Aug. 27, 1935. K. G. HOWARD 2,012,681

BAG FEEDING MACHINE

Filed May 23, 1932 2 Sheets-Sheet 1

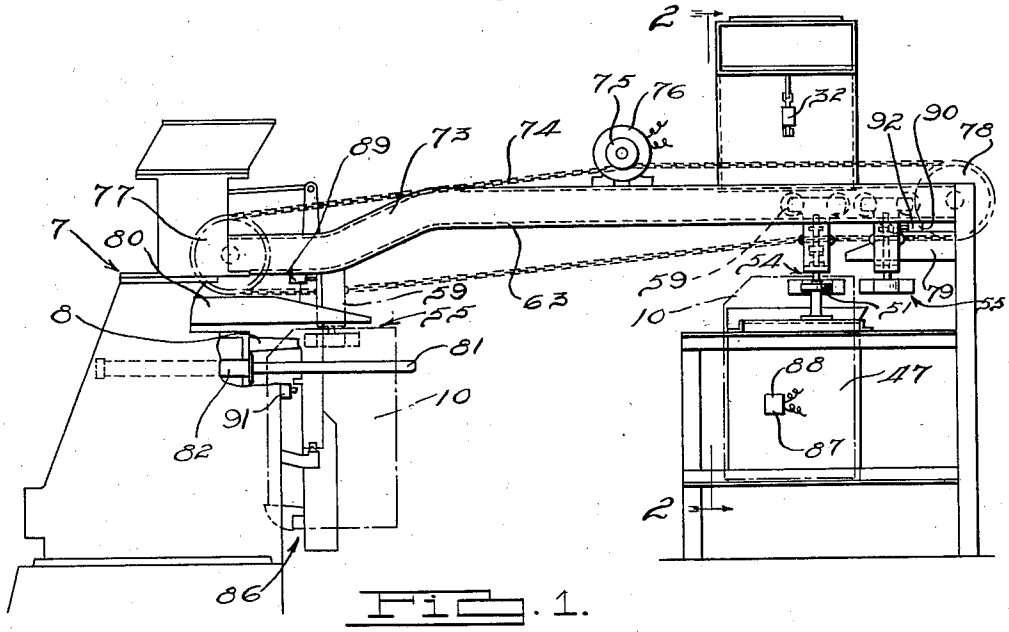


Fig. 1.

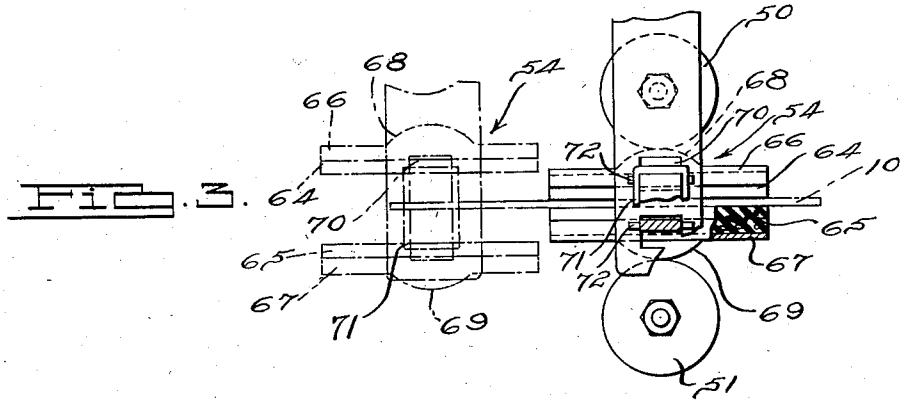


Fig. 3.

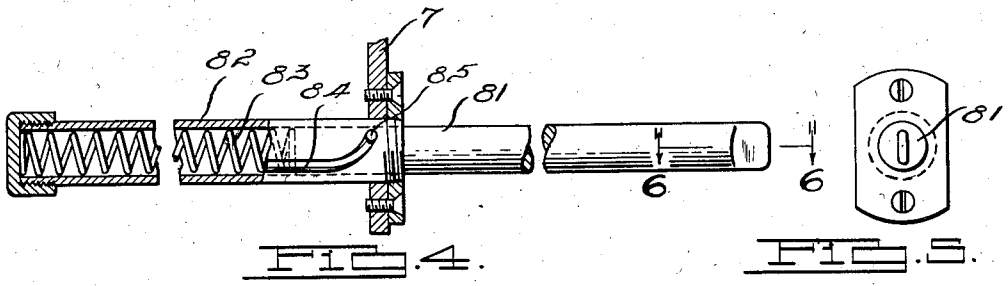


Fig. 4.

Fig. 5.

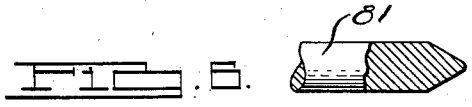


Fig. 6.

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BAG FEEDING MACHINE

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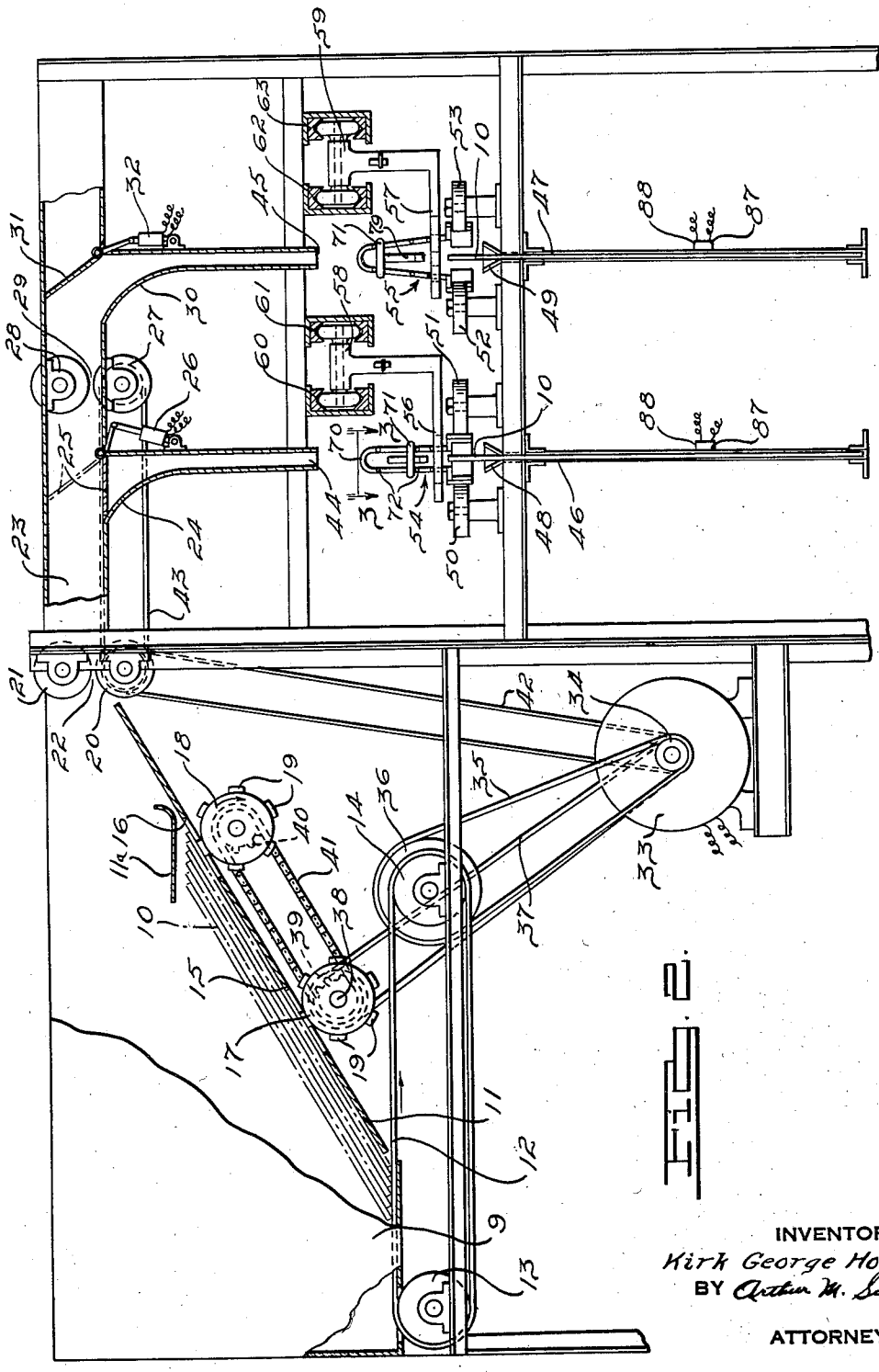


Fig. 2.

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UNITED STATES PATENT OFFICE

2,012,681

BAG FEEDING MACHINE

Kirk George Howard, River Rouge, Mich.

Application May 23, 1932, Serial No. 612,903

11 Claims. (Cl. 226—48)

My invention relates to a bag feeding machine and particularly to a machine adapted to feed bags from a hopper to a bag filling machine and the placing of the bag on the bag filling machine.

There are on the market several types of machines for filling bags through a valve left in the bag for filling purposes. By means of such a valve in a bag it is possible to fill a bag after the bag has been completely sealed except for the valve opening. It is the conventional practice in the art to fill such bags by means of a bag filling machine having a spout adapted to be inserted through the valve opening in the bag. Prior to my invention the operation of feeding the bag to the machine and placing the bag on the filling spout of the bag filling machine has been performed manually. This operation adds greatly to the cost of operation of such bag filling machines and is also dangerous to the person doing this work.

It is, therefore, an object of my present invention to provide a machine which will automatically feed bags to be filled to a bag filling machine and automatically place such bags on the filling spout of the machine.

This and various other objects, features of arrangement, construction and operation are plainly shown and described and will be best understood by reference to the accompanying drawings showing a preferred embodiment of my invention, in which:

Fig. 1 is a side elevation of a machine embodying my invention;

Fig. 2 is an elevation partially in section, taken on the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary top plan with parts broken away, taken on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged side elevation, partially in section, of the valve opening mechanism;

Fig. 5 is an end elevation of the valve opening rod shown in Fig. 4;

Fig. 6 is a fragmentary view, partially in section, taken on the line 6—6 of Fig. 4.

Similar reference numerals refer to similar parts throughout the several views.

Referring more in detail to the drawings, particularly to Fig. 1, 7 designates a bag filling machine of any desired conventional type having a filling spout 8 secured thereto. The machine shown in this view is of the type known to the trade as the "Bates" bag filling machine, but my invention is not limited to use on this machine and the machine is here shown merely as a matter of convenience in explaining the operation of my present invention.

A machine embodying my invention has two cycles of operation for accomplishing two phases of the entire operation. The first phase is the separating of the bag from a source of bag supply, and the second phase is the conveying of that bag to the bag filling machine and placing the valve of the bag on the filling spout 8. In describing my machine and in describing its operation, these phases of operation will be discussed in the order just mentioned.

The mechanism for carrying out the first phase of the operation of my machine is shown in Fig. 2. As there shown, a container 9 adapted to contain a quantity of bags 10 to be filled is constructed with an inclined bag support 11. Directly beneath the inclined bag support 11 an endless conveyor belt 12, running on pulleys 13 and 14, is provided, it being the function of the conveyor belt 12 to carry bags 10 from the rear of the container 9 to a position as here shown in which the bags lie flat upon the inclined bag support 11. Openings 15 and 16 are provided through the inclined bag support 11 and roller conveyors 17 and 18 are provided directly beneath the openings 15 and 16 in the inclined bag support 11. Each of the rollers 17 and 18 is provided with a plurality of soft rubber plug inserts 19, which extend through the openings 15 and 16 a sufficient distance to contact with the bag 10 lying on the inclined bag support 11.

A partition 11a has an opening adjacent the inclined bag support 11, which prevents more than one of the bags 10 from passing to a conveyor roll 20 at any one time.

Adjacent the top end of the inclined bag support 11 is a conveyor roll 20 and a weighted roll 21 spaced a distance from and directly above the conveyor roll 20. A space 22 is provided between the conveyor roll 20 and the weighted roll 21 of sufficient size to permit the bag 10 to pass between the conveyor roll 20 and the weighted roll 21.

A chamber 23 is provided adjacent the opening 22 between the conveyor roll 20 and the weighted roll 21, and a conveyor duct 24 leads from the chamber 23. The opening between the conveyor duct 24 and the chamber 23 is closed by a door 25 operated by an electrically actuated solenoid 26.

It is common knowledge in the art that bag filling machines may have a number of separate bag filling spouts, and my invention is adapted to convey bags and place the bags upon any number of spouts on such bag filling machines. In

the machine shown in Fig. 2 I have provided a machine which will convey bags to two spouts on a machine, but as many more spouts may be serviced as is desired by the addition to the machine here shown of the same mechanism which is being described.

In the case of a machine adapted to convey bags to a two spout filling machine, a conveyor roll 27 identical with the conveyor roll 20, and a weighted roll 28 identical with the weighted roll 21, are provided in the chamber 23, the conveyor roll 27 and the weighted roll 28 being spaced apart to provide an opening 29 adapted to receive a bag passing through the chamber 23.

A conveying duct 30 identical with the conveying duct 24 leads from the chamber 23 and the opening between the conveyor duct 30 and the chamber 23 is controlled by a trap door 31 operated by an electrically actuated solenoid 32 identical in structure and operation with the trap door 25 and the electrically actuated solenoid 26.

A motor 33 is provided which has a plurality of driving pulleys 34. One of the driving pulleys 34 drives a belt 35, which drives a pulley 36, which operates the endless conveyor belt 12. A second pulley 34 drives through a belt 37 to a driving shaft 38, to which is secured a sprocket 39 and the conveyor roll 17. The conveyor roll 18 is provided with a sprocket 40, which is operatively connected with the sprocket 39 by a chain drive 41. A third pulley 34 drives a belt 42, which drives the conveyor roll 20. A belt 43 operatively connects the conveyor roll 20 with the conveyor roll 27.

The conveyor duct 24 terminates in a mouth 44 and the conveyor duct 30 terminates in a mouth 45. Directly beneath the mouth 44 of the conveyor duct 24 is a bag receptacle 46, and directly beneath the mouth 45 of the conveyor duct 30 is a bag receptacle 47. The bag receptacles 46 and 47 are provided with flared top openings 48 and 49 to receive bags 10 which are dropped through the conveyor ducts 24 and 30 into the receptacles 46 and 47. The receptacles 46 and 47 are open at the side toward the bag filling machine 7. Mounted directly above the opening 48 in the bag receptacle 46 are rollers 50 and 51. Mounted directly above the opening 49 in the bag receptacle 47 are rollers 52 and 53.

Bag gripping members 54 and 55 are mounted on conveyor arms 56 and 57, the conveyor arm 56 terminating in a wheel carrier 58, and the conveyor arm 57 terminating in a wheel carrier 59. The wheel carrier 58 operates as a trolley in the tracks 60 and 61, and the wheel carrier 59 acts as a trolley in the tracks 62 and 63.

The details of the bag gripping member 54 are shown in Fig. 3. As there shown the member consists of two gripping members 64 and 65, preferably formed of soft rubber or the like and held in brackets 66 and 67, the brackets 66 and 67 being provided with bulged portions 68 and 69 adapted to be contacted by the rollers 50 and 51. Prior to contact with the rollers 50 and 51, the parts occupy the position shown in the dotted line view of Fig. 3, at which time the gripping members 64 and 65 are held apart by action of the U-shaped spring 70. When in the closed position shown in Fig. 3, the bag 10 is gripped between the gripping members 64 and 65, at which time the spring 70 is compressed and a ring 71 drops down on to pins 72 and holds the gripping jaws 64 and 65 in tight contact with the bag 10.

The mechanism for transferring the bag carriers 54 and 55 from the position shown in Fig. 2 to a position for placing a bag 10 held therein on the bag filling spout 8, is shown in Fig. 1. As there shown, the track 63 extends from the bag sorting and dropping mechanism to the bag filling machine 7. The other tracks 60, 61 and 62, while not shown clearly in this view, extend on parallel lines with the track 63. The tracks each have a dropped portion 73 at a point adjacent the filling spout 8 of the bag filling machine 7. The trolleys 58 and 59 are each operatively connected with an endless conveyor 74, which is driven by a drum 75 driven by a reversible electric motor 76. The conveyor 74 passes over a sheaved pulley 77 secured to the bag filling machine 7, and over a sheaved pulley 78 secured to the bag sorting and dropping mechanism.

A wedge 79 is secured at a point adjacent the bag receptacle 47 and in such a position as to run between the inverted U-shaped member 70 on the bag carrier 55, and a similar wedge 80 is secured to the bag filling machine 7 at a position adjacent the filling spout 8.

A valve opening rod 81 is mounted adjacent the bag filling spout 8. This rod tapers at its end and extends to a point on a vertical line running through the point of beginning of the dropped portion 73 of the track 63. The rod 81 is so placed that its initial contact with the valve in the bag 10 is at the lowest portion of the valve. The rod 81 and its mounting are shown in Figs. 4, 5 and 6. As shown in these views, the rod 81 telescopes within a casing 82 by compressing the spring 83 contained therein. The casing 82 is secured to a portion of the bag filling machine 7 and acts to support the rod 81 in its operative position as shown in Fig. 1.

A cam slot 84 is provided in the casing 82 and a pin 85 secured to the rod 81 extends into the slot 84 and causes the rod 81 to be rotated as it is pushed into the casing 82. The rod 81 is so formed that this rotative movement causes the tapered point of the rod 81 to be rotated after it comes in contact with the valve in the bag 10. This rotation causes a full opening of the valve in the bag 10 just prior to placing the bag 10 on the filling spout 8.

It is a conventional practice to provide some type of a bag supporting mechanism adjacent the spout 8 of the bag filling machine 7, and one such type of bag supporting mechanism is shown in Fig. 1 and includes a bag supporting cradle 86. The bag supporting cradle 86 is adapted to drop downwardly as the bag 10 held therein is filled. As it so drops it performs the function of operating the switch 91, as will hereafter be more fully described.

The control and actuation of the various parts of a machine embodying my invention is accomplished by means of various electrical switches and electrical circuits connecting these switches with electrically actuated solenoids and motors. Inasmuch as various electrical circuits may be employed to accomplish the desired results, I have not shown a wiring diagram, but have shown the switches, the solenoids and motors, it being understood and being apparent to those skilled in the art that various electrical circuits may be employed to connect the switches to the solenoids and/or the motors to accomplish the desired function.

Actuation of the bag sorting and feeding mechanism by the motor 33 is controlled by switches 87 secured to the bag receptacles 46 and 47, the switches 87 being adapted to be opened when a bag 10 drops into the receptacles, and closing when the bag 10 is removed from the receptacles.

The solenoids 26 and 32 controlling the opening of the doors 25 and 31, are electrically connected with and controlled by switches 88 also secured to the bag receptacles 46 and 47, the switches 88 being opened when a bag 10 drops into the receptacles and being closed when the bag 10 is removed from the receptacles.

The carriage 59 is moved by action of the reversible electric motor 76, which is electrically connected with and controlled by a switch 89 placed at the filling machine end of the tracks 62 and 63, and a switch 90 placed at the other end of the tracks 62 and 63.

A switch 91 controlled by the bag holding cradle 86, and a switch 92 mounted with the switch 90, also are electrically connected with the motor 76 and function to control it as will hereafter be more fully described.

The operation of a machine embodying my invention is as follows:

When a bag 10 has been placed on the filling spout 8 of the bag filling machine, the carrier 59 contacts with the switch 89 which stops and reverses the motor 76. The carrier 59 then moves to the opposite end of the track and contacts with the switch 90, which stops the motor 76. After the bag 10 has been filled, the bag cradle 86 moves downwardly and closes the switch 91. This starts the motor 76, which rotates the drum 75 to move the conveyor 74 and the attached carrier 59 to the position for placing a bag 10 on the spout 8. As the carrier 59 reaches the position to contact with the switches 90 and 92, the wedge 79 slides under the retaining ring 71 and raises it, permitting the rubber jaws 64 and 65 to be separated enough to receive a bag 10 between them. The reversing of the motor 76 starts movement of the carrier in the opposite direction, and the portions 69 and 70 of the members 66 and 67 are contacted by the rollers 50 and 51, causing the closing of the jaws and a firm gripping of the bag 10 between the jaws 64 and 65. This permits the ring 71 to drop down and hold the jaws in the closed position.

When the switch 92 is closed by the carrier 59, as above described, the door 31 is opened by the solenoid 32 and the motor 33 is started. The motor 33 causes a movement of the conveyor belt 12 and of the conveyor rolls 17 and 18. The soft rubber plugs 19 in the conveyor rolls 17 and 18 contact with the lower surface of the bag 10 and push the bag 10 upwardly on the inclined bag supporting plate 11 through the opening between the partition 11a and the inclined bag support 11.

The motor 33 also drives the roll 20, and as the upper edge of the bag 10 reaches the roller 20, it is caught between it and the weighted roll 21 and pushed into the chamber 23 and between the rollers 27 and 28. When the bag 10 reaches the door 31, further forward movement of the bag 10 is prevented and it is directed into the chute 30 from which it falls into the receptacle 47, opening the switches 87 and 88 and shutting off the motor 33 and deenergizing the solenoid 32, permitting the closing of the door 31.

As the carrier 59 moves along the tracks 62 and 63, the valve in the bag 10 is opened by the valve opening rod 81 as the carrier 59 reaches the dropped portion 73 of the tracks. The movement of the carrier 59 is now a forward and downward movement and this causes the rod 81 to move rearwardly and upwardly in the fold directly beneath the valve in the bag 10. The rearward movement of the rod 81 in the container 82 causes the pin 85 secured to the rod 81 to move in the slot 84, causing a rotation of the rod 81. The rotation of the rod 81 causes the valve in the bag 10 to be opened to its fullest extent just prior to its contacting with the filling spout 8.

The carrier 59 continues to move forward and the opened valve of the bag 10 is placed on the filling spout 8. At this time the wedge 80 passes under the ring 71 and raises it so that the bag 10 is released from the bag carrier jaws 64 and 65. The carrier 59 then contacts with the switch 89, which stops and reverses the motor 76.

From my description of the operation of a machine embodying my invention, it is to be noted that I have described the operation of but one unit of such a machine and the delivery of bags to but one spout of a bag filling machine. It is to be understood, however, that any desired number of spouts may be serviced by the provision of additional mechanism as above described and by suitable electrical connections similar to those above described.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction as herein set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim is new and desire to secure by Letters Patent of the United States is:

1. In a bag feeding machine adapted to feed valved bags to a bag filling machine having a feed spout lying in a horizontal plane and including a bulk container for unfilled bags, a selector mechanism associated therewith and adapted to feed a single bag from said container by frictional engagement with the surface thereof, a bag conveyor adjacent the said selector mechanism, a bag carrier adjacent said conveyor, said conveyor and carrier cooperating with said selector mechanism to receive a single bag therefrom and thereafter to move the bag in the horizontal plane of the feed spout to a position for filling the said bag through its valve from said horizontally disposed spout on the bag filling machine, and releasable bag engaging members associated with said conveyor and carrier and adapted to operate upon the surface of the bag without causing perforations therein, and a release member operable on said bag engaging members for releasing said engaging members after placement of the bag valve upon the filling spout.

2. The combination of a bag filling machine having a bag filling spout and a bag valve opening mechanism associated therewith, with bag conveying mechanism including a selector mechanism for withdrawing a single bag from a bulk container therefor, and releasable bag conveying and carrier mechanisms adapted to receive the selected bag from the selector mechanism and convey it to the bag filling machine and place the bag in bag filling position on the filling spout thereof, said selector, conveyor and carrier mechanisms each being provided with friction means contacting with a surface of the bag and operating thereon without causing perforations therein, and a release member for disengaging the bag conveying and carrier mechanism from the bag after placement of the bag valve on the bag filling spout.

3. The combination of a bag filling machine having a bag filling spout, with bag conveying mechanism including a selector mechanism for

withdrawing a single bag from a bulk container therefor, and bag conveying and carrier mechanisms adapted to receive the selected bag from the selector mechanism and convey it to the bag filling machine and place the bag in bag filling position on the filling spout thereof, said selector, conveyor and carrier mechanisms each being provided with means for frictionally engaging a surface of the bag and operating to select, convey or carry the bag without causing perforations in the surface thereof, and a release member for disengaging the bag conveying and carrier mechanism from the bag after placement of the bag valve on the bag filling spout.

4. In a bag feeding machine the combination with a machine adapted to fill bags and having a bag filling spout thereon, of means including a hopper for containing said bags, means for separating one bag at a time from said hopper, a delivery chamber adjacent said hopper and a bag receptacle adjacent said delivery chamber, means for conveying a bag from said means for containing said bags to said bag filling machine and including fixed tracks secured to said bag filling machine and said means for containing said bags, and a trolley adapted for movement on said tracks, means secured to said trolley for receiving, holding and releasing a bag deposited in said bag receptacle, means actuating and controlling said machine and including an electric motor operatively connected with said means for containing said bags, and a second electric motor operatively connected with said bag conveying mechanism, and means for controlling said motors including a plurality of switches electrically connected with said motors.

5. In a bag feeding machine the combination with a machine adapted to fill bags and having a bag filling spout thereon, of means including a hopper for containing bags to be filled, said hopper having an inclined bag supporting partition and an endless conveyor belt adjacent thereto, a delivery chamber adjacent said inclined bag supporting partition having a plurality of rolls at the mouth thereof and a bag receptacle adjacent said delivery chamber, means for conveying a bag from said means for containing bags to be filled to said bag filling machine and including fixed tracks secured to said bag filling machine and said means for containing bags to be filled, and a trolley adapted for movement thereon, means secured to said trolley for receiving, holding and releasing a bag deposited in said bag receiving means, means for actuating and controlling said machine and including an electric motor operatively connected with said means for containing bags to be filled, and a second electric motor operatively connected with said bag conveying means, and means for controlling said motors including a plurality of switches electrically connected with said motors.

6. In a bag feeding machine the combination with a machine adapted to fill bags and having a filling spout thereon, of means including a hopper for containing said bags, said hopper having an inclined bag supporting partition and an endless conveyor belt adjacent thereto, means for moving a bag along said inclined bag supporting partition and including a plurality of conveyor rolls having soft friction plugs therein adapted to extend through openings in said bag supporting partition, a delivery chamber adjacent said inclined bag supporting partition, a duct leading from said delivery chamber, movable means separating said conveyor chamber from said delivery chamber, a bag receptacle adjacent said duct, means for conveying a bag from said means for containing bags to be filled to said bag filling machine and including fixed tracks secured to said bag filling machine and said means for containing bags to be filled, and a trolley adapted to run thereon, means secured to said trolley for receiving, holding and releasing a bag deposited in said bag receptacle, means for actuating and controlling said machine and including an electric motor operatively connected with said means for containing bags to be filled, and a second electric motor operatively connected with said bag conveying mechanism, and means for controlling said motors including a plurality of switches electrically connected with said motors.

7. In a bag feeding machine the combination with a machine adapted to fill bags and having a bag filling spout thereon, of a source of bags to be filled, and means for conveying a bag from said source of bags to be filled to said bag filling means and including fixed tracks secured to said bag filling machine and said source of bags to be filled, and a trolley adapted for movement thereon, means secured to said trolley for receiving, holding and releasing a bag and including a plurality of friction jaws secured to a carrier member and adapted to engage with a bag, means for actuating and controlling said machine and including an electric motor operatively connected with said source of bags to be filled, and a second electric motor operatively connected with means for moving said trolley, and means for controlling said motors including a plurality of switches electrically connected with said motors.

8. In a bag feeding machine the combination with a machine adapted to fill bags and having a bag filling spout thereon, of a source of bags to be filled, and means for conveying a bag from said source of bags to be filled to said bag filling means and including fixed tracks secured to said bag filling machine and said source of bags to be filled, and a trolley adapted for movement thereon, means secured to said trolley for receiving, holding and releasing a bag and including a plurality of friction jaws secured to a carrier member and adapted to engage with a bag, spring means secured to said jaws and tending to hold said jaws in an open position, and means for maintaining said jaws in a closed position, means for actuating and controlling said machine and including an electric motor operatively connected with said source of bags to be filled, and a second electric motor operatively connected with means for moving said trolley, and means for controlling said motors including a plurality of switches electrically connected with said motors.

9. In a bag feeding machine the combination with a machine adapted to fill bags and having a bag filling spout thereon, of a source of bags to be filled, and means for conveying a bag from said source of bags to be filled to said bag filling means and including fixed tracks secured to said bag filling machine and said source of bags to be filled, and a trolley adapted for movement thereon, means secured to said trolley for receiving, holding and releasing a bag and including a plurality of friction jaws secured to a carrier member and adapted to engage with a bag, spring means secured to said jaws and tending to hold said jaws in an open position, means for closing said jaws including a plurality of fixed roller

members, means to maintain said jaws in a closed position and including a ring slidable on said spring means, means for actuating and controlling said machine and including an electric motor operatively connected with said source of bags to be filled, and a second electric motor operatively connected with means for moving said trolley, and means for controlling said motors including a plurality of switches electrically connected with said motors.

10. In a bag feeding machine the combination with a machine adapted to fill bags and having a bag filling spout thereon, of a source of bags to be filled, and means for conveying a bag from said source of bags to be filled to said bag filling means and including fixed tracks secured to said bag filling machine and said source of bags to be filled, and a trolley adapted for movement thereon, means secured to said trolley for receiving, holding and releasing a bag and including a plurality of friction jaws secured to a carrier member and adapted to engage with a bag, spring means secured to said jaws and tending to hold said jaws in an open position, means for closing said jaws including a plurality of fixed roller members, means to maintain said jaws in closed position and including a ring slidable on said spring means, means for raising said ring and releasing a bag held in said jaws, and including a wedge secured at each end of the travel of said trolley, means for actuating and controlling said machine and including an electric motor operatively connected with said source of bags to be filled, and a second electric motor operatively connected with means for moving said trolley, and means for controlling said motors including a plurality of switches electrically connected with said motors.

11. In a bag feeding machine the combination with a machine adapted to fill bags and having a bag filling spout thereon, of a source of bags to be filled including a hopper for containing said bags, said hopper having an inclined bag supporting partition therein and an endless movable conveyor belt adjacent said inclined bag supporting partition, means for moving a bag along said inclined bag supporting partition and including a plurality of conveyor rolls having soft friction plugs secured therein adapted to extend through openings in said bag supporting partition for contact with the surface of a bag to be moved from said bag supporting partition, a delivery chamber adjacent said bag supporting partition, a plurality of movable rollers separating said bag supporting partition and said delivery chamber, a conveyor duct leading from said delivery chamber, and movable means separating said conveyor duct and said delivery chamber, means for actuating said movable means and including a plurality of electrically actuated solenoids, means for actuating and controlling said solenoids, a bag receptacle adjacent said conveyor duct and having an open side therein, means for conveying a bag from said source of bags to be filled to said bag filling means and including fixed tracks secured to said bag filling machine and said source of bags to be filled, and a trolley adapted for movement thereon, means secured to said trolley for receiving, holding and releasing a bag deposited in said bag receptacle and including a plurality of friction jaws secured to a carrier member, spring means secured to said jaws and tending to hold said jaws in open position, means for closing said jaws and including a plurality of fixed roller members, means to maintain said jaws in closed position and including a ring slidable on said spring means, means for opening said jaws and including a wedge adapted to contact with said ring and to raise said ring, means for actuating and controlling said machine and including an electric motor operatively connected with said source of bags to be filled, and a second electric motor operatively connected with said trolley, and means for controlling said motors and said solenoids and including a plurality of switches electrically connected with said motors and said solenoids.

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