Dec. 31, 1963 M. A. MILLER 3,115,943

WEIGHER CONTROLLED BAGGING MACHINE

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FIG. 1.

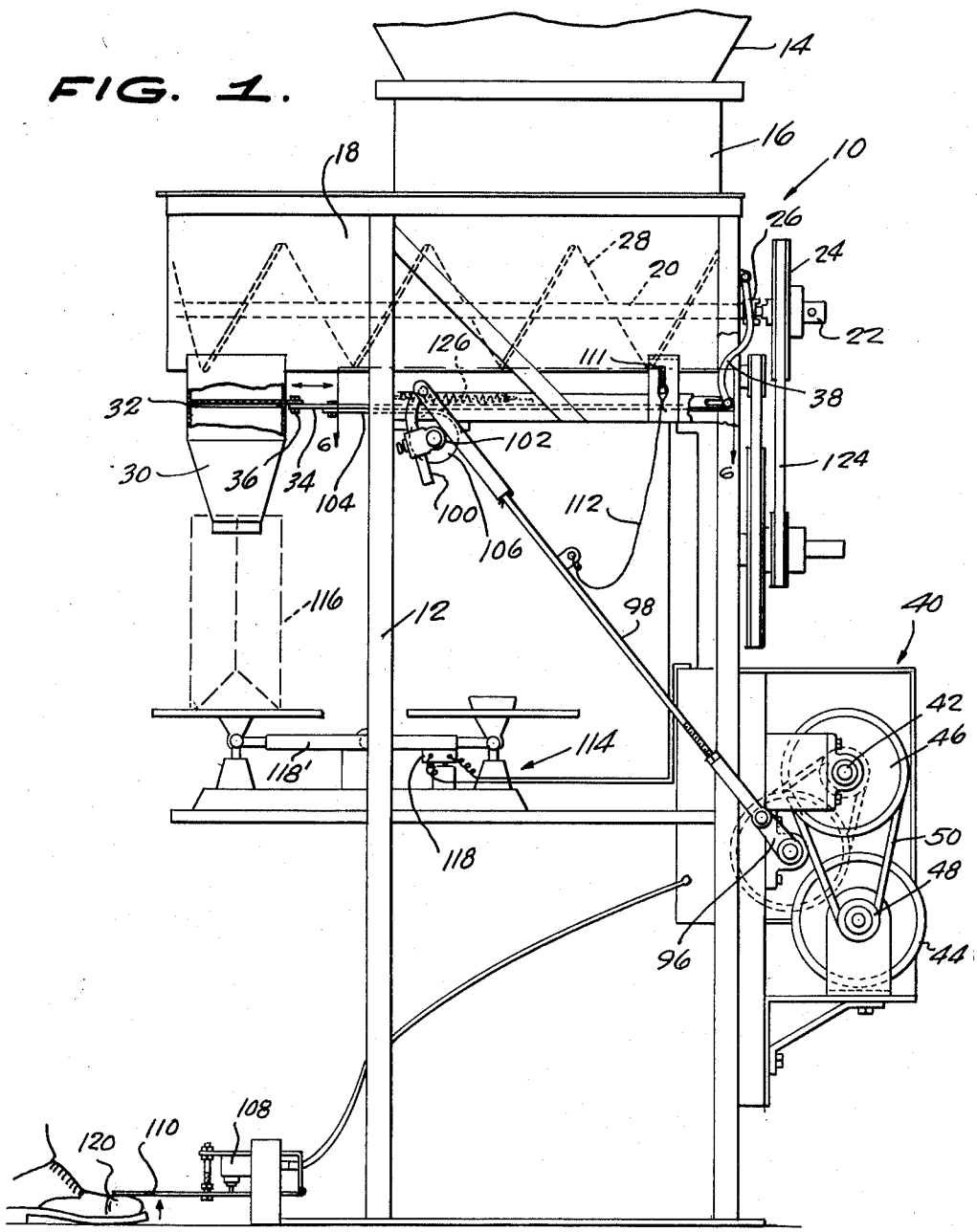
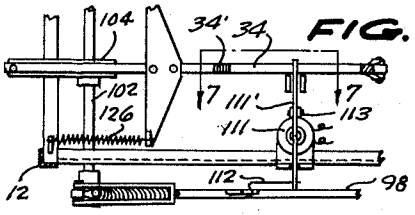


FIG. 6.



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FIG. 2.

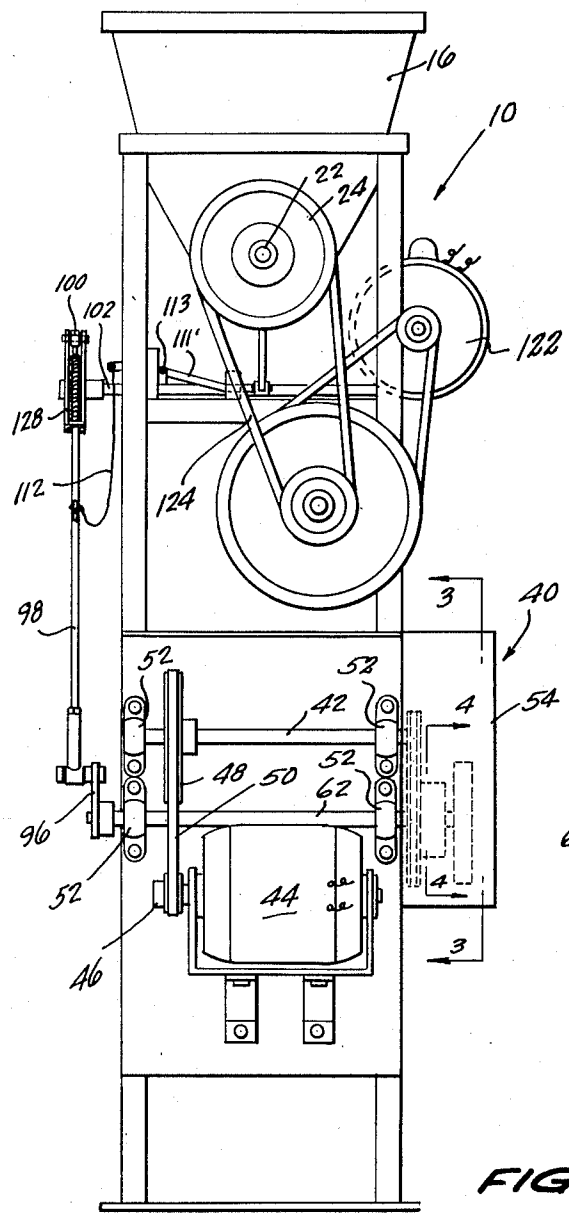


FIG. 3.

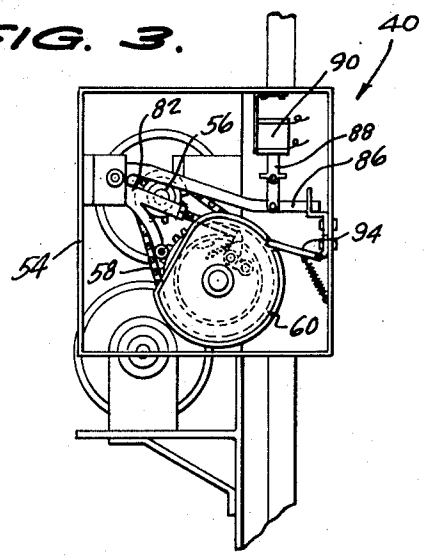
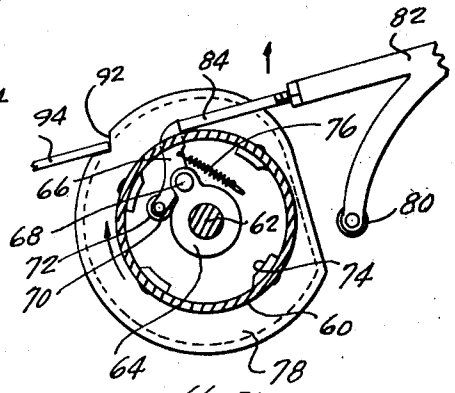


FIG. 4.



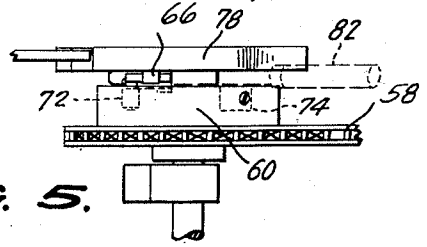
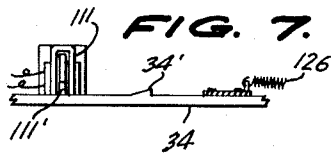


FIG. 5.

FIG. 7.



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3,115,943 WEIGHER CONTROLLED BAGGING MACHINE

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2 Claims. (Cl. 177—109)

The present invention relates to an automatic bagging machine of the type used to sack or bag flour, corn meal, poultry mash, or the like.

Machines are presently in use for sacking or bagging flour, corn meal, poultry mash, or other dry material which often sticks to the walls of the bin or bridges the discharge opening of the bin. Generally, such machines are provided with screw feeds in the hopper or bin for delivering the material to the discharge opening. Means must be provided in such a machine for stopping the screw feed when a bag or sack has been filled and for starting the screw feed when a new bag or sack has been moved into position for filling.

Frequently, this means for starting and stopping the screw feed of such a machine is a pedal operated lever connected to a gate in the discharge opening and also connected to a mechanical clutch for connecting the screw feed to a source of rotative power.

An object of the present invention is to provide a bagging machine in which a simple foot switch is substituted for the pedal operated lever and electrical means is employed to shift the gate between open and closed positions and to engage and disengage the clutch means which connects the screw feed to a source of rotative power.

Another object of the present invention is to provide a bagging machine which is highly efficient in operation, one which is less tiring to the operator than machines presently in use, one which is automatic in operation, and one which is economically feasible.

A further object of the present invention is to provide a bagging machine which has safeguards against improper operation or over-running, one which works at optimum efficiency without waste of the material being bagged or sacked, one which has long-life characteristics, and one which requires only unskilled labor to operate.

A still further object of the present invention is to provide a bagging machine having a positive cycle of operation, one which may be adapted for filling bags or sacks with predetermined weights of materials from one to fifty pounds, and one which is extremely accurate in operation.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in connection with the annexed drawings, in which:

FIGURE 1 is a side elevational view of the bagging machine according to the present invention, the foot of an operator being shown in position for operating the switch of the machine;

FIGURE 2 is an elevational view of the assembly shown in FIGURE 1, as viewed from the rear;

FIGURE 3 is a view taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a view on an enlarged scale, taken on the line 4—4 of FIGURE 2;

FIGURE 5 is a view from above of the components of the invention shown in FIGURE 4;

FIGURE 6 is a view, partly in section, taken on the line 6—6 of FIGURE 1; and

FIGURE 7 is a fragmentary view taken on the line 7—7 of FIGURE 6.

With reference to the drawings in detail, in which like numerals indicate like parts throughout the several views, the bagging machine of the present invention is designated generally by the reference numeral 10 in FIGURES

1 and 2 and it includes an upstanding frame 12 positioned beneath the bottom of a bin or hopper 14 of which only a lower end portion is shown.

A discharge throat 16 connects the hopper 14 with a horizontally disposed closed-ended tube 18 fixedly secured in the upper end portion of the frame 12.

A shaft 20 extends longitudinally of and is disposed within the tube 18 and has a portion 22 exteriorly of one of the closed ends of the tube 18. A pulley 24 is freely rotatable about the portion 22 of the shaft 20 and cooperating clutch means is provided for connecting the pulley 24 to the shaft 20. This means includes a movable clutch element 26 slidably engageable with clutch means provided on one face of the pulley 24, in the conventional manner.

A feed screw 28, shown in dotted lines in FIGURE 1, is circumposed about the shaft 20 and is fixedly secured to the shaft 20 for rotation therewith.

A spout 30 depends from the tube 18 intermediate the ends thereof and a transversely arranged gate is within the spout 30 and normally closes the spout 30. The gate 32, shown in FIGURE 1 in which a portion of the wall of the spout 30 is broken away, is mounted in the spout 30 for movement from the closing position to a position opening the spout 30 and back to the closing position.

A first means connects the clutch element 26 to the gate 32 so that the gate 32 upon initiation of movement from the closed position to the open position effects the shifting of the clutch element 26 to the position in which the shaft 20 is connected to the pulley 24 and is thereby rotated. Specifically, this means connecting the gate 32 to the clutch element 26 includes a bar or rod 34 having one end adjacent the spout 30 and connected to the gate 32 by a connector pin 36 and having the other end adjacent the pulley 24 and pivotally connected to the free end of an arm 38 having its other end rockably mounted upon the frame 12 and having an intermediate part pivotally connected to the clutch element 26, as shown in FIGURE 1. The rod 34 is provided with a shoulder 34', FIGURES 6 and 7, whose purpose will be subsequently described.

A second means is provided which is designated generally by the reference numeral 40 and embodies a driven shaft 42 rotating at a constant speed and driven by a motor 44 with a pulley 48 on its shaft, a pulley 46 on a shaft 42 and a connecting belt 50.

The shaft 42 is journaled in bearing blocks 52 supported upon the frame 12 and has an end portion projecting into the timer housing 54. The end portion of the shaft 42 carries a sprocket wheel 56 drivingly connected by a chain 58 to a rotatable drum 60 freely rotatable about a horizontally disposed shaft 62 also supported in bearing blocks 52 on the frame 12.

A collar 64 is fixedly secured on the end portion of the shaft 62 within the housing 54 and a dog 66 is rockably supported upon a pin 68 extending through a lug 70 which projects from one side of the collar 64.

One end of the dog 66 projects outwardly of the drum 60 and the other end carries a roller 72 which is engageable with any one of a plurality of abutments 74 fixed to the inner periphery of the drum 60.

A spring 76 biases the dog 66 to the position in which the roller 72 engages one of the abutments 74.

A cam plate 78 is carried by the drum 60 and has its working face engageable by a roller 80 on an arm 82 having one end pivotally mounted on the housing 54. The arm 82 carries on its free end an adjustable rod element 84 which engages the dog 66 and holds the latter in the inoperative position as long as the arm 82 is in its normal down position.

The arm 82 has its pivoted end portion formed inte-

grally with an extension arm 86 which is pivotally connected intermediate its ends to the plunger 88 of a solenoid 90, as shown in FIGURE 3.

The periphery of the cam plate 78 is provided with the notch 92 into which falls the free end of another arm 94 preventing reverse movement of the cam plate 78 after it has rotated a complete revolution.

The crank 96 is carried on the other end of the shaft 62 and an operating lever 98 has one end operatively connected to the crank 96, as shown in FIGURE 2. The other end of the lever 98 is pivotally connected to an adjustable arm 100 mounted upon an end portion of a shaft 102 journaled in the frame 12 for limited rotary movement.

A flexible strap 104 has one end connected to the rod 34 inwardly of the end connected to the gate 32 and has its other end mounted upon the periphery of the drum 106 carried by the shaft 102 and in alignment with the rod 34.

A normally open microswitch 108 is mounted upon the frame 12 adjacent the lower end of the latter and is operable by a vertically movable pedal 110 to closed position. The switch 108 is in circuit with the solenoid 90 and with a solenoid switch 111 which is mounted above the lever 98. Pivotally connected to the solenoid switch 111 intermediate its ends, as at 113, is a lever 111' which is connected to the lever 98 by a flexible cord 112. The switch 111 is normally closed and is shiftable to open position by the downwardly movement of the lever 111' into engagement with the shoulder 34' on the rod 34.

A set of scales 114 is supported on the frame 12 so that one end is beneath the spout 30 for support thereon of a bag or sack to be filled, as shown in dotted lines in FIGURE 1 and designated by the numeral 116. The scale 114 has a rockable scale beam 118' and is normally tilted or in a position of unbalance. A micro-switch 118 is carried by the scale beam 118', and is normally closed, the scale beam 118' upon being shifted to a position of balance, when the predetermined weight has been received within the bag or sack 116 when resting upon the scale beam 118', opening the circuit to the solenoid 90 and arresting the operation of the second means.

It is to be noted that springs 126 are operatively connected to the rod 34, as shown in dotted lines in FIGURE 1, and bias the gate 32 to closed position.

In use, an empty bag is placed upon the tilted scale beam 118' of the scales 114 with the top end portion enclosing the lower end of the spout 30, and then the operator barely taps the microswitch 108 with the toe of his shoe, by shifting his toe upwardly, as at 120 in FIGURE 1, which results in the closing of the switch 108 and reopening of the switch immediately upon lowering of the shoe of the operator. In the brief moment the microswitch 108 is closed it energizes the solenoid 90, causing the rod element 84 to be raised and releasing the dog 66 which instantly moves under the rod element 84 by virtue of the pull exerted upon the dog 66 by the spring 76. The pull of the spring 76 rocks the dog 66 about the pin 68 to the position in which the roller 72 engages one of the abutments 74, resulting in drivingly connecting the shaft 62 to rotate with the drum 60 and the associated cam plate 78. The shaft 62 rotates one revolution and then is stopped by the dropping of the free end of the adjustable rod element 84 under the impetus of gravity into the path of the dog 66 and into contact with the dog. Should the arm 82 become stuck, the roller 80 on the arm 82 will engage the high portion of the cam plate 78 and permit the arm 82 and the associated rod element 84 to drop down into the path of the dog 66. During revolution of the shaft 62, the lever 98 pulls the spring-loaded rod 34 back to open the gate 32 and shift the clutch element 26 into engagement with the clutch element on the pulley 24.

When the gate 32 is open and the clutch element 26 is engaged with the clutch element on the pulley 24, the lever 111' drops into engagement with the shoulder 34' on the rod 34, and the arm 100 returns to the normal position.

When the bag on the scales 114 is filled to the proper weight, the scale beam 118' of the scales 114 tilts to a position of balance to close the micro-switch 118, open the circuit to the solenoid 90 and arrest the operation of the second means 40, energizing the solenoid switch 111, raising the lever 111' from engagement with the shoulder 34' and releasing the rod 34, disengaging the clutch element 26 from the clutch element on the pulley 24, and closing the gate 32.

When the bag on the scales 114 has been filled to the set weight, the operator immediately removes the bag from the scales. This removal causes the scales 114 to open the switch 118 which in turn opens the switch 111. In the event the switch 111 should stick, the cord 112 will open it on the next cycle of freeing the lever 111', so that it drops in engagement with the shoulder 34' on the rod 34.

During the entire operation the solenoid 90 and 111 remain open except for the short time when they are energized. However, if the solenoid 90 should stick, roller 80 will pull it open, and permit the rod element 84 to move into the path of the dog 66.

The upper end portion of the lever 98 is provided with a resilient spring 128 which yields to the sudden pulling movement of the lever 98 and protects the rod 34 and gate 32 from damage.

What is claimed is:

1. In a bagging machine, a horizontally-disposed closed ended tube, a rotatable screw working within said tube, a movable clutch element on said screw, a spout depending from said tube intermediate the ends thereof, a gate arranged transversely of and normally closing said spout and mounted in said spout for movement between the closing position and an open position, a first means connecting said clutch element to said gate so that said screw rotates responsive to the initiation of the movement of said gate from the closed position to the open position, a scales having a rockable scale beam normally in a position of unblance, said scales being disposed so that the scale beam is below and spaced from said spout, a microswitch normally in a closed position in said scale beam, and a second means connecting said first means and said micro-switch together so that said gate is held in open position and is retained in such open position until a given weight has been discharged in a bag depending from said spout and resting upon said scale beam and the scale beam rocked to open the micro-switch, and upon the discharge of such given weight in the bag to permit the gate to move to its closed position and disengage the clutch element and arrest the rotation of the screw.

2. In a bagging machine, a horizontally-disposed closed ended tube, a driven shaft extending longitudinally of and within said tube and having a portion adjacent one end exteriorly of one of the closed ends of said tube, a screw circumposed about the portion of said shaft within said tube and fixedly secured thereto for rotation therewith, a movable clutch element on said one end portion of said shaft, a spout depending from said tube intermediate the ends thereof, a gate arranged transversely of and normally closing said spout and mounted in said spout for movement between the closing position and an open position, first means connecting said clutch element to said gate so that said screw rotates responsive to the initiation of the movement of said gate from the closed position to the open position, a scales having a rockable scale beam normally in a position of unbalance, said scales being disposed so that the scale beam is below and spaced from said spout, a micro-switch normally in closed position in said scale beam, and a second means connecting said first means and said micro-switch together so that said gate is held in open position and is retained in such open position until a given weight has been discharged in a bag

depending from said spout and resting upon said scale beam and the scale beam rocked to open the micro-switch, and upon the discharge of such given weight in the bag to permit the gate to move to its closed position and disengage the clutch element and arrest the rotation of the shaft.

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