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AUTOMATIC FEED CONTROL FOR WEIGHING AND PACKAGING MACHINES

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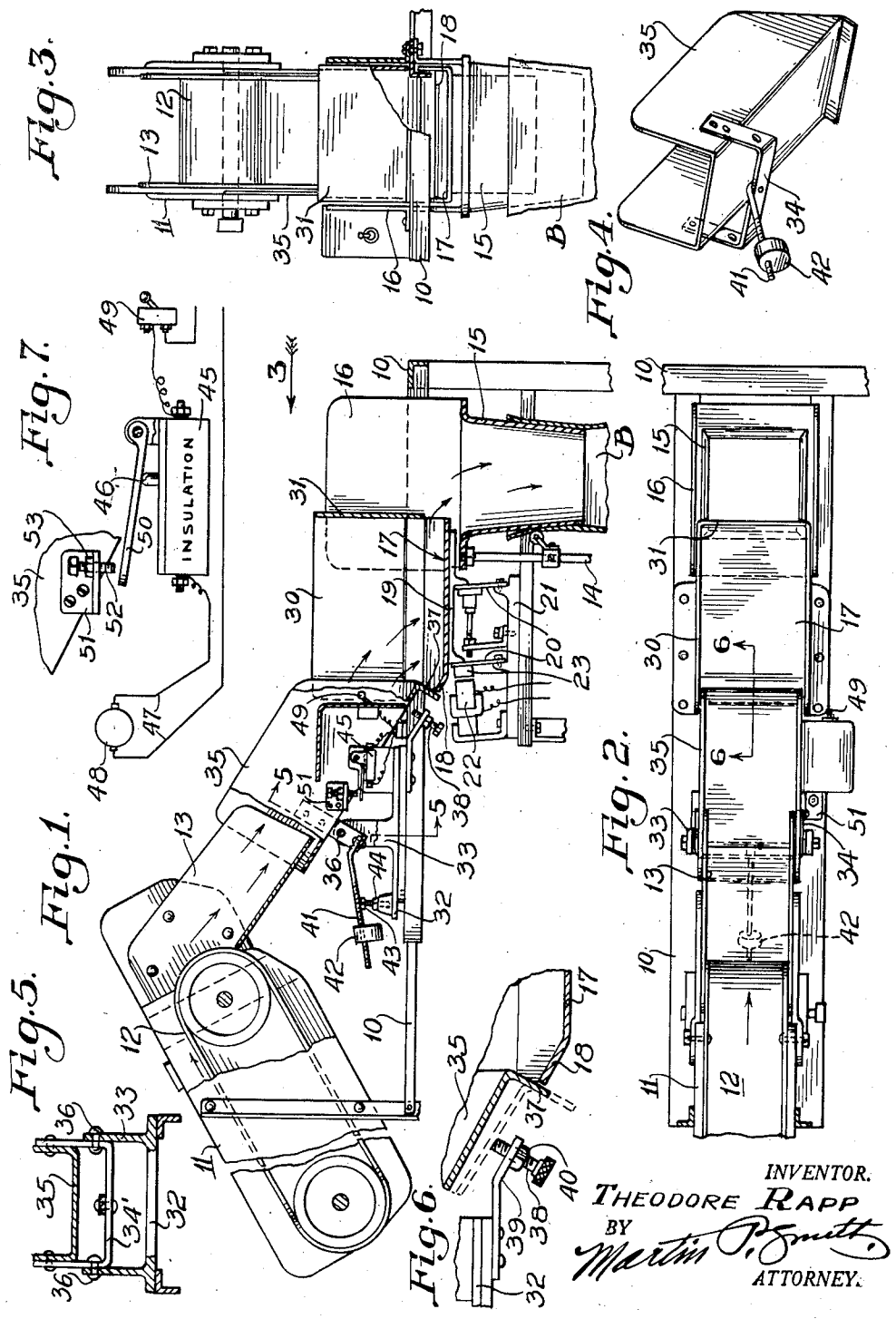

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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AUTOMATIC FEED CONTROL FOR WEIGHING AND PACKAGING MACHINES

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5 Claims. (Cl. 198—37)

My invention relates to an automatic feed control for weighing and packaging machines of the particular type disclosed in my co-pending application for U. S. Letters Patent filed July 27, 1938, Serial No. 221,575.

The principal objects of my present invention are, to generally improve upon and simplify the construction of the automatic feed control disclosed in my co-pending application, as well as other similar feed control devices; further, to provide improved and positively operating means that is automatically actuated by the weight of the product that is moving through the apparatus, for controlling the operation of the endless conveyor that delivers the product to the weighing and packaging machine in order to bring about a more uniform flow or travel of the product as it passes into and through the vibrating trough that discharges into the hopper from which the receptacles are suspended.

A further object of my invention is, to provide an automatic feed control of the character referred to that is particularly applicable for handling products which by reason of their shape and characteristics do not flow as freely as products wherein the individual pieces are substantially of uniform size and shape.

My improved control also provides for automatically cutting out or stopping the operation of the endless conveyor or other feeding means utilized for delivering the product that is being weighed and packaged and, which automatic action is effected by means of a pivoted chute or trough through which the product passes from the discharge end of the conveyor to the vibrating trough. Thus in the event of an overflow or feed of product through the pivoted trough, the latter is actuated by the increase in the weight of the product to stop the operation of the means that delivers the product to said pivoted chute or trough and, when the excess product discharges from the pivoted chute or trough into the vibrating trough said pivoted chute acts automatically to start operation of the material feeding means.

With the foregoing and other objects in view, my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawing in which:

Fig. 1 is a vertical section taken lengthwise through the center of the automatic feed control with parts thereof shown in elevation.

Fig. 2 is a plan view of the feed control.

Fig. 3 is an elevational view of the feed control looking in the direction indicated by the arrow 3 in Fig. 1.

Fig. 4 is a perspective view of the tilting chute that controls the operation of the material feeding means.

Fig. 5 is a cross section taken on the line 5—5 of Fig. 1.

Fig. 6 is an enlarged detail section taken on the line 6—6 of Fig. 2.

Fig. 7 is an elevational diagrammatic view of the switch that controls the circuit to the motor that operates the material feeding means.

Referring by numerals to the accompanying drawing which illustrates a preferred embodiment of my invention, 10 designates the upper portion of the frame of a combined weighing and packaging machine and, projecting above one end of said frame and suitably supported thereby is a housing 11 within which is arranged for operation an endless conveyor 12, preferably a belt that operates over pulleys arranged at the ends of the housing 11. This conveyor is driven by an electric motor shown diagrammatically in Fig. 7 and the upper end of said conveyor discharges into a short inclined trough 13 that projects downwardly from the upper end of the conveyor housing 11.

A conventional weighing scale (not shown) is located in the upper portion of frame 10 adjacent the end opposite the end to which the endless conveyor is connected and, projecting upwardly from one end of the scale beam are rods 14 that support a hopper 15 and, projecting upwardly from the sides of this hopper are walls 16.

Hopper 15 provides means for delivering the product or commodity that is being weighed and packaged directly into bags or containers B and the open upper ends of which latter are detachably connected to said hopper.

A vibrating trough 17 is arranged for operation in a plane just above the upper end of hopper 15 so as to discharge the product that is being weighed and packaged into said hopper and, the receiving end of the bottom of this reciprocating trough is bent upwardly so as to form a short inclined member 18. Arranged on the under side of the bottom of trough 17 is a plate 19 to which is connected the upper ends of slightly inclined plates 20 of resilient metal, the lower ends thereof being fixed to a base plate 21 that is mounted on parts of the frame 10.

Trough 17 may be vibrated by any suitable means, for instance, an electromagnet 22 that is

arranged to attract an armature 23 that is secured to trough 17 or a part carried thereby.

Positioned on the upper portion of frame 10 above and to the sides of the vibrating trough 17 are upright walls 30 that prevent the product that is delivered into the vibrating trough from discharging outwardly from the sides thereof and, the front ends of these side walls 30 are connected by a wall 31, the lower end of which terminates just above the discharge end of vibrating trough 17.

Mounted on frame 10 below the lower end of the inclined trough 13 is a plate 32 and, projecting upwardly from the sides thereof are standards 33 and pivoted to the upper portions of these standards are the lower portions of the vertical members of a substantially U-shaped strap 34. The upper ends of the vertical legs of this strap are connected in any suitable manner to the rear portions of the side walls of a trough 35 substantially U-shape in cross section and which trough swings on the horizontal axis formed by the pivots 36 that connect the upper portions of the standards 33 with the lower portion of strap 34.

The open upper rear end of this tilting trough 35 receives the lower end of trough 13 and the lower forward end of said tilting trough is positioned between the rear ends of the side walls 30 and above the inclined rear portion 18 of the vibrating trough 17. Thus the product that is delivered by the endless conveyor into trough 13 passes by gravity downwardly therethrough into and through tilting trough 35 and discharges from the lower end thereof into the vibrating trough 17.

Depending from the forward end of the bottom of the tilting trough 35 is a flange 37 that occupies a position immediately to the rear of the upper rear end portion 18 of the bottom of trough 17 and, as long as there is a normal flow of product through the tilting trough the forward end of the bottom thereof occupies a position a short distance above the upper end of inclined member 18 as illustrated by solid lines in Figs. 1 and 6.

To limit the downward movement of the forward end of trough 35 and which occurs when an over feed of product is delivered to the troughs 13 and 35 by the conveyor, a stop screw 38 is seated in a fixed bracket 39 beneath the forward end of trough 35 and, mounted on said screw beneath said bracket is a lock nut 40 (see Fig. 6).

This screw 38 may be moved upward or downward through bracket 39 so as to limit the downward movement of the forward end of trough 35 and said screw may be locked in its adjusted position by means of the nut 40.

Secured to the central portion of the cross arm of the U-shaped strap 34 is a rearwardly projecting rod 41, the rear portion of which is threaded for the reception of a weight 42 that serves to counterbalance the weight of the forward portion of trough 35.

In order to limit the upward swinging movement of the forward end of trough 35, a stop screw 43 is seated in a lug on the rear portion of base plate 32 beneath rod 41 and mounted on said screw is a lock nut 44.

Under normal conditions the rod 41 rests on the upper end of screw 43 and with the parts in such position, the lower end of the bottom of trough 35 is positioned a short distance above the upper rear end of the inclined member 18 as illustrated by solid lines in Figs. 1 and 6.

Mounted on base plate 32 in front of the standards 33 is a conventional electric switch 45 of the type that is normally closed and which is opened as a result of pressure applied to a pin or button 46. One of the conductors 47 that lead from a suitable source of electric current supply to the motor 48 that operates the endless conveyor 12 passes through switch 45 and also through a manually operable snap switch 49 that is located on the side wall of trough 35 adjacent switch 45.

The pin or button 46 that acts to open switch 45 is adapted to be engaged and moved downward by a lever 50 that is pivoted on top of switch 45 and, mounted on the side of trough 35 above the free end of lever 50 is a bracket 51. Passing through said bracket is a screw 52 and mounted on said screw above said bracket is a lock nut 53. Under normal conditions or with the forward lower end of trough 35 elevated, the lower end of screw 52 is positioned slightly above the free end of lever 50 and as a result, there is a flow of current through the conductors 47 and normally closed switch 45 to the motor 48 and, as the latter operates the endless conveyor delivers the product that is being weighed and packaged into chute 13. The product or material flow downwardly through trough 13 and also through trough 35 by gravity and discharges into trough 17.

The vibration of trough 17 causes the product delivered thereinto from trough 35 to discharge into the hopper 15, which latter carries the bag or receptacle B and, when the latter is filled with a predetermined amount by weight of the product that is passing through the machine and as indicated by the scale associated with the feeding apparatus, said filled receptacle is removed from the hopper by the operator and an unfilled receptacle positioned upon said hopper.

The downward movement of the forward portion of trough 35 is limited by the adjustable stop screw 38 and the upward movement of the forward end of said trough and the downward movement of the rear portion thereof are limited by the adjustable stop screw 43.

In the event that the flow of product delivered by the conveyor to the trough 13 increases to such an extent as to clog the machine, the increase of weight of the overflow of the product passing through the forward portion of trough 35 will move the forward end thereof downward with the result that screw 52 will engage and press downwardly on the free end of lever 50, thereby actuating push pin or button 46 so as to open switch 45 to cut off the flow of electric current to motor 48 and thus stopping the operation of the endless conveyor.

Thus the conveyor is stopped momentarily or until the overflow of product has passed from trough 35 into the vibrating trough 17 and, following such action the trough 35 will swing on the axis formed by the pivots 36 so that the downward end of said trough will move upward to its limit of movement, thereby relieving the lever 50 of the pressure of screw 52 and switch 45 will act to automatically close the circuit to motor 48 so as to start and drive the endless conveyor.

The particular form of apparatus herein illustrated and described may be utilized to advantage for automatically controlling the feeding and movement of various materials or products that are weighed and packaged by machinery, but said apparatus is especially effective in automati-

cally controlling the flow of products, such as potato chips, pretzels, and the like.

Thus it will be seen that I have provided an automatic feed control for weighing and packaging machines that is relatively simple in construction, inexpensive of manufacture and very effective in performing the functions for which it is intended.

It will be understood that minor changes in the size, form and construction of the various parts of my improved automatic feed control for weighing and packaging machines, may be made and substituted for those herein shown and described, without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. In an automatic feed control for weighing and packaging machines, the combination with a conveyor and its operating means, of a trough mounted for tilting movement at the discharge end of said conveyor, means actuated by the movement of said trough as a result of the weight of an overflow product delivered thereto by said conveyor for rendering the conveyor operating means inoperative, an adjustable stop for limiting the downward tilting movement of the forward portion of said trough and means for limiting the downward tilting movement of the rear portion of said trough.

2. In an automatic feed control for weighing and packaging machines, the combination with a conveyor and its operating means, of a trough mounted for tilting movement at the discharge end of said conveyor, means actuated by the movement of said trough as a result of the weight of an overflow of product delivered thereto by said conveyor for rendering the conveyor operating means inoperative, an adjustable stop for limiting the downward tilting movement of the forward end of said trough, an adjustable counterbalancing weight carried by the rear portion of said trough and an adjustable stop for limiting the downward movement of said counterweight.

3. An automatic feed control for weighing and packaging machines embodying therein, a delivery conveyor for delivering material to be weighed, a second conveyor for advancing material to be weighed, a functionally open topped trough interposed between the delivery conveyor and the second conveyor and positioned to receive material from the delivery conveyor and to discharge it upon the second conveyor, said trough being formed automatically to locate itself in one position when sustaining not more than a predetermined amount of the material to be weighed and to be moved to another position when sustaining a greater predetermined amount of said material, and means operatively associated with said trough and formed automatically to render the delivery conveyor inoperative when material beyond said first mentioned predetermined weight accumulates upon the trough and moves the same so that the end nearer the second conveyor is depressed by failure of the second conveyor to advance the material at a rate sufficient to prevent such accumulation on said trough and for automatically again rendering the delivery conveyor operative when the second conveyor has operated to remove the accumulated material and reduced the material on the trough to said first mentioned predetermined weight.

4. An automatic feed control for weighing and packaging machines embodying therein, a delivery conveyor for delivering material to be weighed, a second conveyor for advancing material to be weighed, a functionally open topped tiltable trough operatively interposed between the delivery conveyor and the second conveyor and positioned to receive material from the delivery conveyor and to discharge it upon the second conveyor, said tiltable trough being formed automatically to occupy one position when sustaining not more than a predetermined amount of the material to be weighed and to be tilted to another position so that the end of the trough nearer the second conveyor is depressed when sustaining a greater predetermined amount of said material, and means operatively associated with said tiltable trough and formed automatically to render the delivery conveyor inoperative when the trough is tilted by the accumulation of material therein beyond the first mentioned predetermined weight by failure of the second conveyor to advance the material at a rate sufficient to prevent such accumulation on the tiltable trough and for automatically again rendering the delivery conveyor operative when the second conveyor has operated to remove the accumulated material and reduced the material on the tiltable trough to said first mentioned predetermined weight.

5. An automatic feed control for weighing and packaging machines embodying therein, a delivery conveyor for delivering material to be weighed, a second conveyor for advancing material to be weighed, pivoted means operatively interposed between the delivery conveyor and the second conveyor and positioned to receive material from the delivery conveyor and to discharge it upon the second conveyor, said pivoted means being formed automatically to locate itself in one position when sustaining not more than a predetermined amount of the material to be weighed and to locate itself in another position when sustaining a greater predetermined amount of said material, and having its pivot so positioned that the end adjacent the second conveyor moves downwardly when overbalanced, and means operatively associated with the pivoted means and formed automatically to render the delivery conveyor inoperative when material beyond a predetermined weight accumulates upon the pivoted means and tilts the same by failure of the second conveyor to advance the material at a rate sufficient to prevent such accumulation on the pivoted means and for automatically again rendering the delivery conveyor operative when the second conveyor has operated to remove the accumulated material and reduced the material on the pivoted means to some predetermined weight.

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