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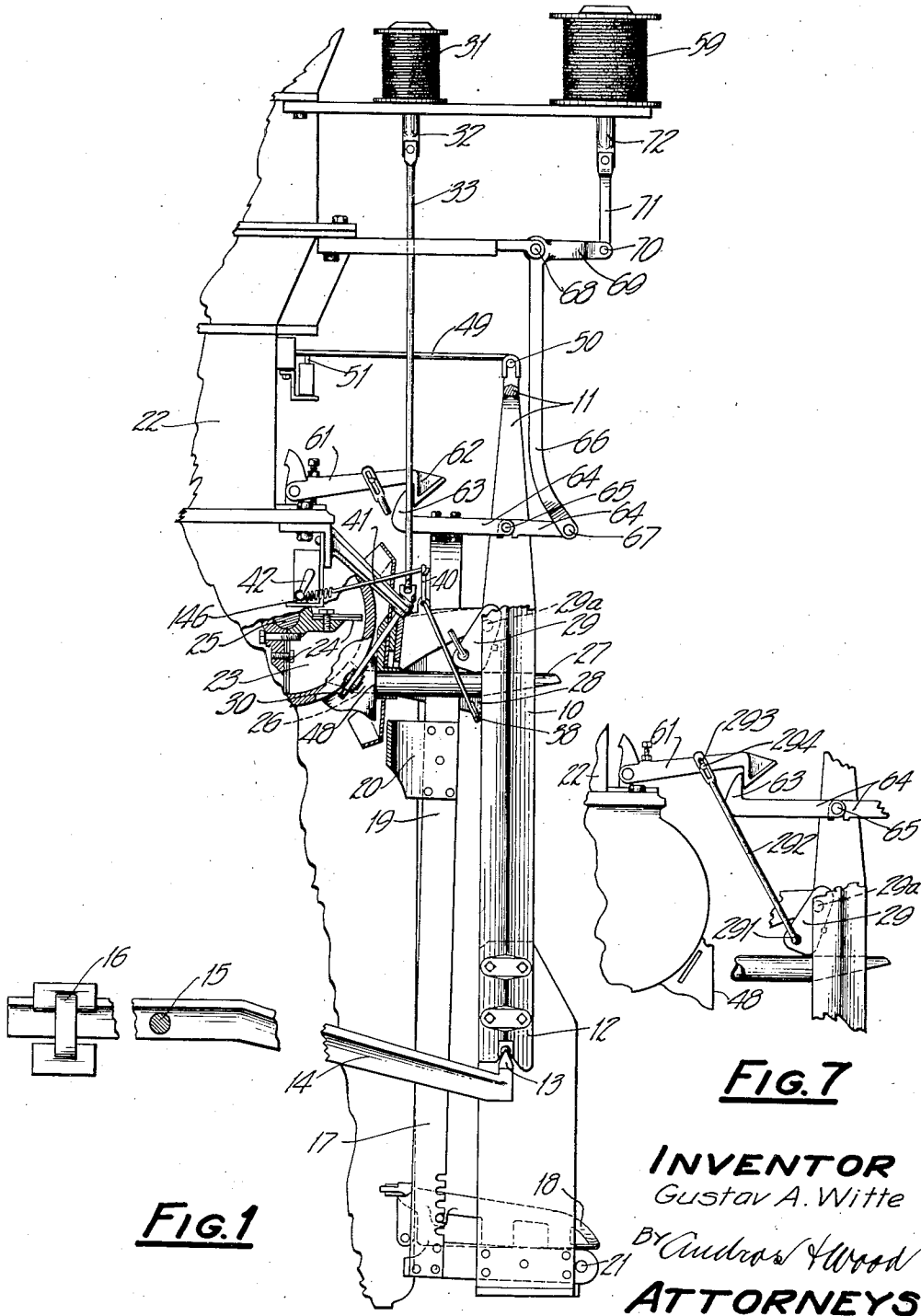
G. A. WITTE

2,052,996

BAG FILLING MACHINE

Filed Jan. 27, 1931

3 Sheets-Sheet 1



Sept. 1, 1936.

G. A. WITTE

2,052,996

BAG FILLING MACHINE

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3 Sheets-Sheet 2

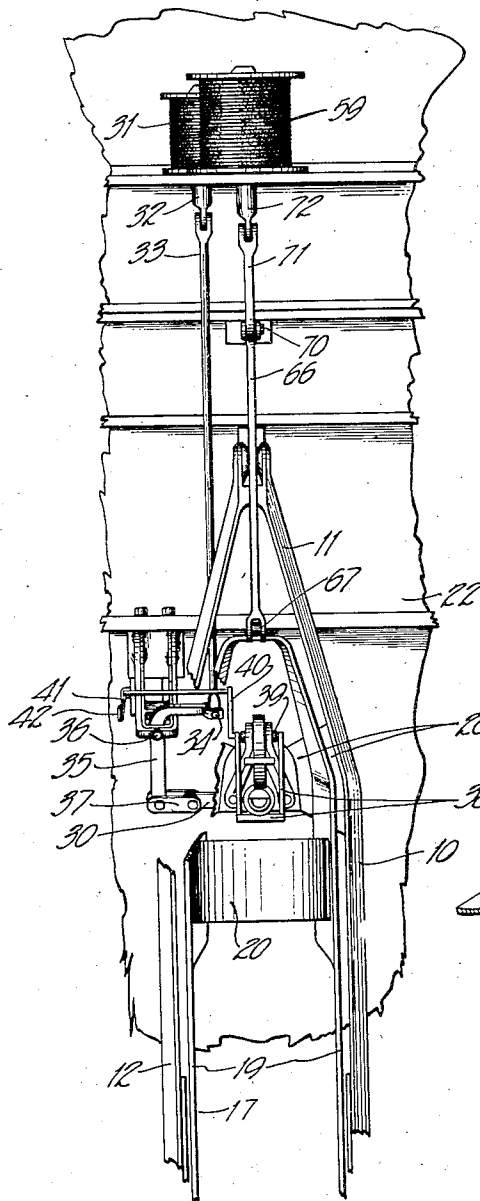
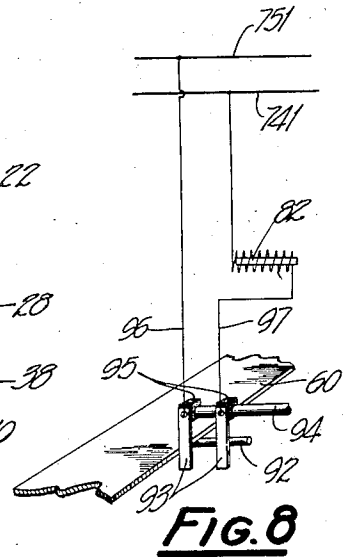
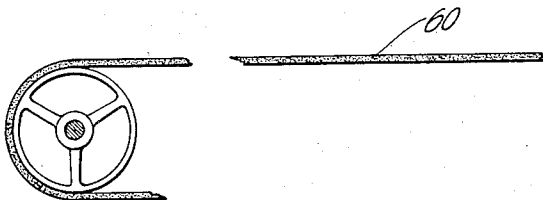


FIG. 2



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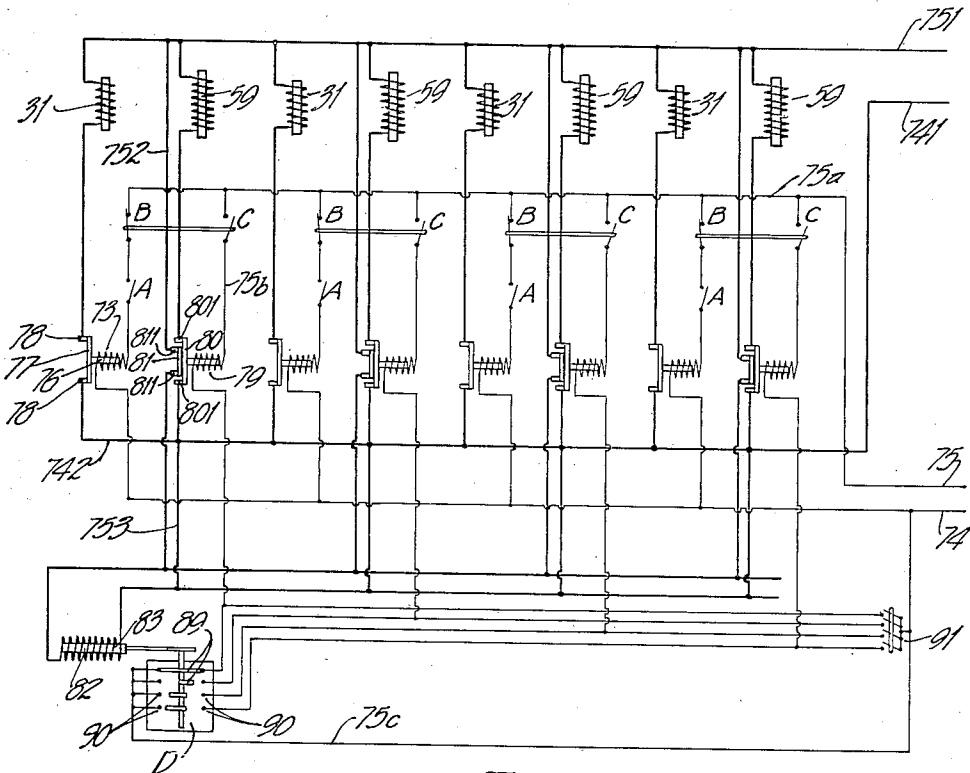


FIG. 3

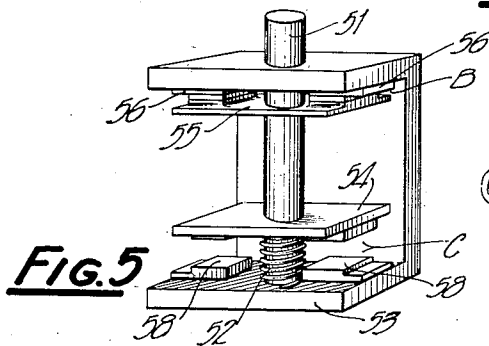


FIG. 5

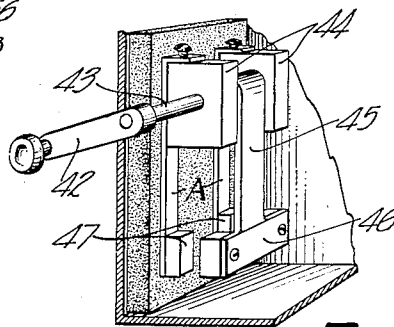


FIG. 4

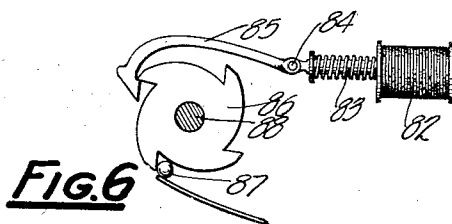


FIG. 6

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2,052,996

BAG FILLING MACHINE

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Application January 27, 1931, Serial No. 511,556

16 Claims. (Cl. 226—48)

My invention more particularly relates to an apparatus for automatically filling bags with finely divided, fluent material, particularly cement, although it will be understood that my invention is equally applicable to machines for filling bags with lime, plaster, and the like.

Another object of my invention is the provision of a plurality of machines for filling bags with finely divided, fluent material, combined with means for causing the bags to be filled and delivered to a suitable carrier in a predetermined sequence.

My invention will best be understood by reference to the accompanying drawings in which I have illustrated a preferred embodiment thereof and in which Fig. 1 is a fragmentary side elevation, partially in section, of a bag filling machine embodying my invention; Fig. 2 is a fragmentary front elevation of Fig. 1; Fig. 3 is a diagrammatic view, illustrating the electrical connections; Fig. 4 is a fragmentary perspective view partially broken away, illustrating a contact device operable to the closed position by placing a bag in the material receiving position on the associated spout; Fig. 5 is a perspective view illustrating two sets of contacts which are operated by the descent of the device or frame on which the bag is mounted; Fig. 6 is a side view illustrating a pawl and ratchet mechanism for operating the controller; Fig. 7 is a side view illustrating connections by which the bag retaining cam is released from the bag; and Fig. 8 is a fragmentary perspective view illustrating a modification.

Like reference characters indicate like parts throughout the drawings.

I have illustrated my invention in connection with a bag filling machine of the general character illustrated in a patent to A. M. Bates, No. 1,138,618, May 11, 1915, although it will of course be understood that my invention is not limited to this type of machine. A frame 10 comprises an upper portion in the general form of an A, 11, and having two vertically extending legs or standards, 12, which are mounted on knife edges 13 on suitable levers 14 pivoted at 15 and provided at their opposite end or ends with a counterweight 16 which normally retains the frame in the elevated position illustrated in Figs. 1 and 2. A second frame 17 is provided with a seat 18 for the reception of a bag, the frame 17 comprising two side members 19 which are connected by a concave plate 20 against which the bag may rest. The frame 17 is pivoted as at 21 and is tiltable forwardly about said pivot in order to dump or remove the bag from the machine in a manner which will be hereinafter more fully described.

A hopper 22 is provided for the reception of finely divided fluent material such as cement from which it is delivered to a receptacle 23, which is preferably cylindrical, as indicated in Fig. 1

and within which a plurality of paddles 24 are mounted on a shaft 25 having suitable bearings (not illustrated) in the frame of the machine for agitating the material and causing it to flow through a port 26 to a spout 27, which is adapted to engage within an opening in the lower end of a bag and deliver the divided material thereto until the bag is filled. The spout and associated parts are mounted on a yoke 28 secured to the frame 10. A cam member 29 pivoted at 29a and of known construction rests against the upper side of the spout 27, so that when the spout is received in the opening in the end of the bag, the upper end of the bag, as it is positioned in the machine, lifts the cam slide and when the latter drops back into position, it holds the bag in position on the spout. In the embodiment of my invention illustrated, the cam is pivoted at 29a and is pivotally connected as at 291 to a link 292 the upper portion of which may be provided with a slot 293 in which is received a fixed pin 294. In order to avoid confusion, the foregoing connections are illustrated in Figs. 1 and 7, but not in Fig. 2.

In accordance with my invention means operable in response to the positioning of the bag in material receiving position on the spout is provided for opening communication between the receptacle 23 and the spout so that the material may flow from the receptacle through the spout and into the bag. A valve plate 30 is provided with an opening (not illustrated) which may register with the port 26 leading from the chamber 23 and the spout. In the embodiment illustrated, this slide valve, which is normally closed, is moved to open position by a solenoid 31, the core 32 of which is pivotally connected to a link 33 the lower end of which is, in turn, pivoted, as at 34, to a bell-crank 35 pivoted at 36 in the frame of the machine. The lower end of the bell-crank 35 is connected by links 37 to one end of the valve 30, the ends of the link embracing the ends of the bell-crank and of the slide valve, respectively.

The circuit for the solenoid 31 is controlled by a yoke 38 secured on a shaft 39 having its bearings in the frame of the machine. An arm 40 is secured to the shaft 39 and connected at its end to a bent link 41, as indicated in Figs. 1 and 2, and which is in turn connected to the end of an arm 42 mounted on a shaft 43 (see Fig. 4). The shaft 43 is mounted in suitable blocks 44 and to the shaft is connected an arm 45 on the lower end of which is mounted a contact member 46 which is adapted to engage and bridge two contacts 47 for closing the circuit to the solenoid 31, the contacts being indicated, generally at A.

The end of the link 41 is preferably formed into a coil spring, as at 146 (see Fig. 1), which is

of sufficient strength to bring about the actuation of the contact member 46 but at the same time permits yielding engagement between said contact member and the contacts 47, thereby avoiding breakage of parts.

The energization of the solenoid 31, therefore, opens the slide valve 30 and permits the finely divided fluent material to flow from the receptacle 23 into the spout 27 and thence into the bag, and the material continues to flow until the bag is filled or substantially so, at which time it weighs a predetermined amount, and the weight thereof on the frame 17 over-balances the weight 16 and the frames 10 and 17 together with the bag which is mounted on the inner frame descend a predetermined amount. The spout 27 likewise descends with the other parts, but the port thereof merely slides over the face of the plate 48, thereby closing communication between the spout and the receptacle 23, and preventing further flow of the material. As the bag carrying means descends, the pin 294 engages the upper end of the slot 293, thereby causing the cam to swing clockwise about the pivot 29a and release the bag.

The descent of the frame also causes the outer end of a lever arm 49 which is pivoted to the movable frame, as at 50, and the other end of which is pivoted at a point not shown on the hopper, to move about the latter pivot. The lever arm 49, in this downward movement, engages a stem 51 (see Figs. 1 and 5) and presses the same downwardly against the action of a coil spring 52 which is interposed between a plate 53 and a second plate 54 which is mounted on the stem 51. Normally, a contact member, indicated generally at B, is closed. This member comprises a contact plate 55 mounted on the stem 51 and which engages two contacts 56. The contacts B are included in series with the contacts A which control the circuit of the solenoid 31.

A contact indicated generally at C is closed by the downward movement of the stem 51. The contactor C comprises a contact plate 54 mounted on the stem 51 and which engages stationary contact members 58. The closing of the contact C closes a circuit, which controls the energization of a solenoid 59 which in turn dumps or removes the bag, which has been filled, from the seat 18 and onto the conveyor 60, and which it will be understood receives bags from a plurality of bag filling machines diagrammatically illustrated in Fig. 3. Normally, the top of the frame 17 is held in vertical position by an arm 61 provided at its end with a hook 62 which engages a hook 63 on an arm or link 64 formed of two sections pivoted together as at 65. The end of the outer section 64 of the link is pivoted to the lower arm of a bell-crank 66, as at 67, the bell-crank being pivoted as at 68. The arm 69 of the bell-crank is pivoted as at 70 to a link 71, which is in turn pivoted to the core 72 of the solenoid 59.

I will now describe the diagrammatic connections illustrated in Fig. 3. The circuit for the solenoid 31 which actuates the valve plate 30, is controlled by a relay 73, the circuit for which is, in turn, controlled by the normally closed contact B and by the contact A which is closed by the insertion of the bag into material receiving position of the spout. The relay 73 is included in a circuit connected to line wires 74 and 75 between which may be impressed a voltage, for example, of 110 volts. To the armature 76 of the relay 73 is connected a contact member 77

which, when the relay 73 is energized, engages contacts 78, thereby closing a circuit to the solenoid 31 which actuates the valve member 30 to open position to permit the flow of fluent material from the receptacle to the spout. Referring to Fig. 3, this circuit of the solenoid is connected to two line wires 741 and 751 between which may be impressed a voltage higher than that between the lines 74 and 75, for example, 440 volts. The circuit for the solenoid may be traced from the wire 751 through the solenoid 31, contacts 78 and 77 to a bus 742 connected to the other line wire 741. The closing of the contact member C closes the circuit to a relay 79 which is connected into a circuit leading to the line wires 74 and 75. This circuit may be traced as follows: line wire 75, bus 75a, conductor 75b, relay 79, contacts 89 and 90 of the contactor D through conductor 75c to the line 74. The energization of the relay 79 closes a circuit through the contact 80 and the associated bridging contacts 801 to the solenoid 59 which dumps the bag and removes it from the machine to the conveyor. This circuit may be traced from the line 751 through solenoid 59, contacts 80 and 801 to the bus 742 and to the line wire 741. The energization of the relay 79 also closes a circuit through the contacts 81 and the associated bridging contacts 811 to a solenoid 82 to the core 83 of which is pivotally connected as at 84 a pawl 85 which is adapted to operate a ratchet 86 through an angle of 90° each time that the solenoid 82 is energized. Beginning with the line wire 751, the circuit includes a conductor 752, contacts 81 and 811, solenoid 82, conductor 753 to bus 742 and to line wire 741. The ratchet may be retained in the position to which it is moved by a well known form of retaining device 87. The ratchet 86 is mounted on a shaft 88 on which is mounted a number of contact members 89, four of which are illustrated. The contact members 89 are adapted successively, or in a predetermined sequence, to engage pairs of contacts 90 and thereby close one portion of a circuit leading to the relays 79. The contactor comprising the contacts 89 and the contact members 90 is represented generally by the reference character D. The current for the relays 79 may be by-passed around the contactor D, if desired, by closing a manually operated switch 91.

The operation of my invention will readily be understood from the foregoing description and is as follows:

The operator inserts the opening in the upper portion of bag over the spout 27 of one of the bag filling machines. In placing the bag in material receiving position on the spout, it engages the yoke 38 and moves the same to the left, as viewed in Fig. 1, thereby actuating the contact member 46 (see Fig. 4) through the described connections to bring it into engagement with the contacts 47, these contacts being indicated generally by the reference character A in the diagram of connections. Remembering that the contact member B is normally closed, the closing of the contacts A closes the circuit for the relay 73 which in turn closes the circuit to the solenoid 31 which opens the slide valve between the receptacle 23 for the finely divided fluent material and the spout 27 thereby starting the flow of material from the hopper, through the receptacle in which the material is agitated by the paddles 24 and which force the material from the receptacle through the spout 27 into the bag. Initially, the frame is seated in the elevated position indicated in Figs. 75

1 and 2. Now, when the bag is filled with a predetermined weight of material, it, together with the frame on which it is mounted, will overbalance the weight 16 thereby causing the frame and the bag to descend until the latch 63 on the link 64 is free from the latch 62 on the arm 61. The downward movement of the frames 10 and 17 causes the lever arm 49 to engage the stem 51 and depress the same against the action of the spring 52, thereby opening the contacts B and at the same time closing the contacts C. The opening of the contacts B opens the circuit for the solenoid 31, thereby permitting the core thereof to drop and through the described connections moves the valve 30 to the left, as viewed in Fig. 2, which is the closed position, thereby stopping the flow of material to the bag. At the same time the closing of the contacts C closes the circuit for the relay 79 which in turn closes the circuit for the solenoid 59 the energization of which dumps or removes the bag from the device. The upward movement of the core 72 and the link 71, which is pivoted thereto, rocks the bell-crank to which the link 71 is connected, thereby causing the lower arm 66 of the bell-crank to move to the right, as viewed in Fig. 1, (it being remembered that the latch 63 has dropped beneath the latch 62) thereby moving the upper end of the frame 17, as viewed in Fig. 1, to the right and about the pivot 21. The bag is thus tilted over from its seat and falls from the machine on to the conveyor 60. The energization of the relay 79 also closes a circuit through contact 81 and the associated bridging contacts 811 thereby energizing the solenoid 82 and rotating the contactor indicated generally at D 90° and closing the next set of contacts, so that when the contacts C of the next machine are closed, a circuit is completed to the associated relay 79.

In Fig. 3, I have illustrated a modification of my invention in which the solenoid 82 is controlled by pins or arms 92 secured and spaced along the conveyor 60. The pins 92 engage two contact members 93 mounted on a shaft 94 and insulated therefrom as by members 95. The contact members 93 are connected by conductors 96 and 97 to the line wires 741 and 751, the winding of the solenoid 82 being included in the conductor 97. When one of the pins 92 on the conveyor engages the contact members 92, they either turn on the shaft, or turn the shaft 94, and the circuit, including the solenoid 82, is energized and the ratchet actuated through an angle of 90 degrees in the manner illustrated in Figs. 3 and 6, thereby placing the conductor in a position to close the circuit for the relay 79 of the next successive bag filling machine.

With manually operated bag filling machines of the general character illustrated in the drawings, it has been necessary for the operator, in order to fill a bag, to pull a handle which opens the slide valve which, in turn, controls the flow of material from the hopper or receptacle associated therewith to the spout, then, when the bag is filled and drops with the frame to a lower position, it is necessary for him manually to actuate said handle and close the same valve and then actuate a second lever in order to dump the bag from the machine. It is common practice for a single operator to serve a plurality of such machines. The operation of three such machines requires a skilled operator and it requires a highly skilled operator to serve four machines. The filling of the bags is comparatively expensive from the standpoint of skilled labor. Furthermore, the

work is commonly done by the piece, and an operator, in order to increase the output of the bags, will frequently step on the frame in order to lower the same and then dump the bag before it is filled. This, of course, leads to complaints because of underweight, from customers.

My invention overcomes the foregoing difficulties by eliminating the skilled service required. All that is necessary for the operator to do is to place bags in position successively on the spouts and they are automatically filled and removed from the machine onto the conveyor and such operations may be carried out with unskilled labor and in a much more satisfactory manner.

A further advantage of my invention resides in the fact that the bags are dumped or removed from the various machines in a predetermined sequence, which is brought about by the controller D. It is desirable to space the bags on the conveyor as equally as may be in order that they may be the more conveniently removed therefrom. It will, of course be understood that if two or more bags were delivered close together on the conveyor, it would make it difficult for the attendant, who is removing bags therefrom, properly to take them from the conveyor.

While in the embodiment of my invention I have illustrated electrical means for actuating the valve controlling the flow of the material from the receptacle to the spout and for dumping the bag and also for controlling the energization of these solenoids, it will be understood that means other than electrical may be utilized, both for actuating the valve and dumping the bag and for controlling the supply of energy thereto. For example, fluid under pressure, such as steam or air, may be used for actuating the slide valve and for dumping the bag, and similar means may be used for controlling the supply of fluid pressure to these devices.

While I have described my invention in its preferred embodiment, it is to be understood that the drawings are merely illustrative, that the words which I have used are words of description rather than of limitation, and that changes within the purview of the appended claims may be made without departing from the true scope and spirit of my invention in its broader aspects.

What I claim is:

1. In a bag filling machine, a device for holding the bag, a receptacle for finely divided fluent material, a spout adapted to deliver said material from said receptacle to the bag, means associated with said receptacle for forcing material therefrom to said spout, a slide valve for controlling the flow of material from said receptacle to said spout, a pivotally mounted member having a portion extending above the spout and engageable and movable by the upper edge of the bag into material receiving position on said spout and means responsive to the movement of said member for actuating said slide valve.

2. In a bag filling machine, a receptacle for finely divided fluent material, a spout adapted to deliver said material from said receptacle to the bag, means associated with said receptacle for forcing material therefrom to said spout, a slide valve for controlling the flow of material from said receptacle to said spout, a pivotally mounted member having a portion extending above the spout and engageable and movable by the upper edge of the bag into material receiving position on said spout, contact means operable to close position by said member, and an electrical device

governed by said contact means for opening said valve.

3. In a bag filling machine, a device for holding the bag, a receptacle for finely divided fluent material, a spout adapted to deliver said material from said receptacle to the bags, means associated with said receptacle for forcing material therefrom to said spout, a slide valve for controlling the flow of material from said receptacle to said spout, a yoke member surrounding said spout and pivotally mounted above the same whereby said yoke is tilted by the upper edge of the bag when placed in material receiving position on said spout, and means responsive to the movement of said yoke for actuating said valve.

4. In a bag filling machine, a pivoted frame engageable with the bottom and sides of the bag and movable downwardly in response to a predetermined weight thereon, means for delivering fluent material to the bag, and means operable in response to the downward movement of said frame for positively tilting the same about its pivot and thereby causing the bag to fall laterally away from the machine.

5. In combination, a plurality of bag filling machines each comprising a pivoted frame engageable with the bottom and sides of the bag, means for filling the bag with fluent material, means operable in response to the downward movement of said frame for positively tilting the same about its pivot and thereby causing the bag to fall laterally away from the machine, and a common conveyor along side said bag filling machines on which the bag from the said machines fall.

6. In a bag filling machine, a device for holding the bag and movable downwardly in response to a predetermined weight thereon, means for delivering finely divided fluent material to the bag, contact means closed in response to the downward movement of said device, and electrical means controlled by said contact means for removing the bag from said device.

7. In a bag filling machine, means for holding the bag in position on the machine, means for delivering finely divided fluent material thereto, and means operable in response both to the weight of the bag and the positioning thereof in material receiving position for controlling the flow of material to the bag.

8. In a bag filling machine, means for holding the bag in position, means for delivering finely divided material thereto, electrically operated means for controlling the flow of material to the bag, electrically operated means for delivering the bag from the machine, and mechanically connected contact means for controlling the respective electrically operated means.

9. In a bag filling machine, means for holding the bag in position, means for delivering finely divided material thereto, a first electric device, means operable thereby for controlling the flow of material to the bag, a second electric device, means operable thereby for removing the bag from the machine, and means for simultaneously opening the circuit of said first electrical device and closing the circuit of the second.

10. In a bag filling machine, downwardly movable means for holding the bag in position, means for delivering finely divided material thereto, a first electric device, means operable thereby for controlling the flow of fluent material to the bag,

a second electrical device, means operable thereby for removing the bag from the machine, and means responsive to the downward movement of the bag holding means for de-energizing said first electric device and for energizing said second electric device.

11. In combination, a plurality of bag filling machines, means for delivering finely divided fluent material from each machine to a bag, means for controlling the flow of material to the bag, means for dumping the bag, and means operable in response to the operation of a given machine for placing another machine in condition for operation.

12. In combination, a plurality of bag filling machines, means for delivering finely divided fluent material from each machine to a bag, means for controlling the flow of material to the bag, means for dumping the bag, and means operable in response to a predetermined weight in a bag for placing another machine in condition for operation.

13. In combination, a plurality of bag filling machines, means for delivering finely divided fluent material from each machine to a bag, means for controlling the flow of material to said bag, a frame on which the bag is mounted and movable downwardly in response to a predetermined weight of material in said bag, and means operable in response to the downward movement of said frame for placing another machine in condition for operation.

14. In combination, a plurality of bag filling machines, means for delivering finely divided fluent material from each machine to a bag, means for controlling the flow of material to said bag, a frame on which the bag is mounted and movable downwardly in response to a predetermined weight of material in said bag, an electric device energized in response to the downward movement of said frame, means actuated by said device for removing the bag from the machine and means operable in response to the downward movement of said frame for controlling the corresponding electric device of another machine.

15. In combination, a plurality of bag filling machines, means for delivering finely divided fluent material from each machine to a bag electrically operated, a first electric device and means actuated thereby for controlling the flow of material to said bag, a frame on which the bag is mounted and movable downwardly in response to a predetermined weight in said bag, a second electric device, means operable in response to the downward movement of said frame for energizing said second electric device, means actuated by said second electric device for removing the bag from the machine, and means operable in response to the downward movement of said frame for controlling the operation of the second electric device of another machine.

16. In a bag filling machine comprising a spout on which the bag to be filled is received and through which the material flows to the bag, means for controlling the flow of material through said spout, a movable yoke member at least partially surrounding said spout and located in a position to be engaged by said bag when moved into material receiving position, and means operable in response to the movement of said yoke member for operating said means.

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