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A. B. CANFIELD ETAL

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DISPENSING DEVICE

Filed July 20, 1962

2 Sheets-Sheet 1

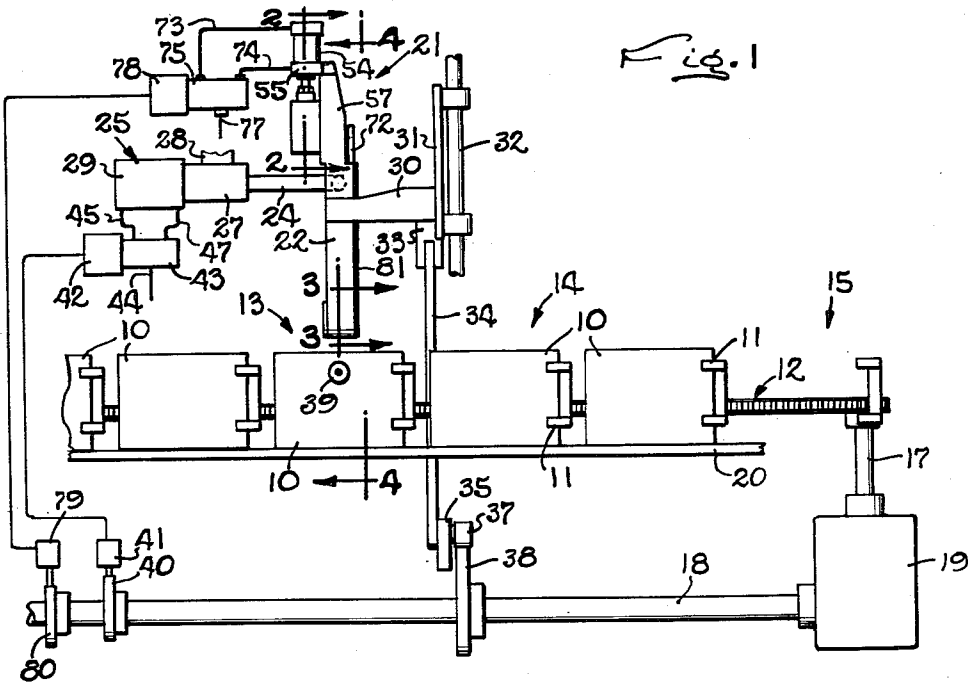


Fig. 1

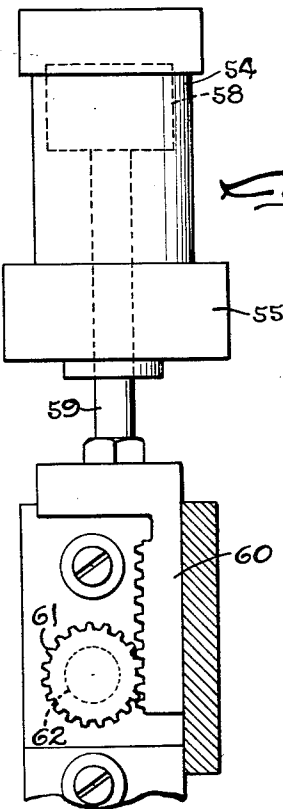


Fig. 2

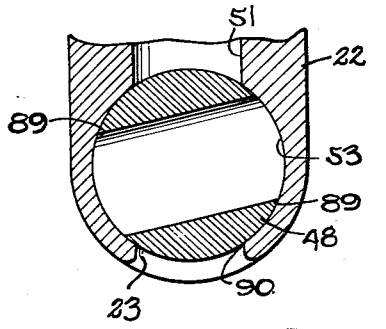


Fig. 3

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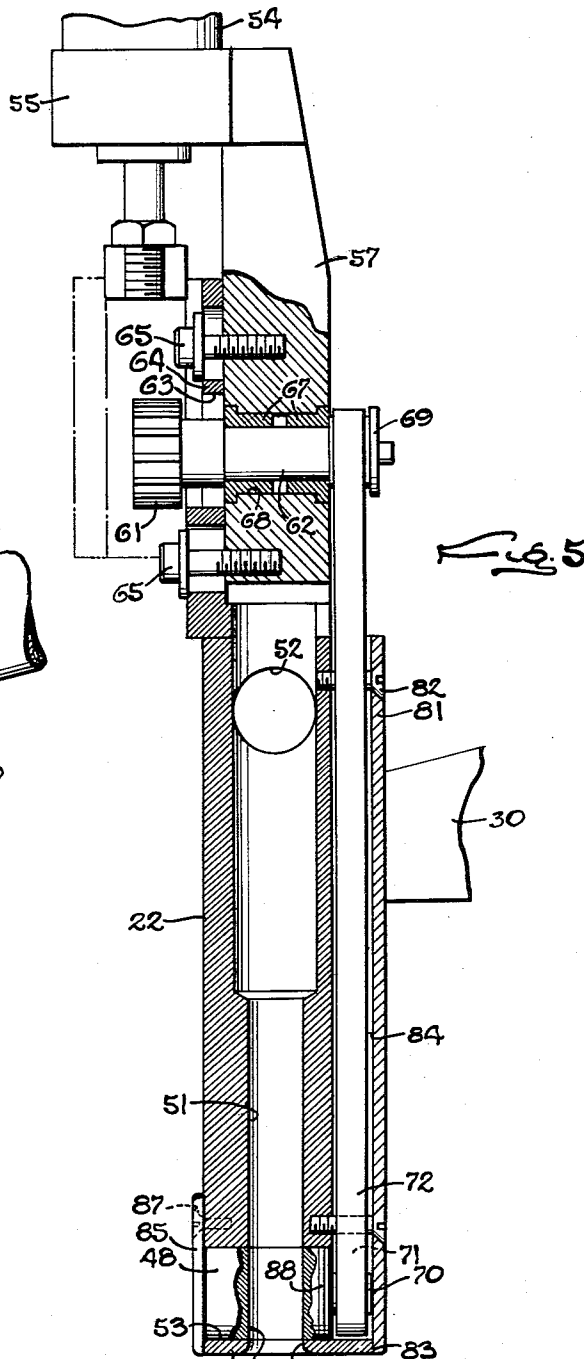
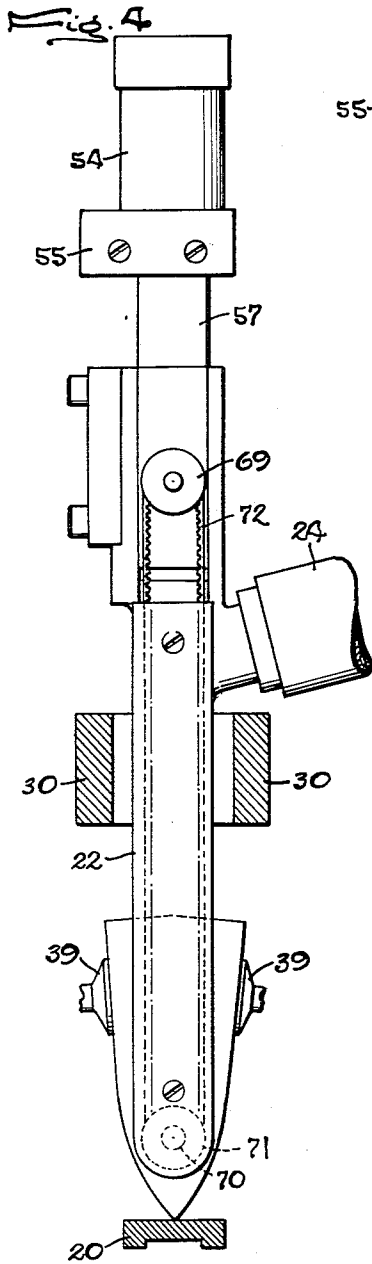
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## DISPENSING DEVICE

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6 Claims. (Cl. 222-185)

This invention relates to dispensing devices for use in automatic packaging machinery and, more particularly, to a dispensing device including a spout mounted to be lowered into successive receptacles such as bags passing below the spout to receive measured amounts of flowable material through a discharge port in the lower end of the spout, the open upper ends of the bags subsequently being sealed closed.

The general object of the present invention is to provide a dispensing device of the above character which is of novel and compact construction and which effects a positive cut-off of the material being dispensed and a tight closure of the discharge port thereby avoiding delayed dripping from the spout and contamination of the seal areas of bags passing below the spout.

A more specific object is to fit a member on the lower end of the spout for back and forth oscillation across the discharge port to open and close the latter in timed relation with the movements of the spout, and to actuate the member in a novel manner independently of the movements of the spout, the member being self-cleaning and effecting a positive chopping action to sever stringy products.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a fragmentary diagrammatic view of a packaging machine embodying the novel features of the invention.

FIG. 2 is an enlarged fragmentary sectional view taken along the line 2-2 of FIG. 1.

FIG. 3 is an enlarged fragmentary sectional view taken along the line 3-3 of FIG. 1.

FIG. 4 is an enlarged fragmentary sectional view taken along the line 4-4 of FIG. 1.

FIG. 5 is an enlarged fragmentary side elevation of the dispensing device with parts broken away and shown in section.

As shown in the drawings for purposes of illustration, the invention is incorporated in a packaging machine in which a succession of bags 10 gripped open-end-up by clamps 11 on a conveyor 12 are advanced edgewise and step by step through filling, closing, and discharge stations 13, 14 and 15 respectively. The conveyor comprises an endless chain supported on spaced sprocket shafts 17 journaled on the machine base, one of the shafts being driven by a continuously rotating camshaft 18 through a conventional Geneva mechanism 19 which imparts an intermittent motion to the chain and, therefore, to the bags. The lower ends of the bags slide along a bar 20 constituting part of the machine base.

During a dwell of the conveyor 12, a dispensing device 21 mounted above the filling station 13 deposits a measured amount of the material to be packaged in the bag in the filling station. Then the conveyor is indexed one step to carry the filled bag into the closing station 14 where the open end of the bag is closed as by a horizontal heat seal applied across the upper end in a manner well known to those skilled in the art. Finally, the clamps 11 are opened to release the bag from the conveyor.

The dispensing device 21 includes an elongated, vertically disposed spout 22 having a discharge port 23 in its lower end and fed through a flexible tube 24 opening

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into the upper end portion of the spout. Material to be dispensed is stored in a suitable hopper (not shown) and is measured out and delivered through the tube periodically in timed relation with the advance of the bags. Herein, this is accomplished by a feeder 25 comprising a cylinder 27 supported on the machine base with a plunger (not shown) guided for back and forth sliding therein. The tube 24 opens into one end of the cylinder and a supply tube 28 (FIG. 1) opens into the top of the cylinder to carry a gravity flow of material into the cylinder. During the forward stroke of the plunger, that is, the movement to the right as viewed in FIG. 1, a charge of material is pressed into the upper end of the spout 22 and flows downwardly through the latter and into the bag 10 in the filling station. An air cylinder 29 reciprocates the feeder plunger back and forth.

To reduce splattering of liquids and dusting of powdered material, the spout 22 is mounted on the machine to be lowered into the bag in the filling station until the discharge port 23 is adjacent the lower end of the bag as shown in FIG. 4, and then to be raised gradually out of the bag as the level of material in the bag rises. For this purpose, the upper end portion of the spout is secured as by welding to the free ends of a pair of horizontal arms 30 fastened to a slide 31 which is guided for up and down sliding on vertical rods 32 (FIG. 1) supported on the machine base.

Pivoted on a block 33 fast on the slide is an elongated generally vertical link 34 which extends downwardly from the block and is fulcrumed at its lower end on the free end of a horizontal lever 35. The latter is pivoted at one end on the machine base and carries a follower 37 which rides on a cam 38 turning with the camshaft 18. Thus, the cam rocks the lever up and down and thereby raises and lowers the link 34, the slide 31, and the spout 22 in timed relation with the movement of the bags. The mouth of the bag in the filling station is held open by two suction cups 39 (FIGS. 1 and 4) of well-known construction and operation.

Proper timing of the flow through the spout is achieved by actuating the feeder 25 from the camshaft 18. A cam 40 (FIG. 1) fast on and turning with the camshaft activates a switch 41 in the circuit of a solenoid 42 which operates a valve 43 controlling the flow from an air pressure supply line 44. In one condition of the switch 41, air flows through a line 45 to one end of the air cylinder 29 to advance the feed plunger and, in the other condition of the switch, the air flows through a second line 47 to the other end of the cylinder to return the plunger. By correlating the operation of the Geneva mechanism 19 and the rises and falls of the cams 38 and 40, the spout 22 first is lowered into the bag in the filling station and then is raised gradually out of the bag as material is delivered through the spout.

The present invention contemplates a dispensing device of novel and compact construction which effects a positive cut-off of material being packaged and closes the discharge port 23 tightly while being self-cleaning thereby to avoid dripping and spattering as bags 10 pass below the raised spout 22. For these purposes, a member 48 is mounted on the lower end of the spout for back and forth oscillation across the discharge port between two predetermined positions and is fitted closely against the lower end wall 49 (FIG. 5) in which the discharge port is formed. A passage 50 through the member communicates with the port in one of these positions thereby opening the port, and is moved out of communication with the port in the other position so that the member closes the port. Mechanism is provided for oscillating the member back and forth in timed relation with the up and down movements of the spout to open the port in the lowered position and close it at the desired point as the spout is

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raised, the member being actuated independently of the spout movement.

In this instance, the spout 22 comprises an elongated tube of rectangular cross-section extending below the supporting arms 30 a distance somewhat greater than the distance the tube is to be projected into the bags. The interior of the tube forms a conduit 51 which communicates adjacent its upper end with the flexible tube 24 through an inlet port 52 (FIG. 5) and opens through the lower end wall 49 to form the discharge port 23.

The member 48 for opening and closing the discharge port takes the form of a cylindrical barrel or plug fitted in a cylindrical bore 53 extending transversely of the tube and intersecting the conduit 51 just above the wall 49. The bore 53 opens outwardly on both sides of the tube to receive the plug. The passage 50 is formed by a diametrical bore extending through the plug and axially aligned with the discharge port 23 and the end of the tube conduit 51 opening into the bore 53. Thus, in one angular position of the plug, the tube conduit communicates with the upper end of the plug passage 50 and the lower end of the latter communicates with the discharge port. When the plug is turned through a predetermined angle in one direction or the other from this position, however, the plug closes the port and the tube passage.

Herein, the mechanism for turning the plug back and forth includes an air cylinder 54 mounted on a platform 55 extending horizontally from one side of a bar 57 fast as by welding on the upper end of the tube 22. A piston 58 (FIG. 2) guided for up and down sliding in the cylinder 54 carries a piston rod 59 which extends downwardly through the platform 55 and is secured to a depending rack bar 60 (FIG. 2). The latter meshes with a pinion 61 fast on one end of a horizontal shaft 62 journaled on the bar. In this instance, the shaft projects through a bore 63 (FIG. 5) in a plate 64 fastened by screws 65 to the side of the bar and is journaled in bushing 67 fitted in a bore 68 through the bar. On the other side of the bar, the shaft projects outwardly and carries a pulley 69 which turns with the shaft and the pinion.

Fast on a stubshaft 70 projecting from one end of the plug 48 and coaxial therewith is a second pulley 71 which is disposed alongside the tube in the plane of the upper pulley 69. Herein, the two pulleys are drivingly connected by a so-called Gilmer belt 72 wrapped around both pulleys so that turning of the shaft 62 correspondingly turns the plug. Thus, the rack and pinion, the shaft 62, the two pulleys, and the belt constitute means connecting the power actuator to the plug and operable to convert the reciprocation of the piston into oscillation of the plug.

To operate the air cylinder 54, air under pressure is admitted alternately into opposite ends of the cylinder through flexible lines 73 and 74 (FIG. 1), the flow being controlled by a valve 75 disposed in a supply line 77 and operated by a solenoid 78. The solenoid is actuated by a switch 79 operated by a cam 80 turning with the camshaft 18 whereby the plug 48 is turned back and forth in timed relation with the movements of the spout. It will be seen, however, that the timing of the plug movements is entirely independent of the spout movement. Accordingly, the port 23 may be opened and closed at any selected points along the path of the spout.

The belt and the lower pulley are protected from contact with the product by an elongated cover plate 81 (FIGS. 1 and 5) fastened to the side of the tube by screws 82 and held thereby in tight contact with a rim 83 projecting laterally from the side and lower edges of the tube, the rim and the plate 81 cooperating to form a narrow chamber 84 extending along the side of the tube and opening upwardly under the upper pulley 69. The belt 72 extends into and out of the chamber through the open end.

To hold the plug 48 against axial shifting in the bore 53, the cover plate 81 abuts against the end of the stubshaft 70 and a short plate 85 covers the end of the bore on the other side and is held against the end of the plug by screws

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37. A seal ring 88 is pressed into a groove encircling the end of the plug adjacent the stubshaft to prevent leakage of the product around the stubshaft and into the lower end of the chamber 84.

Preferably, the edges 89 of the plug around the opposite ends of the passage 50 are formed as knife edges and slide closely along the wall of the bore 53, and the edge 90 defining the discharge port 23 and the lower end of the conduit 51 cooperate with the knife edges to effect a positive chopping action. In this way, any solid, stringy material such as meat or vegetables in the product being packaged is cut in two and it is disposed within the port 23 when the plug is turned. To facilitate this slicing action, the cylinder oscillates the plug with a snap action.

In operation, beginning with the spout 22 disposed in the raised position shown in FIG. 1 and with the discharge port 23 closed as shown in FIG. 3, the spout is lowered by the cam 38 into the empty bag 10 then in the filling station 13 until the discharge port is adjacent the lower end of the bag as shown in FIG. 4. Then the cam 40 operates the switch 41 to advance the feeder plunger and the cam 80 operates the switch 79 to admit air into one end of the cylinder 75 thereby to turn the plug 48 in a direction to open the discharge port. The stroke of the piston 58 is selected and adjusted so that the conduit 51 communicates with the discharge port through the passage 50 when the piston is in one extreme position, this being shown in FIG. 5.

At the same time, the cam 38 begins to raise the spout 22 as material flows through the valve. Preferably, the rate of rise is correlated with the rate of flow so that the spout remains above the level of the product in the bag. In any event, the pulley 71 and the belt 72 are protected from contact with the product by the rim 83 and the plate 81. After a predetermined period of flow, the cam 80 operates the switch 79 and hence the solenoid 78 and the valve 75 to close the discharge port 23, this preferably being done before the port is raised above the top of the bag.

With the foregoing arrangement, a positive and immediate cut-off of any solid material in the port 23, and positive closing of the port, are achieved with a relatively simple operating mechanism which is compactly mounted to permit lowering of the spout even into relatively small bags to deposit the material gently in the bags and prevent splattering of liquids and clouding of dusty solids. Further, the close fit of the plug 48 against the wall 49 effects a self-cleaning action. Thus, dripping, splattering, and the resulting contamination of the seal areas of the bags are prevented both during filling and after the spout has been raised out of the bag. The independent timing of the plug movement permits snap operation of the dispensing device 21 completely independently of the spout movement.

We claim as our invention:

1. A dispensing device comprising a frame, a support mounted on said frame for back and forth movement between raised and lowered positions, an elongated upright spout carried by said support and having a lower end wall with a discharge port therein, a cylindrical plug fitted closely against said wall and journaled in said spout for back and forth oscillation between two predetermined angular positions, a passage through said plug communicating at one end with said port in only one of said predetermined positions whereby said plug closes the port when in the other position, means for delivering material to be dispensed through said spout to the other end of said passage when said plug is in said one position, an upwardly opening chamber extending along one side of said spout, a stubshaft concentric with said plug and projecting from one end thereof into the lower portion of said chamber, a reciprocating power actuator mounted on said support adjacent the upper end of said spout, a shaft rotatably mounted on said support and extending above the upper end of said chamber, means for converting the re-

reciprocation of said actuator into oscillation of said shaft, an endless belt wrapped around said shaft and extending downwardly into said chamber through the upper end thereof and around said stubshaft whereby oscillation of said shaft correspondingly oscillates said plug, and means operable to activate said actuator to turn said plug into said one position when the support is lowered and into said other position at a predetermined instant as the support is raised toward said raised position, said belt being protected in said chamber from exposure to said material.

2. A dispensing device comprising a frame, a support mounted on said frame for back and forth movement between raised and lowered positions, an elongated upright spout carried by said support and having a lower end wall with a discharge port therein, a cylindrical plug fitted closely against said wall and journaled in said spout for back and forth oscillation between two predetermined angular positions, a passage through said plug communicating at one end with said port in only one of said predetermined positions whereby said plug closes the port when in the other position, means for delivering material to be dispensed through said spout to the other end of said passage when said plug is in said one position, a reversible power actuator mounted on said support adjacent the upper end of said spout, means connecting said actuator to said plug to turn the latter into said one position when the actuator is activated in one direction and turn the plug into the other position when the actuator is activated in the opposite direction, and means operable to activate said actuator alternately in opposite directions as said support is raised and lowered to open said port when the support is lowered and close the port at a predetermined instant as the support is raised.

3. A device as defined in claim 2 in which the edges of said plug and said wall defining said port and said one passage end are formed as knife edges coacting to slice off any stringy material disposed in the port when the port is closed.

4. A dispensing device including, in combination, a frame, a support mounted on said frame for back and forth movement between raised and lowered positions, an elongated upright spout carried by said support and having a lower end wall with a discharge port therein, a cylindrical plug journaled in the lower end portion of said spout and fitted closely against said wall, a reciprocating power actuator mounted on said support adjacent the upper end of said spout, means for activating said actuator alternately in opposite directions as said support

moves up and down, means for converting the reciprocation of said actuator into oscillation of said plug between two predetermined angular positions, and a passage through said plug communicating at one end with said discharge port in only one of said plug positions to open the port when said support is lowered and close the port at a predetermined instant as the support is raised.

5. A dispensing device comprising a frame, a support mounted on said frame for back and forth movement between raised and lowered positions, an elongated spout carried by said support and having a lower end wall with a discharge port opening through said wall, mechanism for lowering and raising said support, a member mounted on said spout adjacent said wall for back and forth oscillation across said ports between two predetermined positions, one side of said member being fitted closely against and sliding along said wall, a passage through said member communicating with said port in only one of said predetermined positions whereby said member closes the port when in the other position, a reversible power actuator mounted on said support, means connecting said actuator to said member to shift said member into said one position when the actuator is activated in one direction and shift the member into said other position when the actuator is activated in the opposite direction, and means operable to activate said actuator independently of the movements of said support in said one direction to open said port when the support is in said lowered position and in said opposite direction to close the port at a predetermined instant as the support is raised toward said raised position.

6. A dispensing device comprising a frame, a support mounted on said frame for back and forth movement between raised and lowered positions, an elongated spout carried by and movable with said support and having a discharge port adjacent its lower end, mechanism for lowering and raising said support and said spout, a member mounted on said spout adjacent said lower end for back and forth oscillation across said port between two predetermined positions, a passage through said member communicating with said port in only one of said predetermined positions whereby said member closes the port when in the other position, and mechanism for oscillating said member back and forth between said predetermined positions in timed relation with the movements of said support.

No references cited.