

Oct. 30, 1956

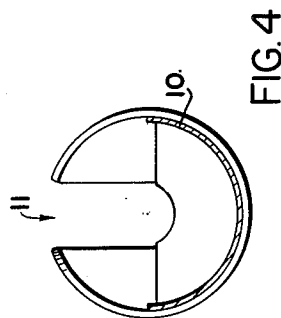
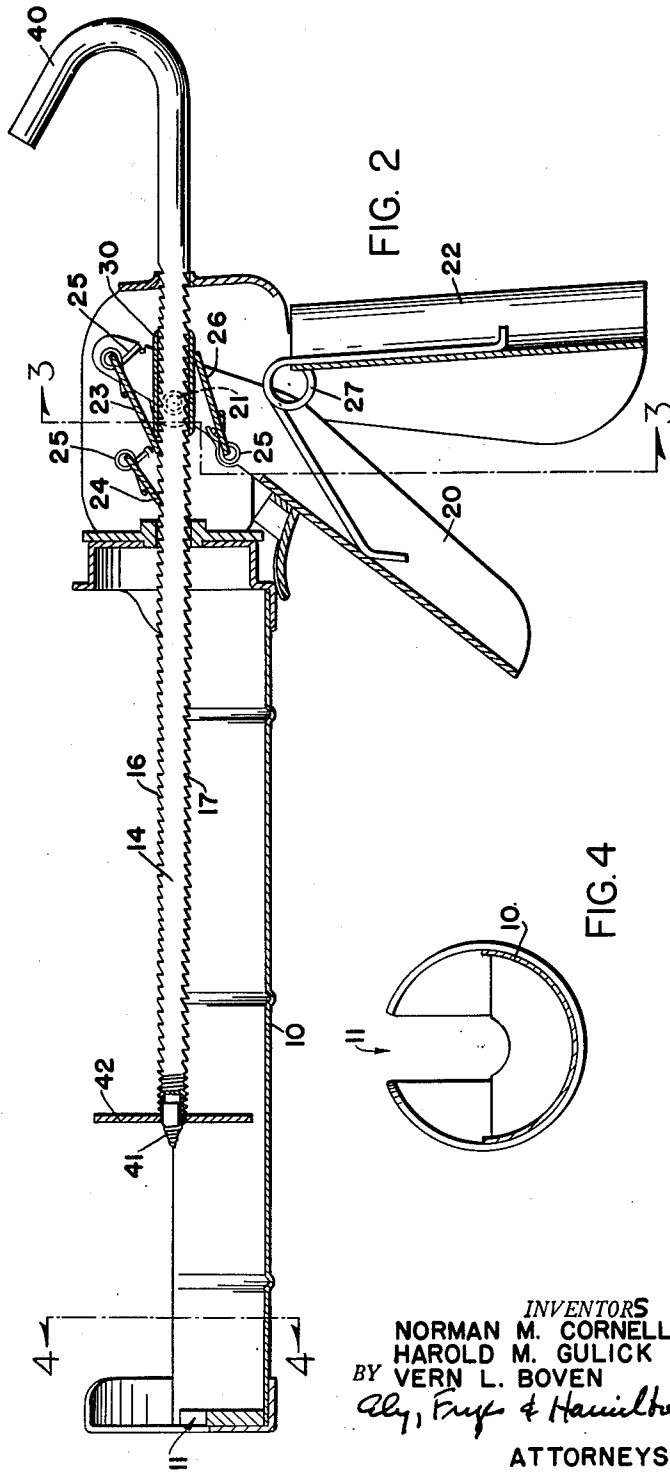
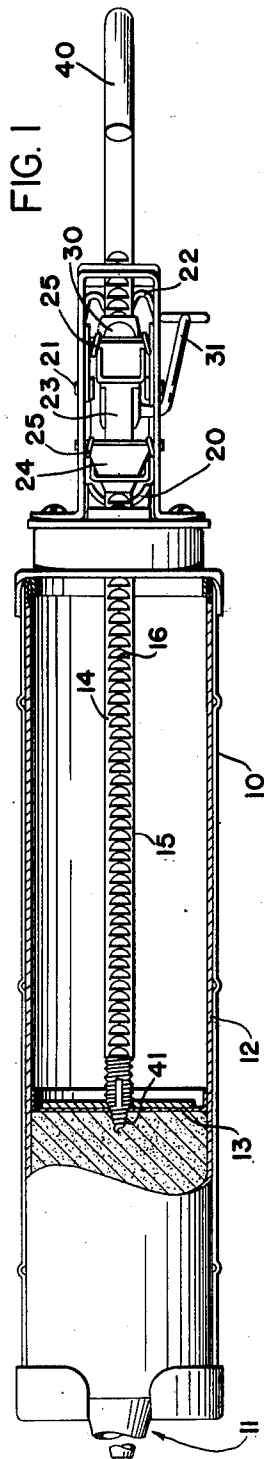
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CALKING GUN

Filed Feb. 27, 1953

3 Sheets-Sheet 1



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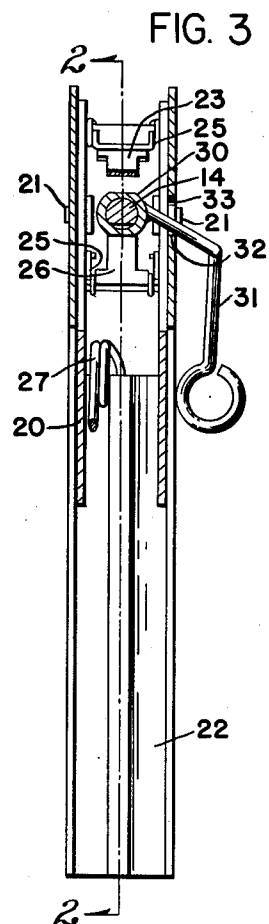
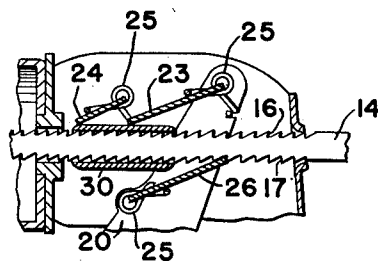
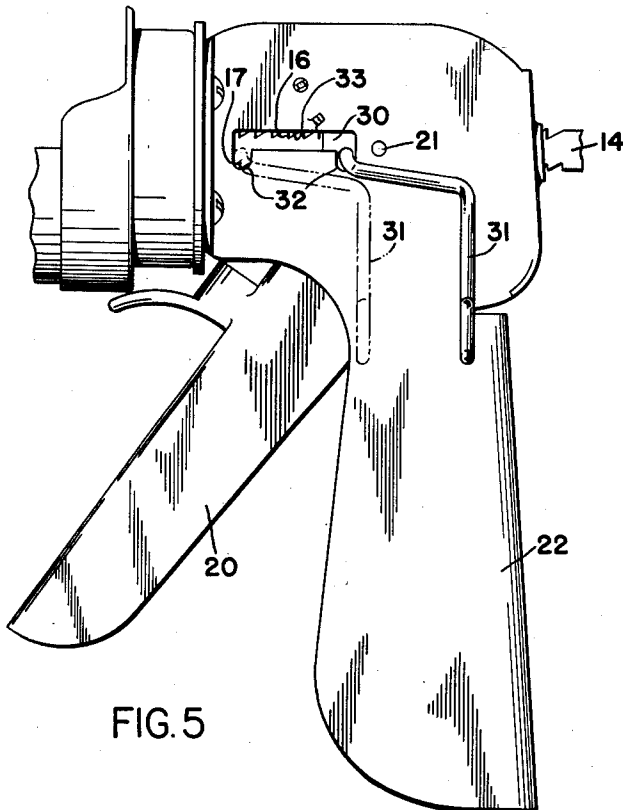
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3 Sheets-Sheet 2



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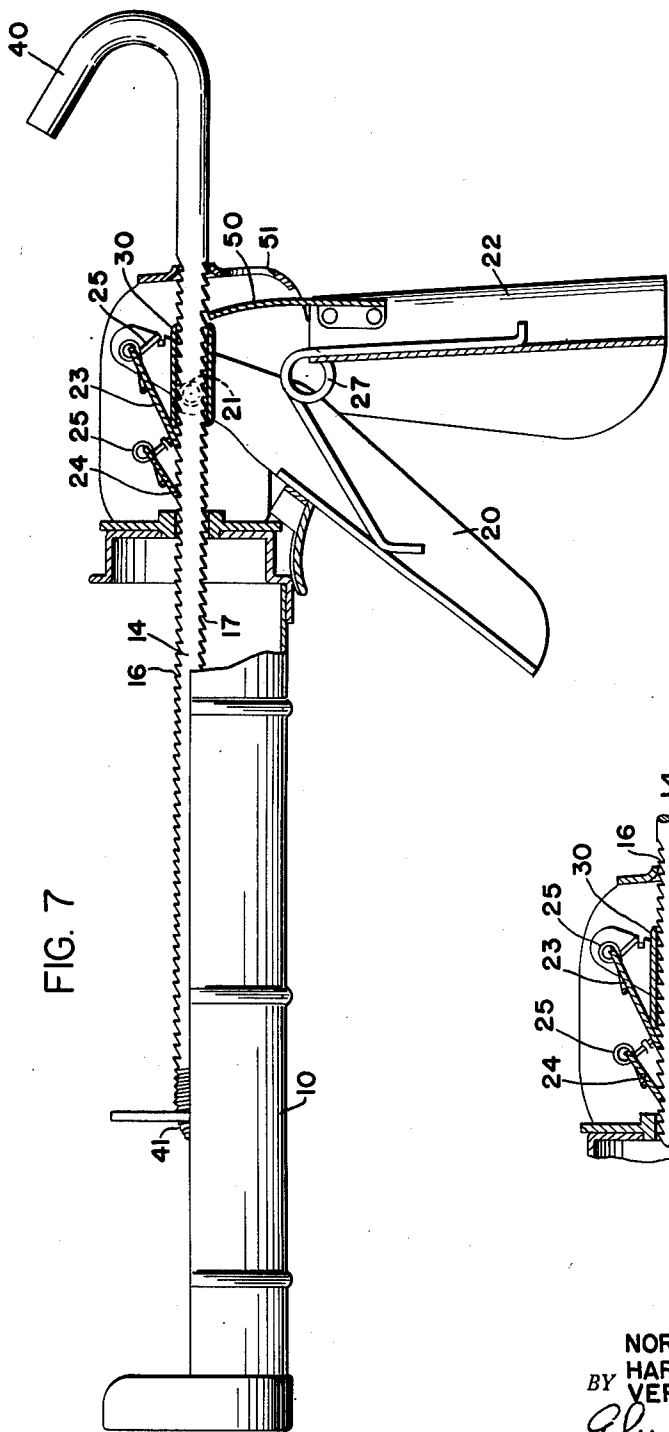


FIG. 7

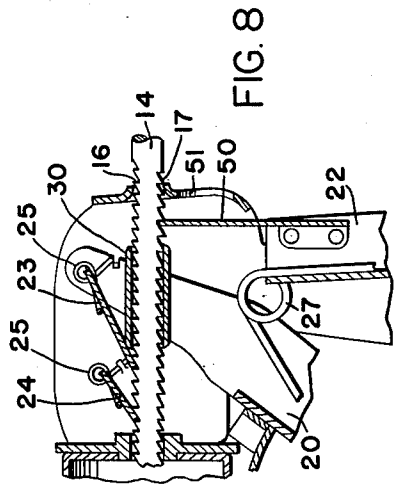


FIG. 8

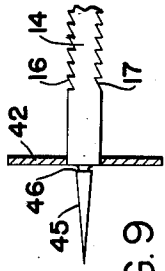


FIG. 9

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1

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## CALKING GUN

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8 Claims. (Cl. 222—80)

The present invention relates to dispensers of the type generally known as calking guns and is most particularly adapted to a calking gun structure designed to be used with interchangeable cartridges of calking material.

The invention may employ a conventional calking cartridge in the form of a paper, metal or plastic tube having at one end an internal cap or sliding closure adapted to act as a plunger to extrude calking material and at the other end a discharge opening through which extrusion takes place. Frangible or removable sealing means is provided at the discharge end of the cartridge so that the cartridge forms a convenient shipping container for calking material.

A difficulty encountered in the use of calking guns, both designed to employ cartridges and those having a self-contained calking compound chamber, is that calking compound tends to continue to flow out the discharge end of the gun for a short time after gun actuation is discontinued. This afterflow is the result of the deformation of the wall of the cartridge or calking compound chamber during gun actuation due to the pressure to which the compound is subjected. The wall, in returning to its unstressed conformation when actuation is discontinued, pumps an additional unwanted increment of compound through the discharge chamber. This action is augmented by whatever compressibility the calking compound itself may have. Afterflow of the calking compound is wasteful and messy and therefore very undesirable.

In attempts to remedy the problem of afterflow, calking guns have been provided in which the advancing pusher rod which engages the plunger may be disengaged from its manually actuated driving elements at the conclusion of gun actuation. Pressure in the cartridge or calking compound chamber is thus relieved to some extent in that the plunger may be pushed back by the compound as the walls of the cartridge or chamber return to their normal position. This arrangement somewhat reduces the amount of afterflow. It does not, however, eliminate afterflow because, at the same time the calking compound expands backward against the plunger, it also expands forward through the discharge opening.

The object of the present invention is to provide a calking gun of simple and inexpensive construction which is adapted to completely and positively eliminate the occurrence of afterflow following gun operation. Our invention involves the provision of a plunger actuating rod which may be advanced by a manual squeeze mechanism and may also be retracted by either a manual squeeze or spring operated drive and yet which is adapted to positively engage the blank wall presented by a cartridge plunger so that the plunger is positively actuated in whatever direction, advancing or retracting, the actuating rod may be driven. The elimination of afterflow by positive bi-directional actuation coupled with the adoption of such positive actuation to calking guns of the cartridge loaded type together make possible the provision of a dispenser structure which has all the con-

2

venience of a cartridge loaded gun but which eliminates the occurrence of afterflow. The elimination of afterflow through the bi-directional actuation feature is also of distinct advantage in calking guns and other dispensers not of the cartridge loading type.

Other objects and advantages of the invention will appear in the following specification and accompanying drawings in which:

Figure 1 is a top view, partially in section, of a calking gun embodying the invention.

Figure 2 is a sectional side view taken on line 2—2 of Figure 3.

Figure 3 is a sectional end view taken on line 3—3 of Figure 2.

Figure 4 is a sectional end view taken on line 4—4 of Figure 2.

Figure 5 is a side view of the grip portion of the gun illustrated in Figures 1—4.

Figure 6 is a view similar to the upper right hand portion of Figure 2 and showing the parts in an alternative operative position.

Figure 7 is a side view, partially in section, of a calking gun similar to the one illustrated in Figures 1—6 but embodying certain additional structural features, which features may be either alternative or supplemental to certain elements of the gun structure illustrated in Figures 1—6.

Figure 8 is a view similar to the upper right hand portion of Figure 7 and showing the parts after they have been spring-retracted from the position shown in Figure 7.

Figure 9 illustrates an alternative form of push-pull coupling.

The illustrated calking gun is designed to be used with calking compound cartridges which are inserted in the holder or bail 10 and discharge out the end 11. The discharge end of each calking compound cartridge 12 may have a plugged discharge spout which is unplugged when the gun is used or it may contain a sealing diaphragm which is ruptured either by insertion in the gun or by the pressure which results when the gun is actuated. Other arrangements may be employed so that each cartridge 12 remains sealed until it is actually used in the gun.

Calking compound cartridges are generally in the form of a paperboard, metal or plastic sleeve and include a sliding plunger or thin stamped metal flanged diaphragm 13 designed to be engaged by the gun actuating rod or ratchet bar 14 and thus to be displaced along the cartridge to force the compound out the discharge orifice. Before use of the cartridge, the plunger 13 serves as a seal or closure for the end of the cartridge opposite to the discharge end.

The gun actuating rod or ratchet bar 14 has oppositely disposed upper and lower ratchet teeth 16 and 17 and smooth cylindrical sides 15. The ratchet bar extends through a body portion integral with the grip handle 22 and terminates in a hooked handle end 40. The cartridge holder or bail 10 is also fixed to this body portion. An actuating lever 20 is pivoted at 21 to the handle grip 22. Pivotaly mounted on the lever 20 is an actuating pawl 23 and a return pawl 26. As illustrated, both these pawls are constrained by suitable wire springs 25 to move in a clockwise or ratchet engaging direction relative to the actuating lever 20. A holding pawl 24 is pivoted on the grip body 22 and is also spring urged into constant engagement with the ratchet bar 14. A large spring 27 urges the actuating lever to its open position.

A pawl-shifting sleeve 30 is movable between forward and rear positions by the latch arm 31. The latch arm 31 may be engaged in its forward and rear positions in the catches 32 formed in the wall of the grip body 22 at the ends of the large latch arm slot 33. The sleeve 30

3

is shown in its rear position in Figure 2. In this position the return pawl 26 is held out of engagement with the ratchet bar 14. When the sleeve 30 is shifted to its forward position, the return pawl 26 rises into engagement and the driving pawl 23 and holding pawl 24 are lifted out of engagement with the ratchet bar 14. Thus, with the sleeve in the position shown in Figure 2, actuation of the arm 20 will intermittently advance the bar 14 to discharge the calking compound in the cartridge 12, the holding pawl 24 preventing return of the bar after each advancement. With the sleeve in the position shown in Figure 6, actuation of the arm 20 will retract the bar 14 through engagement of the pawl 26.

Numerous cartridge-type calking guns have previously been provided which include an intermittent grip or ratchet feed to discharge the gun. However, as previously pointed out, when these guns were actuated to build up pressure in the cartridge and to discharge calking compound, the cartridge walls were deformed outwardly. Upon conclusion of a given calking operation, the walls tended to return to their normal shape and, in doing so, drove out an additional unwanted afterflow of compound. In an attempt to solve this problem, pressure relief areas were provided so that the cartridge plunger actuating rod was relieved of all driving engagement. The pressure in the cartridge was thus relieved partially by backward movement of the actuating bar. However, this pressure still tended to further relieve itself by some afterflow out the gun orifice.

We have positively eliminated afterflow by the provision for a slight positive backward movement of the actuating bar and cartridge plunger at the conclusion of a given calking operation.

As will be understood from the drawings, the arrangement of the pawls 23, 24 and 26 and the circular cross-section of the ratchet bar 14 enables the ratchet bar to be manually rotated about its axis by use of the hooked handle end 40. The possible rotation of the ratchet bar enables it to be displaced quickly in either direction when desired. This free rotation may also be utilized in conjunction with an interlock between the ratchet bar 14 and the cartridge plunger 13, engagement and disengagement of the interlock being functions of the relative rotative positions of the bar and plunger. Thus, for example, cooperating flanges may be provided on the bar and plunger to constitute a bayonet fastening engageable and disengageable by relative rotation. Alternatively, the illustrated threaded screw end 41 may be provided on the plunger-engaging end of the ratchet bar 14. After insertion of a fresh cartridge in the gun, the ratchet bar is manually thrust forward so that the tip of the screw end 41 slightly penetrates the thin wall of the plunger 13. The ratchet bar is thereupon rotated to thread the plunger 13 up into firm engagement with the backing plate 42 provided adjacent the forward end of the ratchet bar.

Other couplings, such as the coupling illustrated in Figure 9, may be employed for push-pull engagement between the bar and plunger. In the coupling illustrated in Figure 9, a wedging pin 45 replaces the screw tip 41. A notch near the base of the wedging pin 45 has a steeply pitched forward side or shoulder 46. After insertion of a cartridge in the gun, the ratchet bar is advanced either by actuating the lever 20 or by pushing forward the handle 40. The plunger diaphragm 13 is thereupon pierced and its center portion is also deflected slightly forward by the pin 45. Upon full penetration, the deflection of the plunger diaphragm is relieved by the base notch so that the diameter of the opening pierced in the diaphragm becomes slightly less than the diameter of the outer periphery of the shoulder 46. Engagement between the backing plate 42 and the plunger diaphragm 13 advances the plunger diaphragm upon further advance of the ratchet bar 14. Engagement between the plunger diaphragm and the steeply pitched

4

shoulder 46 retracts the plunger diaphragm upon retraction of the ratchet bar 14. After the compound within the cartridge 12 is exhausted, the operator fully retracts the ratchet bar and upon engagement of the plunger with an end trim ring 18 (see Figure 1) on the rear open end of the cartridge or, if there is no such ring, with the bail flange 19, the central portion of the plunger diaphragm will be deflected rearwardly by the shoulder 46 (see Figure 1) and thereupon withdrawal and release of the pin 45 will occur.

It will be noted that the return pawl 26 has no corresponding holding pawl. A holding pawl corresponding with pawl 26 may be provided but such a holding pawl is not necessary for return movement because that degree of movement obtained by engagement and driving of one lower ratchet tooth 17 is fully adequate to obtain positive and complete relief of pressure in the cartridge. Thus, the operator at the conclusion of the calking operation flips the sleeve 30 from its rear to its forward position and actuates the lever 20 only once to effectively prevent afterflow. The sleeve 30 is, of course, returned to its rearward position before subsequent calking operations are performed.

A number of variations in specific structural features of our calking gun construction may be made without departing from the scope of the invention. For instance, positive plunger return and pressure relief may be accomplished through the provision of a spring loaded return drive which may either merely supplement or entirely replace and improve upon the return pawl 26. As illustrated in Figures 7 and 8, such a spring loaded return drive may take the form of a relatively heavy spring strip 50 affixed at its lower end to the rear wall of the handle grip 22 and extending upwardly into the path of the ratchet teeth 17. Upon advance of the ratchet bar 14 the spring strip 50 is deflected by each successive passing tooth 17. Spacing between the strip 50 and the holding pawl 24 is such that when the holding pawl is fully engaged in a valley between two of the upper ratchet teeth 16, the strip 50 is approaching its point of greatest deflection by the lower ratchet tooth 17 with which it is in engagement, as shown in Figure 7. Thus, upon release of the pawl 24 by actuation of the latch arm 31 at the conclusion of a calking operation, the ratchet bar 14 will be automatically retracted a short distance by the spring strip 50 independently of any actuation by a return pawl (see Figure 8). During loading when it is desired to rotate the ratchet bar 14, any binding caused by the spring strip 50 can be obviated by pressing inwardly on this strip through an opening 51 in the rear wall of the body portion 22. The ratchet bar 14 will remain free to be quickly advanced or retracted through use of the hook handle portion 15.

Other variations in the specific structural features of the invention we have disclosed (such as the substitution of alternate types of intermittent grip drives) may suggest themselves to those familiar with calking guns or similar manually operated dispensers. Accordingly, our invention is not to be limited to our specific disclosure but is to be defined solely by the scope of the following claims.

What is claimed is:

1. A calking gun adapted to employ calking compound cartridges each having a slidable plunger wall, said calking gun comprising a gun body, means fixed to said body to receive a calking compound cartridge, a ratchet bar having oppositely disposed longitudinally extending upper and lower ratchet teeth and a circular transverse cross-section, said bar being slidably mounted on said gun body, a tapered portion terminating in a point at one end of said bar whereby, when a cartridge is mounted in said gun, said bar may be thrust toward said plunger wall to cause said wall to be pierced by said tapered pointed means and said rod may thereupon be advanced into push-pull engagement with said plunger wall, said body in-

5

cluding a pistol-grip portion, a lever pivoted on said body and spring-urged away from said pistol-grip portion whereby said pistol-grip portion and said lever define a squeeze grip, the pivotal axis of said lever passing transversely through said bar whereby points on a first portion of said lever below said pivotal axis move in a direction relative to said bar opposite to the direction in which points on a second portion of said lever above said pivotal axis move relative to said bar, a driving pawl pivoted to said lever on said second lever portion and spring-urged into engagement with said upper ratchet teeth, a holding pawl pivoted to said body portion above said ratchet bar and spring-urged into engagement with said upper ratchet teeth, a return pawl pivoted to said lever on said first lever portion and spring-urged into engagement with said lower ratchet teeth, a sleeve on said bar, an arm fixed to said sleeve and extending to one side of said gun body, said sleeve being movable by pressure on said arm to a first position to hold said driving pawl and said holding pawl out of engagement with said upper ratchet teeth and to a second position to hold said return pawl out of engagement with said lower ratchet teeth, said ratchet bar and plunger wall being thereby intermittently advanced by actuation of said squeeze grip when said sleeve is in said second position and being retracted by actuation of said squeeze grip when said sleeve is in said first position.

2. In a dispensing device for plastic matter, a dispenser body including a hand grip portion, an actuating lever movable relative to said grip portion, an actuating bar extending through said dispenser body and reciprocable in pushing and pulling piercing engagement with a manually pierceable plunger member adapted to move through a chamber initially filled with said plastic matter, means supporting said chamber on said dispenser body, selective control means, manually driven means to intermittently advance said actuating bar and plunger member upon actuation of said actuating lever when said selective control means is in a first position and means to retract said actuating bar and plunger member when said selective control means is in a second position.

3. A dispensing device as defined in claim 2 in which said means to retract comprises a manually driven intermittent grip retracting drive, said means to intermittently advance being engaged with said actuating bar and said intermittent grip retracting device being disengaged from said actuating bar in said first position of said selective control means, said means to intermittently advance being disengaged from said actuating bar and said intermittent grip retracting drive being engaged with said actuating bar in said second position of said selective control means.

4. A dispensing device as defined in claim 2 in which said means to intermittently advance said actuating bar includes a disengageable holding grip member normally urged into engagement with said actuating bar to hold said bar in positions to which it is advanced, said means to retract comprising spring means biased by advance of said actuating bar and adapted to return to unbiased position and thereby retract said actuating bar upon release of said bar from said holding grip member.

5. A calking gun adapted to employ calking compound cartridges each having a slidable manually pierceable plunger wall, said calking gun comprising a gun body, means fixed to said body to support a calking compound cartridge, an actuating rod slidably mounted on said body, one end of said rod being disposed toward the manually pierceable plunger wall of a gun supported calking compound cartridge, pointed means at said one end of said rod whereby, when a cartridge is mounted, said rod may

6

be thrust toward said plunger wall to cause said wall to be pierced by said pointed means and said rod may thereupon be advanced into push-pull engagement with said plunger wall, manually operated intermittent grip means mounted on said body to intermittently advance said rod upon actuation of a squeeze grip lever, said squeeze grip lever being mounted for pivotal movement relative to said body, means carried on said body to lift said intermittent grip means from holding engagement with said rod, and means carried on said body to retract said rod upon lifting of said intermittent grip means from holding engagement with said rod.

6. A calking gun adapted to employ calking compound cartridges each having a slidable manually pierceable plunger wall, said calking gun comprising a gun body, means fixed to said body to support a calking compound cartridge, an actuating rod slidably mounted on said body, one end of said rod being disposed toward the manually pierceable plunger wall of a gun supported calking compound cartridge, pointed means at said one end of said rod whereby, when a cartridge is mounted, said rod may be thrust toward said plunger wall to cause said wall to be pierced by said pointed means and said rod may thereupon be advanced into push-pull engagement with said wall, selective control means carried on said body, manually operated intermittent grip means mounted on said body to intermittently advance said rod upon actuation of a squeeze grip lever when said selective control means is in a first position, said squeeze grip lever being mounted for pivotal movement relative to said body, and means carried on said body to retract said rod upon moving said selective control means to a second position.

7. A manually operated device for dispensing calking compound from a chamber through which moves a manually pierceable compound-expelling plunger comprising a body adapted to mount said chamber, an actuating rod slidably relative to said body and carried on said body, one end of said actuating rod having coupling means for manual advancement into piercing push-pull engagement with said plunger, manually operable intermittent grip drive means mounted on said body to intermittently advance said actuating rod to push said plunger, withdrawing means mounted on said body and engageable with said actuating rod to retract said actuating rod upon disengagement of said intermittent grip drive means from said actuating rod, and grip lifting means carried on said body to selectively engage and disengage said intermittent grip drive means and said actuating rod.

8. A manually operated device for dispensing viscous matter from a chamber through which moves a manually pierceable matter-expelling plunger comprising a body adapted to mount said chamber, an actuating rod slidably relative to said body, one end of said actuating rod having means for pierceably engaging said plunger both for pushing and pulling of said plunger, manually operable intermittent grip drive means mounted on said body to intermittently advance said actuating rod to push said plunger, withdrawing means mounted on said body and engageable with said actuating rod to retract said actuating rod upon disengagement of said intermittent grip drive means from said actuating rod, and grip lifting means carried on said body to selectively engage and disengage said intermittent grip drive means and said actuating rod.

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