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E. M. LAU

2,871,891

CONTROL FOR BAG FILLING MACHINE

Filed May 28, 1954

2 Sheets-Sheet 1

FIG. 1

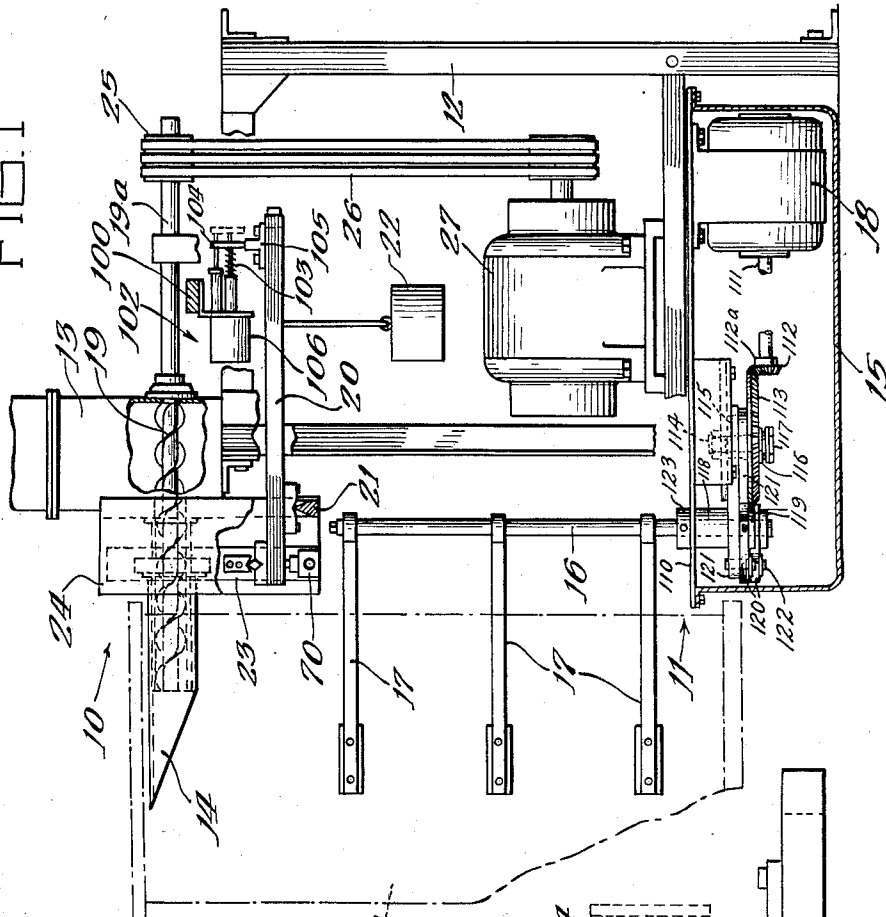


FIG. 2

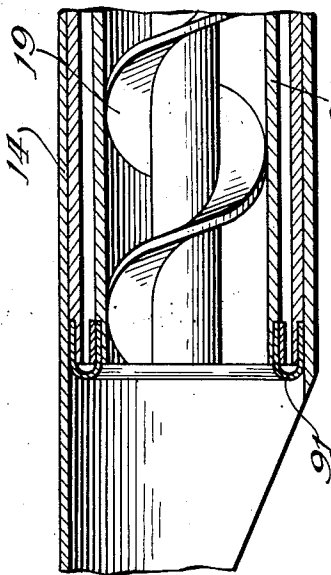
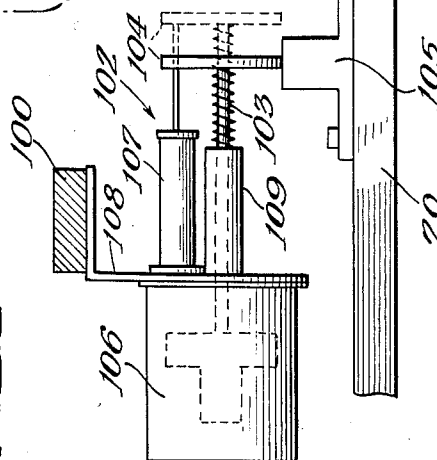


FIG. 3



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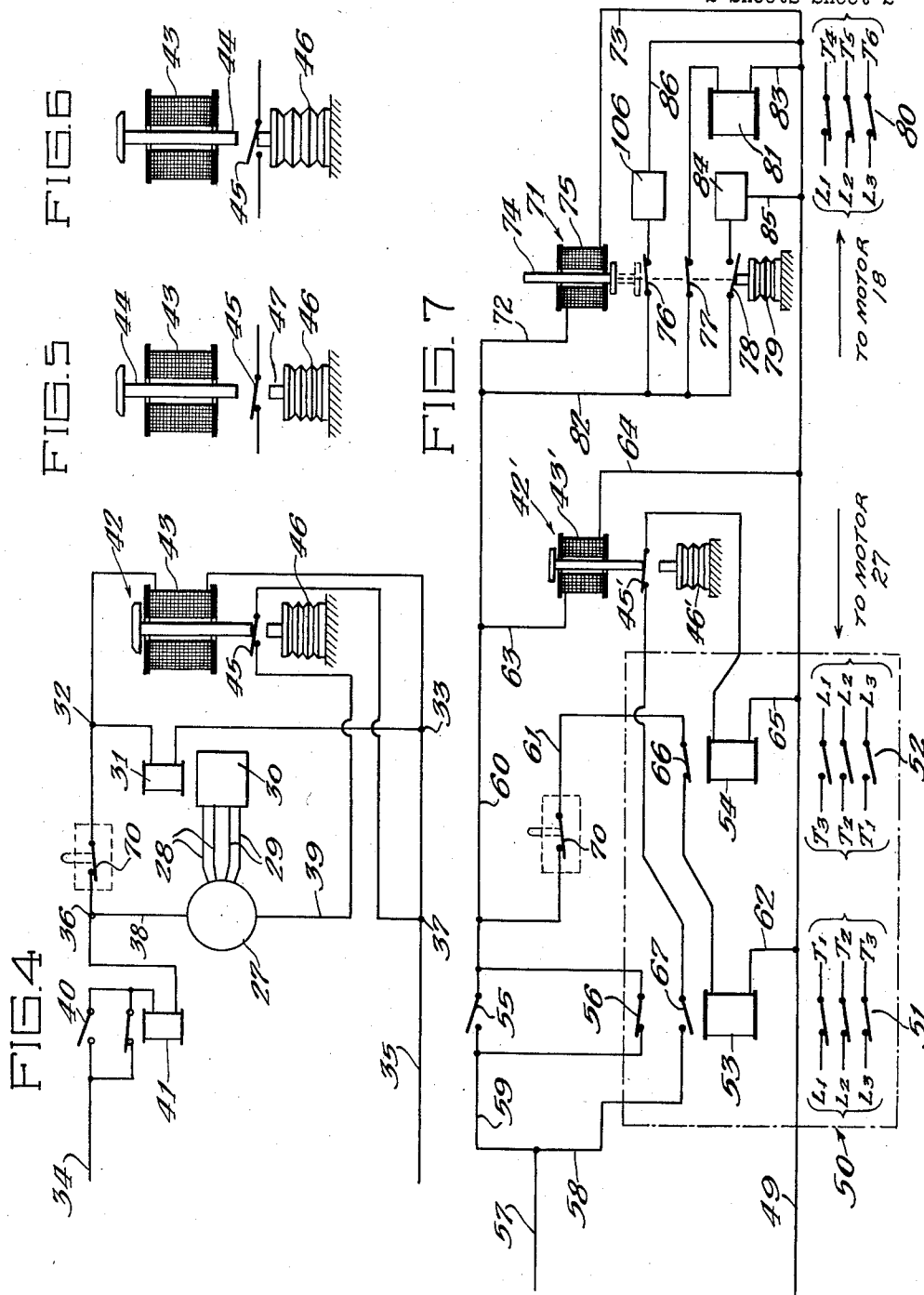
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2 Sheets-Sheet 2



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CONTROL FOR BAG FILLING MACHINE

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Application May 28, 1954, Serial No. 433,094

11 Claims. (Cl. 141—10)

This invention relates to an improved method and means for controlling the operation of bag filling machines.

The present application is a continuation-in-part of my copending application for Bag Filling Machine, Serial No. 335,221, filed February 5, 1953, Patent No. 2,733,040, dated January 31, 1956, and my copending application for Bag Settling Device, Serial No. 429,867, filed May 14, 1954.

The first of said applications relates to a bag filling machine of the automatic cut-off type, in which a bag is supported from the spout of a bag filling machine, and in which an auger is provided for feeding material from the hopper of the machine through the spout and into the bag. As soon as the weight of the bag and contents reaches a predetermined weight, the filling operation is terminated.

It is an object of the present invention to provide control means for such a bag filling machine which eliminates certain inaccuracies.

More particularly, I have found that even when brake means are utilized to stop rotation of the auger, there will be considerable variation in the weight of bag contents. This has been found to be due to the fact that when the auger stops in one angular position, there is a certain amount of dribble due to the fact that the material contained in the spout and outwardly of the last convolution of the auger is free to fall out of the spout and into the bag.

When the auger stops in another angular position, there will be substantially less dribble, since the end edge of the last convolution is directed upwardly.

It has not been found practicable to eliminate this variation by causing the auger to stop in the same predetermined angular position each time.

The present invention provides means for reversing the rotation of the auger for about three revolutions; thus, the material between the convolutions of the auger will be fed back toward the hopper with the result that when the auger finally comes to rest, there will be no material between the convolutions nearest the outer end of the spout. Thus, there will be no dribble, and accurate weighing can be obtained.

The present invention also provides a much cleaner operation, since there can be no dribble after the bag is removed from the spout.

In connection with the bag filling machine I provide a bag settling device which shakes down or packs the material in the bag as the bag is being filled, thus making sure that the contents will not pile up into contact with the spout at the time this operation is terminated. This piling up introduces additional inaccuracies. In the first place it may cause a back pressure against the spout which may affect the accuracy of the weighing mechanism. In the second place, if the material piles up so that it is in contact with the auger, then reversal of the auger will remove material from the bag with the result that the bag will be underweight.

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The second of the above-mentioned applications relates to such a bag settling device which may be used in conjunction with the aforesaid bag filling machine to provide more accurate operation.

However, it has been found that the operation of said bag settling device, if continued up to the time that the cut-off occurs, due to tripping of the beam, will introduce inaccuracies in the operation of the automatic cut-off. This is for the reason that the agitation of the bag will cause premature tripping of the beam.

A further object of the present invention is to provide control means for automatically terminating the operation of the bag settling device prior to the tripping of the beam so as to secure accurate operation of the bag filling machine.

Still another object is to provide an interlock which will prevent tripping of the beam until after the operation of the settling device has been terminated.

Other objects, features and advantages will become apparent as the description proceeds.

With reference now to the drawings in which like reference numerals designate like parts:

Fig. 1 is an elevation, parts being broken away, showing a bag filling machine, including a settling device, which embodies a preferred form of my invention;

Fig. 2 is a vertical section showing the spout construction;

Fig. 3 is a view showing the latching mechanism;

Fig. 4 is a wiring diagram showing one form of the reversing control circuit;

Figs. 5 and 6 illustrate changed positions of the timing relay shown in Fig. 4; and

Fig. 7 is a wiring diagram showing another form of control circuit which controls both the reversing and the settling device.

With reference now to Fig. 1, the reference numeral 10 designates generally a bag filling machine which is substantially the same as that shown in the first of said copending applications, except for the elimination of the braking mechanism and except for the addition of the latching means. The reference numeral 11 designates generally a bag settling device which is substantially the same as that shown in the second of said copending applications.

The bag filling machine 10 comprises a framework 12 which supports a hopper 13 and an external spout 14 upon which a bag 92 may be suspended.

The settling device 11 comprises a housing 15 in which the lower ends of a pair of upright shafts 16 are journaled. The shafts 16 are provided with weighted slapper arms 17 which are adapted to strike the sides of the bag 92 during the initial part of the filling operation. The shafts 16 and arms 17 are oscillated by suitable oscillating mechanism, hereinafter described, which is disposed within the housing 15, and which is driven by a suitable motor 18.

As shown in Fig. 2, an internal spout 90 is disposed within and spaced from the external spout 14. The internal spout 90 is supported from the hopper 13 and communicates therewith. The material within the hopper 13 is fed from the hopper through the internal spout 90 and into the bag 92 by means of an auger 19. A flexible seal 91 is provided to seal the space between the internal and external spout to prevent the entry therein of material being fed.

The filling machine also includes a beam assembly 20 which is supported on a fulcrum 21 carried by brackets 24. The beam assembly also includes an adjustably mounted weight 22 which urges the front end of the beam upwardly. The external spout 14 is mounted on a floating frame 23 which is disposed between the brackets 24 and suitably mounted for vertical movement of a limited

extent. Thus, when the bag 92 is hung on the external spout 14, the force exerted by the bag is transmitted downwardly to the beam assembly by means of the external spout 14 and the floating frame 23, which bears against the front end of the beam assembly 20. Thus, when the weight of the bag contents reaches the desired amount, as determined by the adjustably mounted weight 22, the beam assembly 20, which is a balance beam, will be tripped. The foregoing elements, and their operation, are described in greater detail in the first of the aforesaid copending applications, to which reference is hereby made. The auger 19 includes a rearwardly extending portion 19a which projects beyond the hopper 13 and which is provided with a pulley 25. The pulley is connected by belts 26 to a motor 27 so that the auger 19 may be driven. A microswitch 70, suitably mounted on one of the brackets 24, is operated by the tripping of the beam so as to discontinue the filling operation when the desired amount of material has been fed into the bag 92.

The driving mechanism for the settling device 11, as shown in Fig. 1, includes the motor 18 which is suitably bolted to the underside of the cover plate 110 of the housing 15, and which includes an output shaft 111 which is suitably connected to the collar 112a of a small bevel pinion 112. The bevel pinion 112 meshes with and drives a large bevel gear 113.

The bevel gear 113, mounted on a stub shaft 114, is provided with an eccentric hub 115. A suitable thrust bearing 116 is disposed between the head 117 of the shaft 114, and the bevel gear 113. The eccentric hub 115 comprises a common actuating member for oscillating both of the shafts 16.

As shown in Fig. 1, bosses 118 are formed on the underside of the cover plate 110, and these bosses, being of substantial length serve as bearings for the shafts 16. The lower end of each shaft is provided with a collar 119 which is suitably secured to the shaft, as by a pin. Disposed between the collar 119 and the boss 118 is a yoke arm 120, the yoke end of which surrounds the shaft 25 and grips the same in driving relationship. One of the bosses 118 is longer than the other so that the two yoke arms 120 may be offset, one above the other.

Links 121 are connected to the outer ends of the yoke arms 120 by means of suitable pins 122. The rear end of each link is in the form of a bearing which surrounds the eccentric hub 115 of the bevel gear 113. Thus, rotation of the gear 113 will cause the links 121 to reciprocate back and forth, thus imparting oscillatory movement to the yoke arms 120, the shafts 16, and the slapper arms 17.

The shafts 16 are provided with suitable collars 123 which may be secured thereto by suitable pins or set screws and which bear against the top surface of the cover plate 110 and serve as thrust bearings to support the weight of the shafts 16.

The foregoing driving mechanism is described in greater detail in the aforesaid co-pending application, Serial No. 429,867, to which reference is hereby made.

The present invention, as pointed out above, provides control means, shown in Figs. 4-7, for reversing the direction of rotation of the motor 27 and the auger 19 so as to avoid dribble, and also, as shown in Fig. 7, to control the operation of the settling device 11.

Fig. 4 shows one form of control means for reversing the auger in which the motor 27 is provided with supply leads 28 and field leads 29 extending to a reversing switch 30, the latter being operated by a relay coil 31 which is connected across points 32 and 33 of the main power leads 34 and 35.

When the relay coil 31 is energized, the reversing switch 30 is maintained in its forward driving position; that is, the supply leads 28 and the field leads 29 are connected in their normal relationship so that the motor will rotate in the forward direction. When the relay coil 31 is de-energized, however, the field connections are re-

versed, thereby causing the motor to rotate in the reverse direction.

The motor 27 is connected across the line 34 and 35 at points 36 and 37, by means of conductors 38 and 39, respectively. Interposed in the power lead 34, and in series with the motor 27, is a manual starting switch 40, and a holding relay 41 so that the motor circuit 38, 27, 39 will be maintained closed, until broken by a timing relay indicated generally by the reference numeral 42.

The microswitch 70 is interposed in the power lead 34 between the points 36 and 32, and as pointed out in the aforesaid first copending application, the microswitch 70 is a normally closed microswitch which is engaged by the downward movement of the front end of the beam 20 to operate the same and to cause the circuit through the microswitch 70 to be opened.

The timing relay 42 may be any suitable type of timing mechanism of the "off-delay" type which is designed to open the motor circuit within a predetermined time after the microswitch 70 has been operated. The timing relay shown is a pneumatic timing relay of the type known as "Allen-Bradley, Bulletin 849, Style B." This timing relay comprises a solenoid coil 43, a solenoid plunger 44, which is biased upwardly into unoperated position, a normally open contact member 45, and a pneumatic bellows 46 which is biased toward the solenoid coil 43 and which carries a stem 47 which operates the contact member 45 to displace the same into open circuit position.

The operation of the timing relay is such that when the coil 43 is energized, the solenoid plunger 44 will move downwardly into its operated position, and engage the stem 47 to compress the bellows. When the coil 43 is de-energized, the solenoid plunger will be retracted to its elevated position as shown in Fig. 5, thus permitting the bellows 46 to expand. The rate of expansion is controlled by a suitable needle valve, not shown, in the air inlet, thus providing a time delay which can be suitably regulated.

When the bellows reaches its fully expanded position, as shown in Fig. 6, it causes the contact 45 to be opened, through a suitable lever mechanism, not shown; and an over center spring mechanism, not shown, provides a snap action.

The solenoid coil 43 is connected across leads 34 and 35 in shunt relationship with the relay coil 31 and in series with the microswitch 70.

The normally open contact 45 is connected into the conductor 39 so that it is in series circuit with the motor 27. Thus, as soon as the microswitch 70 is operated, the relay coil 31 will be de-energized, causing immediate reversal of the motor; the solenoid coil 43 will also be de-energized, but the action of the timing relay is such that a delay will occur between the de-energization of the solenoid coil 43 and the opening of the motor circuit. This delay measures the time that the motor 27 drives the auger in the reverse direction.

Those portions of the leads 34 and 35 which are to the right, as viewed in Fig. 4, of the points 36 and 37 comprise an energizing circuit which is controlled, with respect to break, by the microswitch 70. Both the relay coil 31 and the off-delay timing relay 42 are in the energizing circuit. Thus, forward rotation of the motor 27 will be terminated and reverse rotation will be initiated by de-energization of the relay coil 31 incident to operation of the microswitch 70. Reverse rotation of the motor 27 will be terminated by operation of the off-delay timing relay 42 which follows operation of the microswitch 70 by a fraction of a second. Thus, the auger will be caused to rotate in a reverse direction to the extent of approximately three revolutions, after which it is automatically stopped.

Forward rotation of the motor 27 is initiated by depression of the start button 40, since the energizing cir-

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cuit is controlled as to make by the start button 40 and holding relay 41.

A modified form of the invention is shown in Fig. 7 which also includes means for controlling the operation of the settling device 11.

According to this embodiment, a reversing switch designated generally by reference numeral 50 is provided which has three terminals T1, T2, and T3 for connection to the corresponding terminals of the motor 27.

In this type of reversing switch, two sets of contacts are provided, a forward driving set 51 and a reverse driving set 52, each of which is actuated by a separate relay coil 53 and 54, respectively. The power leads L1, L2 and L3 are connected to contacts 51 in the same order as the terminal leads T1, T2 and T3; however, they are connected to the reversing contacts 52, in the reverse order so as to secure reversal of direction of the motor drive.

In this embodiment, the start button 55, together with the holding contact 56, are in series only with the energizing circuit; a separate reverse control circuit is provided for the reverse relay coil 54, as will be pointed out hereinafter.

The control circuit includes power leads 57 and 49 which may be connected respectively, to any two of the power leads L1, L2, L3. The power lead 57 is connected in series to each of two conductors 58 and 59, which are in parallel with each other.

The conductor 59 and the lead 49 form an energizing circuit which includes a forward control circuit and certain auxiliary control circuits. The energizing circuit 59-49 is controlled as to make by the start button 55 and holding contact 56.

The conductor 59 is connected in series to two conductors 60 and 61 which are in parallel with each other. The forward control circuit includes conductor 61, the forward relay coil 53, and a conductor 62 which extends from coil 53 to the lead 49.

The auxiliary control circuits are connected across conductor 60 and lead 49. One of the auxiliary control circuits includes the solenoid coil 43' of the off-delay timing relay 42', the parts and operation of which are the same as the timing relay 42 of Fig. 4. The solenoid coil 43' is connected across the energizing circuit 59, 60, 49, by conductors 63 and 64.

The reverse relay coil 54 is connected across leads 57 and 49 by conductors 58 and 65, and to form the reverse control circuit.

The normally closed microswitch 70 is interposed in conductor 61 so that operation of the beam will de-energize the forward control circuit 61, 53, 62. However, de-energization of the forward relay coil 53 will open the holding contact 56 with the result that the complete energizing circuit is de-energized.

Interposed in the conductor 58 of the reverse control circuit is a normally closed make control switch 67, operated by forward relay coil 53, and a normally open switch 45' controlled by the off-delay timing relay 42'. Thus, de-energization of the forward control circuit 61, 53, 62, makes, or energizes the reverse control circuit 58, 54, 65. The reverse control circuit is broken, at switch 45', a fraction of a second after the control switch 67 is closed, thus terminating the reverse operation in the same manner as pointed out in connection with Fig. 4.

A normally closed interlock switch 66 is interposed in the conductor 61 and is controlled by the reverse relay coil 54 to prevent inadvertent operation of the forward control circuit while the reverse control circuit is energized. A suitable mechanical interlock may also be provided.

Thus, forward rotation of the motor 27 will be terminated and reverse rotation will be initiated by de-energization of the relay coil 53 incident to operation of the microswitch 70. Reverse rotation of the motor 27 will be terminated by operation of the off-delay timing

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relay 42' which follows operation of the microswitch by a fraction of a second, just as in the case of the Fig. 4 embodiment. However, Fig. 7 also provides for control of the settling device 11 so that the same will be started simultaneously with the filling operation, but will be stopped somewhat prior to the termination of the filling operation, for the reasons pointed out above.

The operation of the settling device motor 18 is controlled as to make by the energizing circuit 59, 60, 49 and as to break by an on-delay timing relay 71 which is connected across conductor 60 and lead 49 by conductors 72 and 73. The on-delay timing relay 71 may be the same as the off-delay timing relay 42, except that the solenoid plunger 74 of the on-delay relay is inverted. Thus, de-energization of the solenoid coil 75 will close normally open contacts 76 and 77, and will open normally closed contact 78. Thus, when the solenoid coil 75 is de-energized, the plunger 74 will be spring-biased downwardly to compress the pneumatic bellows 79, and in this position, it will also maintain normally open contacts 76 and 77 in closed position, and will maintain normally closed contact 78 in its open position. As soon as the solenoid coil 75 is energized, however, which occurs simultaneously with the energization of the energizing circuit 59, 60, 49, then the plunger 74 will be drawn upwardly into its solid line position as shown in Fig. 7. The contacts 76, 77, 78, however, remain in their operated position, as illustrated in Fig. 7, until such time as the expansion of the bellows 79 causes them to be tripped. Thus, subsequent to the operation of the plunger 74, a delay is provided between the movement of the contacts from their operated position, shown in Fig. 7, into their normal position, and this delay can be regulated by controlling the rate of expansion of the bellows 79, as pointed out in connection with the timing relay 42.

In other words, the operation of the on-delay timing relay 71 interposes a delay in opening contacts 76 and 77, and a delay in closing contact 78, all of the contacts being suitably tied together for simultaneous tripping.

The settling device motor 18 is provided with terminals T4, T5 and T6 which are connected to the leads L1, L2, L3 by a set of normally open contacts 80. These contacts 80 are operated by a relay coil 81 which is connected across conductor 60 and lead 49 by conductors 82 and 83. The contact 77 is interposed between conductor 82 and the relay coil 81 with the result that the depression of the start button 55 will operate the relay 81 to start the motor 18. At the termination of the time delay provided by the relay 71, the motor circuit will be automatically opened. The timing relay 71 is set to provide a time delay which is of a duration less than the time required to fill the bag.

Suitable braking means for the motor 18 may be provided where necessary, and such braking means may be controlled by brake control means 84 which is connected between conductor 60 and lead 49 by means of conductors 82 and 85. The switch 78 is disposed between the brake control means 84 and the conductor 82 so that the brake control means 84 may be energized at the time that the circuit to motor 18 is broken, and the brake control means will be de-energized upon operation of the microswitch 70.

In order to prevent premature tripping of the balance beam 20, due to operation of the settling device 11, suitable latching means 102 is provided to block any movement of the beam assembly 20 while the settling device 11 is in operation. This latching means includes a solenoid 106 which, as shown in Fig. 7, is connected between conductor 60 and lead 49, by means of conductors 82 and 86. The switch 76 is interposed between the latch solenoid 106 and conductor 82. Thus, the latch solenoid will be operated during the entire period that the motor 18 is energized; upon de-energization of the motor 18, the beam will be unlatched.

Thus, the operation of the settling device motor 18 and

of the latching mechanism 102 are controlled as to make by the energizing circuit 59, 60, 49, and as to break, by operation of the on-delay timing relay 71.

The latching mechanism 102 is shown in Fig. 3 and includes a shaft 103 which is spring-biased rearwardly, or to the right, as shown in Fig. 3. A disk 104 is carried at the end of shaft 103. A block 105 is mounted on the beam assembly 20 in a position in registry with the operated position of the disk 104. Suitable electro-magnetic means, such as the solenoid 106 is provided to draw the shaft 103 and disk 104 forwardly, against the bias of the spring, into operated position. This electro-magnetic means is connected into the auxiliary control circuit 82, 49 with the motor 18 as indicated above so that when the motor 18 is energized, the solenoid will also be energized to operate the latch.

The auxiliary control circuit 82, 49 automatically opens the motor circuit a few seconds before the bag 24 is filled, thus also de-energizing the solenoid 106 and causing the same to move to its unoperated position, which corresponds to the dotted line position of the disk, shown in Fig. 3.

Thus, as soon as the motor 18 is de-energized, the arms 17 will be retracted, and the beam assembly 20 will be unlatched to the end that the filling mechanism will be automatically shut off as soon as the bag and contents reach the proper weight.

In order to avoid the effect of any transient vibratory movements of the bag immediately after retraction of the arms 17, suitable dash pot means 107 may be associated with the shaft 103 to delay its return until such transient movements have died down.

The parts are suitably mounted on a plate 108, secured to structural member 100, the plate 108 carrying a bushing 109 for the shaft 103.

The bag filling machine referred to herein is capable of extremely rapid operation. The present invention provides accurate and automatic control therefor. As an example, the auger is driven at the rate of 1500 R. P. M. This will fill a 100 pound bag of comparatively free flowing material, such as ground coal, for example, in twenty seconds. Therefore, the settling control relay 71 is set for about sixteen seconds delay, and the reversing relay 42 is set for about one-half second delay.

To summarize the operation which has been detailed in connection with the description of the various elements, an empty bag is hung on the external spout, the weight 22 having previously been set for tripping at 100 pounds. Then the manual start button 40 is depressed. The motor 27 is rotated in the forward direction until the beam assembly 20 is tripped. Motor 27 is immediately reversed and the half second delay provides about three revolutions of screw rotation in the reverse direction. This will clear the outer end of the internal spout 90 so that there will be no dribble and hence no variation in weight due to dribble. It is desirable that the reverse rotation be terminated as soon as possible so as to avoid packing in the hopper. For instance, ground pitch or clay products exhibit a more pronounced tendency to pack, with the result that it is very important to provide automatic termination of the reverse rotation as soon as the material is backed up in the internal spout 90 to an extent sufficient to prevent dribble. With denser materials, such as limestone or iron oxide, the reverse rotation can be terminated after one or one and one-half revolutions to avoid dribble.

Referring to Fig. 7, after an empty bag 92 is hung on the spout 14 and the manual start button 55 is depressed, both the filler motor 27 and the settler motor 18 are energized. At the same time, the beam assembly 20 is latched, or locked against tripping by the latching means 102. Thus, the vibratory movements of the bag will not prematurely terminate the filling operation. The settling device packs the material in the bag so as to provide a firmly packaged product and so as to avoid any piling

up which would affect the accuracy of the filling operation. Then, at the end of sixteen seconds, the operation of the settling device 11 is automatically terminated, and the arms 17 are automatically retracted as described in the second of the aforesaid copending applications. At the same time, the latching solenoid 106 is de-energized, but the dash pot 107 introduces a slight delay in the release of the latch so that an opportunity is provided for any transient vibratory movements of the bag to die down before the beam assembly 20 is released. The filling operation continues until the beam is automatically tripped which, in the present example, will be at about twenty seconds, although the tripping is a function of the weight of the bag contents, and not of time. Then the auger 19 will be reversed for three revolutions after which it comes to a stop and the filled bag 92 can be removed from the spout 14. At this time the energizing circuit 59, 60, 49, is dead with the result that there are no moving parts which can injure the operator.

The foregoing description is related to a specific example, and of course, the times referred to must be varied with the type of material. For instance, denser material such as ground limestone and iron oxide, will be filled much more rapidly, at a rate of from six to ten seconds for a hundred pound bag.

The subject matter of the aforesaid copending applications, Serial Nos. 335,221 and 429,867, insofar as consistent with the present disclosure, is incorporated by reference.

Although the invention has been described with respect only to certain preferred embodiments, it will be understood that various modifications and changes may be made in the construction and in the circuits shown without departing from the spirit of my invention as pointed out in the appended claims.

I claim:

1. The method of controlling the operation of a bag filling machine of the automatic cut-off type having a hopper, a weight responsive bag supporting spout and an auger extending from said hopper into said spout, said method comprising the steps of causing said auger to be rotated in the forward direction to feed material from said hopper through said spout and into the bag, slapping the side of the bag during the feeding operation to settle the material in the bag, discontinuing the slapping operation while the feeding operation continues, discontinuing the feeding operation when a predetermined weight has been reached, which should be prior to the time that the material in the bag backs up into contact with said auger, causing said auger to be rotated in the reverse direction immediately upon the discontinuance of said filling operation, and discontinuing the reverse rotation of said auger prior to the time that all of the material disposed in said spout is backed up into said hopper.

2. The method as claimed in claim 1 in which said bag filling machine is provided with a balance beam which controls the filling operation, which includes the step of blocking the movement of said balance beam during the slapping operation so as to prevent premature discontinuance of said filling operation.

3. The method of controlling the operation of a bag filling machine of the automatic cut-off type having a weight responsive bag supporting spout and an auger disposed within said spout, said method comprising the steps of causing said auger to be rotated in the forward direction to feed material through said spout and into the bag, terminating the feeding operation when a predetermined weight has been reached, which should be prior to the time that the material in the bag backs up into contact with said auger, causing said auger to be rotated in the reverse direction immediately upon the termination of said filling operation, and terminating the reverse rotation of said auger after from one to four revolutions thereof.

4. Control means for a bag filling machine of the auto-

matic cut-off type which includes weight responsive bag supporting means including a balance beam, a filling auger, a first motor for driving said auger, a bag settling device, and a second motor for driving said bag settling device, said control means comprising means for starting both of said motors, means for cutting out said second motor to terminate operation of said bag settling device while said auger is still being driven by said first motor, switch means located adjacent said balance beam and engaged thereby to cause operation of said switch means when the weight of the contents of said bag exceeds a predetermined amount, means controlled by said operation of said switch means for reversing the rotation of said first motor, and time delay timing means for rendering said first motor inoperative a predetermined time after the operation of said reversing means.

5. Control means for a bag filling machine of the automatic cut-off type which includes weight responsive bag supporting means including a balance beam, a filling auger, and a motor for driving said auger, said control means comprising a motor circuit including said auger motor, motor reversing means, an energizing circuit, a normally closed beam actuated switch for breaking said energizing circuit when the weight of the contents of a bag supported by said bag supporting means causes movement of said beam, a relay in said energizing circuit for actuating said motor reversing means when said energizing circuit is broken by said beam actuated switch, and means including an off-delay timing relay for breaking said motor circuit, said off-delay timing relay being controlled by said energizing circuit whereby said motor will be caused to operate in the reverse direction for a short period of time subsequent to the operation of said beam actuated switch.

6. Control means for a bag filling machine of the automatic cut-off type which includes weight responsive bag supporting means including a balance beam, a filling auger, a first motor for driving said auger, a bag settling device, and a second motor for driving said bag settling device, said control means comprising a first motor circuit including said first motor, motor reversing means, an energizing circuit, a normally closed beam actuated switch for breaking said energizing circuit when the weight of the contents of a bag supported by said bag supporting means causes movement of said beam, a relay in said energizing circuit for actuating said motor reversing means when said energizing circuit is broken by said beam actuated switch, means including an off-delay timing relay for breaking said first motor circuit, said off-delay timing relay being controlled by said energizing circuit whereby said motor will be caused to operate in the reverse direction for a short period of time subsequent to the operation of said beam actuated switch, a second motor circuit for said second motor, means, including an on-delay timing relay for breaking said second motor circuit prior to the operation of said beam actuated switch, said on-delay relay being controlled by said energizing circuit so that said second motor circuit will be energized simultaneously with the energization of said energizing circuit, a latch for blocking operation of said beam, and means for operating said latch only when said second motor circuit is energized, so that said balance beam will not be affected by the operation of said settling device.

7. In a bag filling machine having a hopper, a balance beam, a fulcrum therefor, an auger for removing material from the hopper, and a motor for driving said auger, the combination of control means for terminating the operation of said bag filling machine so that the contents of the bag being filled can be controlled with respect to weight, said control means comprising a spout surrounding said auger and for supporting a bag, means for displaceably supporting said spout, means connecting said spout with said balance beam, a beam operated switch located adjacent said balance beam and engaged thereby to be operated when the weight of the contents of said bag exceeds

a predetermined amount, motor reversing means including a relay coil, a control circuit including said beam actuated switch and said relay coil, a time delay relay, a motor circuit controlled by said time delay relay, and means providing an electrical connection between said time delay relay and said beam operated switch to open said motor circuit at the termination of a predetermined interval after operation of said beam operated switch whereby said motor will be reversed when said beam operated switch is operated, and whereby the reverse rotation of said motor will be terminated after a few revolutions of said auger.

8. In a bag filling machine having a hopper, a balance beam, a fulcrum therefor, an auger for removing material from the hopper, and a motor for driving said auger, the combination of control means for terminating the operation of said bag filling machine so that the contents of the bag being filled can be controlled with respect to weight, said control means comprising a spout surrounding said auger and for supporting a bag, means for displaceably supporting said spout, means connecting said spout with said balance beam, a beam operated switch located adjacent said balance beam and engaged thereby to cause operation when the weight of the contents of said bag exceeds a predetermined amount, said switch means comprising a normally closed switch, motor reversing means including a relay coil, a control circuit including said beam actuated switch and said relay coil, a pneumatic time delay relay comprising a solenoid coil, a normally open switch actuated thereby, and pneumatically controlled means for delaying the operation of said switch into open circuit position for a predetermined time after de-energization of said solenoid coil, a motor circuit controlled as to break by said time delay relay switch, and means providing an electrical connection between said solenoid coil and said control circuit whereby said solenoid coil will be de-energized when said beam operated switch is operated, thereby causing said motor circuit to be broken at the termination of a predetermined time delay thereafter, whereby said motor will be reversed when said beam operated switch is operated and whereby the reverse rotation of said motor will be terminated after a few revolutions of said auger.

9. Control means for a bag filling machine of the automatic cut-off type which includes weight responsive bag supporting means including a balance beam, a filling auger and a motor for driving said auger, said control means comprising a motor circuit for said motor, motor reversing means, an energizing circuit, means, including a start button and a holding relay for making and maintaining said energizing circuit, a normally closed beam actuated switch, a relay in said energizing circuit for maintaining said motor reversing means in a forward driving position, and off-delay timing relay in said energizing circuit, said energizing circuit including said normally closed beam actuated switch whereby said energizing circuit will be broken when the weight of the contents of the bag supported by said bag supporting means causes movement of said beam so that forward rotation of said motor will be terminated and reverse rotation will be initiated by operation of said beam actuated switch, and means controlled by the delayed operation of said off-delay timing relay for breaking said motor circuit whereby reverse rotation of said motor will be terminated by operation of said off-delay timing relay.

10. Control means as claimed in claim 9 in which said bag filling machine includes a settling device having a second motor, and in which said control means includes a circuit for said second motor, an on-delay timing relay connected into said energizing circuit, and means controlled by the delayed operation of said on-delay timing relay for breaking said second motor circuit prior to the operation of said beam operated switch.

11. In combination, a bag filling machine of the automatic cut-off type including a balance beam for controlling the operation thereof and a spout from which a bag

may be suspended, a bag settling device disposed beneath said spout and including a base, a pair of laterally spaced vertical shafts journaled in said base, a resilient slapper arm secured to each shaft, and common oscillating mechanism including a motor disposed in said base to oscillate both of said shafts so as to cause said resilient slapper arms to strike the sides of a bag disposed between them and suspended from said spout, a solenoid mounted on said bag filling machine adjacent said balance beam,

means providing an electric circuit including said motor and said solenoid, and latching means actuated by said solenoid to lock said balance beam against movement when said motor circuit is energized.

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