof engages the internal wall of said barrel in sealing relationship therewith; a pressure plate received on said shaft in concentricity with said backup plate and said disc and having one face thereof abutted against said remaining face of said disc whereby said disc is disposed between said backup and pressure plates in concentricity therewith; said pressure plate having its peripheral edge surface spaced inwardly from the peripheral edge of said disc, whereby an exposed pressure receiving face is defined by the peripheral edge of said disc; means for moving said pressure plate relatively of said shaft, said backup plate and said disc whereby said disc may be axially compressed and radially expanded; said disc being radially expandable in direct proportion to the amount of pressure applied against said pressure receiving edge thereof, said rubbery disc urging said pressure plate towards a condition of maximum separation from said back-up plate during the time said rubbery disc is axially compressed.

2. The device of claim 1 further characterized by the fact that the axial edge of said disc tapers radially outwardly to a maximum diameter dimension that is disposed in the plane of the face thereof that abuts said pressure plate.

3. The device of claim 1 further characterized by the fact that said pressure plate is of a smaller diameter than said backup plate.

4. A plunger mechanism for use on a shaft of a mortar gun that includes a barrel within which said shaft reciprocates, comprising; a backup plate received on said shaft; a rubbery disc received on said shaft in concentricity with said backup plate and having one face thereof abutted against a face of said backup plate; a pressure plate received on said shaft in concentricity with said backup plate and said disc and having one face thereof abutted against said remaining face of said disc whereby said disc is disposed between said backup and pressure plates in concentricity therewith; said pressure plate having its peripheral edge surface spaced inwardly from the peripheral edge of said disc, whereby an exposed pressure receiving face is defined by the peripheral edge of said disc; means for moving said pressure plate relatively of said shaft, said backup plate and said disc whereby said disc may be axially compressed and radially expanded; said disc having an axially extending peripheral edge surface that tapers in radial dimension between minimum and maximum diameters; said maximum diameter portion being disposed in the plane of said face abutting said pressure plate and contacting the internal wall of said barrel, said rubbery disc urging said pressure plate towards a condition of maximum separation from said backup plate during the time said rubbery disc is axially compressed.

5. A mortar gun of the character described, comprising; a hollow barrel having a discharge spout at one end thereof; a shaft disposed within said barrel and having a piston provided at one end thereof; sealing means carried by the peripheral edge of said piston and engag-

5

ing the internal wall of said barrel; means for advancing said shaft, said piston and said sealing means axially of said barrel as a unit; and means for axially compressing and radially expanding said sealing means in direct proportion to the amount of pressure applied axially there-
 5 against; said last mentioned means including a pressure plate shiftably carried by said shaft in concentricity with said piston and said sealing means and being operable against said sealing means during axial shifting thereof relatively of said shaft; said pressure plate being
 10 urged away from said piston and said sealing means during the period that said sealing means are axially compressed.

6. A method of maintaining the water consistency of mortar during the discharge thereof from a cylinder
 15 upon the movement of a piston that is shiftably axially of said cylinder and that has its peripheral edges in sealing contact with the wall of said cylinder, comprising the step of; progressively axially compressing and radial-

6

ly expanding said piston, whereby the peripheral edges thereof will be progressively urged into tighter sealing contact with said cylinder; said progressive axial compression and radial expansion occurring in response to
 5 pressure variations applied axially of said piston by said undispensed mortar.

References Cited in the file of this patent

UNITED STATES PATENTS

2,309,446	Ekkebus -----	Jan. 26, 1943
2,361,126	Klein -----	Oct. 24, 1944
2,635,787	Bryant -----	Apr. 21, 1953
2,714,474	Sundholm -----	Aug. 2, 1955
2,728,493	Spurgeon -----	Dec. 27, 1955
2,759,640	Deupree -----	Aug. 21, 1956
2,767,890	Carter -----	Oct. 23, 1956

FOREIGN PATENTS

468,627	France -----	Apr. 29, 1914
---------	--------------	---------------