

April 26, 1938.

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2,115,591

GUN FOR DISCHARGING PLASTIC COMPOSITIONS

Filed June 21, 1935

2 Sheets-Sheet 1

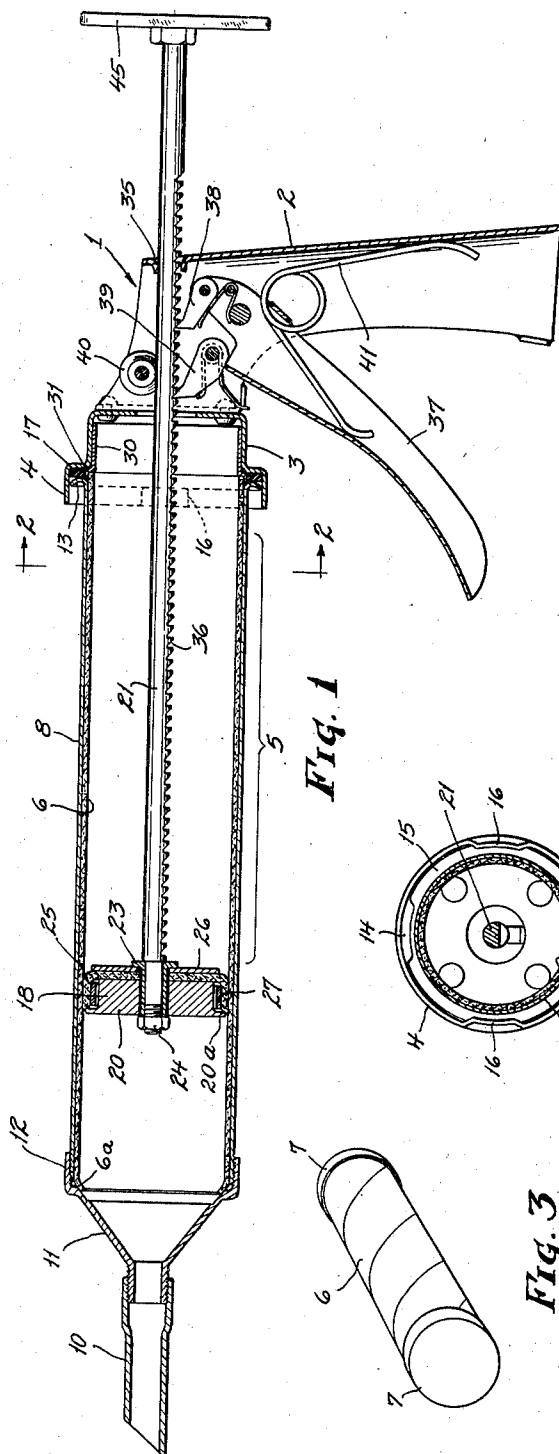


Fig. 1

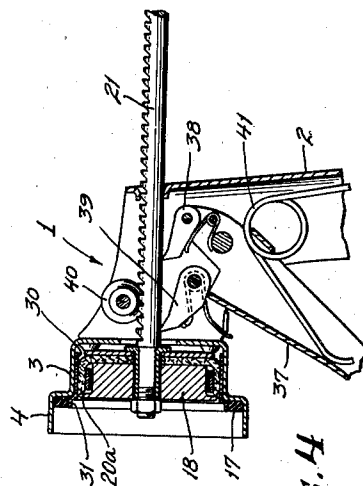


Fig. 4

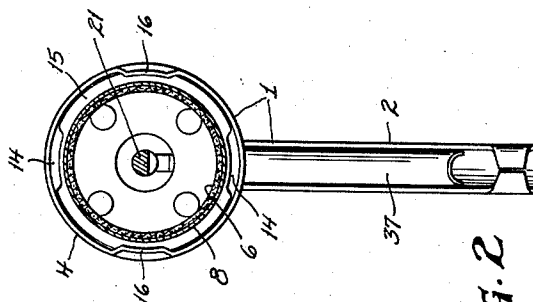


Fig. 2

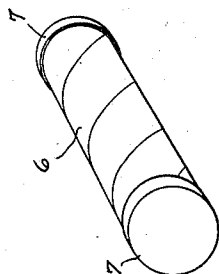


Fig. 3

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2 Sheets-Sheet 2

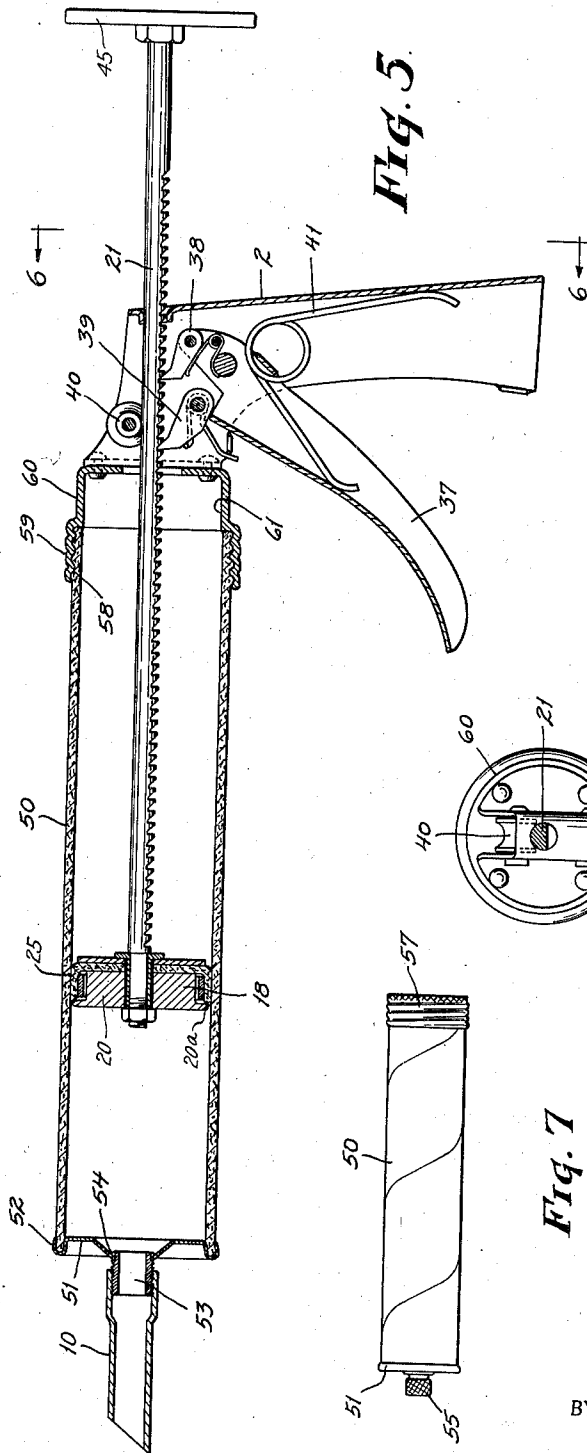


Fig. 5.

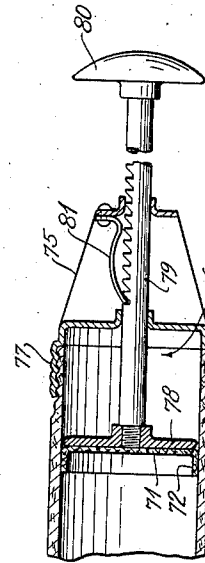


Fig. 6

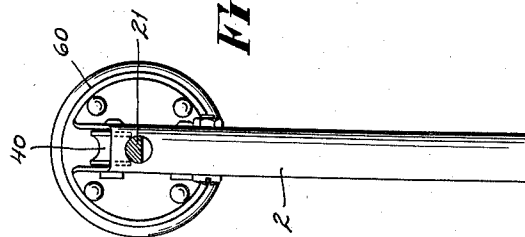


Fig. 7

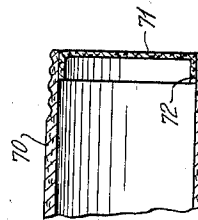


Fig. 8

Fig. 9

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GUN FOR DISCHARGING PLASTIC COMPOSITIONS

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Application June 21, 1935, Serial No. 27,713

1 Claim. (Cl. 18—3.5)

The principal object of this invention is to provide an improved and simplified system and apparatus for placing plastic or highly viscous material into relatively restricted spaces e. g., as in caulking joints in building construction and maintenance. Pipe and conduit fitting, and window glazing with plastic material are specific examples. The invention also contemplates facilitating the handling and application of heavy lubricating grease.

Ordinarily, in caulking joints, the caulking material is applied to the joints by means of a suitable pressure operated gun or applicator. It is exceedingly difficult to load such guns with caulking material when supplied in bulk, due to the peculiar character of the material. Special pumps are sometimes provided to transfer the material from the bulk containers to the guns and sometimes the pistons of the guns are adapted to suck the material into the guns. In any case, the loading operation is inconvenient and time taking. A further loss of time is occasioned by the workmen traveling from their work to the bulk supply.

A specific object is to provide a system and apparatus by which materials of a very sticky and viscous nature, such as creosote, tar, asphalt, pitch and various compounds of the same, and like materials, may be supplied to the workmen in more convenient form and applied by them to the work without material loss of time and without likelihood of loss of any part of the material.

The invention contemplates supplying the workmen with such plastic materials in discardable containers, each holding a sufficient amount of material for one charge of the gun, the major portion (and/or all) of the discardable container, becoming in fact, a part of the gun.

The invention further contemplates greatly reducing the waste of time ordinarily experienced in having to load such guns and to clean them of accumulated material that has become so firmly congealed as to prevent further efficient use of the gun.

A further object is to provide a piston arrangement in connection with a discardable container adapted to serve as the barrel of an applicator or gun, of the class shown, which piston will be certain to properly enter the container and be slid through it, even though the wall of the same be irregular—say scuffed or wrinkled at its end or on its inside surface near its end.

A further object is to provide a novel and extremely simple adapter for a plunger operated

type of gun, such as will enable a discardable container to be effectively used as part of the gun mechanism in cooperation with the plunger.

Still another object is to provide a novel discardable container for plastic material, which container is especially adapted to operate effectively in conjunction with parts of plunger operated guns of various types, and which may be adapted to displace certain of the parts ordinarily required to form complete guns to the ends of greatly reducing initial cost, service cost, operating cost, etc. of such guns.

Further specific objects include the provision of a discardable shipping container for materials, such as mentioned, portions of which container are adapted to serve as barrel, piston, nozzle, etc. parts of a gun in applying the material to the work,—all without necessitating increased expense in forming, filling or sealing the container.

Other objects and features of the invention will become apparent from the following description relating to the accompanying drawings, showing the preferred forms. The essential characteristics are summarized in the claim.

Referring briefly to the drawings, Fig. 1 is a central sectional view of a suitable applicator-gun apparatus, incorporating the invention; Fig. 2 is a transverse sectional view thereof, as indicated by the line 2—2 on Fig. 1; Fig. 3 is a perspective view of the discardable container proper, with conventional end closures; Fig. 4 is a fragmentary view similar to Fig. 1, showing only the breech mechanism of gun, and with the piston or plunger in restricted position; Fig. 5 is a view similar to Fig. 1, showing a modified structure; Fig. 6 is a sectional end elevation thereof, taken as indicated by the line 6—6 on Fig. 5; Fig. 7 is a side elevation of a modified plastic material container with end closures in position thereon; Fig. 8 is a central sectional view of one end of a further modified container, and Fig. 9 is a fragmentary sectional view of the breech portions of a still different gun mechanism adapted for example, to cooperate with the container of Fig. 8.

Referring to Figs. 1 to 4,—1 indicates generally the breech mechanism of a suitable gun. This includes a hollow stock provided with a cup-shaped shell or breech 3 having an enlargement 4 forming part of a detachable coupling between the stock and the barrel 5.

The discardable container for the plastic material (see Fig. 3) comprises a non-metallic tube 6, as of paper, cardboard, plastics or the like,

having end closures 7 of conventional cup-like form, telescoping the ends of the tube. The cylindrical wall of the tube 6 may comprise the entire barrel of the gun or merely a liner for a relatively rigid barrel member 8 comprising say a steel shell, this being the form illustrated in Fig. 1.

The discharge end of the gun (at the left in Fig. 1) comprises, as shown, a tubular applicator snout or nozzle 10, suitably formed in accordance with the nature of the work to be done, and this may be screw-threaded to a frustro-conical adapter 11 having a rim or flange 12 shown as threaded onto the end of the shell 8.

The rear end of the shell 8 has an outwardly and forwardly curved flange 13, forming a bell-mouth to facilitate the entrance of the discardable tube 6, and the flange is mutilated as at 14, Fig. 2, so as to form separate flange sections 15 to cooperate with indented portions 16 on the rim portion 4 of the breech member 3. The shell 8 may thus be coupled with the breech after the manner of a bayonet lock, and a yielding gasket is provided at 17 adapted to be clamped between the flange 13 and the vertical wall of the enlargement on which the rim 4 is formed. The flange sections 15 and indentations 16 are relatively inclined in a well-known manner to effect compression of the gasket.

The piston or plunger 18, by which the gun may be operated, is adapted to be retracted (by means to be later described) so that it may be positioned wholly within the breech shell 3 (see Fig. 4) after the contents of a container tube 6 have been discharged. The piston fits the container tube snugly to effect such discharge.

In order to use the gun, the operator merely removes the caps 7, detaches the barrel 5, and slips the tube 6 into the rear bell-mouthed end of the metal shell. The cylindrical portion of the discardable tube is of such length that the outermost end of it is peripherally compressed, as at 6a, into the conical surface of the adapter 11. The material of the tube, being flexible, forms a valve-like sealing means between it and the adapter to prevent any material from being forced around the outside of the tube 6 or between the tube and the metal shell, upon the building up of pressure on the plastic material in the tube.

The piston, in this form of apparatus, may comprise a head 20, suitably swivelled on the operating rod or stem 21, as on a sleeve 23 held in place on the stem by an end nut 24. The head is provided with the usual flanged washer 25 of flexible material having a rigid backing disc 26 adjacent a flange on the sleeve 23. The flexible flange of the washer 25 is pressed outwardly by an appropriate annular spring 27, so as to bear tightly on the inner wall of the container tube 6.

Just ahead of the skirt of the flanged washer 25 the head 20 of the piston is enlarged as at 20a partly to form a retaining flange for the spring 27. An important function of the flange 20a by reason of the fact that it extends radially nearly to the wall of the discardable tube 6 and is rounded on its front side about as shown, is that the skirt of the washer 25 will be certain to properly enter the tube, notwithstanding irregularities—as ridges or fins—on the wall of the tube. The metal flange 20a irons out or flattens such irregularities before the skirt reaches them.

An important feature of the invention is the relationships between the piston 18, the inner cylindrical surface of the breech member 3 and the inner surface of the tube 6. In the withdrawn

position of the plunger, above described, the flanged washer 25 peripherally seats into the smaller diameter portion of the shell 3, the coacting surface, as shown, being formed by a separate sleeve 30 firmly seated in the shell 3. The sleeve has a shouldered enlargement 31 at its forward end, the rim of which overlaps the rear marginal surface of the discardable tube 6 as a retainer and the shoulder is adapted to abut the end of the tube and shoves the tube to final position 10 when the barrel and breech are connected, as above described. In withdrawing the piston into the sleeve 30, the flange of the washer is contracted, (compressing the spring 27), due to the fact that the inner diameter of the sleeve 30 is smaller than the inside diameter of the discardable tube. The importance of this is that when the gun is again loaded and the barrel attached to the breech, the piston may be progressed out of the sleeve 30 into the inside surface of the frangible tube, and in sealing relation to it, but without danger of damaging the inner end or marginal surface of the tube in so doing.

Rearwardly from the breech shell 3, as shown in Figs. 1 and 4, the piston or plunger stem 21 extends through a suitable guiding opening 35 in the rear wall of the stock 2, and a pawl and ratchet mechanism contained in the stock operates on a set of ratchet teeth 36 on the lower side of the stem to express the plastic material from the discardable tube.

The operating mechanism, as shown, comprises a trigger-like lever 37 pivoted to the stock and having a spring-pressed pawl 38 at its upper end adapted to engage the teeth 36 and progress the piston on counter-clockwise movement of the lever, there being a spring detent pawl at 39 pivoted to the stock to retain the forwardly thrust position of the piston. A reaction roller 40 may be mounted in the stock above the stem 36, adapted to ride on the upper cylindrical surface of the stem for preventing binding of the stem in the opening 35 of the stock. The operating lever has a spring 41 to hold it normally in the illustrated position.

To facilitate returning the piston to retracted position, after the container tube 6 has been emptied, a suitable handle 45 is provided at the free end of the stem, by which the stem may be turned through a degree sufficient to disengage the ratchet teeth from both pawls 38 and 39 (see Fig. 4) whereupon the plunger may be withdrawn by pulling on the handle.

It is to be understood that I may make the metal shell rigid with the breech and provide the necessary detachable connection (say one like that shown between the shell 8 and the breech shell in Fig. 1) between the adapter 11 e. g. and the shell.

In the modified form shown in Figs. 5 to 7, no rigid outer tube, such as the shell 8 of the previously described construction is shown, but the discardable cartridge or container has a much heavier wall, and is in fact sufficiently heavy to withstand the pressure of the plastic material on it while said material is being expressed from a considerably restricted nozzle orifice. Such heavier walled container is shown at 50, and may be closed at one end, for shipping, by a sheet metal end wall member 51, sealingly secured to the cylindrical wall of the tube as by a continuous folded gripping flange 52, or by a threaded connection, as desired. The central aperture of the end wall is provided with a threaded or tapped nipple 53, rigidly secured thereto and adapted for

attachment of the nozzle or applicator 10 and to receive a suitable closure cap 55, or threaded plug (not shown), for shipment.

The rear end of the container 50 has a conventionally "round threaded" cap 57, say of sheet-metal, this being, for example, the same as frequently used in mailing tubes.

The breech shell 60 is modified to the extent of providing internal threads at 59 to match those of the container tube 50; and the cylindrical surface 61 which receives the piston in the retracted position thereof is (as shown in full lines) formed on the shell itself, rather than on a separate sleeve within the shell. The cylindrical surface 61 is sufficiently smaller than the inside diameter of the tube 50 to function, as does the surface of the sleeve 30, previously described, in contracting the flanged washer of the piston.

In order to use the modified gun, the cap 55 and closure 57 are removed, the nozzle 10 is simply screwed onto the nipple 53, in place of the cap 55, and the tube 50 is screwed tightly into the breech shell 60.

The operating mechanism for the modified gun is, as shown, the same as that previously described, and the parts are designated as in Figs. 1 and 4. Likewise, the operation of both guns is the same, except for differences already made note of.

If desired, the applicator snout or nozzle may be of the reversible type commonly used on oil cans for household use, wherein the snout has a double skirted shank (not shown) internally threaded at both ends and adapted to close the end of the container (as by being screwed onto the nipple 55) in two positions, one of which places the snout inside the container. By using such reversible snout as part of the container, the operating mechanism of the gun would comprise a self-contained unit, with no spare parts to become carelessly lost or mislaid.

Referring to Figs. 8 and 9, Fig. 8 shows the discardable shipping tube 70 as closed at one end by a cup 71, say of paper, the flange or rim 72 of which inwardly telescopes the tube. This cup may comprise the entire end closure or an additional cap may be used (like 57, Fig. 7 e. g.) so that the cup 71 may be—when supplied to the workman—wholly unattached to the wall of the tube. The cup is adapted to serve essentially as does the flanged washer of the piston heretofore

described, and since it is filled on the inside with the plastic material contained in the tube, it needs no special support to function as the entire piston in connection with some suitable means to shove it through the tube.

The closure member 71 may, if desired, be reversed,—so that the flange 72 extends outwardly instead of inwardly (not illustrated),—with the result that it will be easier to push the closure through the tube, although the surfaces of both the closure and tube are somewhat rough and the material forming both, or either of these parts, is highly frangible or easily distorted.

As shown in Fig. 9, the tube 70 is mounted in a breech device 75 in the manner of mounting the tube in the Fig. 5 arrangement, and the breech has a space 76 rearwardly of its threaded portion 77, which houses a pusher plate 78 in the retracted position of the latter. The plate may be carried on a suitable stem or rod 79 slidably mounted in the breech, so as to be operated directly by hand (as shown) or by suitable mechanism as desired. A pusher head 80 is shown on the free end of the operating stem and the stem is provided with a spring detent device operating in ratchet teeth on the stem and disengageable therefrom to permit withdrawal of the plate 78 by means of its stem.

It may be mentioned that if the cup device 71 has its flange cemented into place, so as to seal the end of the tube 70 for shipment, it is an easy matter for the workman to break the cup loose by means of the plate and stem as an initial operation in discharging the contents of the tube.

I claim:

A dispensing apparatus for plastic material, comprising a relatively long barrel adapted to receive a shipping tube containing plastic material to be dispensed, and a breech device having a relatively short barrel and a plunger head retractable therein and adapted to move into the tube, to express its contents, a flange on the long barrel and a cup shaped flange on the shorter barrel said flanges engaging each other as a bayonet lock, a compressible sealing ring in the cup shaped flange which ring is compressed when the bayonet lock connection is established, and a shouldered sleeve inside the shorter barrel having a relatively enlarged cup-shaped portion which telescopes the adjacent end of the tube.

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