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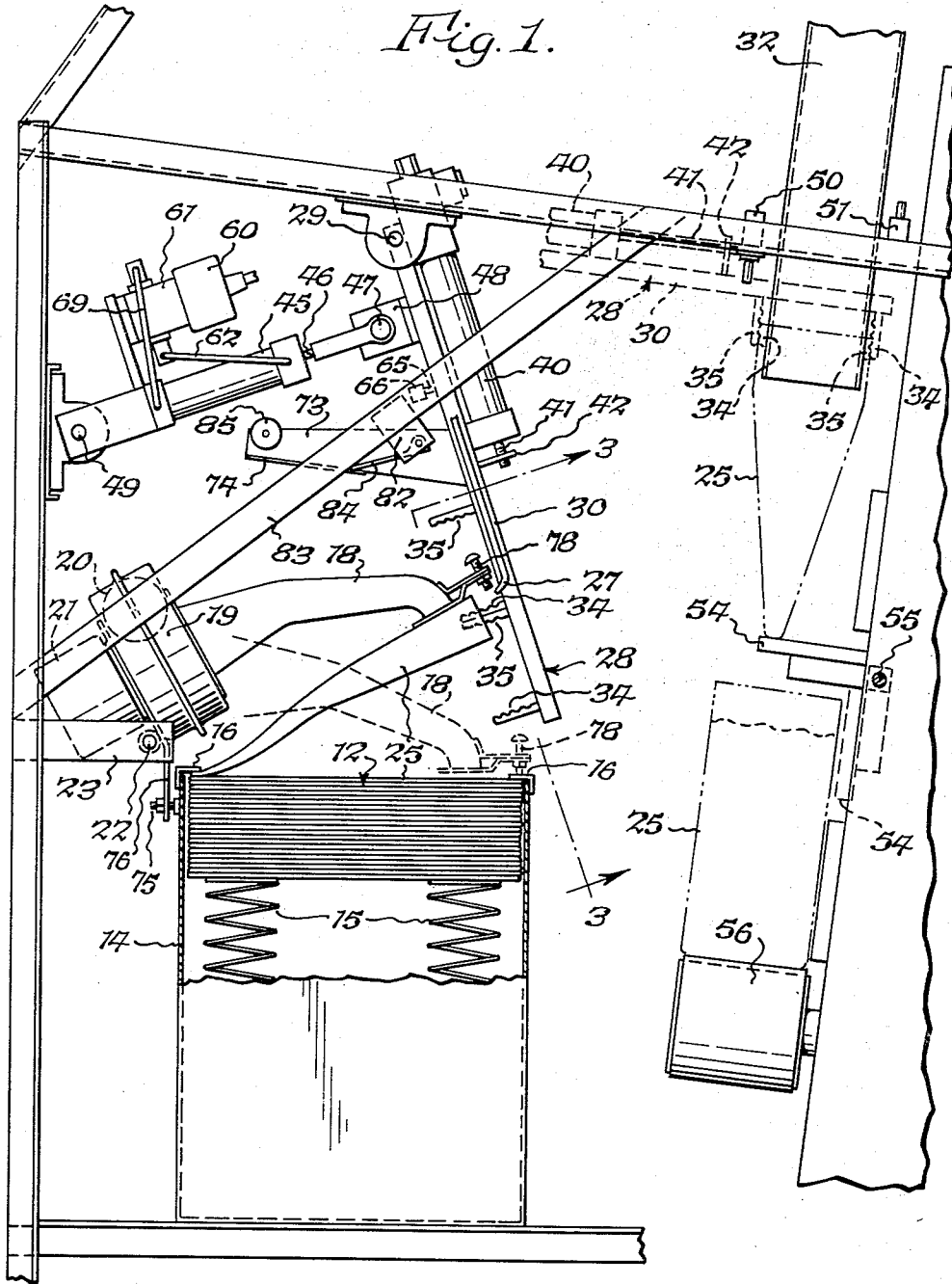
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2,950,589

BAG FEEDING MECHANISM

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3 Sheets-Sheet 1



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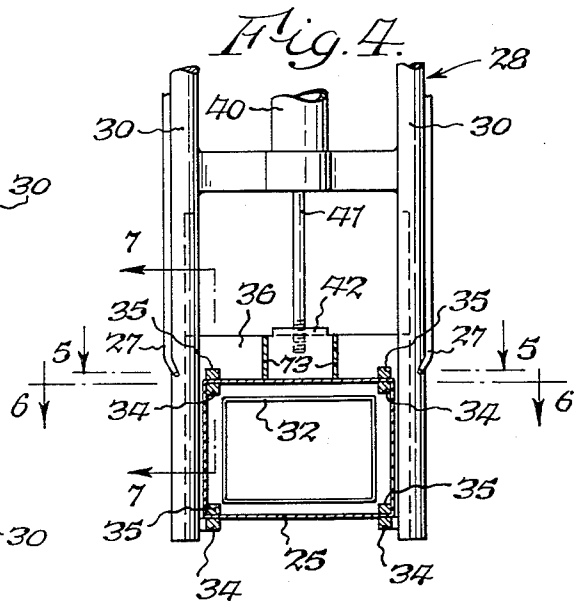
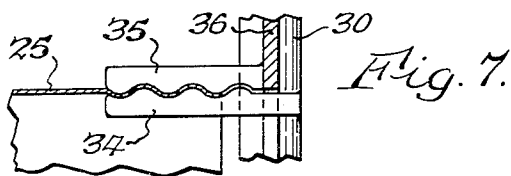
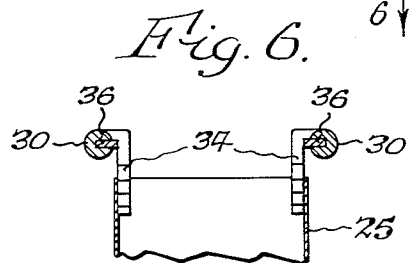
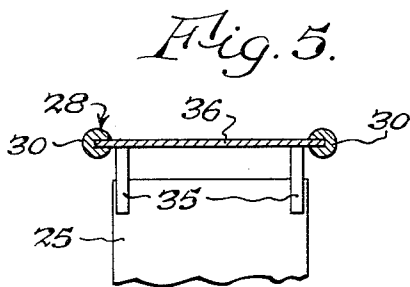
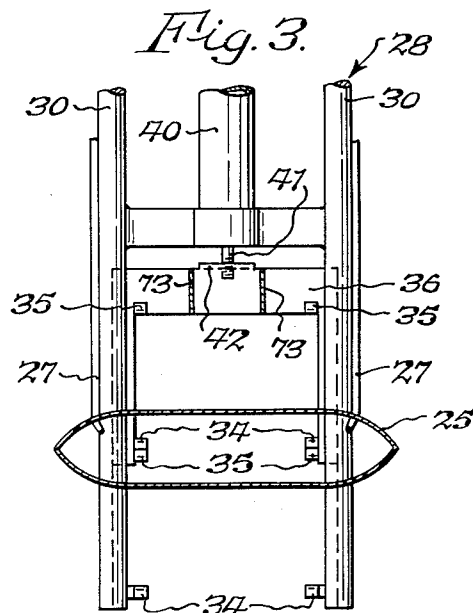
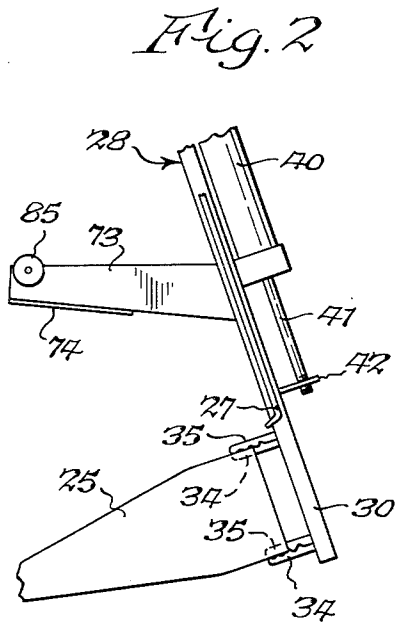
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3 Sheets-Sheet 2



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BAG FEEDING MECHANISM

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11 Claims. (Cl. 53—190)

This invention relates to mechanisms for taking bags, one at a time, from a stack, opening them and placing them in position to receive goods or articles.

This invention relates particularly to mechanisms for handling transparent bags, preferably of a waterproof material, for packaging vegetables, fruits and other perishable materials, but it is not intended to limit this invention for use in connection with bags of this type.

One of the objects of this invention is to provide a bag feeding mechanism which is thoroughly reliable and accurate in the operation of picking up bags from a stack and positioning them about the end of a discharge chute to receive the contents.

Another object is to provide a mechanism of this kind with bag gripping means of improved construction for shaping the mouth of the bag so that it can be readily positioned about the lower end of a discharge chute.

A further object is to provide a bag feeding mechanism including suction means for picking a bag at a time from a stack, moving it into position to be more fully opened by air blasts, clamping the bag in fully opened position, and then inserting it into position to receive its contents. Also to provide a mechanism in which all of these operations are performed automatically in correct sequence.

In the accompanying drawings, which show by way of example one embodiment of my invention:

Fig. 1 is an elevation, partly in section of a bag feeding mechanism embodying this invention.

Fig. 2 is a fragmentary elevation thereof showing parts of the bag engaging jaws in different positions.

Fig. 3 is a fragmentary elevation thereof on line 3—3, Fig. 1.

Fig. 4 is a fragmentary elevation thereof similar to Fig. 3 but showing parts of the mechanism in different positions.

Figs. 5 and 6 are sectional views taken respectively on lines 5—5 and 6—6, Fig. 4.

Fig. 7 is a fragmentary, sectional view on an enlarged scale on line 7—7, Fig. 4.

Fig. 8 is a view showing in elevation the bag carrying jaw arm and showing diagrammatically electrical connections employed in my mechanism.

Fig. 9 is a fragmentary elevation thereof showing a modification of the bag pick-up device of my mechanism.

The bags to be handled by my improved mechanism as received from the bag manufacturer are folded flat and arranged in a stack 12. The stack is arranged in a bag magazine 14 which automatically urges the stack of bags to the open end of the magazine which, in the particular construction shown, is the top of the magazine. The stack of bags may, for example, be urged into an upper position by springs 15 against stops 16 which hold the uppermost bag of the stack always in a position in which it is readily accessible by a suction arm 18 having an open end arranged to engage with the uppermost bag adjacent to its mouth or contents-receiving end.

Air may be withdrawn from the suction arm 18 in any suitable manner, and in the construction illustrated in

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Fig. 1, this arm is connected with the inlet end of a housing 19 of an air pump or blower having discharge opening 20 and driven by an electric motor 21. The entire assembly of suction arm, blower and motor is pivoted at 22 on an arm 23 forming a part of a frame of the mechanism on which the magazine 14 is also supported. This assembly is swingable about the pivot 22 so that the suction arm can swing into the position shown in broken lines, in which it picks up the upper panel of the upper bag of the stack 12 and lifts it to the full line position in which the bag 25 occupies approximately the position shown in full lines in Fig. 1.

The suction arm 18 presents the bag 25 in position to be engaged by gripping jaws. The bag, when raised by the suction arm, becomes partly opened, and preferably the bag is further opened by a blast of air blowing into the same from a pair of air jets 27 mounted on an oscillatory frame member 28 which swings about an axis 29, Fig. 1, and comprising two rods or arms 30. These arms support stationary and movable jaws or bag-clamping members, some of which are arranged to extend into the interior of the bag, and other cooperating jaws or clamping members engage the bag on the exterior thereof to cooperate with the jaws in the interior of the bag to securely grip the bag. In the particular construction shown, the material to be placed in the bags is discharged from a chute or conduit 32, Figs. 1 and 4. In the construction shown, this chute is of rectangular construction and the jaws are consequently so arranged as to extend the mouths of the bags into rectangular shape so as to fit about the lower end of the chute 32 when the oscillatory frame member 28, comprising the two arms 30, swings from the full line position shown in Fig. 1 to the position partly shown in broken lines.

The jaws or clamping members may be of any usual or suitable construction and, as shown in the drawings, there are four jaws 34 rigidly mounted on arms 30, two of these jaws being arranged to engage one panel of a bag and the other two gripping the opposite panel. These jaws are spaced to be at the four corners of the mouth of one opened bag and so that they will clear the exterior of the chute 32 when swung into the broken line position of Fig. 1.

Movable jaws 35 are provided to cooperate with the fixed jaws 34. In the construction shown, these movable jaws are rigidly mounted on a U-shaped member 36 slidably mounted on the arms 30, for example, by providing these arms with slots or guideways in which the sides of the U-shaped slide member 36 are guided. The fixed jaws are rigidly secured to the arms 30 in any desired manner, for example, by providing these jaws with offsets which may be welded to the arms 30, as shown in Fig. 6.

The jaws 34 and 35 are so arranged on the oscillatory arm 28 that when the bag 25 has been moved into its jaw-receiving position, as shown in Fig. 1, and has been opened as shown in Fig. 3 by the air jets, one pair of fixed jaws 34 and one pair of movable jaws will enter the mouth of the bag, as shown in Figs. 1 and 3. The slide member 36 is then moved downwardly with the result that the two upper movable jaws 35 will move down to clamp the upper panel of a bag between themselves and the fixed jaws 34. At the same time the two lower movable jaws will move downwardly within the mouth of the bag to clamp the other panel of the bag between themselves and the lower fixed jaws 34. This movement of the lower jaws 35 also serves to open the mouth of the bag into rectangular shape, as shown in Fig. 4.

The movement of the slide member may be effected in any suitable manner, for example, by means of a piston arranged in a cylinder 40, the piston having a piston rod

41 connected by an arm or bracket 42 with the slide 36.

By means of the jaws, the mouth of the bag has been extended so as to fit about the discharge end of the chute 32 and the swinging member 28 is then swung in an arc of a circle about the pivot 29 to occupy the broken line position shown in Fig. 1, so that the bag and chute 32 will be in positions shown in Fig. 4. This swinging of the arms 30 and frame members 28 may be effected in any desired manner, for example, by means of an air piston arranged in a cylinder 45, the piston having a rod 46 connected by a pivot 47 and a bracket 48 with the oscillatory frame member 28. The cylinder 45 is pivoted at 49 on a frame member of the machine. The grip of the jaws on the bag is much firmer than that of the suction nozzle, so that it is not necessary to interrupt the suction when the bag is being moved by the jaws.

When the swinging jaw carrying member 28 moves into its upper position, it actuates a switch 50 which causes a plunger (not shown) to descend in the chute 32 to fill the bag, and when the plunger has descended, a part connected therewith actuates another switch 51 which closes two circuits, one of these circuits including a conductor 52 which is part of an electrical circuit supplied with the proper current through the lines 100 and 101 and which actuates suitable mechanism not shown, for electrically actuating a pneumatic valve 57. This valve is not herein shown since these valves are well known and readily purchased on the open market. The valve when actuated by current supplied through the conductor 52 releases or reverses the air pressure on the cylinder 40, this permitting the jaws 35 to release the bag, which is resting on a movable supporting platform 54. When the bag is completely filled, the platform 54 swings downwardly about its pivot 55 into the broken line position shown in Fig. 1, thus letting the bag drop on a conveyor belt 56 by which it is removed from the machine. The plunger in the chute 32 and the actuating mechanism for the platform 54 are not herein described or shown since they form parts of another application for patent for the bag filling mechanism.

The switch also closes another circuit including a conductor 58 leading to another electrically actuated pneumatic valve which is shown somewhat more completely in Fig. 1, and includes an electrically operated part 60 which controls a pneumatic valve 61 connected by a tube 62 to the outer end of the cylinder 45, thus moving the jaw-carrying member 28 to return to the full line or bag-receiving position shown in Fig. 1. Upon returning to this position, the jaw-carrying member 28 through a projecting part 65, Fig. 8, actuates another switch 66 which completes a circuit including a conductor 67 leading to the electrically operated valve member 57 which reverses the air pressure in the cylinder 40, thus closing the jaws 35 on another bag. The switch 66 also completes another circuit including a conductor 68 leading to the valve member 60, 61 to admit air to the tube 69, Fig. 1, leading to cylinder 45 which again causes the jaw-carrying member to move a bag to the chute 32.

The movement of the suction arm downwardly is preferably effected as follows: An arm 73 is mounted on the U-shaped slide member 36 which carries the movable jaws 35 so that when the jaws are closed on the bag, the arm 73 is in a lowered position. Consequently, when the jaw-carrying member 28 starts its movement from the full line position shown in Fig. 1 toward its upper position about the pivot 29, a plate 74 secured on this arm 73 strikes the head of an adjustable pin or bolt 78 secured on the suction arm 18, causing this arm to swing about its pivot 22 into the position shown in broken lines in Fig. 1, in which the suction picks up the upper panel of the uppermost bag of the stack 12. As soon as this is accomplished, the suction arm 18 again swings into its upper position to present the bag to the jaws 34 and 35, this being accomplished because of the fact that the motor 21 is heavier than the suction tube 18. When the

suction tube is in its upper position to present a bag to the jaws, the arm 73 will be in its upper position and will thus clear the pin or bolt 78 of the suction arm 18, when the jaw-carrying member returns to its bag-receiving position.

The movement of the suction arm 18 may be limited in any desired manner. For example, a set screw 75 secured on an arm 76 mounted on the housing 19 of the suction fan engages the side of the bag magazine 14 to limit movement of the suction arm into its upper position. The downward movement of the suction arm 18 may be limited by contact of the arm with the uppermost bag.

The passage of air to the air jets 27 which opens the bags for entry of the jaws is controlled by an air valve 82 mounted on a diagonally extending stationary frame member 83. This valve is connected with a suitable supply of air under pressure (not shown) and the valve is also connected with the two air jet tubes 27 in any suitable manner, for example, by flexible tubes or the like, also not shown. This air valve has a handle 84 which extends into the path of movement of a bearing or contact member 85 mounted on the arm 73, when this arm returns to its full line position shown in Fig. 1. Since the bearing member is near the outer end of the arm 73, it will of course open the valve 82 before the jaws arrive in positions to enter the bag so that the air jets will have opened the mouth of the bag to receive those jaws which enter the bag.

In Fig. 9 I have shown a modified form of the means for withdrawing air from the suction arm for picking up bags from the stack. In this construction 90 represents the suction arm pivoted at 89 on a stationary frame member and the motor 91 and suction fan 92 are stationarily mounted, for example, on the bag magazine 14 by means of a bracket 93. The inlet of the suction fan is connected by means of a contractable tubular member 94, such as a bellows or diaphragm, to the end of the suction arm 90 opposite to the end thereof which lifts the bags. In this construction the outer end of the suction tube is moved downwardly by its own weight into the full line position shown in Fig. 9 and the suction tube is again moved upwardly into the broken line position shown in Fig. 9 by the suction in the tube 94 which collapses this tube as shown in broken lines because of the fact that the outer end of the suction tube is closed by the bag. When the bag is removed from the outer end of the tube by the bag-clamping jaws 34 and 35, the suction within the tube is broken so that the bellows 94 are filled with air and permit the tube 90 to move by gravity into the full line position shown in Fig. 9.

Adjustable limiting means similar to the stop 75 is indicated by the numeral 75'.

It will be understood that various changes in the details, materials and arrangements of parts which have been herein described and illustrated in order to explain the nature of the invention may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

I claim:

1. A bag feeding mechanism including a magazine for a stack of bags, means for taking one bag at a time from said stack and moving it into another position with the mouth of the bag foremost, bag clamping means including jaws which enter said bag, and jaws on the exterior of said bag positioned to cooperate with the jaws inside the bag, means for moving the interior and exterior jaws into positions to clamp the edge portions of said bag, a chute for discharging material into a bag, and means for moving said jaws in a generally upward direction into position at the sides of said chute to place the bag into position in which said chute extends into said bag to receive material to be contained therein, and back to a position to receive another bag.

2. A bag feeding mechanism according to claim 1 in which said jaws are positioned to shape the mouth of

the bag to receive the contents and extends about the discharge end of said chute.

3. A bag feeding mechanism according to claim 1, in which said jaws when closed being positioned to shape the mouth of the bag to fit over the discharge end of said chute, said jaw moving means also moving said jaws along the sides of the chute.

4. A bag feeding mechanism according to claim 1, in which said means for taking a bag from the stack are in the form of a pivoted suction tube urged to swing from bag receiving position to said other position, and means actuated by said second jaw moving means to engage said pivoted suction tube to swing it to said stack of bags.

5. A bag feeding mechanism for feeding a bag from a stack of bags into position to be filled, including a pivoted suction arm movable to said stack to take a bag and into another position to present the mouth of the bag to a series of jaws, a jaw-carrying member which receives the bag and carries it to a filling position and then moves back to its bag-receiving position, and a part on said jaw-carrying member which impinges on said suction arm when said jaw-carrying member moves to said filling position and imparts motion to said suction arm to return it to said stack.

6. A bag feeding mechanism according to claim 5 and including an air jet positioned to direct a blast of air into the mouth of the bag when in said other position, and valve means opened by said jaw-carrying member when moving back to its bag-receiving position to admit air to said jet.

7. A bag feeding mechanism including means for presenting a bag into position for a further operation and with its mouth opened, a plurality of jaws movable into position for operating on the bag, some of said jaws being movable into said bag, a jaw carrier on which said jaws are mounted and which is movable back and forth from a bag-receiving position to a bag-discharge position, means for securing some of said jaws rigidly on said carrier, a member movably mounted on said jaw carrier and on which said movable jaws are secured, a fluid pressure actuated unit mounted on said carrier and connected with said movable member, means for admitting actuating fluid to said unit when said carrier has moved to its bag-receiving position, and means for discharging actuating fluid from said unit when the bag is filled.

8. A bag feeding mechanism including a magazine for a stack of bags, a suction tube pivotally mounted to swing downwardly into position to take a bag from the stack, means for impacting against said tube to swing the same

downwardly into said bag-taking position, and counterbalancing means acting on said tube to move the same about its pivot after it has become attached by suction to a bag and into position to remove a bag from said stack.

9. A bag feeding mechanism according to claim 8 in which said counterbalancing means is a power driven device for removing air from said tube and located at the end of said tube opposite to that which engages the bags, the pivot about which said tube swings being located so that said power driven device more than counterbalances the weight of said tube and normally urges said tube into position in which said tube removes a bag from said stack.

10. A bag feeding mechanism including a magazine for a stack of bags, a suction tube pivoted intermediate of its ends to swing into position in which one end thereof can take a bag from said stack, means for moving said suction tube about its pivot to place said end thereof in position to seize a bag from said stack, suction producing means mounted in fixed relation to said magazine, and a contractable tubular member connecting said suction-producing means with the other end of said suction tube, whereby suction contracts said tubular member to urge said tube to swing into position to remove a bag from said stack.

11. A bag feeding mechanism including means for presenting a bag into position for a further operation and with its mouth opened, a plurality of jaws movable into position for operating on the bag, some of said jaws being movable into said bag, a jaw carrier on which said jaws are mounted and which is movable about an axis back and forth from a bag-receiving position in which the bag is at a slight inclination to the horizontal, to a bag-discharge position in which the bag is in substantially upright position, means for securing some of said jaws rigidly on said carrier, a member slidably mounted on said jaw carrier and on which said movable jaws are secured, means for moving said slidable member into jaw-closing position when said carrier is in said bag-receiving position, said means for moving said slidable member including a fluid pressure actuated unit mounted on said carrier.

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