

May 23, 1961

W. G. FISCHER ET AL

2,985,339

DISPENSER FOR METERING PREDETERMINED QUANTITIES

Original Filed Oct. 27, 1958

3 Sheets-Sheet 1

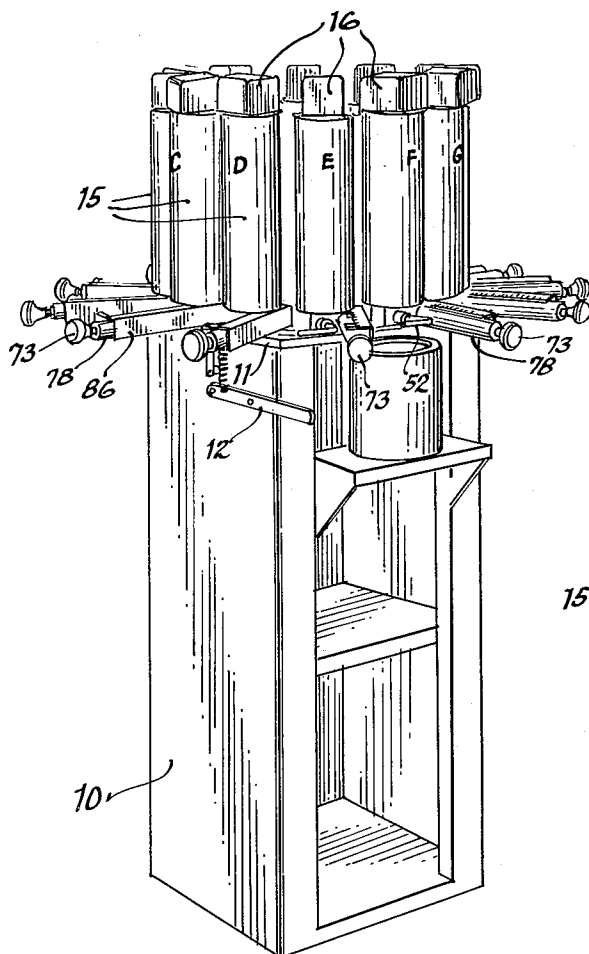


FIG. 1

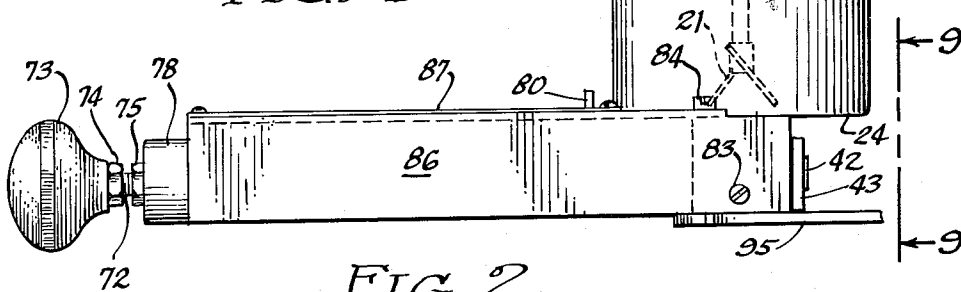


FIG. 2

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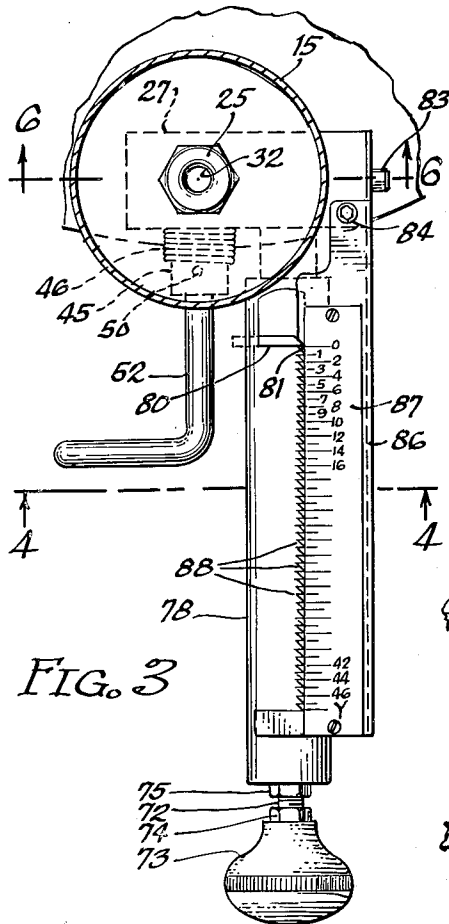


FIG. 3

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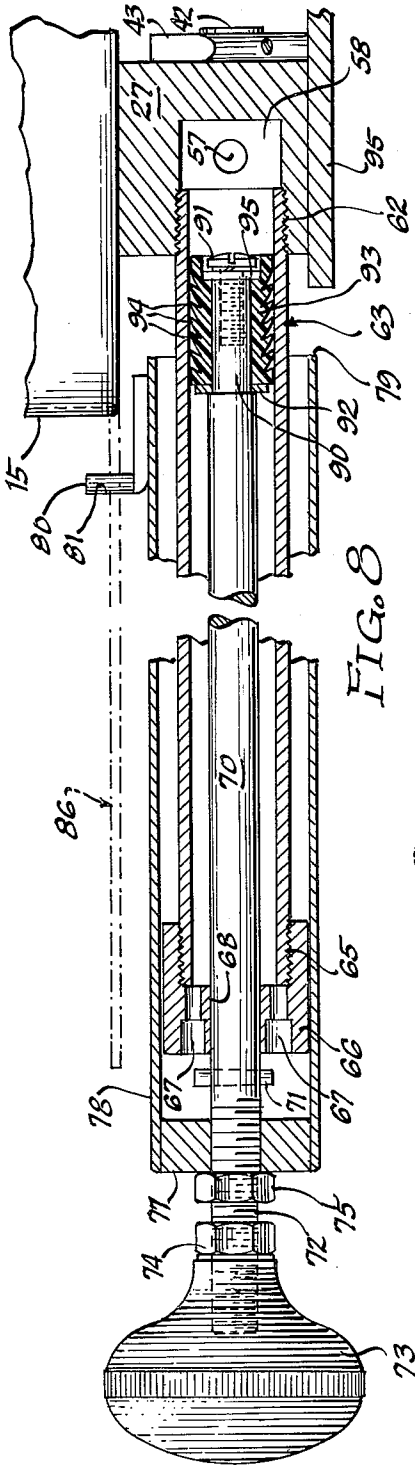


FIG. 8

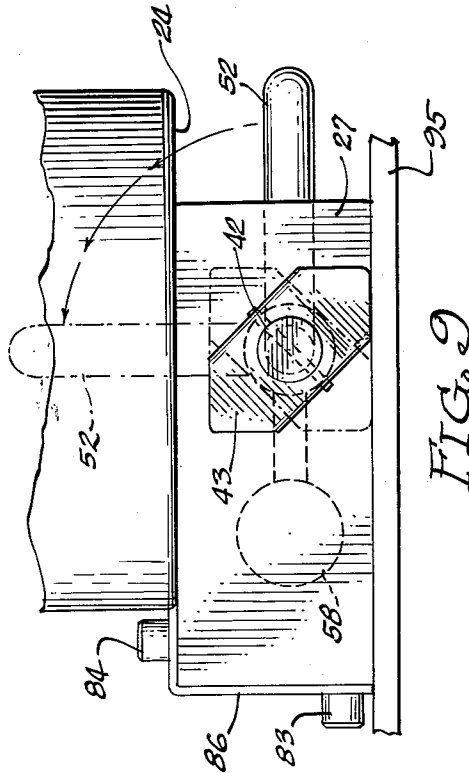


FIG. 9

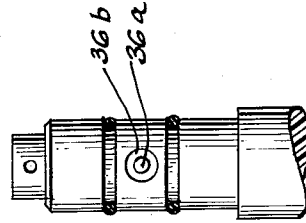


FIG. 6A

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2,985,339

DISPENSER FOR METERING PREDETERMINED QUANTITIES

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Continuation of application Ser. No. 769,706, Oct. 27, 1958. This application Sept. 21, 1960, Ser. No. 58,877

8 Claims. (Cl. 222-44)

This invention relates to a dispenser and more particularly to a dispenser for metering predetermined quantities of liquid or semi-liquid materials. In particular, the invention provides an accurate dispenser for use with paints and pigments for paints.

In connection with mixing pigments and coloring materials for paints, it is essential that accurate dispensing of the components be available. Thus, a collection of dispensers each having one particular color or composition may be used. The nature of the coloring materials and pigments used in paints is such that conventional materials and conventional construction quickly results in clogging and impairing the operation of a dispenser. Thus, it is well known that many pigments such as those containing oxides of iron are highly abrasive. In addition, many pigments and paint materials have a tendency to corrode metals or precipitate on metals.

A dispenser embodying the present invention has been found to be simple and easy to operate, has a long and useful life and may be easily cleaned.

The invention will be described in connection with the drawings wherein Figure 1 is a perspective view of a cabinet provided with a turntable upon which a plurality of the new dispensing units are mounted.

Figure 2 is a side elevation, with certain parts broken away, of a new dispensing unit embodying the present invention.

Figure 3 is a top view with part of the top cut away.

Figure 4 is a section along line 4-4 of Figure 3.

Figure 5 is a section along line 5-5 of Figure 4.

Figure 6 is a section along line 6-6 of Figure 3.

Figure 6A is a detail from the bottom of the valve member.

Figure 7 is a section similar to Figure 6 but showing the valve in a different position.

Figure 8 is a section along line 8-8 of Figure 4.

Figure 9 is a detail along line 9-9 of Figure 2.

Cabinet 10 of any desired construction is provided with turntable 11 upon which is secured a number of dispensing units. A battery of such dispensing units may be marked with letters of the alphabet or may be marked with any other indicia to identify the dispensers with regard to content.

The cabinet and turntable may be of generally conventional construction and no detailed description of these is believed to be necessary. Turntable 11 may be locked to an indexed position by any suitable means including handle 12 to keep a particular dispenser in proper position. Since all the dispensers are similar in construction, only one will be described in detail.

A dispensing unit comprises container 15 of generally cylindrical construction having an open top upon which may rest housing 16 containing an electric motor. The motor has shaft 18 coupled to stirrer rod 19 carrying a number of stirrer paddles 20 and 21. These paddles may be of any desired shape and may be attached to rod 19 in conventional fashion.

Container 15 has bottom 24 suitably apertured at

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the center to accommodate bushing 25. Bushing 25 is externally threaded and rigidly couples container 15 to valve block 27 by engaging a threaded recess therein. Preferably container 15, rod 19, paddles 20 and 21 and bushing 25 and block 27 are of stainless steel or other suitable metal.

In the normal position of the dispenser, as illustrated in Figure 2 for example, container 15 will be upright with valve block 27 below the bottom of the container. Valve block 27 has horizontal cylindrical chamber 30 extending through the same. Cylindrical chamber 30 has access to the interior of container 15 through bore 31 in the valve block and bore 32 in bushing 25.

The bottom of valve block 27 is hollowed at 34 and the block material is provided with fine discharge opening 35 providing communication between hollow region 34 and cylindrical chamber 30. Fitted in cylindrical chamber 30 is valve member 36. Valve member 36 is cylindrical and has two annular grooves in which are disposed O rings 38 and 39. These O rings are of neoprene or other synthetic rubber and are disposed on the valve member to be on opposite sides of bore 31 and serve as sealing rings.

Valve member 36 is of a plastic material available in the trade under the name Teflon and is a tetrafluoroethylene resin manufactured by Du Pont. A related material wherein one of the fluorine atoms is replaced by chlorine is manufactured and sold by the M. W. Kellogg Company under the trade mark Kel-F may also be used. These materials are chemically inert and are characterized by a slippery surface to which few if any materials will adhere.

Valve member 36, in the normal rest position illustrated in Figure 6, has recess 36a in its outer cylindrical surface opposite discharge opening 35. Seated in recess 36a is neoprene ring 36b which surrounds the top end of discharge opening 35 and seals the valve member.

Valve 36 has one end 42 of reduced diameter and provided with metal retainer 43. Retainer 43 may be locked on reduced end 42 by a pin. Valve member 36 has end portion 45 somewhat larger in diameter than the valve member proper. Enlarged portion 45 has a shoulder which is adapted to bear against the adjoining face of the valve block.

The valve member is spring biased to a predetermined rotary position by means of coil spring 46 around enlarged portion 45. Coil spring 46 has end 47 anchored to a pin or bolt carried by valve block 27 while end 48 of the coil spring is attached to pin 50 passing transversely through enlarged portion 45 of the valve member. Pin 50 also serves to retain operating handle 52 having an end disposed within enlarged portion 45.

Referring to Figures 6 and 7 of the drawing, it will be apparent that valve member 36 has two radial valve passages 54 and 55 at right angles to each other and intersecting at the axis of the valve member. Valve passage 54 in the position illustrated in Figure 6 registers with bore 31 in the valve block. In this position, companion valve passage 55 will register with internal passage 57 in valve block 27. Passage 57 in block 27 leads to chamber 58 within the valve block. Passage 57 may be made by drilling block 27 from end face 60 of the block and thereafter filling the part of the passage between end face 60 and chamber 58.

In the position of the valve illustrated in Figure 7, passages 54 and 55 are turned 90 degrees so that passage 54 registers with passage 57 and passage 55 registers with discharge opening 35. This will be accomplished by rotation of valve handle 52 in a clockwise direction through 90 degrees, as seen in Figure 4.

Chamber 58 within block 27 is internally threaded at 62 and accommodates the threaded end of pump cylinder

63. Pump cylinder 63 has end 65 externally threaded and has collar 66 threaded on to it. Collar 66 has passages 67 for engagement by a spanner wrench and to provide vents for permitting the flow of air to and from the interior of cylinder 63. Collar 66 is provided with bore 68 to accommodate pump rod 70.

Pump rod 70 has transverse pin 71 passing through the same and cooperates with collar 66 to limit the travel of the rod. Pump rod 70 has threaded end portion 72 which engages a threaded recess in knob 73. Nut 74 on rod 70 may be used for locking knob 73 in position. Lock nut 75 on rod 70 is provided for engaging end wall 77 of outer cylinder 78. End wall 77 is threaded to accommodate threaded part 72 of rod 70.

Outer cylinder 78 is larger than the outside diameter of collar 66 so that outer cylinder 78 may move freely with pump rod 70. Outer cylinder 78 is sufficiently long so that in the extreme in position of pump rod 70, free inner end 79 of outer cylinder 78 will be adjacent valve block 27 but stop short of it.

Outer cylinder 78 carries at the outside thereof, rigidly attached thereto, detent finger 80 having knife edge 81 (see Figure 3). Rigidly attached to valve block 27 by bolts 83 and 84 (Figures 3 and 4) is angle piece 86 carrying scale plate 87 to be visible from the top when the dispensing unit is in its normal position. Angle piece 86 has ratchet edge 88 (Figure 3) for cooperation with knife edge 81 of finger 80.

It will be clear that by rotation of knob 73, finger 80 may be moved into or out of engagement with ratchet teeth 88 and that if finger 80 is free of the ratchet teeth, pump rod 70 may be moved in or out as desired. All the parts relating to cylinder 63 and outer cylinder 78 and pump rod 70 and the like are preferably made of stainless steel or other suitable metal. The piston carried by pump rod 70 is non-metallic and will now be described.

Pump rod 70 has end portion 90 reduced and has the very end of the rod provided with a blind threaded recess for accommodating bolt 91. Reduced end portion 90 has metal washer 92 bearing against the shoulder formed by the enlargement of the rod diameter. Metal washer 92 is adjacent plastic piston body 93. Piston body 93 is constructed to provide a plurality of annular flutes 94 which in longitudinal section has the appearance of ratchet teeth. Plastic piston body 93 is made of the same material as valve member 36 and is locked in position upon the piston rod by washer 95 retained by bolt 91. The dispenser may be carried by mounting plate 95.

To use the dispenser, pump rod 70 is disposed in its innermost position as illustrated, for example, in Figures 2 and 3. Knob 73 is turned to clear detent finger 80 from the ratchet teeth 88 of the angle piece. The valve member in its normal spring biased position, as illustrated in Figure 6, connects the interior of container 15 with the pump cylinder 63. Knob 73 is pulled to retract the piston a desired distance. This distance may be calibrated in terms of volume of pumped material by reference to scale plate 87. The pump rod and knob are manipulated so that knife edge 81 of detent finger 80 will engage the proper ratchet tooth corresponding to the desired scale indication.

The valve member is now turned so that the valve is in the position illustrated in Figure 7. The pump cylinder is connected to discharge through outlet opening 35. The valve member is retained in this position by hand against the bias of coil spring 46. With the valve in this position, as illustrated in Figure 7, knob 73 is pushed inwardly. The slope of ratchet teeth 88 causes the detent finger to move to an unlocking position and this may be aided by turning knob 73 while pushing in. The inward movement of the knob results in the pump piston expelling the material within the pump cylinder, the expelled material passing out through opening 35.

Assuming that the dispenser has been properly purged

of air prior to use, accurate metering of material is possible. By virtue of the use of the particular plastic materials for the valve and piston members, long continued operation is possible even with highly abrasive materials. The plastic will not retain any material on its surface and can therefore be cleaned quite easily.

This is a continuation of our abandoned application Serial No. 769,706, filed October 27, 1958.

What is claimed is:

1. A dispenser for handling liquid or semi-liquid material, said dispenser comprising a normally horizontal valve block having top and bottom portions in the normal position of the dispenser, said block having a through passage vertically between said top and bottom portions for dispensed material, said block having an internal horizontal passage one end of which intersects said first-named through passage at an intermediate region thereof and the other end of which extends into a pump chamber, three-way valve means including a manual control, said three-way valve means including a cylindrical valve member lying in a horizontal valve chamber which extends through the valve block and intersects the two passages at their intersection, said valve means in one position connecting the top of said vertical passage to said internal horizontal passage and in other position connecting said internal horizontal passage to the bottom of said through vertical passage whereby material can be supplied from the top portion of said valve block to said internal horizontal passage or from said internal horizontal passage to the bottom portion of said valve block, a container for material to be dispensed, said container being disposed at the top portion of said valve block and having the interior of said container connected to the top portion of said through vertical passage in said valve block, a pump cylinder having one end portion thereof rigidly attached to said valve block with said one end of said cylinder in said valve block chamber, the axis of said pump cylinder and axis of said valve member being horizontal, the manual control and pump cylinder extending forwardly in the same general direction, said valve chamber communicating only with said internal horizontal passage and with said one end of said cylinder, a piston inside of said cylinder, a pump rod rigidly attached to said piston and extending away from said valve block beyond the other end of said cylinder, said pump rod having a handle at the outer end thereof, means providing a straight scale member having ratchet teeth along one edge thereof and carrying scale indications along the length thereof for disposition parallel to but laterally offset from the axis of said pump cylinder, a finger extending transversely of said pump cylinder axis, said finger and scale member forming two parts of a metering combination, means for securing one part of said metering combination to said pump rod, means for securing the remaining part of said metering combination to a stationary part of said dispenser, said pump rod being rotatable in the pump cylinder to selectively move said finger and ratchet teeth into or out of engagement so that said piston may be retracted away from the valve chamber for a desired distance to provide a desired intake volume for said pump, said three-way valve permitting material to be supplied from the container into said pump and expelled by said pump from the bottom of said block.

2. The construction according to claim 1 wherein said piston is shaped to provide a series of annular ratchet teeth, said piston ratchet teeth encircling the piston to provide a series of annular portions, said annular portions generally sloping toward that end of the piston so that when said piston is pushed inwardly into the cylinder, said annular portions will tend to be straightened and upon reverse movement of said piston, said annular portions tend to yield and slide along the cylinder wall.

3. The construction according to claim 2 wherein said piston is of a fluorinated polyethylene resin to which foreign materials do not readily adhere.

4. The construction according to claim 1 wherein said

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valve means includes a cylindrical valve member of a fluorinated polyethylene resin, said valve member having two passages extending radially and intersecting at the central region of said member, said valve block having a cylindrical chamber for accommodating said valve member.

5. The construction according to claim 1 wherein said valve means includes a cylindrical valve member of fluorinated polyethylene resin, said member having two passages at right angles to each other extending inwardly and intersecting at the central region thereof for three-way valve operation and O rings of neoprene for said valve member, said O rings being disposed at spaced regions on said member to provide sealing for said valve member.

6. A dispenser for handling liquid or semi-liquid material, said dispenser comprising a normally horizontal valve block having top and bottom portions in the normal position of the dispenser, said block having a through vertical passage between said top and bottom portions for dispensed material, said block having a horizontal valve chamber extending through said block perpendicular to said through passage and intersecting said through passage at an intermediate region thereof, a plastic valve member disposed in said valve chamber and rockable about the axis of said valve member, said block having an internal horizontal passage one end of which is at said valve chamber and the other end of which extends into a pump chamber in said valve block, said valve member having two connected passages extending inwardly from the outer surface so that said valve member can function as a three-way valve for connecting the top portion of said through passage with said internal horizontal passage or connecting the bottom portion of said through passage with said internal horizontal passage, a container disposed at the top portion of said block permitting material in said container to flow into the top of said through vertical passage, a pump cylinder having one end disposed in an opening in said valve block at said valve block pump chamber, said pump cylinder extending generally horizontally from said valve block, said valve member and pump cylinder axes being horizontal, said valve manual control and pump cylinder being forwardly of the valve block, a piston within said pump cylinder, said piston being of plastic and having a plurality of annular flutes so that from the side, said piston has the appearance of having ratchet-like teeth, said flutes having the edges pointing toward the valve block, a pump rod attached to said piston and extending away from said valve block beyond the other end of said pump cylinder, said pump rod having a knob at the free end thereof, a sleeve at the other end of said pump cylinder for providing a bearing for said pump rod, a stationary plate disposed in parallel relation to said cylinder, but laterally offset therefrom, said stationary plate having scale markings along the length thereof parallel to the direction of movement of said pump rod and a finger extending laterally of said plate for cooperation with said scale indications whereby in one valve position said pump cylinder may be filled with a predetermined volume of material from said container and in another valve position, said predetermined volume of material may be expelled from the pump cylinder to the bottom of said valve block.

7. A dispenser for handling liquid or semi-liquid material, said dispenser comprising a normally horizontal valve block having top and bottom portions in the normal position of the dispenser, said block having a through passage vertically between said top and bottom portions for dispensed material, said block having an internal horizontal passage one end of which intersects said first-named through passage at an intermediate region thereof and the other end of which extends into a pump chamber, three-way valve means including a manual control, said three-way valve means including a cylindrical valve member lying in a horizontal valve chamber which extends through the valve block and intersects the two passages at their intersec-

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tion, said valve means in one position connecting the top of said vertical passage to said internal horizontal passage and in other position connecting said internal horizontal passage to the bottom of said through vertical passage whereby material can be supplied from the top portion of said valve block to said internal horizontal passage or from said internal horizontal passage to the bottom portion of said valve block; a container for material to be dispensed, said container being disposed at the top portion of said valve block and having the interior of said container connected to the top portion of said through vertical passage in said valve block, a pump cylinder having one end portion thereof rigidly attached to said valve block with said one end of said cylinder in said valve block chamber, the axis of said pump cylinder and axis of said valve member being horizontal, the manual control and pump cylinder extending forwardly in the same general direction, said valve chamber communicating only with said internal horizontal passage and with said one end of said cylinder, a piston inside of said cylinder, a pump rod rigidly attached to said piston and extending away from said valve block beyond the other end of said cylinder, an outer cylinder rigidly attached to said pump rod and telescoping said pump cylinder, a finger carried by said outer cylinder and extending laterally therefrom, a straight member rigidly supported with respect to said outer cylinder, said straight member being stationary lying outside of and above said outer cylinder and having a straight series of ratchet teeth thereon, said finger cooperating with the teeth, said pump rod being rotatable to move said finger into or out of engagement with said teeth, said stationary member having means providing scale indications thereon readily visible from above so that said piston may be retracted away from the valve block chamber for a desired distance to provide a desired intake volume for said pump, said three-way valve permitting material to be supplied from the container into said pump and expelled by said pump from the bottom of said block.

8. A dispenser for handling liquid or semi-liquid material, said dispenser comprising a normally horizontal valve block having top and bottom portions in the normal position of the dispenser, said block having a through vertical passage between said top and bottom portions for dispensed material, said block having a horizontal valve chamber extending through said block perpendicular to said through passage and intersecting said through passage at an intermediate region thereof, a plastic valve member disposed in said valve chamber and rockable about the axis of said valve chamber, a manual control for turning said valve member, said block having an internal horizontal passage one end of which is at said valve chamber and the other end of which extends into a pump chamber in said valve block, said valve member having two connected passages extending inwardly from the outer surface so that said valve member can function as a three-way valve for connecting the top portion of said through passage with said internal horizontal passage or connecting the bottom portion of said through passage with said internal horizontal passage, a container disposed at the top portion of said block permitting material in said container to flow into the top of said through vertical passage, a pump cylinder having one end disposed in an opening in said valve block at said valve block pump chamber, said pump cylinder extending generally horizontally from said valve block, said valve member and pump cylinder axes being horizontal, said valve manual control and pump cylinder being forwardly of the valve block, a piston within said pump cylinder, said piston being of plastic and having a plurality of annular flutes so that from the side, said piston has the appearance of having ratchet-like teeth, said flutes having the edges pointing toward the valve block, a pump rod attached to said piston and extending away from said valve block beyond the other

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end of said pump cylinder, said pump rod having a knob at the free end thereof, a sleeve at the other end of said pump cylinder for providing a bearing for said pump rod, a second cylinder disposed outside of said pump cylinder and rigidly attached to said pump rod to be movable therewith, a stationary plate disposed in parallel relation to said outer cylinder, but laterally offset therefrom, said stationary plate having scale markings along the length thereof parallel to the direction

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of movement of said pump rod and a finger carried by said outer cylinder and extending laterally therefrom for cooperation with said scale indications whereby in one valve position said pump cylinder may be filled with a predetermined volume of material from said container and in another valve position, said predetermined volume of material may be expelled from the pump cylinder to the bottom of said valve block.

No references cited.