May 6, 1947. W. E. SHERBONDY 2,420,203

DISPENSING APPARATUS FOR PLASTIC MATERIAL

Filed July 10, 1944 2 Sheets-Sheet 1

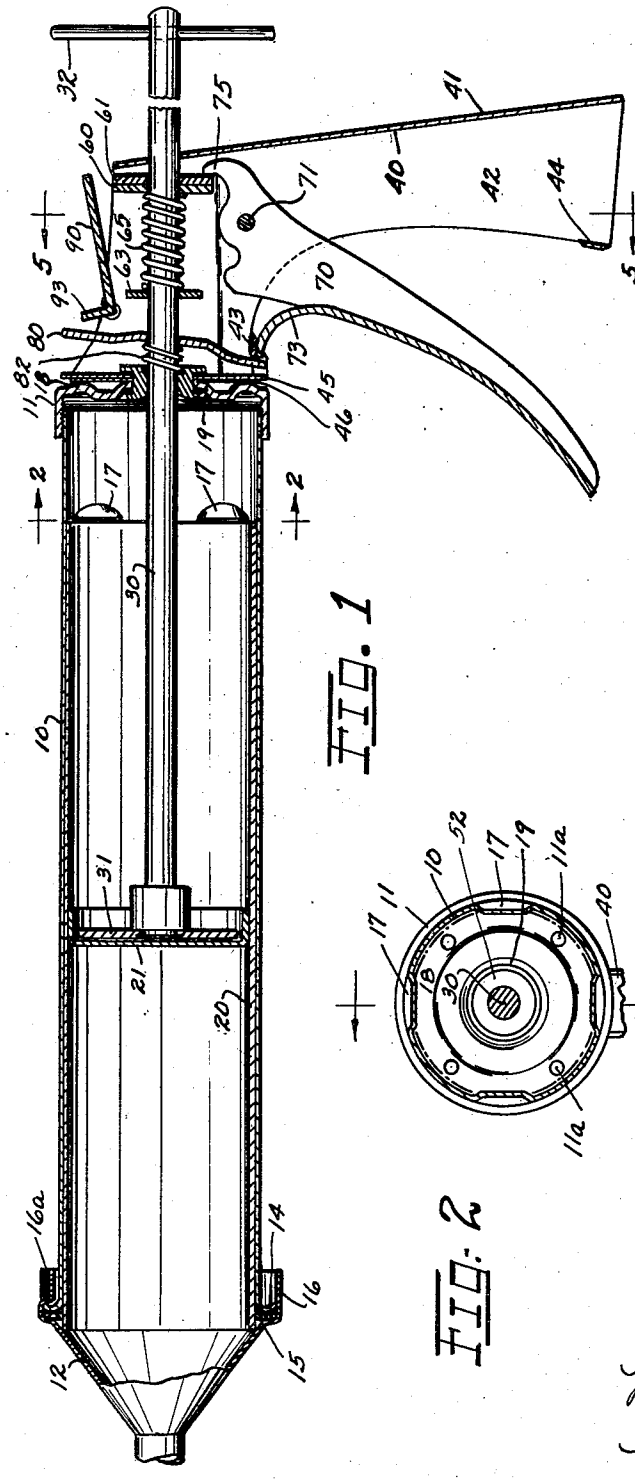


FIG. 1

FIG. 2

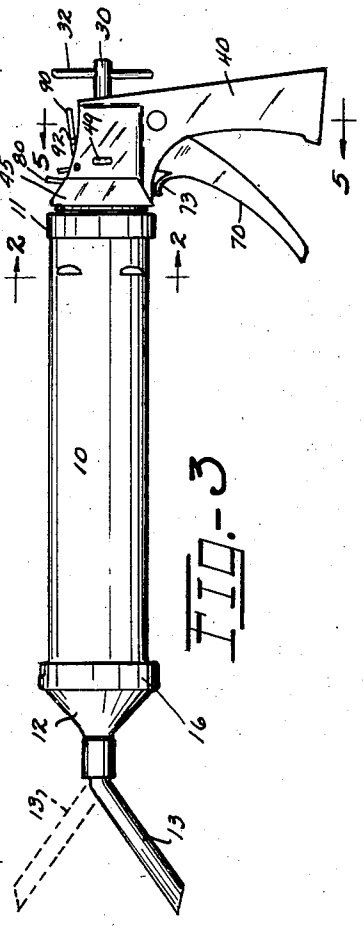


FIG. 3

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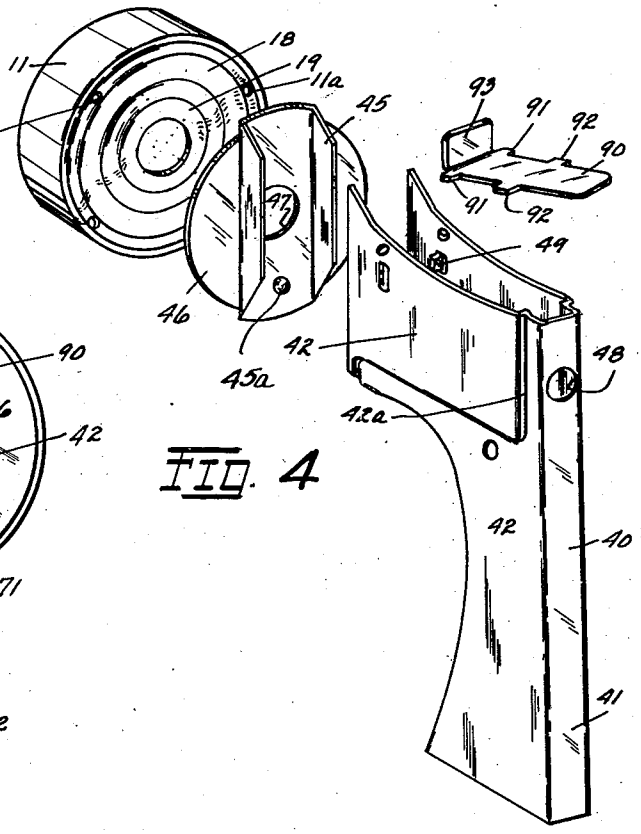


FIG. 4

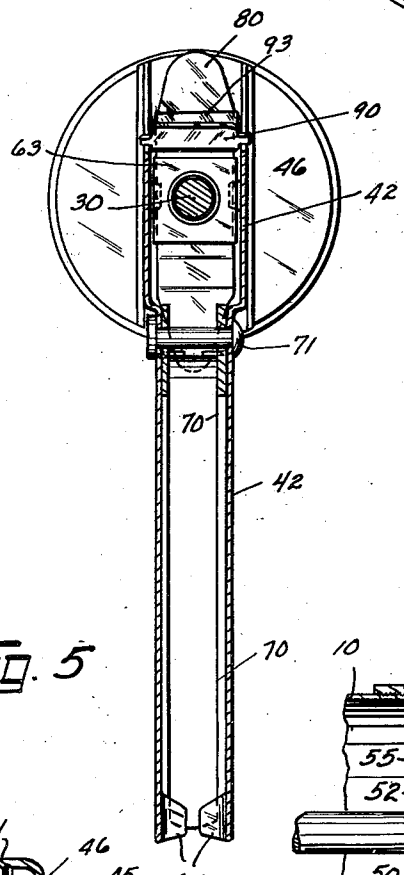


FIG. 5

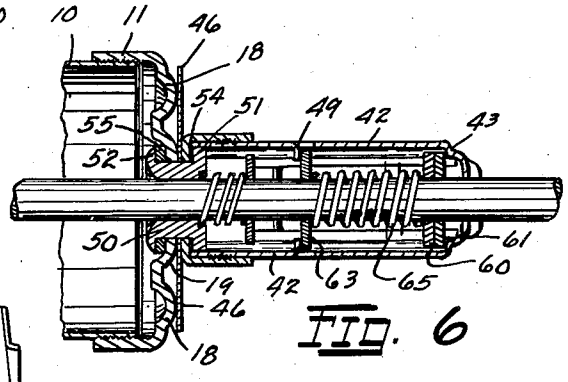


FIG. 6

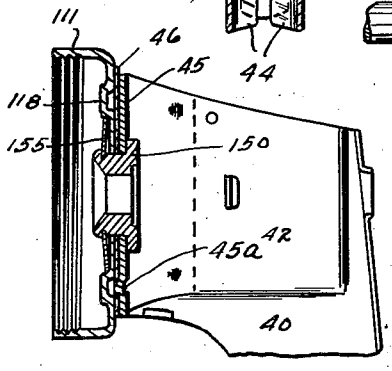


FIG. 7

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UNITED STATES PATENT OFFICE

2,420,203

DISPENSING APPARATUS FOR PLASTIC MATERIAL

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Application July 10, 1944, Serial No. 544,291

13 Claims. (Cl. 222—323)

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This invention relates to a device of the type commonly called a gun for dispensing plastic materials such as caulking compound, grease, etc. It is a primary object of the invention to provide such a device in an extremely simple and at the same time efficient form which may be cheaply constructed of a minimum number of parts.

My device comprises a barrel having a plunger expelling the material therefrom and a hand grip connected to the barrel and carrying manually operated mechanism adapted to operate the plunger. A further object of the invention is to provide for the swiveling of the hand grip to the barrel, so that an oblique nozzle at the discharge end of the barrel may extend in any desired direction relative to the hand grip.

In my gun, a rod for the plunger extends through the head of the gun and past the operating mechanism, and a lever mounted in the hand grip acts on means to engage and advance the rod for each operation of the hand lever, while a suitable detent mechanism retains the gain made on each stroke. A simple device is provided to throw out the retaining device enabling the rod and plunger to be drawn back ready for a fresh load of material in advance of the plunger. My invention includes the mechanism I have provided for this purpose, all of which will be hereinafter more fully explained in connection with a preferred embodiment of the device illustrated in the drawings.

In the drawings, Fig. 1 is a longitudinal central section through my gun; Fig. 2 is a cross section thereof in a plane indicated by the line 2—2 on Fig. 1 or Fig. 3; Fig. 3 is a side elevation on a smaller scale of the complete gun; Fig. 4 is a separated perspective of various associated parts, comprising the hand grip, the swivel connection, the barrel cap and the throw-out device; Fig. 5 is a section through the hand grip and parts of the operating mechanism in an up-and-down plane indicated by the line 5—5 on Figs. 1 and 3; and Fig. 6 is a horizontal axial section through the operating mechanism and the swivel connection of the cap; Fig. 7 is a detail of a slightly modified form of swivel connection.

In Figs. 1, 2 and 3, 10 designates the barrel of the gun, to one end of which is secured a cap 11 carrying the hand grip with the operating mechanism and to the other end of which is secured a cap 12, of funnel-shape and leading to a discharge nozzle 13. The cap 11 is shown as screw-threaded to the barrel. The cap 12 is removably connected to the barrel preferably by a breech-lock connection. As shown, the barrel

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10 is flanged outwardly at the discharge end at 14, there being a suitable washer 15 between such flange and an annular ledge on the discharge cap, and the cap has a cylindrical flange 16 extending beyond the barrel flange. The cap flange is provided with inwardly projecting portions 16a, Fig. 1, inclined at the forward edge. These projections may pass through notches in the barrel flange, and thereafter, by turning the cap, ride on the rear face of the barrel flange, thus making a tight connection.

The material fed by my gun is preferably contained in a paper cartridge shoved into the barrel from the discharge end when the cap 12 is removed. Such cartridge is shown in Fig. 1 at 20. Its rear end rests against inward bosses 17 of the gun barrel; its outer end projects through the washer 15 and abuts the conical wall of the cap 12, preventing the passage of any discharging material backwardly along the outside of the cartridge.

The paper cartridge contains a flanged paper plug 21 within it at its rear end. Suitable paper caps (not shown) preferably cover the two ends of the cartridge when shipped or stored, these caps being removed before the cartridge is inserted in the barrel. The cartridge is inserted in the direction to bring the internal plug to the rear where it lies in position to be engaged by the plunger and forced along the cartridge. Fig. 1 shows such plug after it has been progressed about half way in the cartridge.

The internal plug 21 is progressed in the cartridge to exude the contents by means of an axial operating rod 30 slidably mounted in the cap 11 and having at its forward end a disc 31 slightly smaller in diameter than the internal diameter of the flange of the plug 21 and adapted to bear against such plug and force it lengthwise of the cartridge.

The hand grip of the gun, designated 40 as a whole, comprises a single piece of sheet metal doubled on itself to provide a flat back 41 and two parallel side portions 42 which enter and are secured to a channel-shaped piece 45. I prefer to weld the channel piece to the two side arms 42 of the hand grip to the flanges of the channel piece so that the handle portion, and the channel, form in effect one rigid piece.

The complete handle described is swiveled to the cap 11, there being an intermediate rub-disc 46, the disc and channel piece having registering central openings 47. As shown in Figs. 1 and 6, this is effected by a bushing 50 which has a rear head 51 overlapping the web of the channel mem-

ber and a forward head 52 overlapping the cap. Fig. 6 shows a washer 54 between the rear flange 51 and the channel web and a washer 55 between the forward flange 52 and the cap. The disc is locked to the handle against independent rotation, for instance, by a lug 45*a* on the channel piece entering an opening in the disc.

I have shown the cap in Figs. 1 and 6 as stiffened by concentric deformations, thus there is an outwardly bowed concavo-convex annular portion 18; then a substantially flat annular portion; then the body of the cap adjacent the opening for the bushing is domed outwardly as at 19 to be tangent to the same plane as the annular rib 18. The disc 46 is preferably of brass and bears against the high portions of the outward ribs as shown in Fig. 6, and thus provides a good non-freezing rubbing engagement with the cap.

The turning of the barrel and cap with reference to the handle causes circumferential sliding between the disc 46 and the outer face of the cap, and between the bushing and the handle or between the bushing and the cap, at one or the other or both of the interposed washers. In place of the swivel connection described, I may employ the modification shown in Fig. 7, hereinafter described in detail. In either case the barrel is connected tightly enough to the handle so that it will not normally turn with reference thereto but may be turned as desired to cause an oblique nozzle to extend in any direction, as indicated by the broken lines in Fig. 3.

The operating rod 30 extends outwardly through the open space between the side members 42 of the handle and out through a rear opening 48 (Fig. 4) in the hand grip. Surrounding the rod within the handle are a plurality of loose feeding plates, two being shown at 60 and 61, and some distance in front of these plates is a cross plate 63 bearing against lugs 49 (Fig. 6) partially severed from the hand grip sides 42 and turned inwardly. Between the plate 63 and the plate 60 is a helical compression spring 65 surrounding the rod. This spring normally presses the plate 60 and 61 back to the limit of their movement, this limit being provided by shoulders formed on the hand grip.

The plates 60, 61 and 63, are rectangular in cross section and their vertical edges terminate just inside of the side members 42 which are offset outwardly in this region, as indicated at 42*a*. The outward offset provides a pair of vertical shoulders against which the plate 61 bears.

To operate the plates 60 and 61, to cause them to bite into the rod and feed it forwardly, I provide an operating lever 70 into the hand grip to which they are pivoted by a cross pin 71. The operating lever has at its rear top end a projecting tongue 75 which extends upwardly across the rear face of the plate 61. The spring 65 acting on the plates therefore normally holds them in their rearmost position and also holds the lever 70 swung into the forward position shown in Fig. 1. The openings through the feeding plates are only slightly of greater internal diameter than the external diameter of the rod and the plates are hardened to insure retaining abrupt edges at the openings.

When the operator grasps the grip and with his fingers pulls the lever the result is that the plates become cocked slightly, the lower portions swinging forwardly and this causes their edges at the central openings to bite into the rod, so that their continued movement, as they are

shoved forwardly against the action of the spring, shoves the rod and plunger forwardly.

By employing a plurality of feeding plates, I divide the pressure on the rod and avoid marring it while obtaining an equivalent feeding action. I also lessen the stress on any individual plate and allow them to be made narrower than otherwise, which is an advantage in reducing the size and weight of the apparatus.

To retain the gain made by each actuation of the lever, I provide a detent pawl 80 which comprises a plate located between the side arms of the hand grip extending in a general up-and-down direction and having an opening to embrace the rod, the lower end of this plate extending downwardly in front of lugs 43 on the hand grip sides 42. A helical compression spring 82 surrounds the rod and bears at its forward end against the bushing 50 and at its rear end against the detent plate.

It results from the construction described that as the hand lever is drawn into the hand grip its upward tongue cants the driving plates 60, 61, so that they bite into the rod and force it forwardly, the rod passing freely through the loose plate 80. Then at the end of the stroke, as the operator releases his hold on the lever and the forward stress on the rod ceases, the light spring 82 forces the detent plate 80 rearwardly, causing it to grasp the rod and retain it against backward movement. Thus the continuous reciprocation of the lever forces the rod forward by a ratchet action to exude the plastic from the gun. I provide suitable breather openings 11*a*, Fig. 2, in the cap 11, to prevent any pneumatic binding of the plunger, as it moves forwardly.

It will be noticed that the intermediate portion of the trough-shaped lever near the upper end is partially severed and bent forwardly, as shown at 73 in Fig. 1, and the upper end bears against a stop which may be provided by the lugs 43 formed on the two side members of the hand grip and bent inwardly therefrom. The forwardly curved portion 73 also forms a protecting guard for the operator's fingers. An inward stop for the lever's movement is provided by inward lugs 44 at the lower front corners of the hand grip.

To release the detent 80 and allow the forwardly positioned rod to be drawn backwardly, I provide a throw-out device 90, Figs. 1, 3 and 4, which comprises an L-shaped plate having a pair of side lugs 91 occupying openings in the side members of the hand grip. The drawings show this throw-out device in idle position, side lugs 92 of the plate 90 resting on the top of the side members of the hand grip.

To use the throw-out device its rear end is simply swung upwardly and forwardly, causing its short forward portion 93 to engage the detent plate 80 and cam it forwardly to idle position. Accordingly, whenever the cartridge has been completely discharged by the plunger reaching the far end thereof, the operator merely turns up the throw-out plate 90 rendering the detent idle then the rod is free to be drawn back. The rod is provided near its rear end with a cross rod 32 which may be engaged by the operator's fingers for this purpose.

In Fig. 7 is shown a modified form of swivel connection between the cap and hand grip. In the construction of this view, the hand grip 40, 42, the channel-shaped fitting 45 welded thereto, and the brass washer 46 are the same as in the other embodiment. The cap 111 differs from

the cap 11 in that the reinforcing rib 118 is indented inwardly, leaving a flat face on the exterior of the cap which rubs against the brass washer. The bushing 150 differs slightly from the bushing 50, and in place of a flat washer 55 between the inner face of the cap and the inner head of the bushing I have provided a tempered crowned spring 155. The inner periphery of this spring occupies an anular seat in the bushing, while the outer periphery bears against the cap adjacent the shoulder provided by the inward annular offset 118. The spring is dish-shaped, comparatively stiff, and well tempered so that it produces considerable inward longitudinal stress on the bushing and thus maintains a substantially tight connection between the hand grip and cap while allowing the swiveling action desired.

It will be seen that my gun is extremely simple. The special formations on the different parts of the hand grip provide shoulders and pivot points where needed without the necessity for additional parts. By making the feeding and detent members merely plates embracing the rod, I provide a cheap construction of feeding parts and avoid any expense of notching the operating rod, and by making these different operating plates of substantially rectangular form I guide them by the side portions of the hand grip member. The swivel connection in either of the forms shown is readily made and causes the entire handle and operating mechanism to be effectively maintained in proper relation to the barrel cap without danger of inadvertent displacement while allowing a reasonably rotating force applied to the barrel to turn it as desired.

I claim:

1. In a dispensing apparatus, the combination of a barrel, a hollow hand grip connected thereto, a plunger within the barrel, a rod for operating the plunger extending through the upper portion of the hand grip, said hand grip having a pair of spaced side portions offset outwardly to provide shoulders adjacent the rear of the handle, a feeding plate loosely surrounding the rod and located between the side portions of the handle, a spring for normally pressing said plate against said shoulders, a lever carried by the handle, operable to cant said plate and feed it forwardly and means for retaining the gain effected by such feeding.

2. In a dispensing apparatus, the combination of a barrel, a plunger therein, a handle connected to the barrel, the plunger having a rod extending across the handle, the handle having a pair of spaced side plates respectively on opposite sides of the rod, feeding mechanism mounted within the handle for engaging the rod to feed the same forwardly, a detent plate loose within the handle having an opening surrounding the rod, a spring between the barrel and detent plate normally holding it in engagement with the rod, a throw-out device pivoted to the side plates of the handle having an operating portion and a projecting arm adapted when the device is operated to engage the detent plate and cam the same forwardly against the action of its spring to release the rod.

3. In a dispensing apparatus, the combination of a barrel having a cap, a plunger-operating rod extending from the barrel outwardly through the cap, a hollow handle comprising a sheet member doubled on itself to provide a back and two side portions, the forward ends of the side portions being connected to the cap, said side portions in their upper regions being offset-outwardly, a feeding plate surrounding the rod and normally bearing against shoulders provided by the outward offset of the upper side portions of the handle, an abutment plate within the handle having its ends positioned by shoulders on the side plates, and a compression spring between the abutment plate and the feeding plate.

4. In a dispensing apparatus, the combination of a barrel, a cap therefor, a handle composed of sheet material doubled on itself in two regions to provide a back and two side portions, a channel-shaped member to which the forward ends of the side portions are secured, a disc in front of the channel-shaped member secured to it and bearing against the outer face of the cap, a bushing extending through the channel-shaped member, disc and cap, said bushing having an inner head in front of the cap and an outer head behind the channel shaped member, a washer between one of said heads and the adjacent member, whereby a swiveling action is effected, a plunger within the barrel, an operating rod therefor extending outwardly through the bushing and between the two side arms of the handle, mechanism within the handle for engaging the rod to feed it forwardly, and means for retaining the gain made by the feeding mechanism.

5. In a dispensing apparatus, the combination of a cap adapted to be secured to a barrel, said cap having an inward annular rib formed on its head, a handle, a bushing extending through the handle and cap having a head on the outer side of a portion of the handle, and a tempered crowned spring on the inner side of the cap having its inner periphery engaging the bushing and its outer periphery lying against the inner side of the cap within a boundary provided by said inward annular rib of the cap.

6. In a dispensing apparatus, the combination of a cap adapted to be removably secured to a barrel and stiffened by an annular deformation in its transverse portion, a handle, a disc on the outer side of the cap bearing against said cap and extending across said deformation and a bushing for securing the handle, disc and cap together and providing a swivel connection between the handle and cap while allowing for the passage of an operating rod.

7. In a dispensing apparatus, the combination of a barrel, a cap therefor, a handle composed of a piece of material doubled on itself in two regions to provide a back and two side portions, a channel-shaped member to which the forward ends of the side portions are secured, a disc in front of the channel-shaped member bearing against the outer face of the cap, a bushing extending through the channel-shaped member, disc and cap, said bushing having an inner head in front of the cap and an outer head behind the channel-shaped member whereby a swiveling action is effected and means provided for the passage of a rod to operate a plunger in the barrel.

8. In a dispensing apparatus, the combination of a barrel, a plunger-operating rod extending out of the barrel, a handle carried by the rod, an operating lever pivoted to the handle, mechanism actuated by the lever to grip the rod and feed it into the barrel when the lever is drawn toward the handle, a detent device comprising a plate having an opening surrounding the rod, a fixed abutment carried by the handle which the detent plate engages on one side of the rod, a spring acting on the detent plate and tending

to force it into position to bind the rod against rearward movement, the detent plate being free to move forwardly against its spring on the forward movement of the rod, and a throw-out device carried by the handle and adapted when moved to swing the detent plate forwardly to hold it out of binding engagement with the rod, the abutment on the handle acting as a fulcrum in such forward movement.

9. In a dispensing apparatus, the combination of a barrel, a plunger-operating rod extending out of the barrel, a hollow handle carrying the rod and open toward the front, an operating lever pivoted within the handle and movable toward it, mechanism within the handle actuated by the lever to grip the rod and feed it into the barrel when the lever is drawn toward the handle, a detent device within the handle comprising a plate having an opening surrounding the rod, a fixed abutment carried by the handle which the detent plate engages below the rod, a spring acting on the detent plate and tending to force it into position to bind the rod against rearward movement, the detent plate being free to move forwardly against its spring on the forward movement of the rod, the upper end of the handle having an opening and detent plate projecting through said opening so as to be accessible for engagement to move it forwardly to releasing position, said abutment on the handle acting as a fulcrum in such forward movement.

10. In a dispensing apparatus, the combination of a barrel, a plunger therein, a rod connected with the plunger and extending axially beyond the barrel, a hollow handle connected to the barrel, a movable feeding plate within the handle loosely surrounding the rod, an abutment plate fixed within the handle loosely surrounding the rod, a helical compression spring surrounding the rod and compressed between the abutment plate and feeding plate, an apertured detent plate within the handle between the abutment and the barrel and closely surrounding the rod, a fixed fulcrum for the detent plate carried by the handle and spaced from the rod, a spring tending to swing the detent plate about its fulcrum into engagement with the rod, a lever carried by the handle for canting the feeding plate and moving it forwardly to feed the rod, and means whereby the detent plate may be swung into idle position independently of said lever.

11. In a dispensing apparatus, the combination of a barrel, a cap mounted thereon, a handle having a pair of spaced side plates, a rub-disc interposed between said cap and handle and provided with a channel-shaped member, the forward ends of the side plates rigidly secured to said member, a bushing extending axially through the disc and cap and provided with heads respectively on the outer side of the disc and the inner side of the cap to swivel the handle to the cap, and an operating rod extending from within the barrel outwardly through the bushing and said handle.

12. In a dispensing apparatus, the combination of a cap adapted to be removably secured to a barrel and stiffened by an annular outwardly bowed rib, a disc on the outer side of the cap bearing against the annular rib, means to swivel the disc to the cap, an operating rod extending through the cap and disc, and mechanism carried by the handle for operating the rod.

13. In a dispensing apparatus, the combination of a cap adapted to be secured to a barrel, a handle, a bushing swiveling the handle to the cap, said bushing having an annular recess therein, a resilient dished spring having an inner and outer periphery, said inner periphery surrounding the bushing and adapted to be seated within said annular recess, said outer periphery bearing against the interior of the cap, said spring applying an inward longitudinal stress to the bushing to maintain a snug swivel connection between the handle and cap, and an operating rod extending through the bushing.

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