

Oct. 17, 1939.

A. BURNETT

2,176,121

FILLING MACHINE

Filed Aug. 24, 1937

5 Sheets-Sheet 1

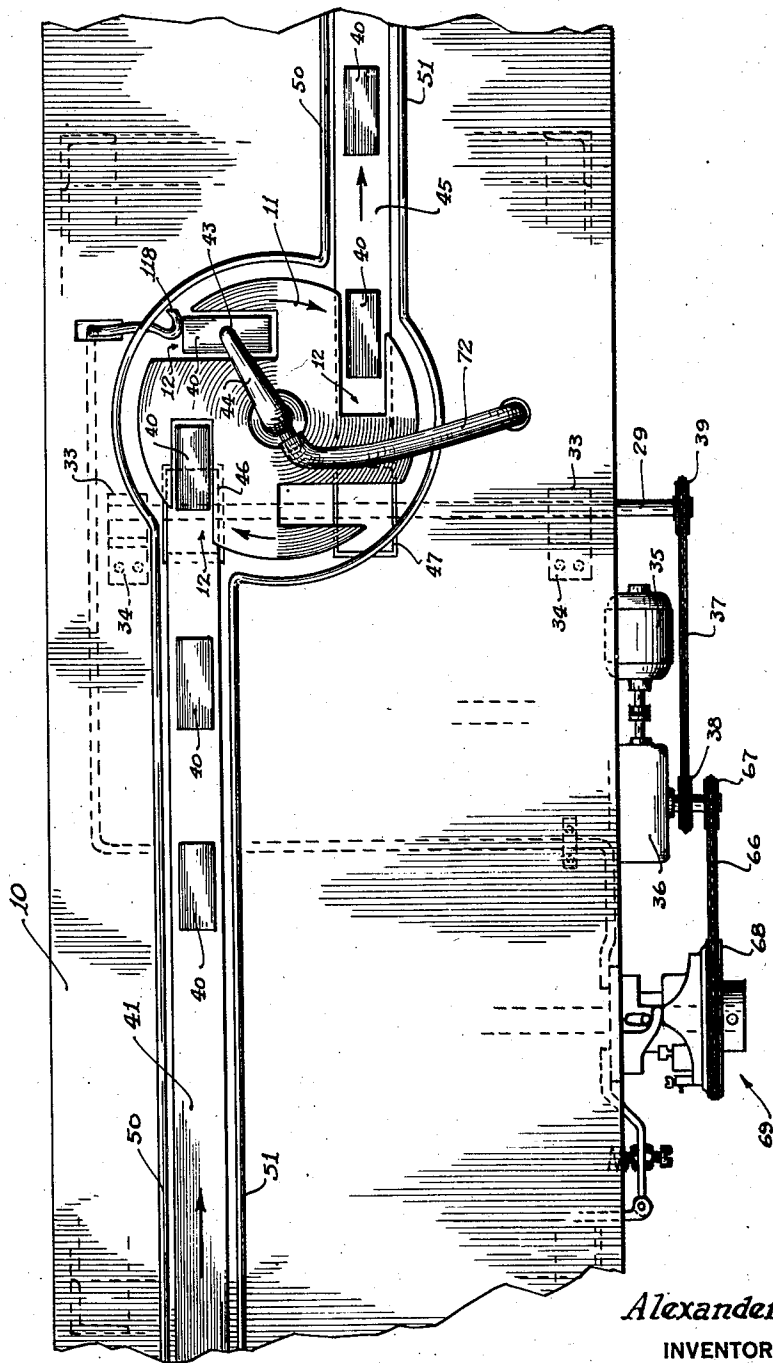


Fig. 1

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5 Sheets-Sheet 2

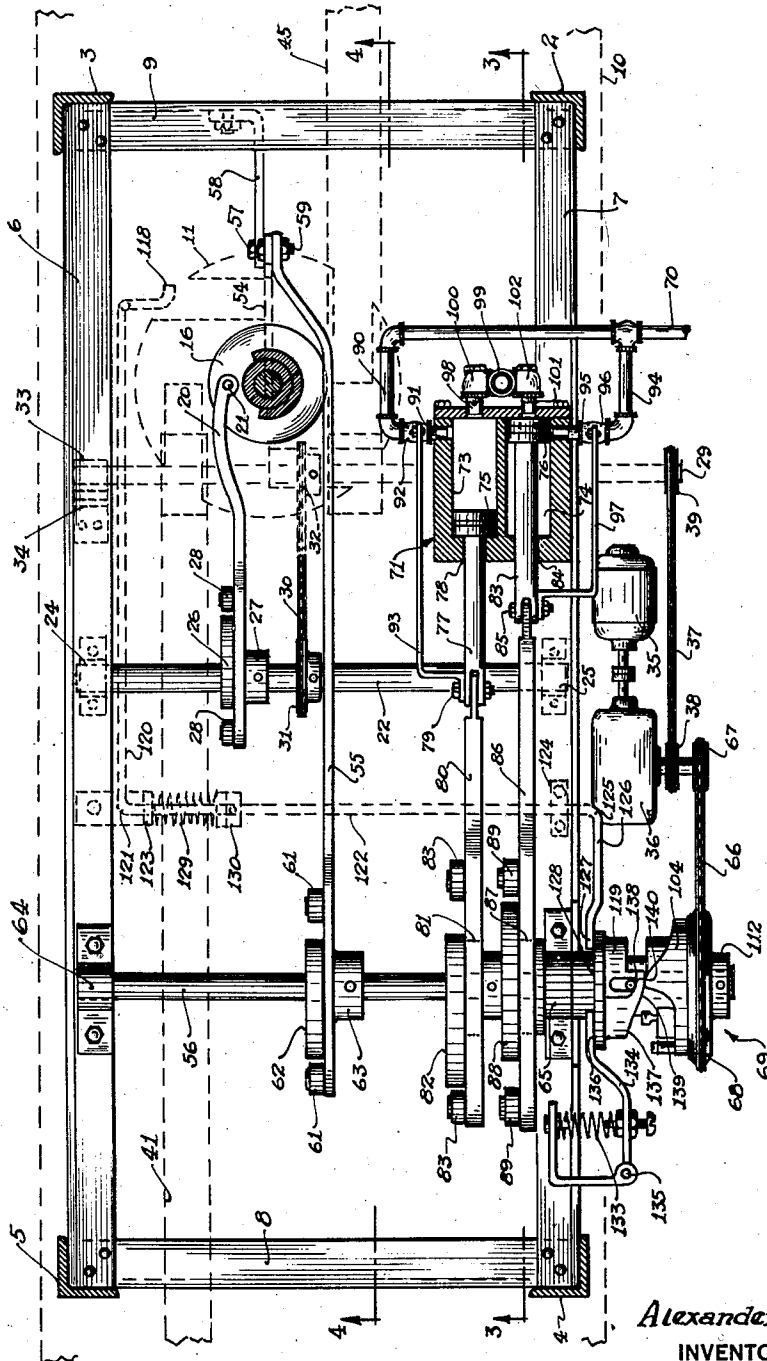


Fig. 2

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5 Sheets-Sheet 3

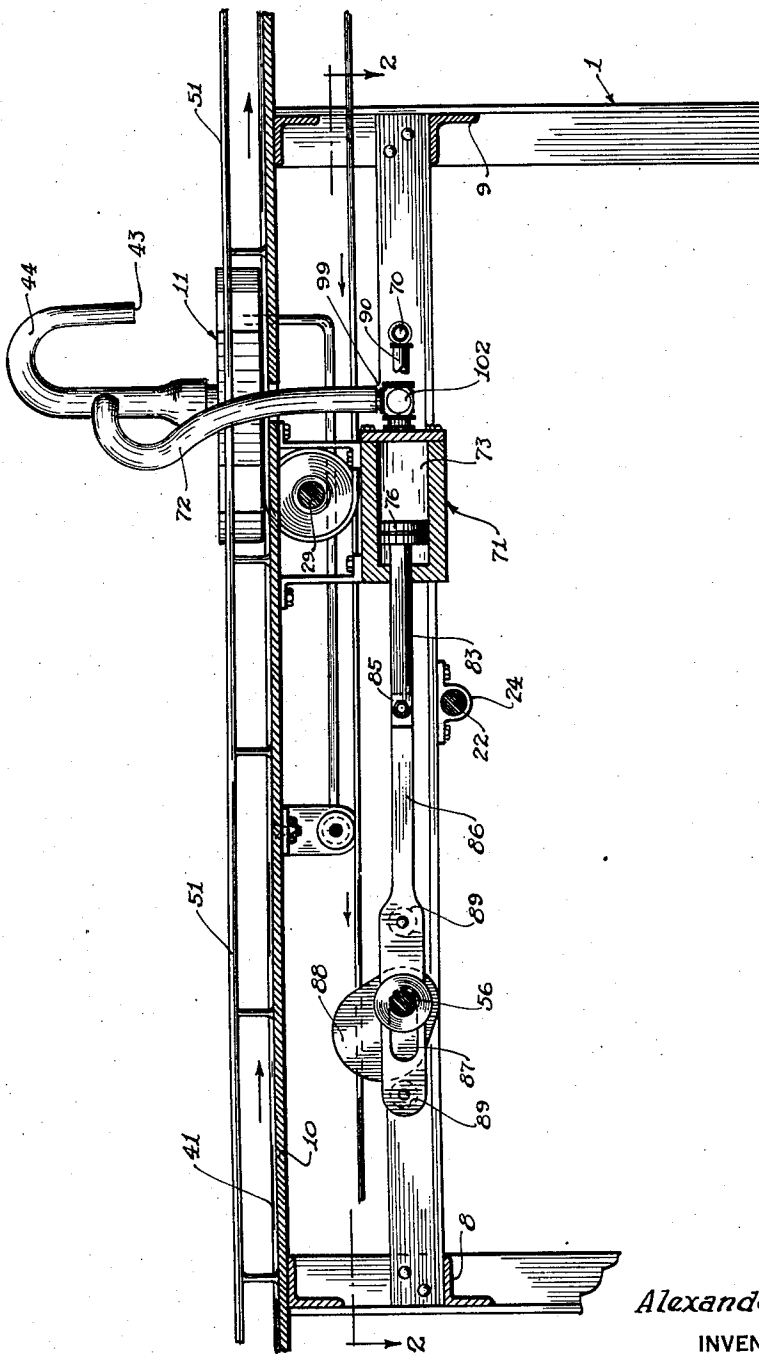


Fig. 3

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5 Sheets-Sheet 4

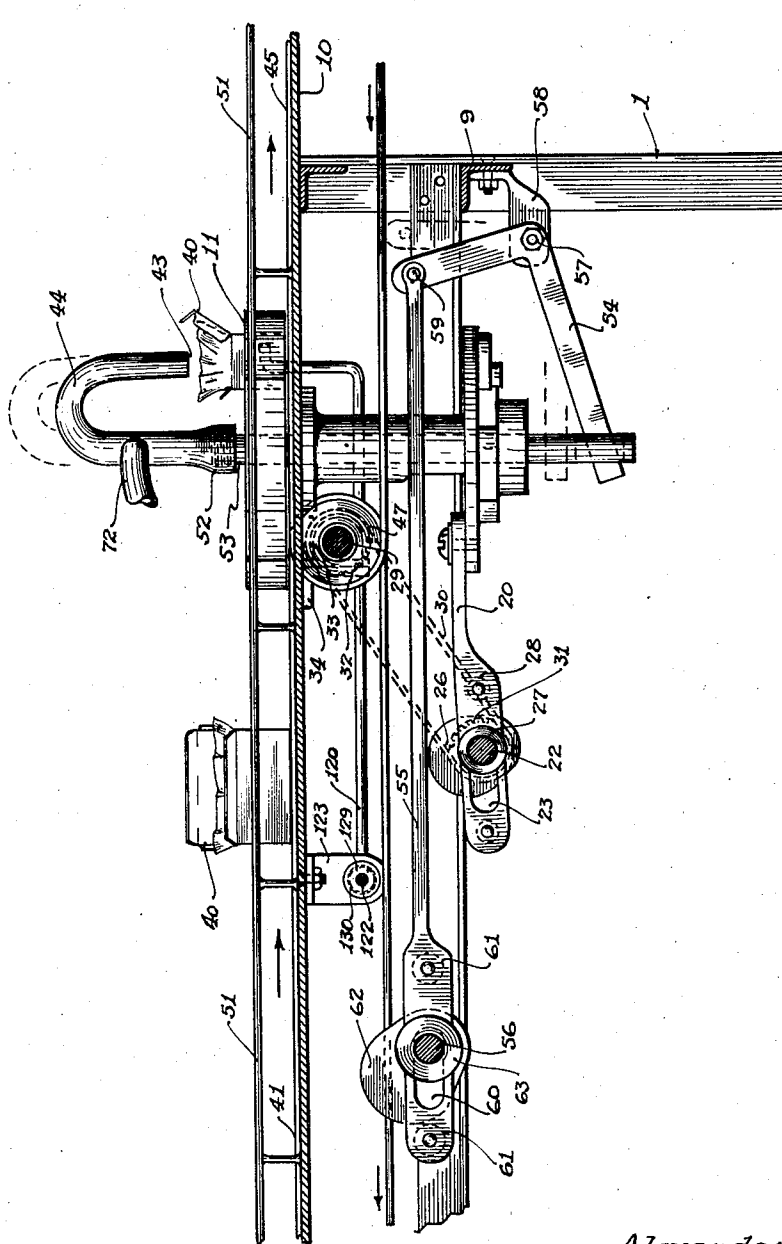


Fig. 4

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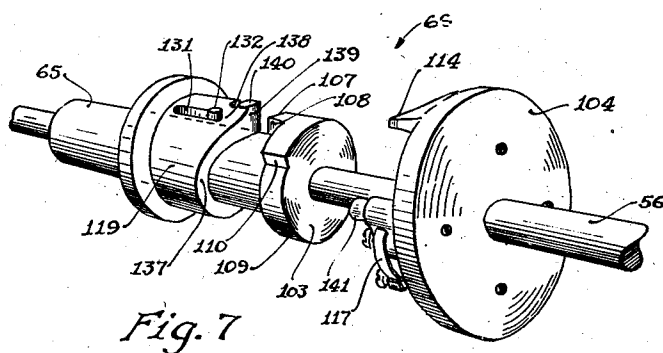
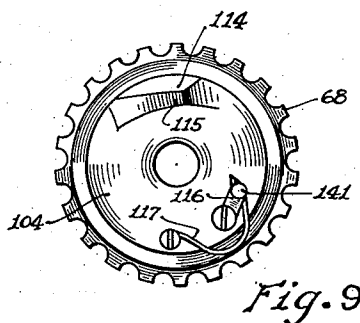
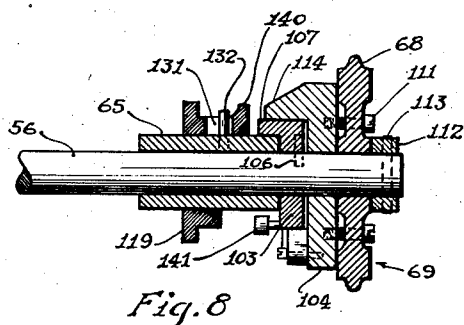
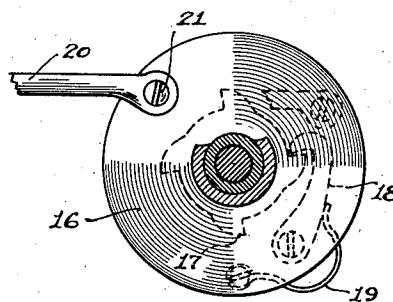
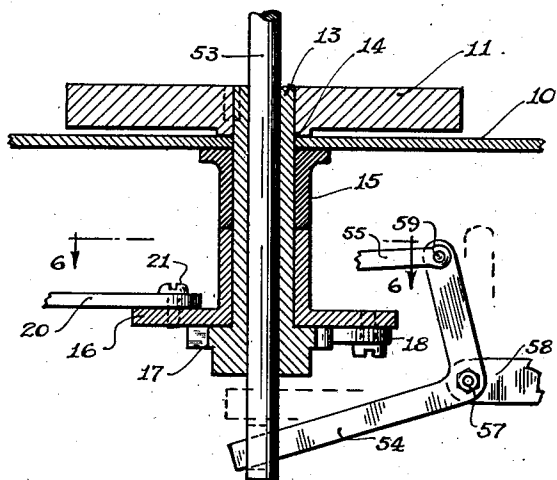
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FILLING MACHINE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,176,121

FILLING MACHINE

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Application August 24, 1937, Serial No. 160,719

2 Claims. (Cl. 226—97)

This invention relates to a measuring and filling apparatus for dispensing predetermined amounts of liquid and semiliquid materials, such as oils and greases.

One of the objects of the invention is to provide an improved device for dispensing predetermined amounts of liquid and semiliquid materials, such as oils and greases.

Another object of the invention is to provide a measuring and filling device having automatic means for feeding cartons to and from a fixed discharge nozzle and for preventing the discharge of materials from the nozzle in the absence of a properly fed carton.

Another object of the invention is to provide a measuring and filling device having a non-drip, non-spatter filling nozzle.

Other objects of the invention will be apparent from the description and claims which follow.

In accordance with the present invention, cartons ready for filling are successively fed on an endless conveying means and into the receiving pockets of an intermittently movable rotatable turret for movement relative to a discharge nozzle. With each movement of the turret, a previously fed carton is moved into filling position relative to the nozzle and simultaneously a previously filled carton is moved by the turret onto a discharge conveying means whence it is carried from the machine.

The nozzle of the present invention is adapted for movement toward and from the turret. The movements of the nozzle are effected in synchronism with the turret so that before filling of the carton the nozzle is lowered relative to the carton. The lowering of the nozzle minimizes the drop of discharged material and thus prevents spattering of the material.

The nozzle, after each discharge, is raised from the carton and simultaneously, through timely operation of a valve arrangement in the measuring and discharge mechanism, suction is applied against the material remaining in the nozzle thus preventing dripping of the material between each filling of the cartons.

The device of the present invention employs a measuring device of the conventional cylinder and piston type. The actuating means of the nozzle and measuring device is controlled from a common shaft rotatably driven through the medium of a throwout clutch. The clutch is controlled through the medium of a guard member mounted relative to the revolving turret and adapted for movement into an empty pocket of the turret when and as the empty pocket is moved

relative to the filling nozzle. In the event a carton has failed to feed to a pocket of the turret, the guard member is moved into the pocket as it approaches filling position thereby releasing the clutch and preventing discharge of material from the nozzle.

Attention is directed to the drawings in which like characters of reference are used to designate similar elements.

Figure 1 is a plan view of a measuring and filling device constructed in accordance with the present invention.

Figure 2 is a top view, partly in section, taken substantially on line 2—2 of Figure 3, the turret and conveying means being shown in dotted lines.

Figure 3 is a side view, partly in section, taken substantially on line 3—3 of Figure 2, parts being omitted.

Figure 4 is a side view, partly in section, taken substantially on line 4—4 of Figure 2.

Figure 5 is an enlarged detailed view, partly in section, of the turret mechanism.

Figure 6 is a view taken on line 6—6 of Figure 5.

Figure 7 is an enlarged view, in perspective, illustrating the clutch mechanism. In this figure the main clutch plate is shown removed from the other clutch elements.

Figure 8 is an enlarged detailed view, partly in section, of the clutch assembly.

Figure 9 is a side view of the main clutch plate and drive sprocket.

The device of the present invention is mounted upon suitable framework 1 comprising standards 2, 3, 4 and 5, cross members 6 and 7, end members 8 and 9, and top 10.

Turret 11 is provided with carton receiving pockets 12 and is rigidly secured to tubular shaft 13, the shaft 13 being rotatably mounted in collar bearing 15 fixedly secured at opening 14 in top 10.

Drive plate 16 is rotatably secured on shaft 13 for movement relative to ratchet member 17 rigidly secured to shaft 13. Drive plate 16 is provided with pawl 18 held in constant engagement with ratchet 17 by spring 19. Plate 16 is oscillated on shaft 13 by reciprocating rod 20 and, in turn, serves to intermittently rotate turret 11 through the medium of ratchet 17 and pawls 18. Rod 20 is pivoted at one end, as at 21, to plate 16 and at its opposite end, is slidably mounted on shaft 22 through slot 23.

Shaft 22 is journaled in bearings 24 and 25 rigidly secured to cross members 6 and 7. Cam 26 is pinioned, or otherwise secured, to shaft 22. Rod 20 is held adjacent cam 26 by collar 27 rigidly secured to shaft 22. Rod 20, at either side

of slot 23, is provided with roller bearings 28 and is reciprocally operated by rotation of cam 26 against the bearings 28.

Shaft 22 is continuously driven from shaft 29 through the medium of chain 30 and sprockets 31 and 32. Shaft 29 is journaled in suitable bearings 33 rigidly secured, as by brackets 34, to the under surface of top 10, and is continuously driven by power transmitted from motor 35 through the medium of gear box 36, chain 37 and sprockets 38 and 39.

As shown in Figure 1, empty cartons 40 are fed one after the other on endless conveying belt 41 and into pockets 12 of turret 11. At each movement of turret 11, the carton last fed from conveying belt 41 is moved into filling position below discharge end 43 of nozzle 44 and simultaneously the carton last filled is moved to a position from nozzle 44 onto discharge conveyor 45 whence it is carried from the machine.

Conveying belt 41 is continuously driven on pulley 46 and conveyor belt 45 is continuously driven on pulley 47. Each of the pulleys 46 and 47 is rigidly secured to shaft 29.

Guide rails 50 and 51 are secured adjacent either side of the path defined by conveyors 41 and 45 and turret 11 for securing the cartons within their proper limits during travel through the machine.

As shown in Figure 4, discharge nozzle 44 is reciprocally mounted for movement relative to the pockets of turret 11. The movements of nozzle 44 are effected in synchronism with the movements of turret 11 so that following movement of each carton into filling position, the nozzle is lowered relative to the carton before discharge of the material into the carton. The lowering of the nozzle minimizes the drop of the discharged material and thus prevents spattering of the material. After filling of the carton, the nozzle is raised relative to the carton prior to the next movement of the turret.

Nozzle 44 is threaded, as at 52, to rod 53 slidably mounted in tubular shaft 13. Rod 53 is reciprocated through the medium of bell crank lever 54 connected through the medium of rod 55 with drive shaft 56. Lever 54 is pivoted, as at 57, on bracket 58 rigidly secured to end member 9. Rod 55 is pivoted at one end, as at 59, to lever 54 and at its other end is mounted through slot 60 for slidable movement on shaft 56. Rod 55, at either end of slot 60, is provided with bearing members 61. Cam 62 rotates with shaft 56 and serves to reciprocate rod 55 through engagement with bearing members 61. Rod 55 is held adjacent cam 62 by collar 63 pinioned on shaft 56.

Shaft 56 is journaled in bearing 64 rigidly secured to frame member 6 and sleeve bearing 65 rigidly secured to frame member 7 and is adapted for continuous rotation. Power is transmitted to shaft 56 from motor 35 through the medium of gear box 36, chain 66, sprockets 67 and 68 and clutch element 69. The operation of clutch element 69 will be hereinafter more fully described.

As shown in Figures 1, 2 and 3, the material delivered through supply line 70, which extends from a source of supply not shown, is measured in predetermined amounts in measuring device 71. The measured material is forced from measuring device 71 through flexible line 72 and nozzle 44 in synchronism with the movement of the cartons in turret 11.

Measuring device 71 comprises cylinders 73

and 74 respectively provided with pistons 75 and 76 mounted for relatively opposite movements. Piston 75 is rigidly secured to connecting rod 77 mounted through opening 78 of cylinder 73. Connecting rod 77 is pivotally connected, as at 79, to drive rod 80, mounted as through slot 81 for slidable movement on shaft 56. Reciprocal movement is imparted to rod 80 and thus to rod 77 and piston 75 through rotation of cam 82 in engagement with bearing members 83.

Piston 76 is secured to connecting rod 83 mounted through opening 84 in cylinder 74. Rod 83 is pivotally connected, as at 85, to drive rod 86 mounted, as through slot 87, for slidable movement on shaft 56. Reciprocal movement is imparted to rod 86 and thus to rod 83 and piston 76 through rotation of cam 88 in engagement with bearings 89. It will be noted that cams 82 and 88 are mounted on shaft 56 so as to provide a relatively opposite movement of the pistons 75 and 76. It will be noted also that when one of the pistons 75 and 76 is being moved in a direction to measure a supply of material the other of the pistons is being moved in a direction to discharge a previously measured supply of material.

It will be seen further that through proper spacing of bearings 83 and 89 relative to their respective cams 82 and 88 pistons 75 and 76 will momentarily remain idle at each of their extreme movements. This idleness is timed to permit one complete movement of the turret between each discharge of the material.

Material from supply line 70 is directed to cylinder 73 through lines 90 and 91, the line 91 being provided with shutoff valve 92 operable through rod 93 by movement of connecting rod 77. Material from line 70 is directed to cylinder 74 through lines 94 and 95, the line 95 being provided with shutoff valve 96 operable through rod 97 by movement of connecting rod 83.

The material forced from cylinder 73 is directed through line 98, header 99, flexible tubing 72 and nozzle 44. Line 98 is provided with check valve 100, preferably of the suction type. Material forced from cylinder 74 is directed through line 101, header 99, flexible tubing 72 and nozzle 44. Line 101, like line 98, is provided with a check valve 102, also of the suction type.

Check valves 100 and 102 are operated through suction caused by intake movement of their respective pistons and thus serve to close their respective lines in the direction from the nozzle to the piston. The suction exerted in closing each of the valves, however, is reflected throughout the discharge line and thus at the discharge end 43 of nozzle 44, by which dripping of material from nozzle 44, between filling of the cartons, is prevented.

As shown in Figure 2 and more in detail in Figures 7, 8 and 9, clutch assembly 69 comprises drive wheel 103 and clutch disk 104. Drive wheel 103 is rigidly secured, as by pin 106, to shaft 56 and is mounted adjacent sleeve bearing 65. Drive wheel 103 is radially flanged as at 107 to provide shoulder 108 and at its peripheral edge is provided with cam surface 109 thus providing shoulder 110. As seen in Figure 8, flange 107 rotates relative to the outer periphery of sleeve 65.

Sprocket 68 is rigidly secured, as by bolts 111, to clutch disk 104. Sprocket 68 and clutch disk 104 are secured on shaft 56 as by collar 112 and pin 113 and are free to rotate on shaft 56 except when in driving engagement with drive wheel 75

103. As seen in Figures 8 and 9, clutch disk 104 is radially flanged, as at 114, to provide cam surface 115. Flange 114 is adapted for rotation relative to the outer periphery of drive wheel 103.

In operation, clutch disk 104 is normally maintained in driving engagement with drive wheel 103 by pawl 116 normally pivotally urged by the action of spring 117 against shoulder 110 of drive wheel 103. In the event, however, a carton fails to feed to a pocket of the turret, it is desired to prevent discharge of material from the nozzle when and as the empty pocket is moved relative to the nozzle. This is accomplished by momentarily releasing pawl 116 from against shoulder 110 of drive wheel 103 whereby clutch disk 104 and sprocket 68 will be free to rotate one complete revolution without driving the shaft 56.

The mechanism for releasing pawl 116 comprises guard member 118 and clutch throwout member 119.

As shown in Figure 2, guard member 118 is formed integral with rod 120, bent as at 121, to provide rod 122. Rod 122 is slidably mounted for longitudinal movement in bracket 123 rigidly secured to frame member 6 and bracket 124 rigidly secured to frame member 7. Rod 122 is bent, as at 125, to provide rod 126. The free end 127 of rod 126 presses against face 128 of clutch member 119 and serves to urge clutch member 119 in a direction toward clutch disk 104 when guard member 118 is moved into an empty pocket of the turret.

Guard member 118 is normally urged against the periphery of turret 11 and thus for movement within an empty pocket of turret 11 by pressure of coiled spring 129 secured on rod 122 against bracket 123. The tension of spring 129 may be regulated by collar 130 rigidly secured on rod 122.

It will be seen that the clutch member 119 is adapted for longitudinal movement on sleeve 65 within the limits defined by slot 131 and pin 132. The movement of clutch member 119 toward clutch disk 104, as by the action of rod 126 and spring 129, may be augmented by the action of spring 133 and arm 134 pivotally secured to rigid bracket 135. The free end 136 of arm 134 is maintained in constant contact with face 128 of clutch member 119 at a point relatively opposite to the point of contact of free end 127 of rod 126. The tension of spring 133 should be of itself insufficient to urge clutch member 119 in the direction toward clutch disk 104. Spring 133 is, in fact, a balance spring, the tension of which, when combined with the tension of spring 129 when that spring is brought into play, will serve to quickly move clutch member 119 in equilibrium in the direction toward clutch disk 104.

As shown in Figures 2 and 7, clutch member 119 is radially flanged as at 137 to provide radial cam surface 139 and shoulder 138. An axial cam surface 140 is also provided on the peripheral surface of radial flange 137. In the operation of the device hereinafter described, it will be seen that when clutch member 119 is pressed to its forwardmost position toward clutch disk 104, axial cam 140 is made to contact with knob 141 of pawl 116 whereby pawl 116 is disengaged from shoulder 110 of drive wheel 103, and thus the clutch disk 104 and sprocket 68 made free to rotate on drive shaft 56. It will also be seen that after one revolution of sprocket 68 on drive shaft 56, radial cam 139 will be made to contact radial cam 114 whereby clutch member 119 will be

thrown to its retracted position away from clutch disk 104.

In operation, pawl 116 is normally urged by spring 117 against shoulder 110 of drive wheel 103 thus completing the connection between drive sprocket 68 and shaft 56 by which to rotate the several cams 62, 82 and 88.

In the event a carton fails to feed to a pocket of turret 11, guard member 118, through action of spring 129, will move within the empty pocket and through rods 120, 122 and 126 will press clutch member 119 in the direction toward rotating drive wheel 103 and clutch disk 104. Drive wheel 103 will continue to rotate until shoulder 108 of the drive wheel 103 is mated with shoulder 138 of clutch member 119 whence clutch member 119 will be free to move to its forwardmost position toward clutch disk 104. When clutch member 119 is moved to its forwardmost position, knob 141 of pawl 116 will ride against axial cam 140 of clutch member 119 and thus raise pawl 116 out of engaging position with drive wheel 103.

When the pawl 116 is released from engaging position with drive wheel 103, clutch disk 104 and sprocket 68 are made free to rotate one complete revolution on shaft 56 whence the rotation of the several cams 62, 82 and 88 and the functions of their respective elements, particularly the discharge of material from the nozzle 44, are prevented for one complete movement.

In the meantime, the shafts 22 and 29 being continuous, the turret 11 will be rotated in due order and the carton fed to the next succeeding pocket of the turret will be moved into filling position relative to the nozzle 44. The next movement of the turret will return guard member 118 against the outer periphery of the turret and thereby release the pressure of spring 129 against clutch member 119.

Also radial cam 114 will strike against radial cam 139 and thus throw clutch member 119 to its retracted position away from clutch disk 104, whence pawl 116 will be free to re-engage shoulder 110 of drive wheel 103 and again complete the connection between clutch disk 104 and drive wheel 103.

It will be seen that the several features exemplified in the present invention are made to operate in synchronism with one another and that in the event a carton fails to feed to a pocket of the turret 11, operation of the material discharge mechanism and the nozzle operating mechanism are discontinued one complete movement without interruption to the operation of the turret and carton feeding mechanism.

It will be understood that changes may be made in the structure of the apparatus shown in the drawings without departing from the spirit of the invention as described in the claims which follow.

I claim:

1. In a filling machine, the combination of a nozzle for the discharge of material, a rotatable turret having carton receiving pockets normally supplied with cartons intermittently movable relative to the nozzle and means for lowering the nozzle toward each carton when fed by the turret and for raising the nozzle from each carton following the discharge of material comprising a bell crank lever operatively connected with the nozzle and with a reciprocally movable rod provided at one end with a slot and spaced roller bearings, a drive shaft slidably mounting the rod

through the slot and a cam rigidly secured to the shaft and engageable with the spaced bearings.

2. In a filling machine including a discharge nozzle adapted for movement toward and from the carton placed in filling position therewith, means for moving the nozzle toward and from the carton comprising a bell crank lever opera-

tively connected with the nozzle and with a reciprocally movable rod provided at one end with a slot and spaced roller bearings, a drive shaft slidably mounting the rod through the slot and a cam rigidly secured to the shaft and engage- 5
able with the spaced bearings.

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