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MACHINE FOR FILLING CANS WITH PASTE HAVING A PLUNGER WITH PASTE SUCTION RELIEF BLADES

Filed March 29, 1947 4 Sheets-Sheet 1

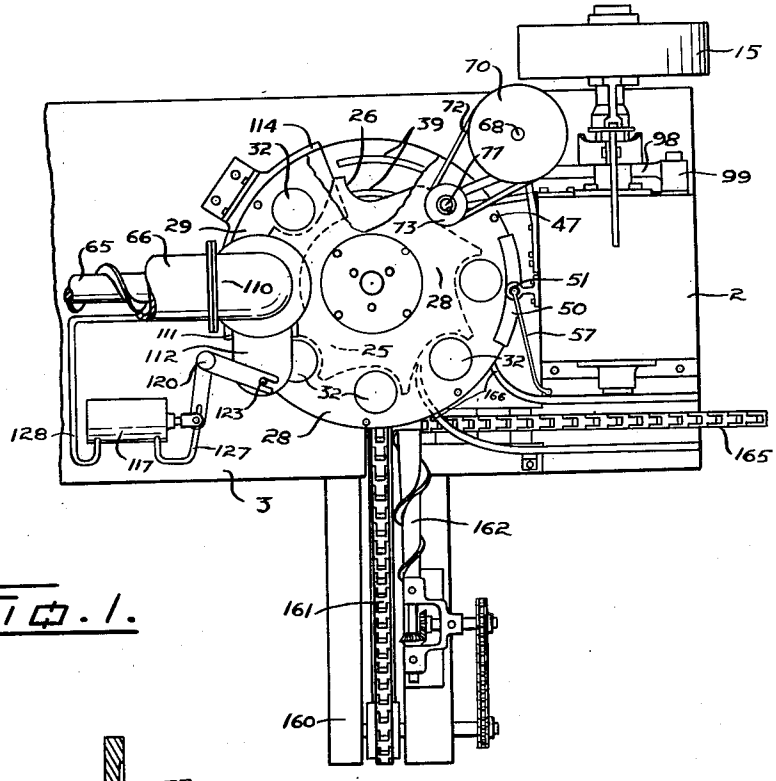

FIG. 1.

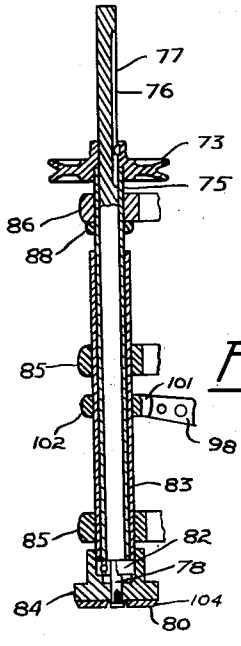

FIG. 5.

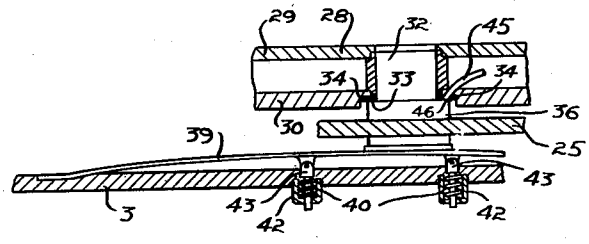

FIG. 6.

INVENTOR
HORATIO WATSON MACKINNON
Ernest L Carver
ATTORNEY

Dec. 5, 1950 H. W. MacKINNON 2,532,777

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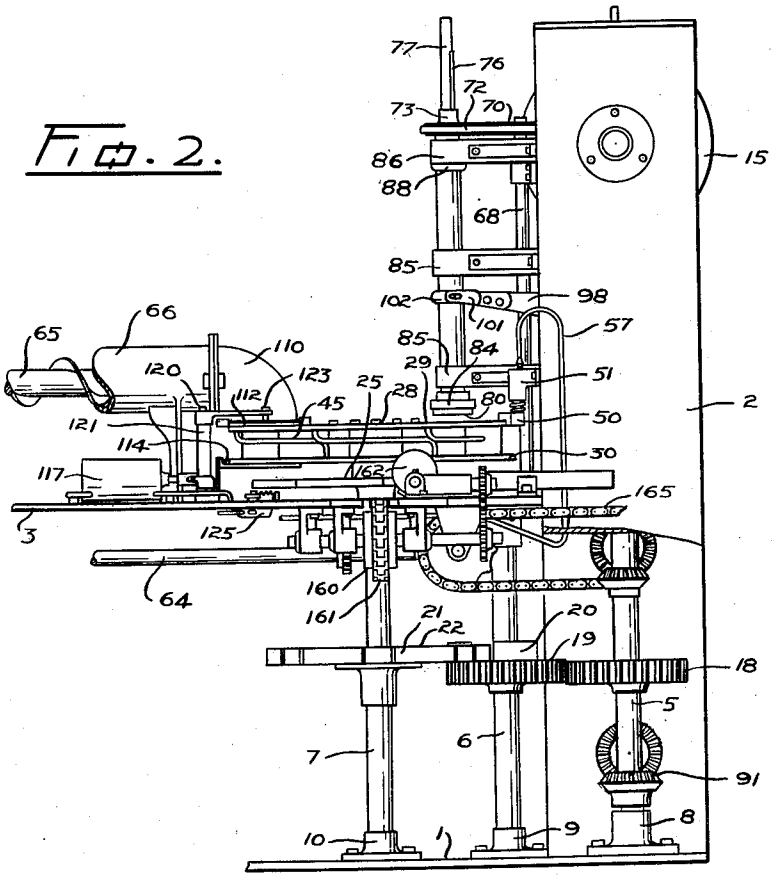
FIG. 2.



INVENTOR.
HORATIO WATSON MACKINNON
BY Ernest F. Carver
ATTORNEY

Dec. 5, 1950 H. W. MacKINNON 2,532,777

MACHINE FOR FILLING CANS WITH PASTE HAVING A PLUNGER WITH PASTE SUCTION RELIEF BLADES

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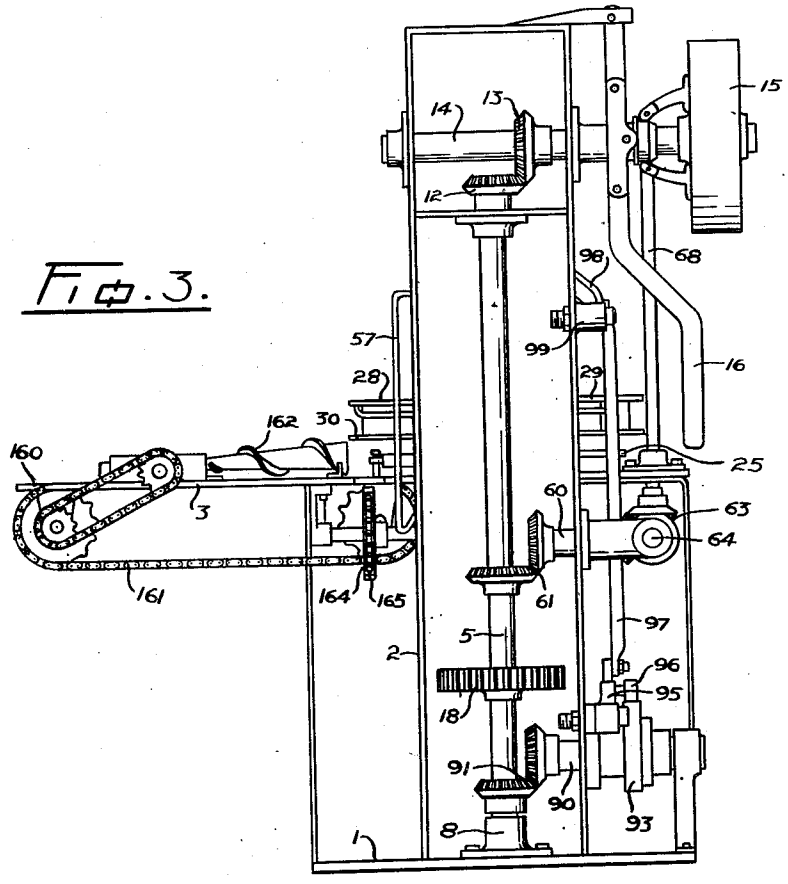
Fig. 3.



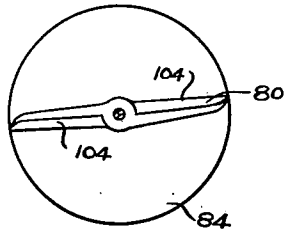


Fig. 7.

INVENTOR
HORATIO WATSON MACKINNON
Ernest H. Carver
ATTORNEY

Dec. 5, 1950 H. W. MacKINNON 2,532,777

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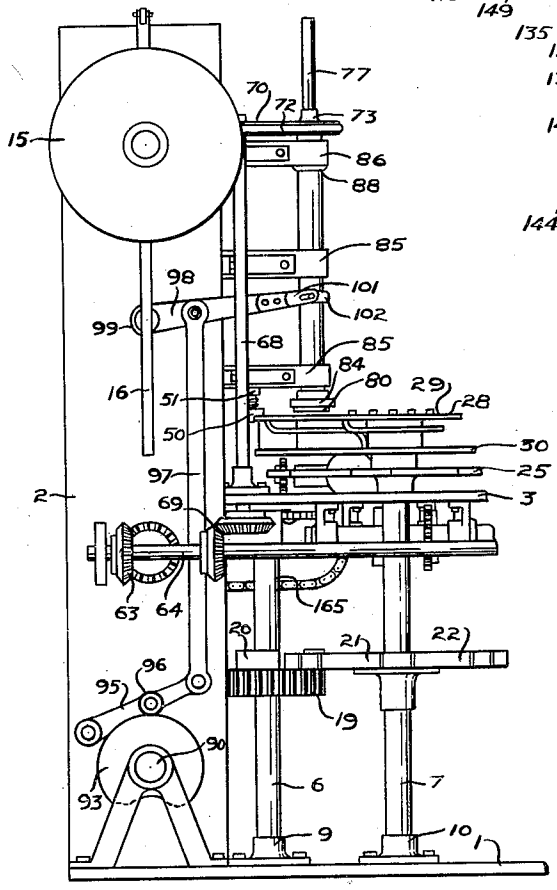

FIG. 4.

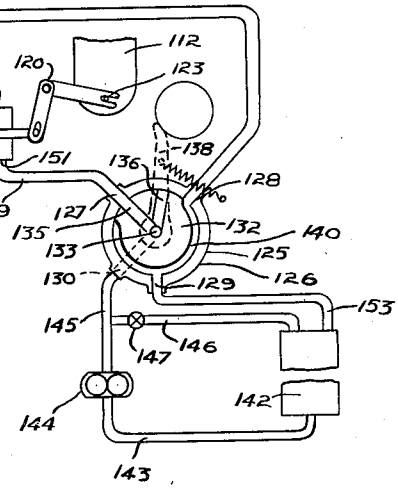

FIG. 8

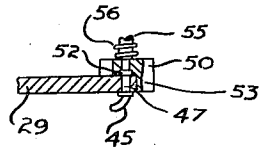

FIG. 9.

INVENTOR
HORATIO WATSON MACKINNON
Ernest F. Carver
ATTORNEY

Patented Dec. 5, 1950 2,532,777

UNITED STATES PATENT OFFICE

2,532,777

MACHINE FOR FILLING CANS WITH PASTE HAVING A PLUNGER WITH PASTE SUCTION RELIEF BLADES

Horatio Watson MacKinnon, Vancouver, British Columbia, Canada, assignor to John F. Latta, Vancouver, British Columbia, Canada

Application March 29, 1947, Serial No. 738,082

4 Claims. (Cl. 226—97)

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My invention relates to improvements in machines for filling cans with paste. The objects of the present invention are to provide a machine whereby cans or other containers may be filled with paste material such as fish or meat as a continuous process, supplying each container presented with a definitely measured quantity of paste without soiling the exterior of the can, and also to provide for the exhaustion of the can prior to filling, so that the entire measured quantity will enter said container. A still further object is to provide means for smoothing off the surface of the paste forced into the container, so that when the cover is applied thereto no extrusion of paste shall occur. A further object is to provide means to prevent any measuring section of the machine from being supplied with paste unless a can is provided to receive the paste from said measuring section.

Referring to the drawings:

Fig. 1 is a plan view of the invention.

Fig. 2 is a front elevational view.

Fig. 3 is an end elevational view showing the main driving train.

Fig. 4 is a rear elevational view of the invention.

Fig. 5 is a sectional detail view of the plunger for forcing the paste into the cans.

Fig. 6 is a detail sectional view of the spring support for the cans.

Fig. 7 is a detail plan view, looking up, of the smoothing knife.

Fig. 8 is a diagrammatic plan view showing the control of the paste feed gate.

Fig. 9 is a detail view, part in section, of the suction shoe.

In the drawings like characters of reference indicate corresponding parts in each figure.

The numeral 1 indicates a base having a hollow rectangular column 2 which supports one end of a table 3, a portion only of which is shown. Three vertical shafts 5, 6 and 7 are journalled in bearings 8, 9 and 10 respectively upon the base 1. The shaft 5, which will hereinafter be referred to as the main drive shaft, extends upwardly through the column 2 and is fitted with a mitre gear 12 meshing with a similar gear 13 on an overhead shaft 14, which shaft is fitted with a clutch pulley 15 controlled by a lever 16.

The main drive shaft 5 is fitted with a pinion 18 which meshes with a smiliar gear 19 upon the shaft 6 to drive it. Immediately above the gear 19 is a toothed wheel 20 of a Geneva gear 21, the slotted gear 22 of which is secured upon the shaft 7.

The shaft 7 is fitted above the table 3 with a can carrier disk 25, shown in dotted line in Figure 1, which disk is provided with peripheral pockets 26 in which empty cans are received and moved throughout the filling cycle, and above the

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carrier disk a turret head 28 is fitted upon the shaft 7. The turrent head consists of spaced disks 29 and 30 and is provided with cylindrical pockets 32, see detail in Figure 6, which are counter bored as at 33 at their lower ends and are each provided with a rubber gasket 34. The counter bore 33 is somewhat larger than the upper rim diameter of an empty can 36 and serves to form an airtight seal between said can and the pocket 32 under which said can is supported.

Secured to the table 3 is a pair of arcuate support springs 39 which are urged upwardly in the path of the cans by compression springs 40, the springs being preferably seated in sockets 42 secured to the underside of the table 3, as shown in Figure 6. These springs thrust upwards onto plungers 43 which connect with the support springs 39 and urge the springs and any can moving therealong into sealing contact with the gasket 34 in the counter bore 33 of the pocket 32. A suction tube 45 communicates through a port 46 within the inner can area of each counter bore 33 and a port 47 formed in the upper face of the disc 29 of the turret head 28. The ports 47 are moved progressively into register with a suction shoe 50 carried from a bracket 51 upon the column 2.

The suction shoe 50, shown in detail in Figure 9, is a member having an elongated arcuate recessed port 52 on its underside, which recess is in length substantially equal to the distance between adjacent ports 47 in the turret 28. The shoe 50 is provided with a downwardly projecting rim 53 which engages the periphery of the disc 29 and a tubular shank 55 which is slidably mounted in the bracket 51. A compression spring 56 surrounds the shank 55 which bears upwardly against the bracket and downwardly onto the shoe to keep said shoe in sealing contact with the disc 29 and its ports 47. The shank is connected to a pipe 57 which leads to a suitable suction device (not shown) to maintain a suction through the shank to the arcuate port 52 and to each of the ports 47 as they move lengthwise of said port during the rotational movement of the turret 28.

Extending through the rear side of the column 2 is a short horizontal shaft 60 which is driven through mitre gears 61 from the vertical shaft 5. The horizontal shaft 60 drives through mitre gears 63 a horizontal shaft 64 which extends along the rear edge of the table, see Figures 2, 3 and 4, to drive the feed worm 65 of a paste feed pipe 66 through any suitable driving train (not shown). A vertical shaft 68 is driven through mitre gears 69, see Figure 4, and is fitted at its upper end with a driving pulley 70 which is connected by a belt 72 to a driven pulley 73. The driven pulley 73 is secured upon a sleeve 75 and is provided with a key which rides

in a key slot 76 of a shaft 77 on the lower end of which a small diameter stem 78 is provided to fixedly support a knife 80. The lower end of the shaft 77 is journalled in a bearing 82 carried in the sleeve 83 and the sleeve is provided at its base with a plunger 84 slidably mounted in bearings 85 carried from the column 2. The upper end of this sleeve forms a bearing for the lower end of the sleeve 75 which is also journalled in a bearing 86. The sleeve 75 and pulley 73 are held against endwise movement by a collar 88 secured to the sleeve 75 below the bearing 86. To provide means for reciprocating the plunger 84 a short horizontal shaft 90 is provided, which is driven by mitre gears 91 and is fitted with an edge cam 93, see Figures 3 and 4. Swingingly mounted upon the rear wall of the column 2 is an arm 95 having a roller 96 which engages the periphery of the cam 93. The outer end of said arm is coupled by a vertical rod 97 to an upper arm 98 which is pivoted as at 99 and is provided with a fork 101 which engages a trunnion collar 102 secured to the slidably mounted sleeve 83. The knife 80 is bevelled on its leading edges as at 104 and its rear face is in a single plane and in continuous rotating contact with the face of the plunger 84 and serves to break the adhesion of the paste from the face of the plunger as soon as the plunger starts on its upward stroke.

At the free end of the paste feed pipe 66 a delivery spout 110 is provided, which is adapted to register with the pockets 32 as they are carried around the axis of the turret 28, and intermediate the end of said spout and the face of the disc 29 is a slide 111 in which a gate valve 112 is slidably mounted to cut off the flow of paste through the spout 110. Below the turret and in contact with the underside of the disc 29 is a segmental plate 114, see Figures 1, 2 and 4, for the purpose of preventing the paste admitted to the pockets 32 from being extruded below the plane of the underside of the disc 29 and to so retain the measure quantity in each pocket filled until the can below said pocket reaches the lower end of the supporting springs 39 and raises the can to lift its upper rim into sealing contact with the gasket 34 of the counter bore 33.

It will be understood that since the feed screw 65 in the feed pipe 66 is considerably smaller than said feed pipe, that constant pressure is exerted on the paste and that when the gate valve 112 is opened the paste will immediately flow therethrough and when closed, a counterflow of paste will take place between the periphery of the screw and the inside wall of the pipe. The structure involved to provide this immediate flow when wanted, is common and is incidental only to the invention.

The gate valve 112 is actuated by hydraulic control consisting of a cylinder 117 having a double acting piston 118 and a piston rod 119 which rocks a bell crank 120 which is mounted upon a vertical shaft 121 carried upon the table 3, see Figures 1, 2 and 8, one arm of the bell crank 120 being connected to an upstanding pin 123 of the gate valve 112. A control valve generally indicated by the numeral 125 is provided to control the piston movement. This valve consists of a cylindrical casing 126 having combined supply and return ports 127 and 128 and an exhaust port 129 in one plane and an inlet port 130 in a lower plane of said casing. A valve plug 132 is rockingly mounted in the casing and is provided with a vertical ported passage 133 in constant communication with the inlet port 130 and with radial passages 135 and 136 which selectively register with the ports 127 and 128. The valve plug 132 is provided with a spring loaded lever 138, shown in dotted line in Figure 8, which is adapted to be moved against its spring tension by a passing can to bring the passage 135 into register with the port 127 as shown in the figure. The plug is provided with a circumferential groove 140 which is in constant register with the exhaust port 129 and selectively in register with either of the ports 127 and 128, the registration in the setting shown being with the port 128. In the diagrammatic view Figure 8, the gate valve 112 and the can under the measuring pocket 32 which is about to be filled, are shown as being separated from each other horizontally instead of being in the position in which they will properly assume in the machine during the pocket filling phase of the operating cycle of the machine, viz. with the gate withdrawn to clear the measuring pocket.

A fluid supply to operate the piston 118 and the gate valve 112 is from a reserve tank 142 and is drawn through a pipe 143 by a continuously driven pump 144 and which is connected through a pipe 145 to the valve inlet port 130. A byepass 146 having a spring loaded check valve 147 connects the supply pipe 145 back to the tank 142. Pipes 149 and 159 communicate respectively with the valve port 127 and the front end cylinder port 151 and the valve port 128 and the front end cylinder port 152. A return pipe 153 communicates between the exhaust port 129 of the valve 125, and the tank 142.

Connecting with the front of the table 3 is a conveyor 160 having a conveyor chain 161 which is suitably driven from an appropriate part of the machine, which carries cans towards the can receiving disc 25. The cans are appropriately spaced by a can feed screw 162 chain and sprocket driven from the operating train of the conveyor 160. Below the turret 28 a discharge conveyor 164 having a conveyor chain 165 and a pair of curved guide rails 166 which serve to deflect filled cans from under the turret and from the carrier disc 25 onto the discharge conveyor.

In operation, the drive through the Geneva gear 21 imparts an intermittent rotational motion to the turret 28 and the can carrier disc 25. A continuous suction is exerted within the pipe 57 and the suction shoe 50 to one of the ports 47 and a constant flow of liquid is maintained by the pump 144 for controlling the flow of paste to the measuring pockets 32 and paste is continuously flowing within the paste feed pipe 66. Cans are brought to the machine upon the conveyor 160 and are fed at suitable intervals into the recesses of the can carrier disc 25 and are carried around, each can being vertically aligned with a measuring pocket 32 of the turret 28. As each pocket 32 approaches a position under the spout 110, assuming that a can is being carried along under said pocket, the can will contact the valve lever 138 and swing it in the direction of can travel until the pocket is directly under the feed spout, when the turret 28 will come to rest by virtue of the then disposition of the elements 20 and 22 of the Geneva gear 21. Simultaneously the valve plug 132 being in the position shown in Figure 8, will cause a fluid flow to the front end of the cylinder 117 to actuate the piston 118 and rock the bell crank 120 to open

the gate valve 112 and allow paste to flow through the spout 110 and deliver a measured quantity into said pocket 32, which at this time is closed off at the bottom by the segmental plate 114. As soon as sufficient fluid has been delivered to the cylinder 117, the discharge from the gear pump 144 will bye-pass back to the reserve tank 142 through the spring loaded check valve 147. When the toothed portion of the wheel 20 of the Geneva gear 21 again engages the slotted gear 22 to drive it, the turret will again turn, moving the last filled can beyond the segmental plate 114 and onto the arcuate supporting springs 39 where in successive movements the can is raised by said springs to seal its upper rim into sealing contact with the gasket 34 of the counter bore 33 of the filled pocket 32. As soon as the port 47 of the pipe 45 connecting the said filled pocket comes under the suction shoe 50, said can will be subjected to suction through the pipe 57, thus exhausting the can and effecting a downward suction on the paste within said pocket, so that when the turret next comes to rest with the said pocket and its can under the plunger 84, said plunger actuated by the rotation of the cam and its operating train descends to force the paste wholly into the can. The knife 80 being under constant rotation sweeps between the paste mass and the plunger 84, thus preventing adhesion of one to the other and allows said plunger to rise on its return stroke free from adherent paste material. The filled can is carried further around in intermittent steps, first moving off the arcuate supports spring 39 onto the table 3 and is finally withdrawn from the carrier disc 25 by the curved guide rails 166 to deliver it onto the discharge conveyor 164. The description of this cycle applies to one measuring pocket and one can only, but it will be understood that as one measuring pocket is being filled a can under a preceding pocket will be undergoing exhaustion and another can will be in process of being filled. As each can passes from its position below the filling spout, the gate valve 112 closes by virtue of the valve plug 132 swinging to reverse the fluid flow to the cylinder 117 incidental to the can passing away from the end of the spring tensioned valve lever 138. Obviously if a measuring pocket 32 in reaching filling position is not accompanied by a can, the lever 138 cannot be swung and consequently the gate will not be opened, so that said pocket will remain empty until it again approaches the feed spout appropriately accompanied by a can.

What I claim as my invention is:

1. A paste filling machine comprising a table, a vertical shaft extending above said table, means for imparting intermittent rotation to the shaft, a container carrying device secured upon the shaft and a turret having a plurality of concentrically arranged pockets within the turret, said pockets being open at their upper and lower ends, said carrier being adapted to move a container into alignment with each pocket, a stationary plate interposed below a portion of the turret and in the path of the containers and a feed spout disposed above said plate to supply paste to the pockets progressively, a gate interposed between the spout and the turret, and means responsive to the movement of a container into aligned position with the gate for opening said gate to admit paste to the measuring pocket above said container, means for closing the gate after each pocket is filled, and means for transferring the paste from the pocket to its container.

2. A paste filling machine comprising a table, a vertical shaft extending above said table, means for imparting intermittent rotation to the shaft, a container carrying device secured upon the shaft and a turret having a plurality of concentrically arranged pockets within the turret, said pockets being open at their upper and lower ends, said carrier being adapted to move a container into alignment with each pocket, a stationary plate interposed below a portion of the turret and in the path of the containers and a feed spout disposed above said plate to supply paste to the pockets progressively, a gate interposed between the spout and the turret, and means responsive to the movement of a container into aligned position with the gate for opening said gate to admit paste to the measuring pocket above said container, means for closing the gate after each pocket is filled, and means for transferring the paste from the pocket to its container, said means consisting of a fluid pressure operated member operatively connected with the gate to open it and a valve for controlling the movement of the member, said valve having a lever normally interposed in the path of the container and to be moved thereby.

3. In a paste filling machine having open ended measuring pockets adapted to be filled with material and to be moved along a path with a container held in adjusted position at an open end of each pocket, a plunger adapted for reciprocatory movement to enter each of said pockets progressively and to thrust the contained material into its container, and means associated with the plunger to substantially clean the plunger to prevent the withdrawal of material from the container, said means consisting of a member mounted on the thrust face of said plunger, and means for moving the member to sweep said face as the plunger is withdrawn.

4. In a paste filling machine having open ended measuring pockets adapted to be filled with material and to be moved along a path with a container held in adjusted position at an open end of each pocket, a plunger adapted for reciprocatory movement to enter each of said pockets progressively and to thrust the contained material into its container, and means associated with the plunger to substantially clean the plunger to prevent the withdrawal of material from the container, said means consisting of a rotary knife journalled upon the thrust face of the plunger to sweep said face as the plunger is withdrawn, and means for imparting rotation to the knife.

HORATIO WATSON MacKINNON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
407,943	Nichols	July 30, 1889
671,392	Brown	Apr. 2, 1901
1,099,114	Bracy	June 2, 1914
1,434,766	Babcock	Nov. 7, 1922
1,981,485	Westin	Nov. 20, 1934
2,176,449	Ayars	Oct. 17, 1939
2,433,061	Pearson et al.	Dec. 23, 1947

FOREIGN PATENTS

Number	Country	Date
287,924	Germany	May 6, 1913