United States Patent

[11] 3,581,943

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[45] Patented **June 1, 1971**

[54] **ASSEMBLY FOR DISPENSING VISCOUS MATERIALS**
5 Claims, 15 Drawing Figs.

[52] **U.S. Cl.** **222/102**
[51] **Int. Cl.** **B65d 35/28**
[50] **Field of Search** 222/102

[56] **References Cited**

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ABSTRACT: An assembly for dispensing viscous materials which includes a pair of spaced, vertically arranged rollers, at least one of which rollers is driven, either mechanically or electrically. A tubular single or multiple celled cartridge having flexible walls containing one or more viscous materials which is to be dispensed is fed between the two rollers. A nozzle is provided at one end of the cartridge whereby, when the flexible walls of the cartridge are forced towards each other by the rollers, the viscous material is forced through the nozzle of the cartridge in a mixing or extruding action for use. Release mechanism is provided for moving one of the rollers in a direction away from the other roller to permit ready removal of the cartridge.

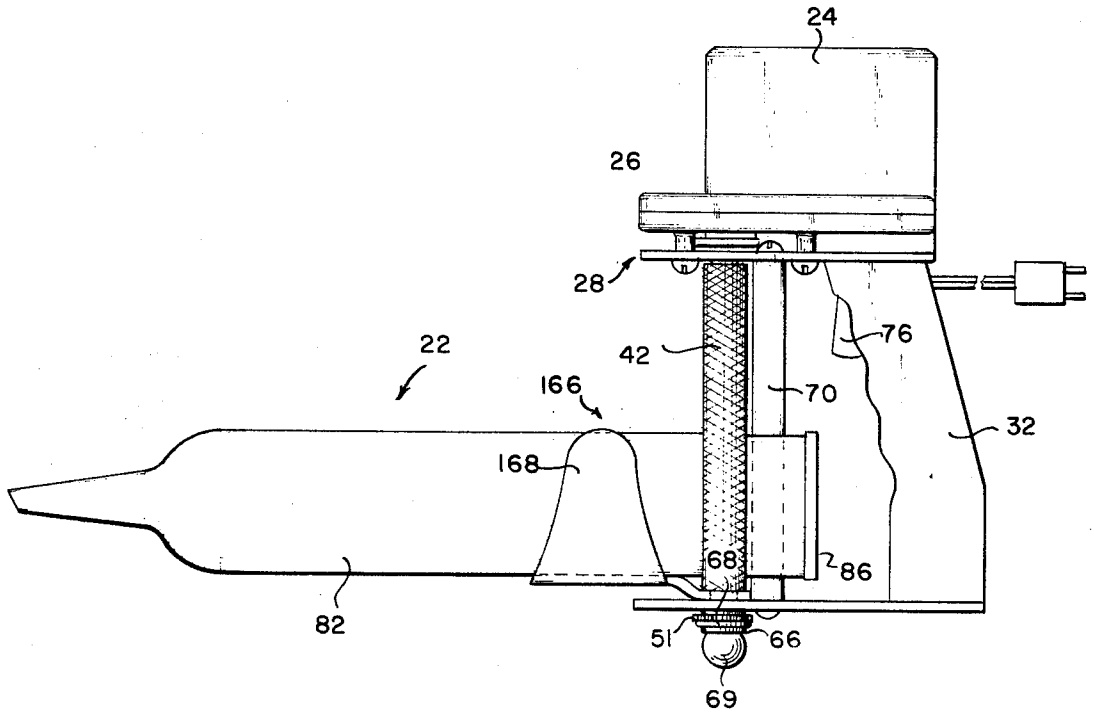


Fig. 1

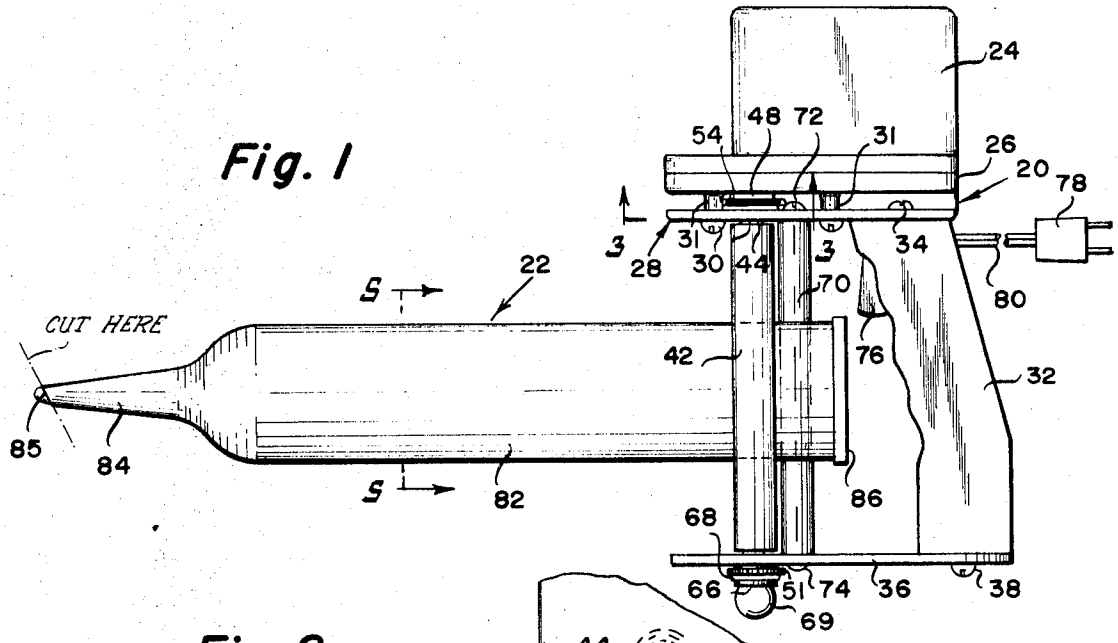
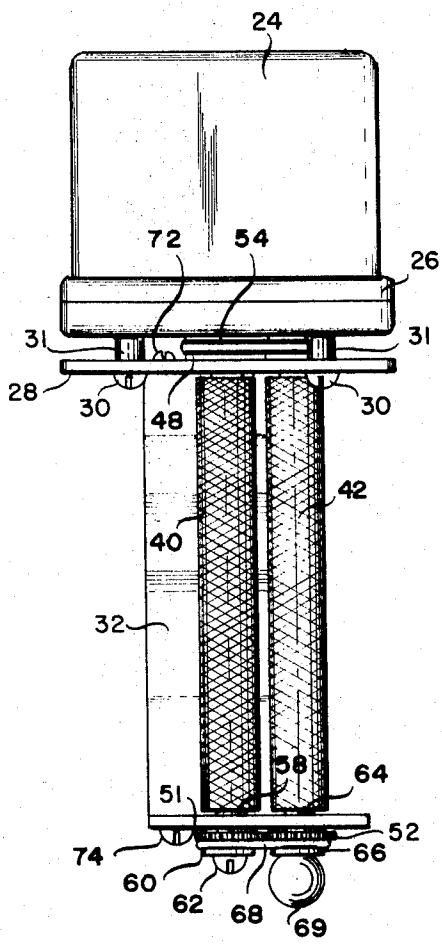


Fig. 2



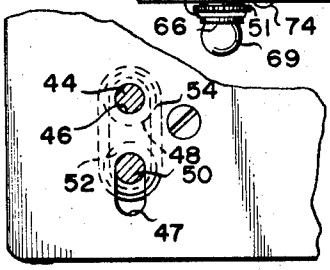


Fig. 3

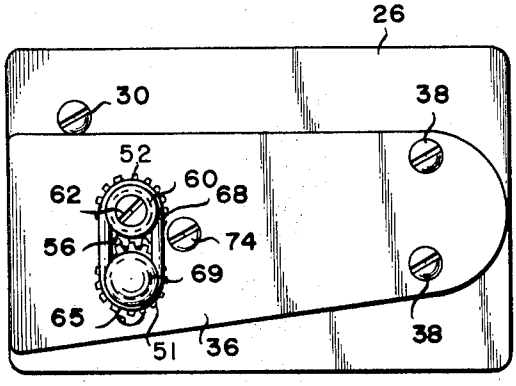
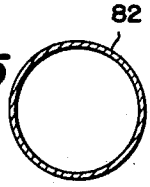


Fig. 4

Fig. 5



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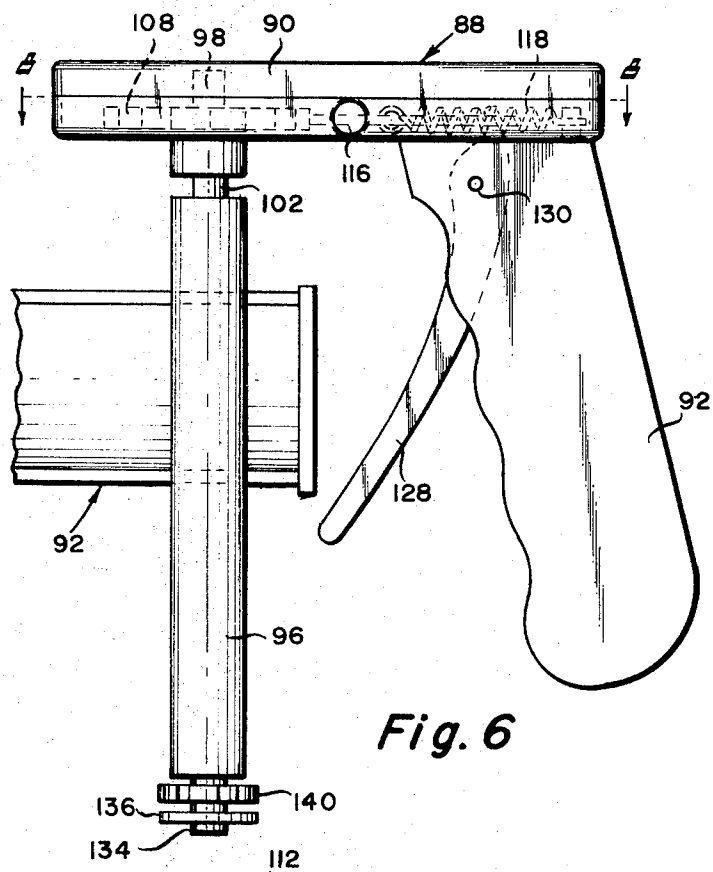


Fig. 6

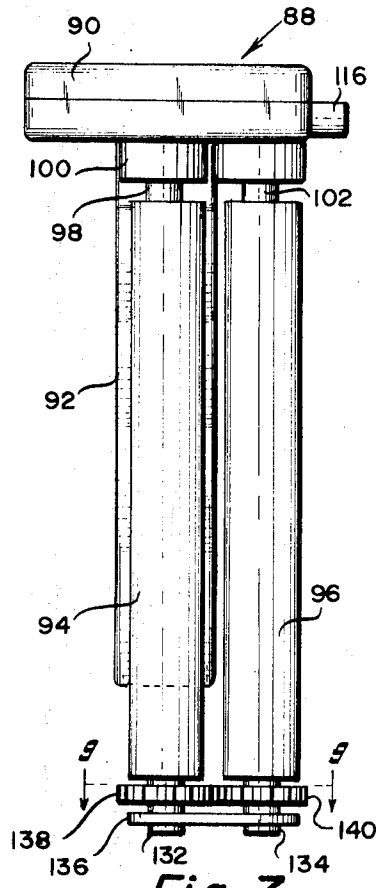


Fig. 7

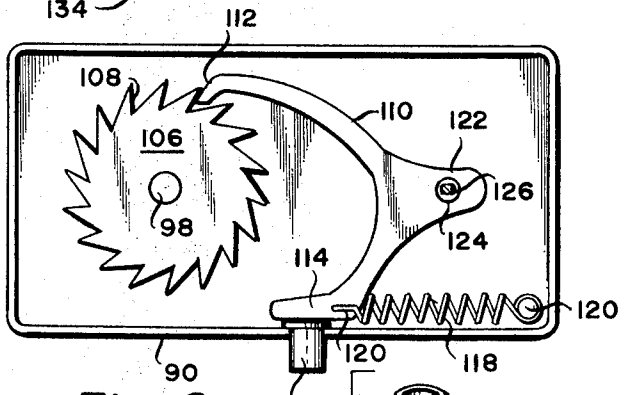


Fig. 8

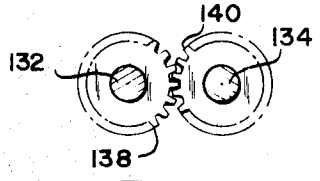


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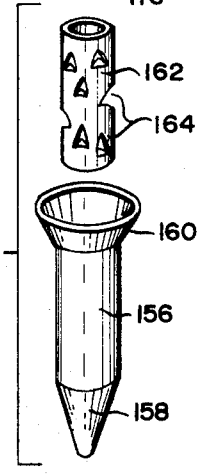


Fig. 10

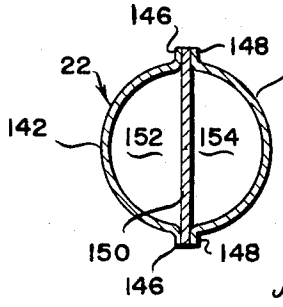


Fig. 11

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Fig. 12

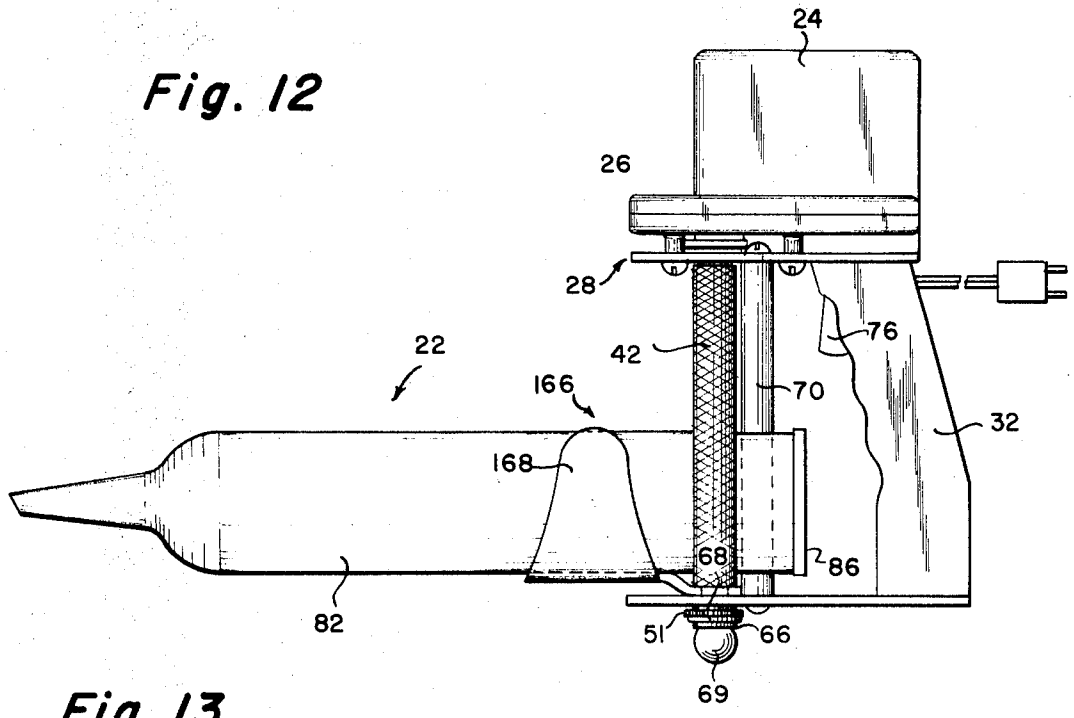
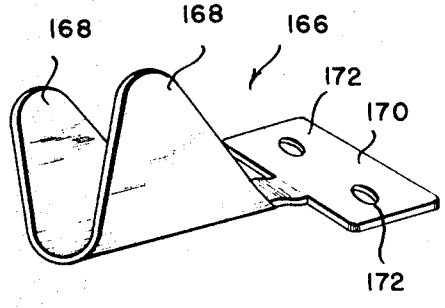


Fig. 13



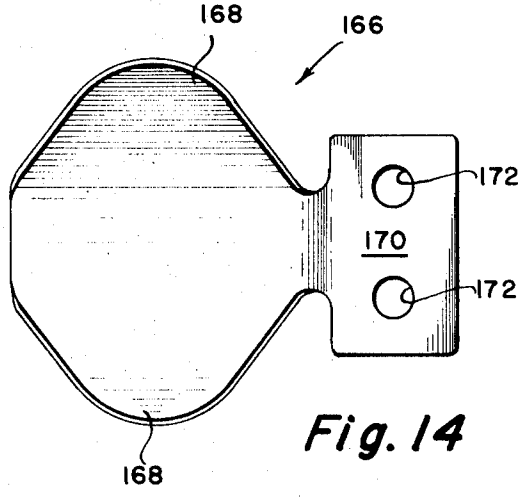
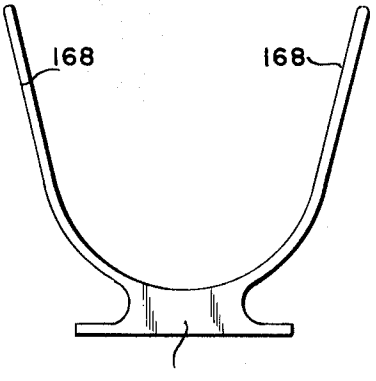


Fig. 14

Fig. 15



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ASSEMBLY FOR DISPENSING VISCOUS MATERIALS

BACKGROUND AND OBJECTS

It has been common practice in the past to dispense viscous materials such as caulking, sealants, adhesives, etc., by means of hand-operated rechargeable caulking guns, in which are placed cylindrical cardboard tubes or cartridges containing the viscous material, the viscous material being dispensed by means of a piston in engagement with a terminal of the tube, which acts to compress the contents of the tube and discharge the same through a nozzle. The cylindrical cardboard tubes are spirally wound with the result that a joint spirals longitudinally of the tube. This joint tends to leak or break under pressure of the tube contents. The ends of the cardboard tube have the same tendency. Additionally, air infiltrates these cartridges through the joints and contaminates the contents or causes the contents to solidify. Solvents in the tube contents can also escape through the tube joints which results in solidification thereof. Moisture admitted to the interior of the cartridge through the joints and through the cardboard itself may affect the contents. Leakage of the cartridge contents through the joints during use requires frequent cleaning of the caulking gun, with resultant delays.

This type of equipment is necessarily bulky since the piston is provided with a shaft of approximately the same length as the cardboard tube, and the length thereof will necessarily change with the length of the cardboard tube. Additionally, due to its bulkiness, it is unwieldy to operate in close quarters or when working at heights requiring the use of ladders or the like. Also, after a period of operation, the operator is fatigued, thereby reducing his efficiency with respect to the amount of viscous material which he can dispense and the quality of the work which he is performing.

It is an object of this invention to provide an assembly for dispensing viscous materials such as caulking compounds, sealants, mortar, adhesives, etc., which assembly is compact and can be operated by the user for extended periods of time without fatigue.

Another object is to provide an assembly of the character described which includes a pair of vertically disposed, spaced rollers, between which is fed a cartridge containing viscous material, the wall of the cartridge being collapsible and provided with a nozzle through which the viscous material is dispensed upon engagement of the rollers with the flexible walls of the cartridge.

A further object is to provide an assembly of simple, economic construction, for dispensing viscous fluids, which assembly may be mechanically or electrically operated and wherein, by virtue of the arrangement of the rollers, no supporting structure is required for stabilizing and orienting the flexible cartridge while in use.

A further object is to provide an attachment for the assembly which under certain operating conditions, is desirable for laterally orienting the cartridge for ease in inserting the latter into the assembly, equalizing the feed of the cartridge through the assembly, and to initially orient the cartridge nozzle for a properly shaped bead of extruded material.

A still further object is to provide an assembly of the character described wherein release mechanism is provided for readily and effectively disengaging the rollers from the flexible cartridge at any time desired.

Other objects will be manifest from the following description of the present invention taken in connection with the appended drawings.

DESCRIPTION OF FIGURES OF DRAWING

FIG. 1 is a side elevational view of the assembly of the present invention;

FIG. 2 is a front elevational view of the gun per se forming a part of the present assembly;

FIG. 3 is a sectional view taken along the line 3–3 of FIG. 1, looking in the direction of the arrows;

FIG. 4 is a bottom plan view of the gun illustrated in FIG. 2;

FIG. 5 is a sectional view taken along the line 5–5 of FIG. 1, looking in the direction of the arrows;

FIG. 6 is a side elevational view of a modified form of the present invention;

FIG. 7 is a front elevational view of the gun illustrated in FIG. 6.

FIG. 8 is a top plan of the form of the invention of FIG. 6 with the top cover removed;

FIG. 9 is a sectional view taken along the line 9–9 of FIG. 7, looking in the direction of the arrows;

FIG. 10 is an exploded view of a modified form of nozzle and mixing valve for a modified form of the cartridge;

FIG. 11 is a transverse sectional view of a cartridge for use with the nozzle and mixing valve of FIG. 10;

FIG. 12 is a side elevational view of the device of the present invention with a cartridge stabilizing support attached thereto;

FIG. 13 is a perspective view of the cartridge stabilizing support per se;

FIG. 14 is a top plan view of the same, and

FIG. 15 is a rear elevational view of the cartridge stabilizing support.

DESCRIPTION OF FORM OF INVENTION OF FIGURES 1 TO 5

In FIGS. 1 to 5, there is illustrated an assembly for dispensing viscous materials which includes a gun generally designated 20 into which is fed a cartridge 22 in which the viscous material is stored.

Gun 20 includes a motor housing 24 which is mounted on a generally rectangular gear box member 26. A top mounting plate 28 is mounted subjacent gear box member 26 by suitable connecting members 30 and spaced therefrom by suitable means 31. The aft end of top mounting plate 28 is secured to the upper terminal of a hand grip 32 by securing means 34. A bottom mounting plate 36 is fixed to the lower terminal of hand grip 32 by securing means 38.

As shown to advantage in FIGS. 1 and 2, a pair of spaced, vertically disposed rollers 40 and 42 are rotatably mounted between top mounting plate 28 and bottom mounting plate 36. The peripheral surfaces of both rollers are knurled or provided with a suitable friction surface to effect optimum frictional engagement with the wall surface of cartridge 22.

Referring to FIG. 3, it will be seen that the upper terminal portion of roller 40 is reduced to form an axial pin 44 which passes through a circular opening 46 in top mounting plate 28, and through a shaft bearing 48 for actuating engagement with a gear housing 26 and conventional motor cover 24. Adjacent the opening 46, there is an elongated slot 47 through which a reduced terminal 50 of roller 42 passes into a bearing member.

Roller 42 is preferably driven by means of standard meshing gears 51 and 52 fixed to the lower terminals of the roller shafts. A resilient O-ring 54 or other tensioning device connects bearings 48 and 52 in order to normally hold rollers 40 and 42 in proximate spaced relationship to each other elongated slot 46, however, permitting movement of roller 40 away from roller 42 under force.

As shown in FIG. 4, the bottom mounting plate 36 is likewise provided with a circular opening 56 through which an axial pin 58 of drive roller 40 extends into a sleeve bushing 60, which is held in place by a securing member 62.

An axial pin 64 of roller 42 passes through an elongated slot 65 of bottom mounting plate 36 into a second sleeve bushing 66. A second resilient O-ring 68 or other tensioning device between sleeve bushings 60 and 66 permits ready relative movement of roller 40 with respect to roller 42 upon the exertion of force on a release knob 69 issuing from sleeve bushing 66 in a direction away from roller 42.

It will be noted from a consideration of the Figures of the drawings that rollers 40 and 42 normally lie in proximate spaced relationship to each other, and both lie in a vertical plane when the gun is held in position for normal use

Aft of rollers 40 and 42 is a deflection bar 70 which is substantially coextensive with the lengths of rollers 40 and 42, the deflection bar being secured to top mounting plate 28 by securing means 72 and to bottom mounting plate 36 by securing means 74. Deflection bar 70 is preferably of general circular shape and is angularly disposed with respect to the path of movement of a cartridge 22 being fed between rollers 40 and 42 in order to deflect the same away from hand grip 32, in the manner illustrated in FIG. 1.

For actuating the drive roller 40, hand grip 32 is provided with a trigger 76 which, upon actuation energizes the motor within housing 24 when plug 78 is placed in a conventional electrical socket to feed electrical current through conductor 80 to the motor.

Cartridge 22 includes a tubular body 82 of generally circular cross section which may be made of any suitable nonporous, flexible construction such as polyethylene. The viscous material is stored between the walls of body 82 and one terminal thereof is formed to provide a nozzle 84 having a terminal cut to size and an orifice 85. The opposite end of the cartridge is flattened at 86 for ready insertion of the latter between rollers 40 and 42.

OPERATION

In use of the assembly of the present invention, flattened portion 86 of cartridge 22 is fed between rollers 40 and 42. Actuation of trigger 76 effects rotation of rollers 40 and 42 in a direction to exert an inward force on the flexible walls of body portion 82 of the cartridge, collapsing the walls and squeezing the viscous material into nozzle 84 for extrusion through nozzle orifice 85.

It has been found that by virtue of the location of rollers 40 and 42 in a vertical plane, no supporting member to stabilize and orient cartridge 22 is required, the cartridge remaining in a substantially horizontal plane, at right angles to the plane of the rollers during the dispensing operation.

When the material is completely dispensed from the body portion 82 of cartridge 22, or when it is desired to remove the cartridge from the gun, it is only necessary that knob 69 be moved in a direction away from roller 42. By virtue of tensioning devices 54 and 68, limited movement of the rollers is permitted, to effect ready removal of the cartridge from the gun. As an alternative, when the contents of the tube have been dispensed, the remainder of the cartridge may be passed between the rollers by actuating trigger 76.

In this form of the invention, also, continuous dispensing of the viscous material is effected simply by pulling and holding trigger 76, thereby requiring no repeated hand movement to effect squeezing of the material from the cartridge.

DESCRIPTION OF FIGURES 6 TO 9

In FIGS. 6 to 9 there is illustrated a hand operated gun 88 for use with the present assembly. Gun 88 includes a gear housing 90 from the underface of which extends a hand grip 92.

Forwardly of hand grip 92, there are provided a pair of vertically disposed, slightly spaced rollers 94 and 96. The upper terminal of roller 94 is reduced to provide an axial pin 98 which is rotatably mounted in a bushing 100 which is secured in a suitable manner to the lower portion of housing 90. The terminal of axial pin 98 extends into gear housing 90.

The upper terminal of roller 96 is reduced to provide an axial pin 102 which is rotatably mounted in a bushing 104, which bushing is secured to gear housing 90.

As shown to advantage in FIG. 8, a ratchet wheel 106 having a plurality of teeth 108 is fixedly secured to the terminal portion of axial pin 98. Adjacent ratchet wheel 106 is a ratchet arm 110 having a ratchet wheel engaging member 112. In opposed relation to ratchet wheel engaging member 112 is an abutment member 114 which lies adjacent a push button member 116 which extends through an opening in the sidewall of gear housing 90. A spring member 118 is secured at 120 to abutment member 114, the opposite end of the spring member being fixed to the housing at 120.

At a point intermediate members 112 and 114 of ratchet arm 110, there is provided an extension 122 having an opening 124 through which the upper terminal 126 of an operating lever 128 extends for engaging ratchet engaging member 112 with teeth 108. At a point adjacent terminal 126, lever 128 is pivotally connected at 130 with hand grip 92.

As shown to advantage in FIG. 9, the lower terminals of rollers 94 and 96 issue into axial pins 132 and 134 respectively, the terminals being rotatably mounted in a suitable plate member 136. At a point adjacent plate 136, meshing gears 138 and 140 (See FIG. 7) are secured to axial pins 132 and 134 so that, as driven roller 96 is rotated upon actuation of lever 128, a rotation of gear 140 effects intermeshing with gear 138 to drive roller 96.

OPERATION

The operation of this form of the invention is the same as described above in connection with FIGS. 1 to 3. In this manual form, however, the operation of lever 128 effects a rotation of the lever about pivot point 130, thereby producing a forward movement of terminal 126, with resultant rotation of ratchet wheel 106 under urging of member 112, and consequent rotation of rollers 94 and 96 in a direction to cause squeezing engagement of the rollers with flexible walls of cartridge 22.

DESCRIPTION OF FIGURES 10 AND 11

In FIG 11 there is illustrated a transverse sectional view of a modified form of cartridge 22' which includes flexible wall sections 142 and 144, the terminal portions of which are urged outwardly to form flanges designated 146 and 148 respectively. A partition member 150 is located between walls 142 and 144, is coextensive with walls 142 and 144, the upper and lower extremities of the partition being located between and secured to flanges 146 and 148. In this manner, two separate compartments 152 and 154 are provided for holding and maintaining separate two different compositions.

In connection with this form of the invention there is provided a nozzle 156 having an orifice 158 which is adapted to be either removably attached to, or permanently secured to, a terminal portion of cartridge 22'. A portion of nozzle 156 is flared at 160 to receive the cartridge body.

It is a salient part of this form of the invention to provide a mixing valve 162, which may be integrally formed with, or positioned within nozzle 156. Mixing valve 162 is of cylindrical construction, the walls of which are struck as indicated at 164. As the two compositions in separate compartments 152 and 154 pass into nozzle 156, under urging of gun 88, the two compositions are intermingled, which intermingling is expedited by struck portions 164.

DESCRIPTION OF FIGURES 12 TO 15

In FIGS. 12 to 15 there is illustrated a lateral stabilizing attachment for either form of the present invention which is generally designated 166.

Attachment 166 includes a unitary saddle of generally U-shape including wings or lateral stabilizing supports 168 which are slightly divergent with respect to the base of the saddle. A connecting plate 170 extends outwardly from the base of the saddle, and is provided with spaced perforations 172. As shown in FIG. 12, attachment 166 is detachably secured to the assembly by passing the lower terminals of the roller shafts through perforations 172.

Attachment 166 serves to laterally stabilize and orient cartridge 22 for facilitating feeding of the latter between rollers 40 and 42. It further equalizes the feed of the cartridge through the assembly and, particularly when the contents of the cartridge are of low viscosity, orients and stabilizes the cartridge during the dispensing operation.

What we claim is:

1. An assembly for dispensing viscous materials including

a. a gun,

b. said gun comprising a top mounting plate,

c. a bottom mounting plate in spaced relation to said top mounting plate,
d. a pair of rollers rotatably mounted in proximate relationship between said top and bottom mounting plates,
e. said gun further including a handgrip adjacent said rollers attached to said top and bottom mounting plates,
f. a trigger positioned on said handgrip,
g. drive means comprising an electric motor on said top plate,
h. said drive means being operatively engaged with at least one of said rollers and actuated by said trigger.

2. The assembly of claim 1, with the addition of
a. resilient band means joining the terminal portions of said rollers for urging the latter towards each other, and
b. a release member carried by a terminal of one of said rollers to permit pulling of said roller away from the other of said rollers, against the tension of said resilient bands.

3. The assembly of claim 1, with the addition of
a. a deflection plate positioned between said top and bottom mounting plates,
b. said deflector plate being interposed between said rollers and handgrips,
c. the deflector plate further being of substantially circular shape and angularly disposed with respect to said rollers, to deflect said cartridge laterally with respect to the assembly after it passed between said rollers.

4. The assembly of claim 1, with the addition of
a. lateral stabilizing and support means carried by said gun.

5. The assembly of claim 4, wherein said lateral stabilizing and support means includes
a. a saddle member of generally U-shape,
b. said saddle member including wings engageable with the sidewalls of said cartridge.