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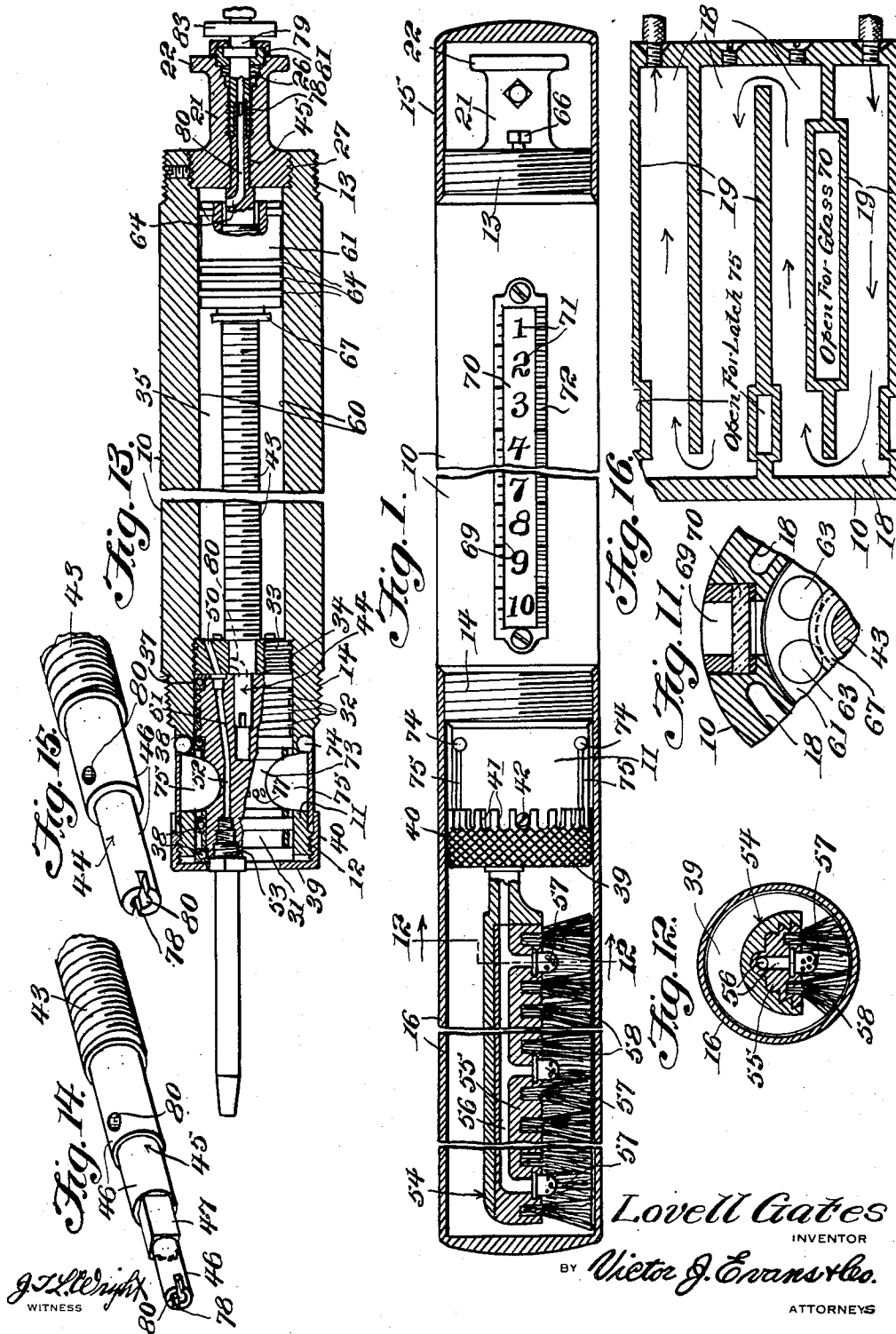
L. GATES

2,107,242

PRESSURE FEEDER FOR MATERIALS

Filed June 1, 1937

3 Sheets-Sheet 1



Lovell Gates  
 INVENTOR  
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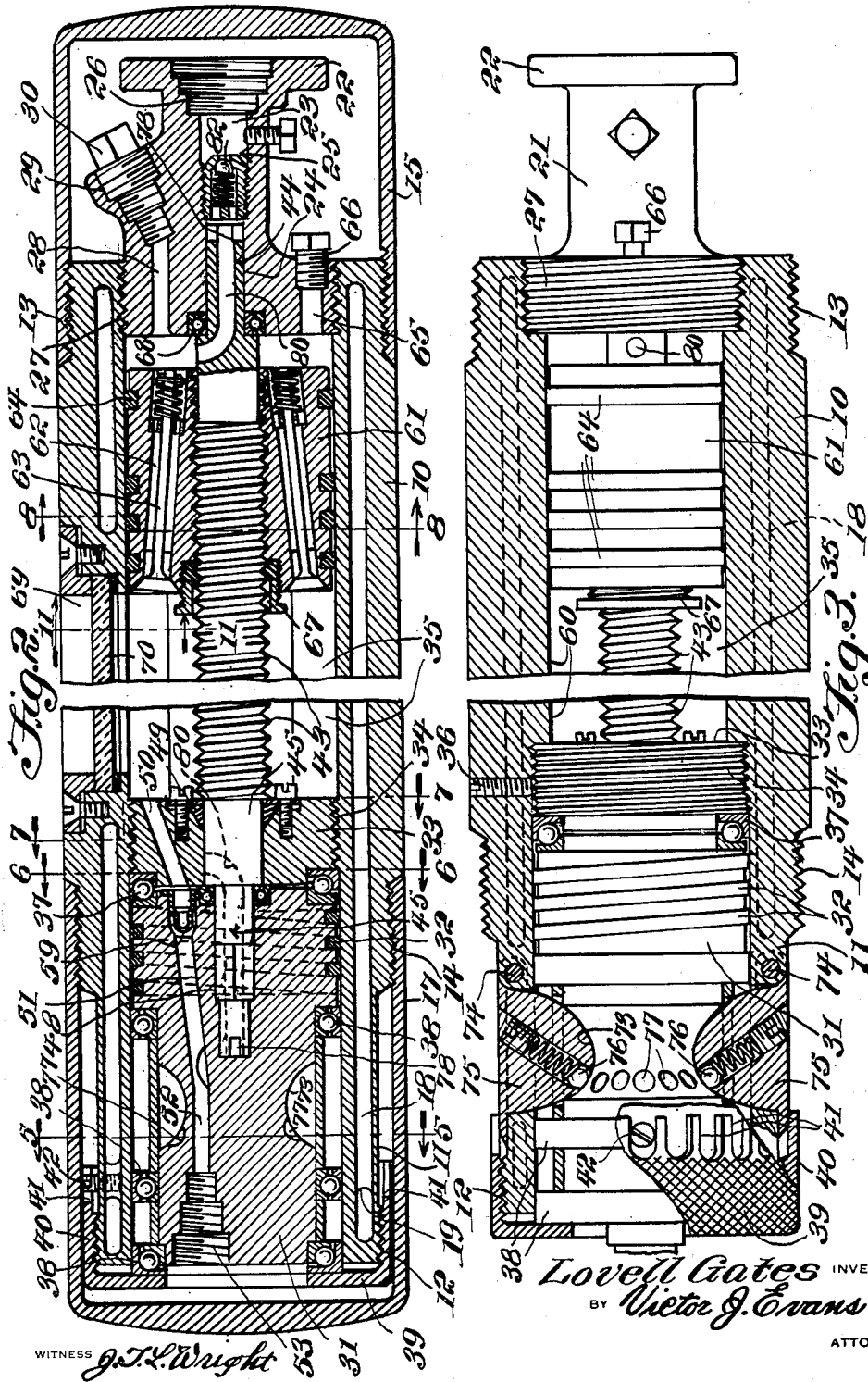
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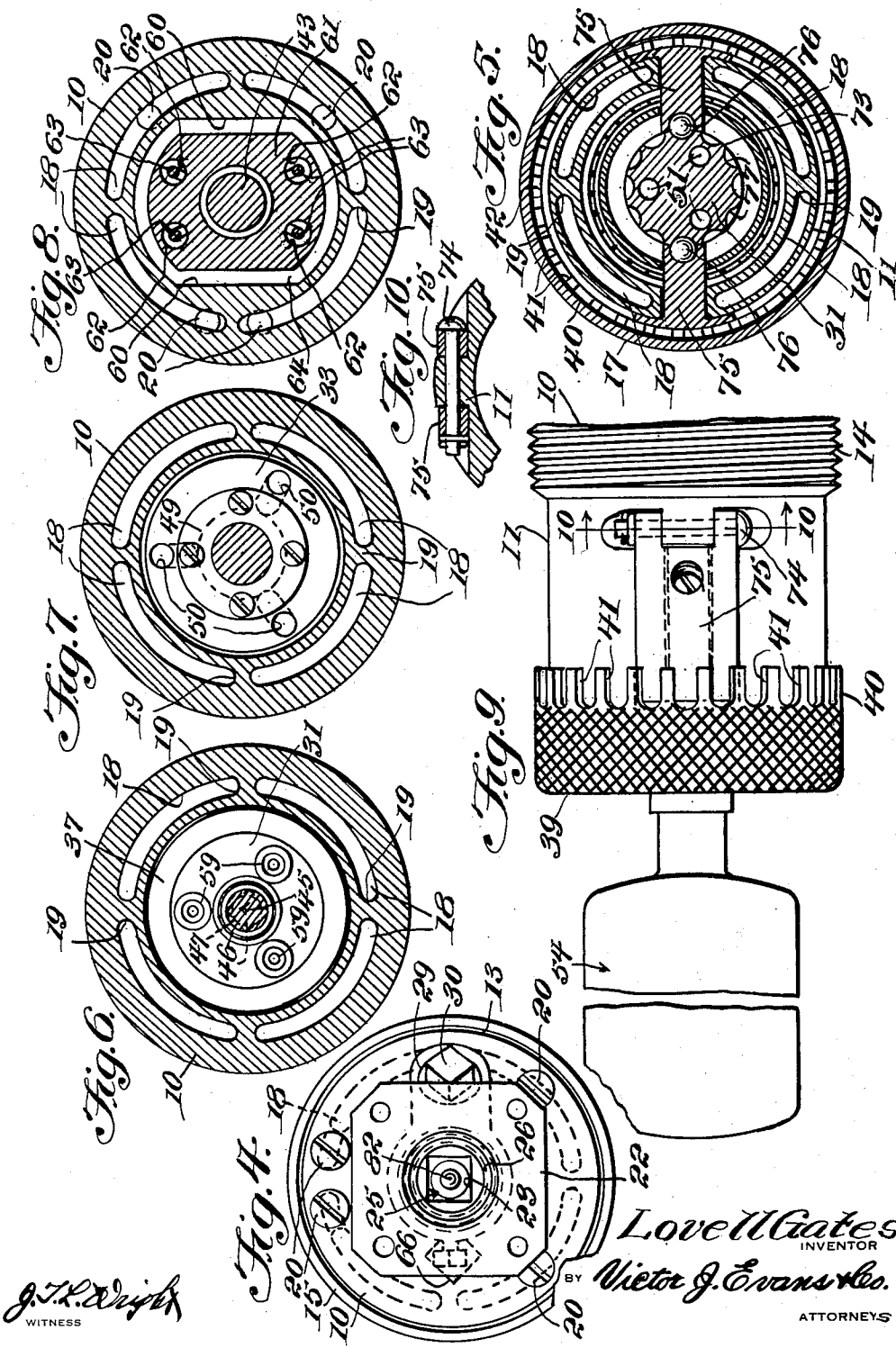
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PRESSURE FEEDER FOR MATERIALS

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3 Sheets-Sheet 3



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# UNITED STATES PATENT OFFICE

2,107,242

## PRESSURE FEEDER FOR MATERIALS

Lovell Gates, Idaho Falls, Idaho

Application June 1, 1937, Serial No. 145,847

12 Claims. (Cl. 221—79)

The invention relates to a pressure feeder for materials and more especially to a force feed gun or dispensing device.

The primary object of the invention is the provision of a device of this character, wherein fluids or semi-liquid materials can be dispensed under pressure, thus enabling the use of varying applicators for the applying of such materials by said device, for example, the application of tooth paste to a brush, shoe polish thereto, paint or other substance in a convenient manner and with dispatch as well as a uniform application of such material either in a cold or hot state as the occasion may require, the device being useful for service in giving hypodermics or for any other purpose for the dispensing of fluid under pressure.

Another object of the invention is the provision of a device of this character, wherein the construction thereof is novel in its entirety and assures the dispensing of material under pressure in a unique manner.

A further object of the invention is the provision of a device of this character, which is simple in its construction, thoroughly reliable and effective in operation, convenient for easy handling, susceptible of many uses for dispensing material under pressure, particularly liquid and semi-liquid substances, and inexpensive to manufacture.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings, which disclose the preferred embodiment of the invention and pointed out in the claims hereunto appended.

In the accompanying drawings:

Figure 1 is a plan view partly in section of a device constructed in accordance with the invention.

Figure 2 is an enlarged vertical longitudinal sectional view thereof with the brush removed and a modified form of cap fitted therewith when devoid of the carrying of the brush.

Figure 3 is a view similar to Figure 2 taken at substantially right angles thereto.

Figure 4 is an end view with an end cap removed.

Figure 5 is a sectional view on the line 5—5 of Figure 2 looking in the direction of the arrows.

Figure 6 is a sectional view on the line 6—6 of Figure 2 looking in the direction of the arrows.

Figure 7 is a sectional view on the line 7—7 of Figure 2 looking in the direction of the arrows.

Figure 8 is a sectional view on the line 8—8 of Figure 2 looking in the direction of the arrows.

Figure 9 is a fragmentary plan view looking toward the back of the brush.

Figure 10 is a fragmentary sectional view taken on the line 10—10 of Figure 9 looking in the direction of the arrows.

Figure 11 is a fragmentary sectional view taken on the line 11—11 of Figure 2 looking in the direction of the arrows.

Figure 12 is a sectional view on the line 12—12 of Figure 1 looking in the direction of the arrows.

Figure 13 is a view similar to Figure 3 showing the feed screw of the device reversed from that shown in Figures 1 and 2.

Figure 14 is a fragmentary perspective view of one end of the feed screw.

Figure 15 is a fragmentary perspective view of the other end of the feed screw.

Figure 16 is a fragmentary diagrammatic plan view showing the cooling system for the device.

Similar reference characters indicate corresponding parts throughout the several views in the drawings.

Referring to the drawings in detail, the gun or device constituting the present invention comprises a cylindrical body or barrel 10 having a reduced end portion 11, this with the opposite end portion is provided with external threads 12 and 13, respectively, while at the inner end of the reduced end portion 11 are slightly outset screw threads 14. The threads 13 and 14 permit the separable connection with the body or barrel 10 of end caps 15 and 16, respectively, there being a supplemental or auxiliary cap 17 in substitute for the cap 16, which latter is for a special purpose as will be hereinafter fully described.

The body or barrel 10 is formed interiorly thereof throughout its length with a fluid space 18 having therein the directing webs 19 effecting a circuitous course longitudinally of the said body or barrel and this space is accessible for the introduction and discharge of fluid to and from the same by plugged openings, the removable plugs being indicated at 20. In this manner hot or cold fluids can be admitted to the space 18 for the heating or cooling of the contents of the body or barrel 10 at the option of the user of the device.

The body or barrel 10 at the end having the threads 13 is formed with an axial neck extension 21 provided with an external coupling flange 22, the extension being formed with a central longitudinally directed bore flat walled at 23 for a distance and round walled at 24 for the remainder of its extent, the bore being generally indicated at

25. This flat walled portion 23 opens into a stepped internally threaded socket 26 for the detachable engagement therein of different sizes of discharge ends of fluid containers (not shown) for the delivery of the contents to the interior of the barrel through the bore 25 for a purpose presently described.

The neck extension 21 is a separable unit from the body or barrel 10 and is separably threaded therewith at 27. The extension 21 eccentric to the bore 25 is formed with a delivery passage 28 which opens into a stepped internally threaded socket 29 normally closed by a separable plug 30 and this socket 29 accommodates the separable connection therein of different sizes of discharge ends of containers for fluid to be introduced into the body or barrel 10 for a purpose presently described.

Rotatably fitted in the body or barrel 10 at the reduced end 11 thereof is a head 31 which at its inner end carries packing rings 32 snugly contacting with the interior of the body or barrel 10. Next to the inner end of the head 31 is a separator 33 removably threaded at 34 in the body or barrel 10 and effecting within this body or barrel 10 between it and the extension neck 21 a fluid storage chamber 35. The separator 33 is held fast in the body or barrel 10 by a set screw 36 threaded in the latter. Interposed between the head 31 and the separator 33 are thrust bearings 37 while interposed between the said head 31 and the reduced end portion 11 of the body or barrel 10 are antifriction bearings 38. The head 31 is held tight within the end portion 11 by a setting collar 39 engaged with the threads 12. This collar is formed with the fluted rim 40, the flutes or notches 41 therein selectively accommodating a retaining screw 42 engaged in the end portion 11 of the body or barrel 10. Thus on adjustment of the collar 39 the head 31 can be held against end play and snugly and rotatably retained within this end portion 11.

Releasably centered within the body or barrel 10 is a longitudinally directed feed screw 43 having the stepped opposite journal ends 44 and 45, respectively, the stepped end 44 being rounded while the stepped end 45 has round and flat faced portions 46 and 47, respectively. The head 31 at its inner end is formed with a central stepped socket 48 matching the stepped end 45 of the feed screw 43 for interfitting and locking with each other yet this socket 48 will rotatably accommodate the end 44 when the screw 43 is reversed for a purpose presently described. The ends 44 and 45 of the screw 43 are adapted for fitting in the bore 25 of the extension neck 21. In one position of the feed screw 43, the end 44 fits the bore 25 and the end 46 fits the socket 48 in the head 31, in this position the latter will be fixed with the screw 43 while the body or barrel 10 can rotate relative to the screw and head. On reversal of the screw 43, as shown in Figure 13 of the drawings, it will freely rotate independently of the head 31 and the body or barrel 10 and is susceptible of direct rotary drive relative thereto.

The separator 33 rotatably accommodates the screw 43 centrally thereof in both positions under reversal of the same and this separator is provided with a packing gland 49 about the screw 43 at its portion journaled therein to avoid leakage from the chamber 35 about the screw passed said separator 33. The separator 33 is provided with ports 50 which are uniformly spaced apart and converge in an outward direction for regis-

try with the branches 51 of a discharge or dispensing passage 52 provided in the head 31, this passage being communicative or common to a stepped internally threaded socket 53 for separable connection therein of varying dispensing implements, for example, a brush 54, its bristle carrying part 55 being releasably fitted with the stock of said brush 54 and this brush is provided with distributing leads 56 for fluid fitted with perforated rubber discharge nipples 57 interarranged with the bristles 58 of the brush for the dispensing of fluid therethrough. This brush can be utilized under variations in the construction thereof as a shoe polish dauber, a tooth brush, paint brush or liquid applying brush medium.

The branches 53 at their ends next to the ports 50 are removably fitted with liquid feed regulating nipples 59 to vary the flow of fluid to the passage 52 and control the slight velocity of such liquid to the brush or other implement fitted with the head 31. The brush 54 when connected with the head 31 can be incased or enclosed by the cap 16. On removal of this brush 54 from the head 31, the cap 17 is applied to the body or barrel 10 to conceal the said head 31. The cap 15 when fitted with the body or barrel 10 encloses the neck extension 21, these caps 15 and 17 being shown fitted with the body or barrel 10 in Figure 2 of the drawings.

The chamber 35 throughout its length in the body or barrel 10 has opposed flat parallel walls 60 and working within the said chamber is a force piston 61 which is threaded on the screw 43 and by reason of the opposed flat wall 60 the said piston 61 can not rotate relative to the body or barrel but will by the screw 43 be fed longitudinally within the chamber 35. This piston 61 is formed with passages 62 opening through opposite sides thereof and within such passages are arranged spring seated valves 63 which open in one direction only so that fluid delivered into the chamber 35 will freely flow through the passages 62 from one side of the piston to the other side thereof and will be checked against return flow through said piston. The piston 61 is provided with packing rings 64 contacting with the interior surface of the chamber 35. When the piston 61 is advanced in one direction within the chamber 35 it exerts pressure upon the contents of the chamber for the dispensing of such contents through the passage 52 under pressure.

The unit creating the extension neck 21 has a plugged opening 65, the plug being indicated at 66 and into this opening can be introduced a thermometer (not shown) so as to enable a user of the device to determine the temperature of the fluid within the chamber 35 in the body or barrel 10.

The piston 61 carries a packing gland 67 about the screw 43 and this screw at the point of journal of the same in the passage 25 has cooperating therewith antifriction bearings 68.

The body or barrel 10 for a distance of the chamber 35 therein is formed with a sight window 69 covered by a glass 70 having indicia 71 and scale markings 72, respectively, so that the quantity of fluid within the chamber 35 can be determined thereby.

The head 31 intermediate thereof is formed with an annular channel 73 while hinged at 74 at diametrically opposite sides of the body or barrel 10 are latching dogs 75, these being shaped to fit within the channel 73 and carry spring pressed friction latching balls 76 which press into

seats 77 provided in said channel 73 for frictional snap latching of the head 31 when the body or barrel 10 is rotated about the same. These dogs 75 are releasably engaged in the channel 73 by the rim 40 of the collar 39, this being clearly shown in Figures 3, 5 and 9 of the drawings.

Each end 44 and 45 of the screw 43 is bifurcated to form a clutching tip 78 so that a hollow drive shaft 79 can be clutched therewith and also these ends 44 and 45 are formed with delivery passages 80 so that fluid can be supplied from the shaft 79 into the chamber 35 between the piston 61 and the extension neck 21 for the filling of the chamber 35 with said fluid to be dispensed under pressure when the piston 61 is operated. The shaft 79 is coupled in the extension neck 21 by a coupling 81 and when the screw 43 is interfitted with the shaft 79 the said screw will be directly driven for the travel of the piston 61 within the chamber 35.

When the feed screw 43 is fixed with the head 31 and the latter is stationarily held by grasping the body or barrel 10 and turning movement imparted thereto, motion will be imparted to the piston 61, the screw 43 being fixedly held with the head, this turning of the body causes the advancement of the piston 61 to place under pressure the contents of the chamber 35 for the dispensing of such contents under pressure.

Of course, it is understood that the brush 54 is merely illustrated in Figure 1 of the drawings to show an adaptation of an implement with the device because any other liquid applying implement can be associated with the device for the dispensing of fluid under pressure. An example of an implement is a hypodermic needle, a shoe polish dauber, a paint brush or the like may be used in connection with the said device for the applying of materials either in fluid state or semi-liquid. When power is to be transferred directly to the said screw 43, it is, of course, understood that such screw is reversed from the position shown in Figure 2 to that shown in Figure 13 of the drawings whence the ends 44 and 45 will be reversed and the end 44 fitting in the socket 48 in the head 31 will become journaled therein. Thus the piston 61 will be advanced either by the turning of the screw 43 or the turning of the body or barrel 10 placing the contents of the chamber 35 under pressure and causing the dispensing of such contents in this state. The device when in association with material applying implements affords a force feeder for the material.

The passage 25 has located therein a fluid return check valve 82. On the hollow drive shaft 81 is fitted a drive pulley 83 for the transfer of power to the said shaft for driving purposes from any suitable source.

When the device is not in use, either the caps 15 and 17 are applied or when the brush 54 or other implement is connected with the device then the caps 15 and 16 are applied to the body or barrel 10 of said device.

What is claimed is:

1. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, and a feed screw revers-

ibly fitting the neck and head and threaded in the piston.

2. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, and formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder.

3. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, and a water jacket formation created within the body of said cylinder.

4. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, and means at one end of the feed screw for separably locking it with the head.

5. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separably locking it with the head, and valves located in the passages in the piston and opening in one direction only.

6. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly

fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separably locking it with the head, valves located in the passages in the piston and opening in one direction only, and friction latches carried by the cylinder and engageable with the head and effecting snap action thereon when the said head is turned relative to the cylinder.

7. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separably locking it with the head, valves located in the passages in the piston and opening in one direction only, friction latches carried by the cylinder and engageable with the head and effecting snap action thereon when the said head is turned relative to the cylinder, and means fitting the cylinder for holding the head snugly within the same and maintaining the friction latches in operative position.

8. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separably locking it with the head, valves located in the passages in the piston and opening in one direction only, friction latches carried by the cylinder and engageable with the head and effecting snap action thereon when the said head is turned relative to the cylinder, means fitting the cylinder for holding the head snugly within the same and maintaining the friction latches in operative position, and means for the coupling of a power shaft with said feed screw and insertable in the neck.

9. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative

turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separably locking it with the head, valves located in the passages in the piston and opening in one direction only, friction latches carried by the cylinder and engageable with the head and effecting snap action thereon when the said head is turned relative to the cylinder, means fitting the cylinder for holding the head snugly within the same and maintaining the friction latches in operative position, means for the coupling of a power shaft with said feed screw and insertable in the neck, and a fitting within the cylinder between the piston and said head and held fast to said cylinder for journaling the feed screw.

10. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separately locking it with the head, valves located in the passages in the piston and opening in one direction only, friction latches carried by the cylinder and engageable with the head and effecting snap action thereon when the said head is turned relative to the cylinder, means fitting the cylinder for holding the head snugly within the same and maintaining the friction latches in operative position, means for the coupling of a power shaft with said feed screw and insertable in the neck, a fitting within the cylinder between the piston and said head and held fast to said cylinder for journaling the feed screw, and a check return valve fitting within the neck.

11. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversibly fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separately locking it with the head, valves located in the passages in the piston and opening in one direction only, friction latches carried by the cylinder and engageable with the head and effecting snap action thereon when the said head is turned relative to the cylinder, means fitting the cylinder for holding the head snugly within the same and maintaining the friction latches in operative position, means for the coupling of a power shaft with said feed screw and insertable in the neck, a fitting within the cylinder between the piston and said head and held fast to said cylinder for journaling the

feed screw, a check return valve fitting within the neck, and packing rings carried by the piston and head, respectively.

5 12. A device of the kind described comprising a cylinder, end caps removably fitted to the cylinder, an extension neck separably fitted at one end of the cylinder and having separate inlets, a head rotatably fitted in the other end of the cylinder and having discharge passages opening into each  
10 other and through said head, a piston movably fitted within the cylinder and having passages therethrough, a feed screw reversably fitting the neck and head and threaded in the piston, formations interiorly of the cylinder for engaging the  
15 piston for holding the latter against relative turning movement with respect to said cylinder, a water jacket formation created within the body of said cylinder, means at one end of the feed screw for separably locking it with the head,

valves located in the passages in the piston and opening in one direction only, friction latches carried by the cylinder and engageable with the head and effecting snap action thereon when the said head is turned relatively to the cylinder, 5 means fitting the cylinder for holding the head snugly within the same and maintaining the friction latches in operative position, means for the coupling of a power shaft with said feed screw and insertable in the neck, a fitting within the  
10 cylinder between the piston and said head and held fast to said cylinder for journaling the feed screw, a check return valve fitting within the neck, packing rings carried by the piston and head, respectively, the said neck having an open-  
15 ing for accommodating a thermometer for presenting the latter to the interior of said cylinder, and a plug closing said opening.

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