June 6, 1944. H. G. ALLEN 2,350,666

BAG FEEDING MACHINE

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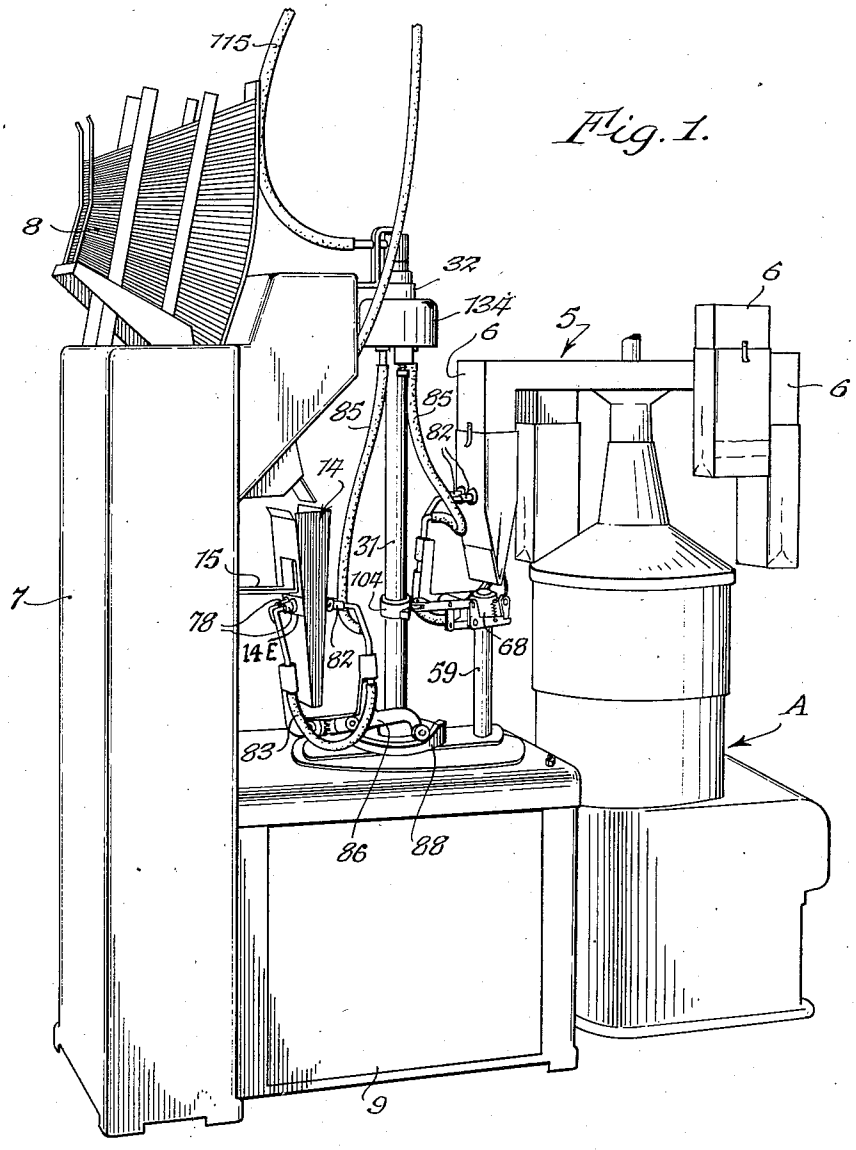

Fig. 1.

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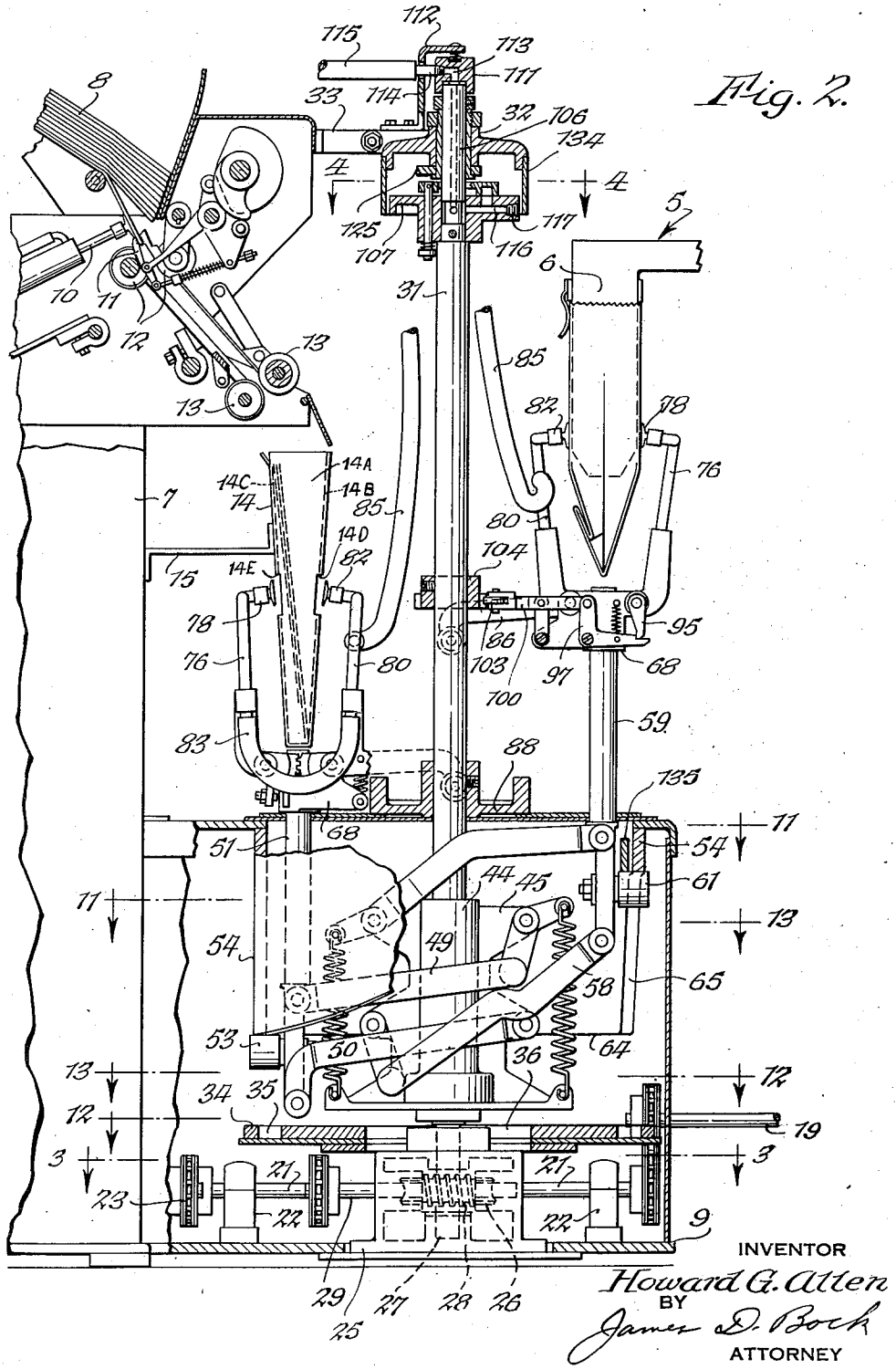
Fig. 2.



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BAG FEEDING MACHINE

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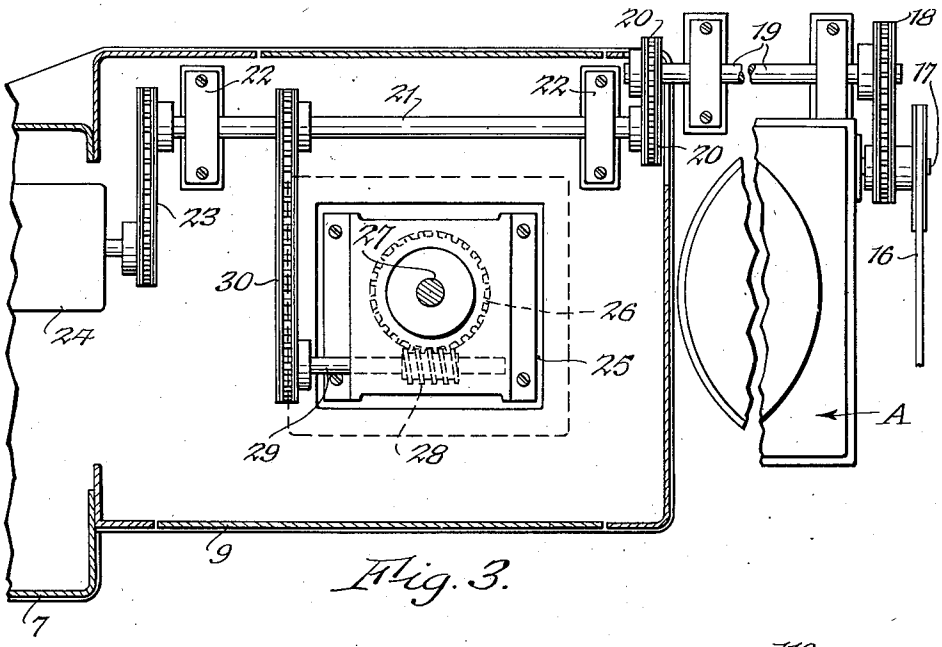

Fig. 3.

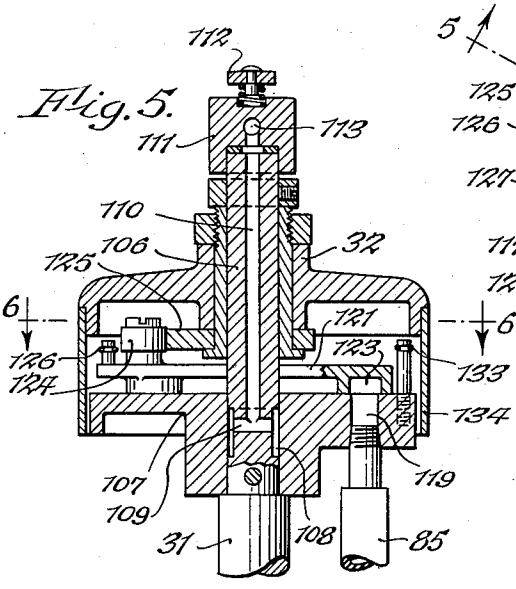

Fig. 5.

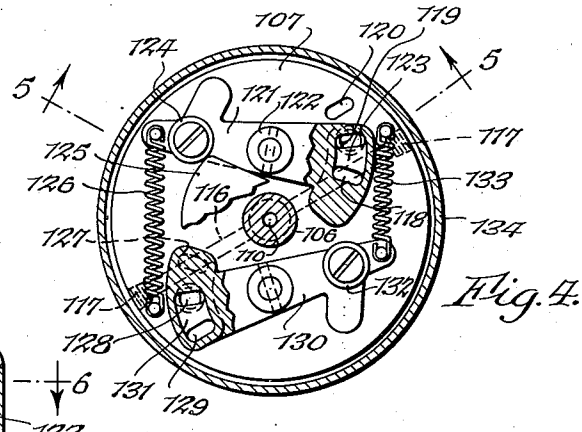

Fig. 4.

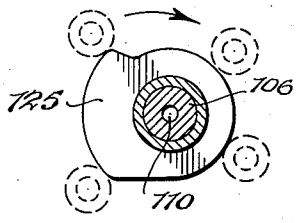

Fig. 6.

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BAG FEEDING MACHINE

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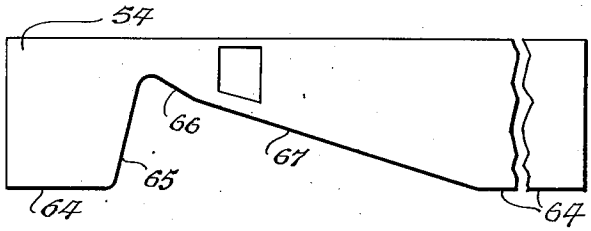

Fig. 7b.

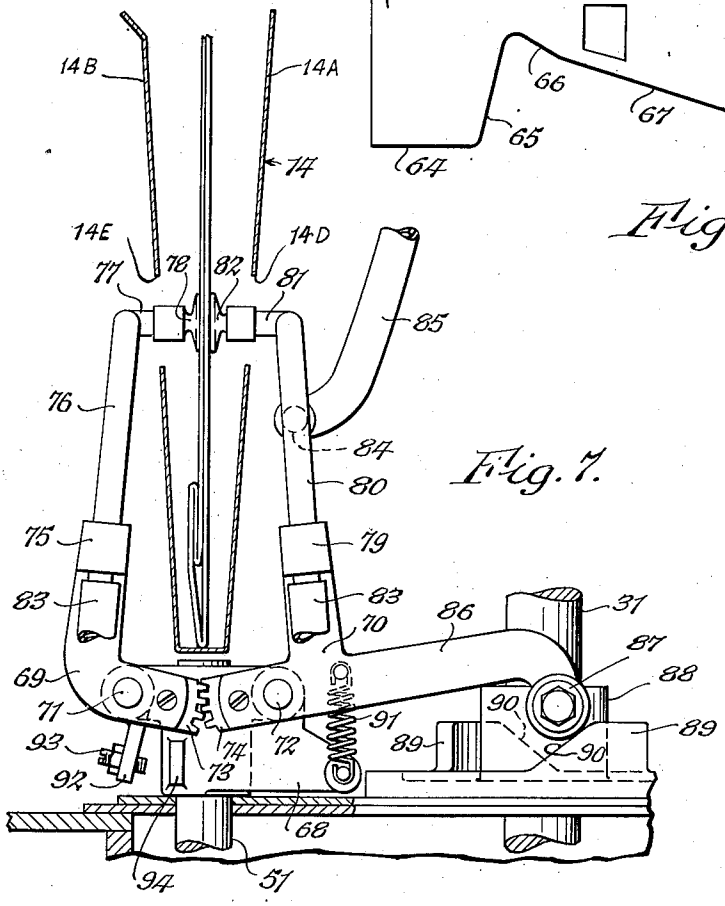

Fig. 7.

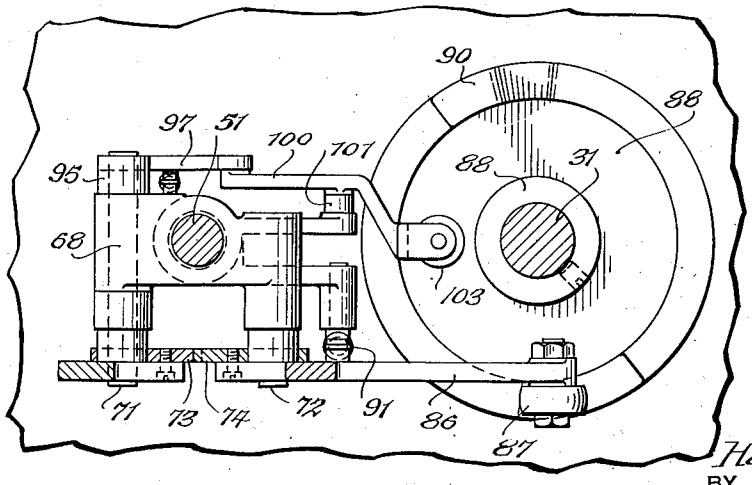

Fig. 8.

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Fig. 9.

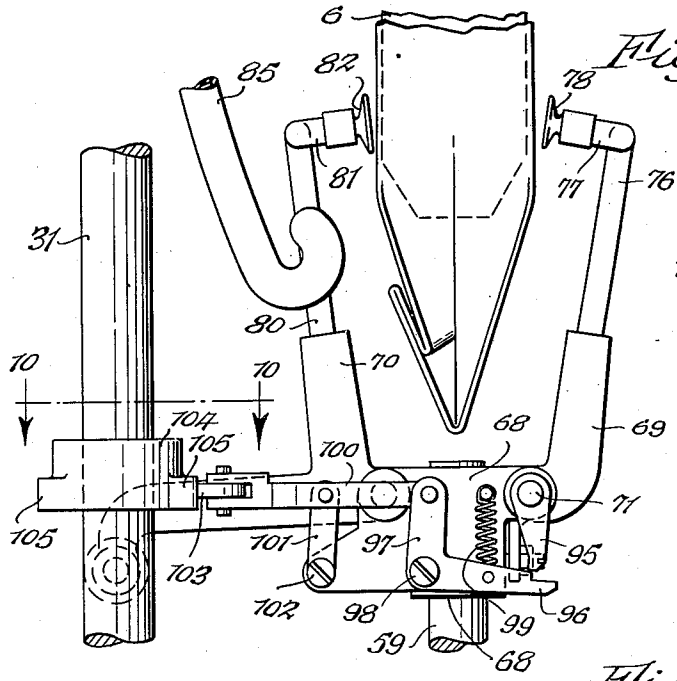


Fig. 10.

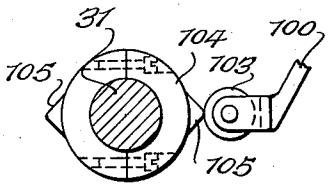
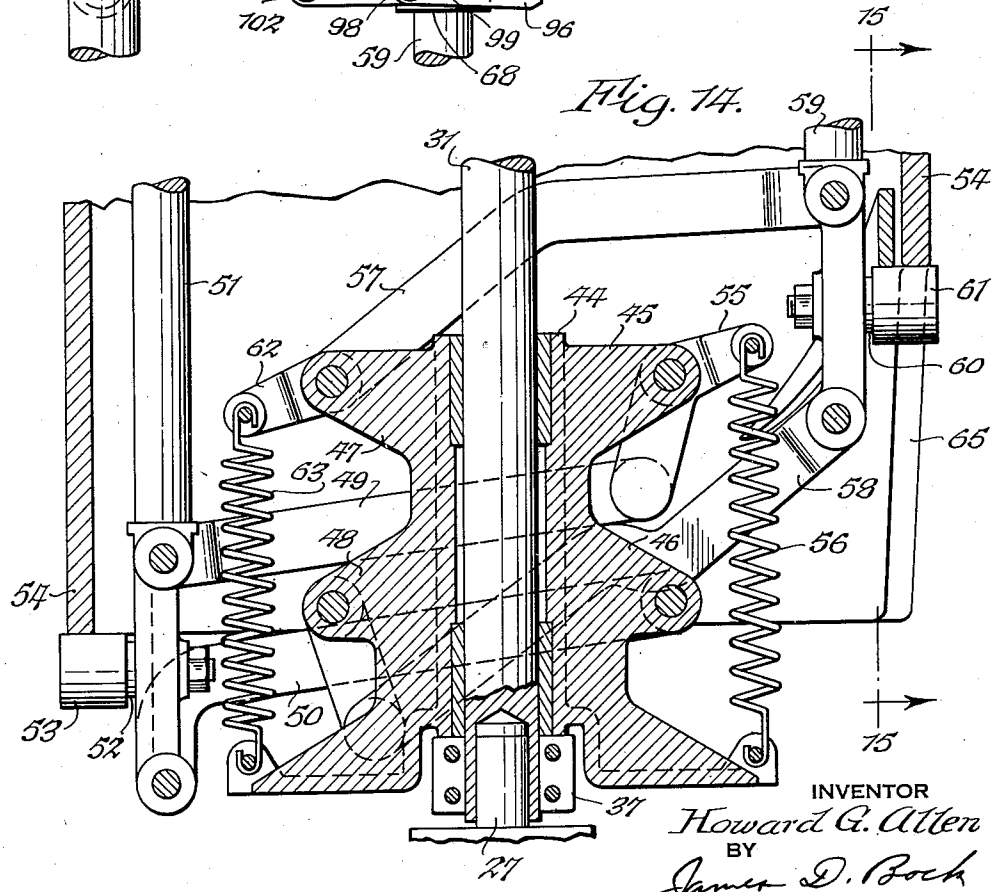


Fig. 14.



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BAG FEEDING MACHINE

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Fig. 11.

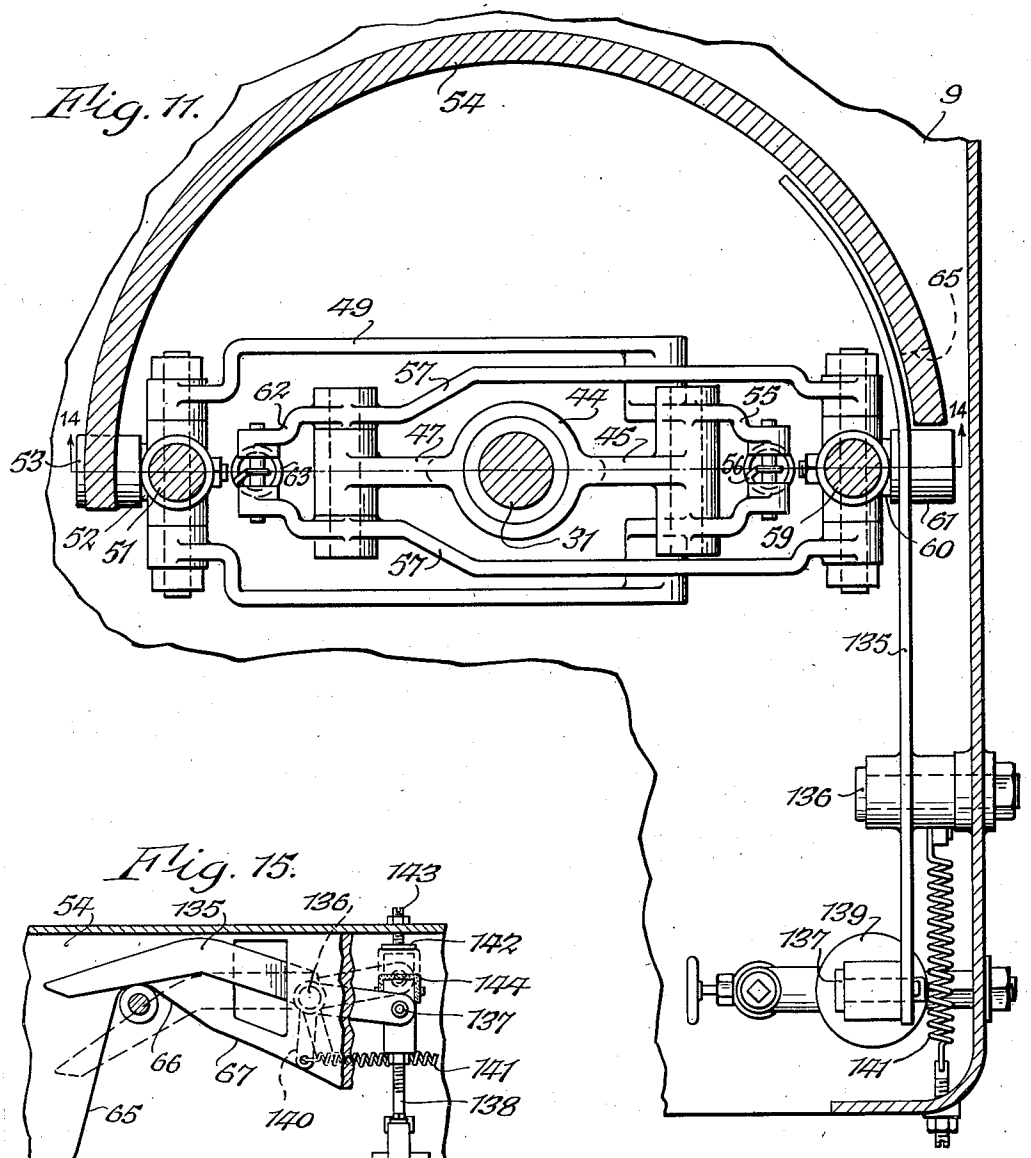

Fig. 15.

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BAG FEEDING MACHINE

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Fig. 13.

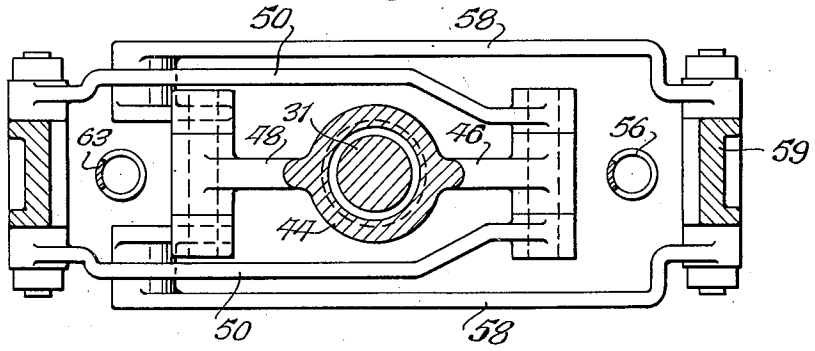
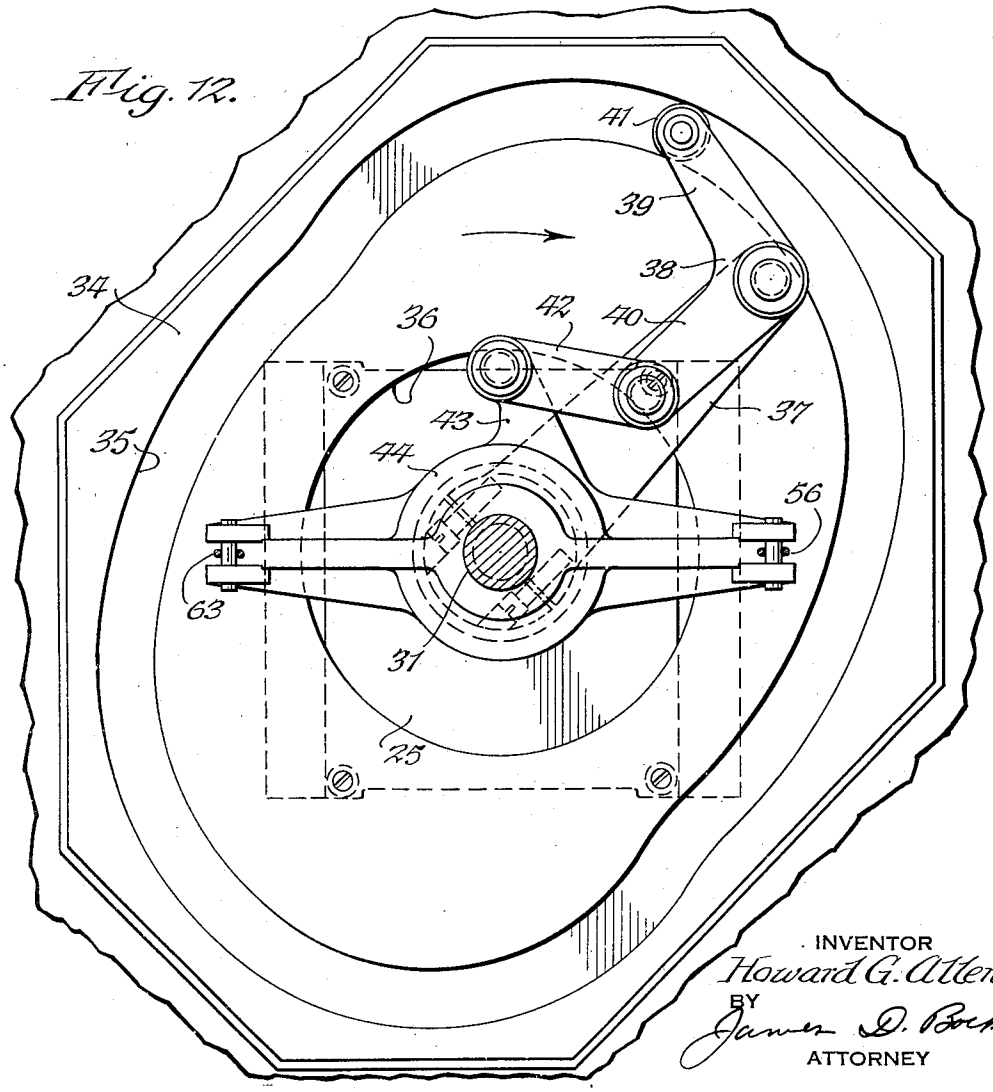


Fig. 12.



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Patented June 6, 1944 2,350,666

UNITED STATES PATENT OFFICE

2,350,666

BAG FEEDING MACHINE

Howard G. Allen, Niagara Falls, N. Y., assignor to Consolidated Packaging Machinery Corporation, Buffalo, N. Y., a corporation of New York

Application December 30, 1941, Serial No. 424,879

6 Claims. (Cl. 226—49)

This invention relates to new and useful improvements in article handling devices and particularly seeks to provide a novel machine for automatically feeding paper bags from a supply stack to an opening and filling machine.

Heretofore various forms of bag handling devices have been developed which were so designed and constructed as to be an integral part of a bag filling machine or the like. Naturally, the bag handling devices of this nature are limited in the uses to which they can be put by the limits of the machine with which they are combined. Thus, a bag filling machine designed for use in conjunction with a particular type of bag includes bag feeding and handling means adapted for use with that type of bag only and cannot therefore be used in handling other types of bags.

This invention provides novel bag feeding and handling means which forms a complete and unitary structure capable of being used in conjunction with a number of bag opening and/or filling machines and which is readily adaptable for use with bags of various sizes and types but which is particularly adaptable for use in conjunction with bag opening and filling machines of the type employing a filling turret having a plurality of radially disposed filling and/or bag opening elements and which is adapted to be rotatably advanced at a uniform speed to present successive filling nozzles to the position at which the bags are adapted to be applied thereto.

Therefore, an object of this invention is to provide a fully automatic bag feeding machine which may be employed to feed bags from a supply stack to the bag receiving station of an opening and filling machine with which it is associated.

Another object of this invention is to provide a machine of the character stated that is capable of uniformly feeding and applying bags at a relatively high rate of speed.

Another object of this invention is to provide a machine of the character stated that will withdraw a single bag from a supply stack, partially open the mouth thereof, transfer the partially opened bag from the station adjacent the supply stack to the bag applying station of the associated opening and filling machine, and raise the partially opened bag into engaging relation with the bag opening devices and/or filling nozzle of said opening machine.

Another object of this invention is to provide a machine of the character stated which employs novel bag transfer means including a rotary table having sets of bodily movable bag holding elements mounted thereon and which is adapted to be driven from a constantly rotating shaft through the medium of lost motion cam and linkage connections so that the table will be brought to a complete stop twice during each revolution thereof in order that the bag holding elements may first properly receive a bag from the supply stack and subsequently apply the bag held thereby to the opening devices of the associated machine.

Another object of this invention is to provide a machine of the character stated in which a cylindrical cam is associated with the rotary transfer table and is effective to permit and control bodily vertical movement of the bag holding elements as an incident to the application of a bag held thereby to the opening devices of the associated machine.

Another object of this invention is to provide a machine of the character stated in which a movement of separation is imparted to the bag holding elements of the rotary transfer table subsequent to the time at which a bag is initially engaged thereby and prior to the time at which the bag is applied to the associated machine in order that the mouth portion of the bag may be at least partially opened preparatory to actual application thereof to the opening devices of the associated machine.

With these and other objects in view, the nature of which will become more apparent, the invention will be more fully understood by reference to the drawings, the accompanying detailed description, and the appended claims.

In the drawings:

Fig. 1 is a perspective view of a bag feeding machine constructed in accordance with this invention together with a somewhat diagrammatic representation of a bag filling machine with which it is adapted to be associated;

Fig. 2 is a somewhat fragmentary front elevation partly in section of the machine;

Fig. 3 is a horizontal section taken along line 3—3 of Fig. 2;

Fig. 4 is a horizontal section taken along line 4—4 of Fig. 2;

Fig. 5 is a sectional view taken along line 5—5 of Fig. 4;

Fig. 6 is a detailed horizontal section taken along line 6—6 of Fig. 5;

Fig. 7 is an enlarged elevational view partly in section of the bag holding elements;

Fig. 8 is a top plan view partly in section of the mechanism shown in Fig. 7;

Fig. 9 is an elevational view somewhat similar

to Fig. 7 but taken from the opposite side of the bag holding elements and showing the same in their positions just after a bag has been applied to the opening elements of the associated machine;

Fig. 10 is a detailed horizontal section taken along line 10—10 of Fig. 9;

Fig. 11 is a horizontal section taken along line 11—11 of Fig. 2;

Fig. 12 is a horizontal section taken along line 12—12 of Fig. 2;

Fig. 13 is a horizontal section taken along line 13—13 of Fig. 2, portions of the mechanisms not being shown;

Fig. 14 is a detailed vertical section taken along line 14—14 of Fig. 11;

Fig. 15 is a detailed vertical section on a reduced scale taken along line 15—15 of Fig. 14; and

Fig. 16 is a development view of the bag holder elevating cam.

Referring to the drawings in detail, the invention, as illustrated in Fig. 1 of the drawings, is associated with a bag filling machine generally indicated A and which includes a constantly rotating turret 5 having a plurality of filling spouts 6 (herein somewhat diagrammatically illustrated). It will be understood that the spouts 6 function in the normal manner in that each is successively presented to a filling station at which predetermined charges of material to be packaged are introduced into bags applied to the spouts by the bag feeding machine constructed in accordance with this invention and that, as an incident to such filling operations, vertical movement may be imparted to the spouts subsequent to the time at which unfilled bags have been presented thereto.

The bag handling machine in which this invention is embodied includes a main frame having an upstanding portion 7 which carries devices for individually extracting bags from a supply stack 8 and a laterally extending portion 9 which carries devices effective to transfer the individual bags to the spouts 6 of the associated filling machine.

The devices which effect the extraction of individual bags from the supply stack 8 are disclosed in detail in my copending application serial No. 347,378 filed July 25, 1940, and it is believed unnecessary to describe the same in detail herein. However, these devices include vacuum sucker mechanisms 10 adapted to displace the lower end of the bottom bag in the stack 8 for engagement by gripper jaws 11. The jaws 11 are bodily movable to bring the bag end held thereby into engagement with upper feed rolls 12, 12 which are thereafter effective in cooperation with lower feed rolls 13, 13 to inject the bag into a vertically disposed receiver 14 rigidly secured to the frame portion 7 as by a bracket 15.

The receiver 14 is closed on three sides by the walls 14A, 14B and 14C. The walls 14B and 14C have respectively formed therein openings 14D and 14E which extend to the open side of the receiver which is opposite the wall 14A. The bag transfer mechanism to be hereinafter described includes sucker elements which are brought into a position opposite the openings 14D and 14E and are then projected through these openings into contact with a bag positioned within the receiver. The sucker elements are then moved in the direction of the open side of the receiver 14 whereby to remove the bag from the receiver.

The above described devices as well as the bag transfer devices and the mechanisms of the filling machine with which they are associated are driven from a single source of power in order that they may be continuously operated in proper synchronization. To this end, power may be supplied from an electric motor or other driving means (not shown) through belt and pulley connections 16 to the main shaft 17 of the associated filling machine. Power is taken from the shaft 17 for operation of the bag feeding and transfer mechanisms through sprocket chain and gear connections 18 and a horizontal shaft 19 connecting the filling and feeding machines. The shaft 19 is in turn operatively connected through sprocket chain and gear connections 20 to horizontal shaft 21 journalled in spaced pillow bearings 22, 22. The sprocket gear connections 23 operatively connect the shaft 21 with a gear box 24 to drive and control operations of the bag feeding mechanisms which are contained within the upstanding portion 7 of the main frame.

The mechanisms which are adapted to transfer individual bags from the receiver 14 to the filling spouts of the associated filling machine include a speed reducer 25 having a worm wheel 26 carried by a vertical shaft 27 and a worm 28 carried by a horizontal shaft 29. The shaft 29 is continuously driven from the shaft 21 through sprocket chain and gear connections 30. A vertical shaft 31 has its lower end coupled to the upper end of the shaft 27 of the speed reducer and its upper end journalled in a bearing 32 carried by a bracket 33 rigidly affixed to the upright portion 7 of the main frame as shown in Fig. 2 of the drawings.

A plate cam 34 is rigidly affixed within the laterally extending portion 9 of the main frame and is provided on its upper face with a symmetrically formed irregular cam groove 35, the exact purpose of which will be hereinafter described. The central portion of the cam plate 34 is provided with an aperture 36 through which the shaft 31 extends. A radially extending arm 37 is rigidly secured to the shaft 31 adjacent the upper face of the cam plate 34. A bell crank lever 38 having arms 39 and 40 respectively is pivotally connected at its angle to the free end of the arm 37.

The arm 39 of the bell crank is provided with roller cam follower 41 engageable in the groove 35 of the cam plate 34. The free end of the arm 40 of the bell crank lever is pivotally connected to one end of a link 42, the other end of which is pivotally connected to the projecting end of a lug 43 formed integrally with a sleeve 44 freely journalled on the shaft 31. The sleeve 44 is provided on one side with upper and lower lugs 45 and 46 respectively and on its other side with a similar pair of lugs 47 and 48 respectively. A pair of parallel links 49 and 50 are pivotally connected at one end to the respective lugs 45 and 46 and have their other ends disposed in spaced relation and pivotally connected to the lower end of a vertically disposed rod 51 upon which bag holding elements are supported as will be hereinafter described. It will be noted that the lower end of the rod 51 is provided with a boss 52 which rotatably supports a laterally extending roller cam follower 53 engageable with the cam face of a cylinder cam 54 rigidly secured within the laterally extending portion 9 of the main frame. The link 49 is provided with a short arm 55 which is biased by a tension spring 56 extending from the arm to the base of the sleeve 44 to constantly urge the links and the rod 51 upwardly and keep

the cam follower 53 in constant engagement with the cylinder cam 54.

A similar pair of parallel links 57 and 58 are pivotally connected at one end to the respective lugs 47 and 48 and have their other ends disposed in spaced relation and pivotally connected to the lower end of a vertically disposed rod 59 which is similar to the rod 51 and which is adapted to support a second set of bag holding elements. The lower end of the rod 59 is similarly provided with a boss 60 which rotatably supports a laterally extending roller cam follower 61 also engageable with the cylinder cam 54. The link 57 is provided with a short arm 62 which is biased by a tension spring 63 extending between the end of the arm and the base of the sleeve 44 to thereby similarly urge the links 57 and 58 and the rod 59 upwardly and keep the cam follower 61 in constant engagement with the cylinder cam 54.

It will be observed by reference to Fig. 16 of the drawings that the lower edge of the cylinder cam 54 is provided with a horizontal cam portion 64 terminating in an upwardly extending sharply inclined portion 65 effective to permit abrupt rise of the rods 51 and 59 in order to apply bags to the filling spouts as will be hereinafter described in detail. Following the sharply inclined portion 65, the lower edge of the cam slopes downwardly a short distance as at 66 and then continues at a lesser slope as at 67 until the level of the horizontal portion is again reached. It will be noted that the cylinder cam 54 is so oriented within the frame portion 9 that the beginning of the horizontal portion 64 of the cam face is disposed in registry with the bag receiver 14 and the top of the sharply inclined portion is disposed diametrically opposite thereto and in alignment with the position at which the bags are applied to the spouts of the associated filling machine.

A mounting block 68 for supporting the bag holding elements is rigidly affixed to the upper end of each of the vertical rods 51 and 59. A pair of generally right angle arms 69 and 70 are secured to shafts 71 and 72 journalled in the mounting block and are respectively provided with gear sectors 73 and 74 which are disposed in constantly meshing relationship. The upper end of the arm 69 is provided with an offset portion 75 which supports an upwardly extending tube 76 having a laterally extending bifurcated portion generally indicated 77 and the ends of which carry rubber sucker elements 78. The arm 70 is similarly provided with an offset portion 79 which carries a corresponding upwardly extending tube 80 having a laterally bifurcated portion 81 which extends in opposition to the bifurcated portion 77 of the tube 76 and the ends of which are similarly provided with rubber sucker elements 82. The lower ends of the tubes 76 and 80 are connected by a flexible hose 83 by which air is permitted to pass from one tube to the other. The tube 80 is provided with a connection 84 upon which a flexible hose 85 is secured. The other end of the hose 85 is connected through valve mechanisms to be hereinafter described to a source of vacuum (not shown) in order to enable the rubber sucker elements 78 and 82 to operatively engage a bag.

The arm 70 is provided with an extension 86 terminating in a hooked end having a roller cam follower 87. The cam follower 87 is engaged with a cam 88 rigidly affixed to the vertical shaft 31 and is provided with a pair of opposed lugs 89 having inclined faces 90. The arm 70 is biased downwardly by a spring 91 extending from the arm to the adjacent portion of the mounting block 68 and, consequently, the spring tends to constantly urge rotation of the arm in a clockwise direction about its pivot. Since the gear sectors 73 and 74 are constantly enmeshed, any rotation of the arm 70 will impart corresponding but opposite rotation of the arm 69 and movement of the sucker elements 78 and 82 toward and from each other will be effected. The movement of separation of the suckers 78 and 82 is limited through the medium of a downward extension 92 of the arm 69 which is provided with an adjusting screw 93 engageable with a stop lug 94 carried by the mounting block 68.

The other end of the pivot shaft 71 is provided with a downwardly extending arm 95 rigidly affixed thereto and having its free end engageable with the notched end 96 of a bell crank lever 97 pivotally connected to the mounting block 68 as at 98. (See Figs. 2, 8 and 9.) The end 96 of the bell crank lever is constantly urged upwardly through the medium of a biasing spring 99 extending therefrom to the mounting block 68. The other arm of the bell crank lever extends upwardly and is pivotally connected at its free end to one end of a generally horizontal link 100. The midportion of the link 100 is supported by and pivotally connected to the upper end of a link 101, the lower end of which is pivotally connected to the mounting block 68 at 102. The other end of the link 100 is provided with a roller cam follower 103 rotatable about a vertical axis and engageable with a cam 104 rigidly affixed to the shaft 31 and provided with a pair of diametrically opposed cam lugs 105. The linkage above described effects an additional movement of separation between suckers 78 and 82 after a bag has been applied to the spout of the associated filling machine as will be hereinafter described in detail.

The upper end of the vertical shaft 31 is provided with a portion 106 of reduced diameter which is rotatably engaged with the supporting bearing 32. A valve mechanism supporting disk 107 is rigidly affixed to the reduced diameter portion 106 adjacent the lower end thereof. An annular groove is formed in the reduced diameter portion 106 and is located within the area embraced by the disk 107 to define an annular chamber 108. The chamber 108 is disposed in open communication with a transversely extending duct 109 which in turn is disposed in open communication with an axially disposed duct 110 extending upwardly therefrom to the upper end of the reduced portion 106 of the shaft 31. The extreme upper end of the reduced portion 106 is rotatably engaged within a cap block or bearing 111 affixed to an auxiliary bracket 112 carried by the bearing supporting bracket 33 (see Figs. 2 and 3). The block 111 is provided with a right angled duct 113, one portion of which is disposed in communication with the axial duct 110 of the shaft 31 and the other portion of which extends laterally into communication with a connecting nipple 114 upon which a flexible hose 115 is mounted for communication with a suitable source of vacuum (not shown). The annular chamber 108 which is defined by the groove of the reduced portion 106 of the shaft 31 and the valve mechanism supporting disk 107 communicates with a duct 116 extending diametrically through the disk 107 and has its outer ends closed through the medium of screw plugs 117 or other suitable devices. The upper face of the valve mechanism supporting disk 107 is ground to a

smooth finish and is provided with a port 118 connecting with the duct 116. The disk 107 is also provided with a vertically disposed passage 119 extending completely therethrough (see Figs. 4–6). The passage 119 is connected to one hose 85 for operation of the vacuum suckers with the bag engaging mechanisms. Another passage 120 extends vertically through the disk 107 and forms an exhaust port. It will be noted that the port 118, the passage 119 and the passage 120 are respectively spaced apart along an arcuate path. A valve gate 121 is disposed to one side of the shaft portion 106 and is pivotally connected intermediate its ends as at 122 to the upper face of the supporting disk 107. One end of the valve gate is provided with an elongated chamber 123 of sufficient length to span the distance between the port 118 and the passage 119 or the distance between the passages 119 and 120. It will be apparent that oscillation of the valve gate will bring either the port 118 and the passage 119 into open communication through the chamber 123 or will bring the passages 119 and 120 into open communication. In this manner, vacuum will be applied through the hose 85 to the associated suckers of the bag handling elements. When communication between the passages 119 and 120 is established through the chamber 123, the hose 85 will be open to the atmosphere through the passage 120. The other end of the valve gate 121 is provided with a roller cam follower 124 which is maintained in operative engagement with a cam 125 rigidly affixed to the bearing 32. A tension spring 126 extends from the end of the valve gate 121 to an adjacent portion of the supporting disk 107 to constantly bias the cam follower 124 against the cam 125.

A cimilar port 127 is provided in the duct 116 on the opposite side of the shaft portion 106 and is spaced the same distance therefrom that the port 118 is spaced. Similarly, the disk is provided with a vertically disposed passage 128 which connects with the other hose 85 to operate the second set of bag engaging sucker elements and a vertical passage 129 extending into communication with the atmosphere and spaced from the passage 120. A second valve gate 130 is provided on the opposite side of the shaft portion 106 from the valve gate 121 and includes an elongated chamber 131 which performs the same function as the chamber 123 of the valve gate 121. The valve gate 130 is similarly provided with a roller cam follower identified 132 which also engages the cam 125 and is maintained in constant engagement therewith through the medium of a biasing spring 133. The whole of the valve mechanism above described is preferably protected from exposure to the atmosphere as by a cylindrical skirt 134 secured to and extending downwardly from the bearing structure 32.

In operation, it will be understood that the vertical shaft 31 is continuously driven at a uniform speed from the constantly rotating horizontal shaft 21 through the sprocket gear, chain, and speed reducer connections 26 to 30; and the arm 37 which is rigidly affixed to the shaft 31 will be correspondingly rotated. The rotation of the shaft 31 and the arm 37 is imparted to the sleeve 44 through the bell crank lever and link connections 38 and 42. As the arm 37 is rotated, the bell crank lever 38 will be given an oscillatory movement relative thereto as the result of the engagement of the roller cam follower 41 with the cam groove 35. As the roller cam follower 41 moves away from the axis of the shaft 31, the bell crank lever 38 will be pivoted in a clockwise direction relative to the arm 37. This pivotal movement of the bell crank lever will result in a lessening of rotative movement of the sleeve 44 and its associated mechanisms. When the arm 37 has reached the position indicated in Fig. 12, the roller cam follower 41 has reached its farthermost position away from the shaft 31 and at this position no movement of rotation is imparted to the sleeve 44. As these parts approach the position shown in Fig. 12, the roller cam follower 53 which controls the rod 51 and its associated bag engaging mechanisms has reached the horizontal portion of the cylindrical cam 54 and the arms 69 and 70 which carry the rubber vacuum suckers 78 and 82 respectively are in the position indicated in Fig. 2 of the drawings preparatory to being closed upon a bag to remove the same from the receiver 14. At the same time the roller cam follower 61 has passed the limit of the horizontal portion 64 of the cylindrical cam 54 and has ridden up the sharply inclined portion 65 thereof to the position indicated in Figs. 2 and 14 to thereby effect the application of the bag held by suckers 78 and 82 of the rod 59 to the filling spout 6 of the associated machine. At the time the roller cam follower 61 of the vertical rod 59 has reached the top of the inclined portion 65 of the cylindrical cam, the rotative movement of the sleeve 44 and its associated mechanisms including the bag engaging devices has been completely stopped by the action of the bell crank and link connections as above described. Since the shaft 31 is continuously rotating, relative movement will occur between the shaft and the sleeve 44 and its associated mechanisms. Therefore, the inclined cam face portion 90 of the cam 88 carried by the shaft 31 will effect a raising of the extension 86 of the arm 70 of the bag holding elements and will rock the arm 70 in a counterclockwise direction about its pivot 72. This rocking movement will be transmitted in a reverse direction to the arm 69 as a result of the constant engagement of the gear sectors 73 and 74 carried by the respective arms. Thus, the rubber suckers 78 and 82 are brought through the openings 14E and 14D respectively into positive engagement with opposing wall portions of a bag held in the receiver 14 as shown in Fig. 7 of the drawings. At the same time the relative movement between the shaft 31 and the sleeve and its associated mechanisms causes shifting of the valve gate 121 to the position shown in Fig. 4 of the drawings to provide for the application of vacuum through the passage 119 to the suckers 78 and 82 which are carried by the rod 51.

Simultaneously with engagement of the bag in the receiver 14, another bag has been applied to the filling spout 6 by the mechanisms carried on the upwardly projected rod 59. The shifting of the valve gate 121 to the position shown in Fig. 4 is also concurrent with the shifting of the valve gate 130 to the position shown in Fig. 4 to release the vacuum applied to the suckers 78 and 82 carried by the upwardly projected rod 59 to release the engagement of the suckers with the bag which has been applied to the filling spout. The same relative movement between the shaft 31 and the sleeve 44 and its associated elements which was effective to close together the suckers 78 and 82 of the rod 51 is effective, through the cam 104 and the bell crank and link connections 97—103, to release the arm 95 (see Fig. 9) from the notched end 96 of the bell crank lever 97. This release of the arm 95 permits the biasing spring

91 to impart a slight additional movement of separation between the suckers 78 and 82 whereby complete separation of the suckers from the applied bag may be effected without any substantial dragging of the suckers across the surface of the bag.

As all of the above operations occur, the continued rotation of the shaft 31 will impart a swinging of the bell crank lever 38 in a counterclockwise direction relative to the arm 37 and the rotation of the sleeve 44 will again occur. It may be noted that wherever the curvature of the cam groove 35 is truly concentric with the shaft 31, the sleeve 44 and the shaft will be rotated at the same rate of speed and that, when the groove 35 moves away from the axis of the shaft 31, the speed of rotation of the sleeve 44 will be relatively lessened, and when the groove 35 moves in toward the shaft 31, the speed of rotation of the sleeve 44 will be relatively increased. The slowing down and instantaneous stopping of the rotation of the sleeve 44, together with its associated bag engaging mechanisms, must be effected twice during each revolution since there are two sets of bag engaging elements, each of which must be stopped at the bag receiving station and at the position at which a bag is to be applied to one of the filling spouts of the associated machine.

As the mechanisms are rotated to the position at which the roller cam followers 53 and 61 associated with the rods 51 and 59 reach the position at which they ride up the sharply inclined portion of the cylinder cam 54, means are preferably provided to regulate the manner in which the vertical travel of these elements is effected in order that they will not sharply strike the top of the inclined portion 65. These means (see Figs. 11 and 15) may include a lever 135 pivoted intermediate its ends as at 136 to the frame of the machine. One end of the lever projects beyond the inclined portion 65 of the cylinder cam 54 as shown in Fig. 15 and the other end of the arm 135 is pivotally connected as at 137 to the upper end of the piston rod 138 of a dash pot or hydraulic retarder 139. The arm 135 is preferably provided with a short downwardly extending arm 140 which is constantly biased to the right, as viewed in Fig. 15, by a tension spring 141. Thus, the spring 141 constantly tends to rotate the arm 135 in a counterclockwise direction about its pivot to the position indicated in dotted lines in Fig. 15. As either of the roller cam followers 53 or 61 rises along the inclined portion 65 of the cam 54, it will contact the lower edge of the arm 135. Continued movement of the cam follower will impart a clockwise pivoting of the arm about its pivot which will impart a downward movement to the rod 138 of the hydraulic retarder 139 which becomes effective to so control the speed of movement of the cam follower as to bring it to a relatively gentle stop at the top of the inclined portion 65 of the cylinder cam. In order that the initial position of the arm 135 may be accurately regulated, an abutment 142 is adjustably secured to the frame through adjusting screw means 143. The top of the rod 138 of the dash pot mechanism may be provided with a pad 144 adapted to be engaged with the abutment 142 to limit the upward travel of the rod and to determine the initial position of the arm 135.

Thus, it will be seen that the herein described invention provides a fully automatic bag feeding machine operable in conjunction with a filling machine, which is capable of withdrawing a single bag from a supply stack, partially opening the mouth thereof, transferring the partially opened bag from the position adjacent the supply stack to the bag applying station of the associated machine, and raising the bag into engaging relation with the filling spout of said opening; which employs novel bag transfer means provided with a rotary assembly including sets of bodily movable bag holding elements mounted thereon, and which is adapted to be driven from a constantly rotating shaft through the medium of lost motion cam and linkage connections so that the rotary assembly will be brought to a complete stop twice during each revolution thereof in order that bags may be properly handled.

It is of course to be understood that certain details of arrangement and proportions of parts may be variously modified without exceeding the scope of the appended claims.

I claim:

1. In an automatic bag feeding machine adapted to transfer bags individually from a magazine to filling spouts of a filling machine associated therewith, a main supporting frame, a bag retaining magazine mounted on said frame, rotatable bag transfer mechanisms including at least one set of opposed movable bag holding elements, a bag receiver, bag feeding means adapted to feed individual bags from said magazine to said receiver, means for rotating said bag transfer mechanisms to move said bag-holding elements into and out of registry with said bag receiver and into and out of registry with a filling spout of the associated filling machine, means for stopping rotation of said transfer mechanisms each time said bag holding elements are in registry with said bag receiver and to cause movement of said elements into bag engaging position, said rotation stopping means being also effective to stop rotation of said transfer mechanisms each time said bag holding elements are in registry with a filling spout of the associated filling machine, means for imparting a movement of separation to said bag holding elements to thereby open the mouth of the bag held thereby, and means to cause upward projection of said bag holding elements to apply the bag held thereby to a spout of the associated filling machine.

2. In an automatic beg feeding machine adapted to transfer bags individually from a magazine to filling spouts of a filling machine associated therewith, a main supporting frame, a bag retaining magazine mounted on said frame, rotatable bag transfer mechanisms including at least one set of opposed movable bag holding elements, a bag receiver, bag feeding means adapted to feed individual bags from said magazine to said receiver, means for rotating said bag transfer mechanisms to move said bag-holding elements into and out of registry with said bag receiver and into and out of registry with a filling spout of the associated filling machine, means for stopping rotation of said transfer mechanisms each time said bag holding elements are in registry with said bag receiver and to cause movement of said elements into bag engaging position, said rotation stopping means being also effective to stop rotation of said transfer mechanisms each time said bag holding elements are in registry with a filling spout of the associated filling machine, means for imparting a movement of separation to said bag holding elements to thereby open the mouth of the bag

held thereby, means to cause upward projection of said bag holding elements to apply the bag held thereby to a spout of the associated filling machine, means for releasing engagement of said bag holding elements from the bag held thereby, and means for imparting an additional movement of separation to said bag holding elements subsequent to the release thereof from the said applied bag.

3. In an automatic bag feeding machine adapted to transfer bags individually from a magazine to filling spouts of a filling machine associated therewith, a main supporting frame, a bag retaining magazine mounted on said frame, rotatable bag transfer mechanisms including at least one set of opposed movable bag holding elements, a bag receiver, bag feeding means adapted to feed individual bags from said magazine to said receiver, means including cam and lost motion linkage connections for rotating said bag transfer mechanisms to move said bag-holding elements into and out of registry with said bag receiver and into and out of registry with a filling spout of the associated filling machine and for stopping rotation of said transfer mechanisms each time said bag holding elements are in registry with said bag receiver and to cause movement of said elements into bag engaging position, said rotation stopping means being also effective to stop rotation of said transfer mechanisms each time said bag holding elements are in registry with a filling spout of the associated filling machine, means for imparting a movement of separation to said bag holding elements to thereby open the mouth of the bag held thereby, and means to cause upward projection of said bag holding elements to apply the bag held thereby to a spout of the associated filling machine.

4. In an automatic bag feeding machine adapted to transfer bags individually from a magazine to filling spouts of a filling machine associated therewith, a main supporting frame, a bag retaining magazine mounted on said frame, rotatable bag transfer mechanisms including at least one set of opposed movable bag holding elements, a bag receiver, bag feeding means adapted to feed individual bags from said magazine to said receiver, means including cam and lost motion linkage connections for rotating said bag transfer mechanisms to move said bag-holding elements into and out of registry with said bag receiver and into and out of registry with a filling spout of the associated filling machine and for stopping rotation of said transfer mechanisms each time said bag holding elements are in registry with said bag receiver and to cause movement of said elements into bag engaging position, said rotation stopping means being also effective to stop rotation of said transfer mechanisms each time said bag holding elements are in registry with a filling spout of the associated filling machine, means for imparting a movement of separation to said bag holding elements to thereby open the mouth of the bag held thereby, means to cause upward projection of said bag holding elements to apply the bag held thereby to a spout of the associated filling machine, means for releasing engagement of said bag holding elements from the bag held thereby, and means for imparting an additional movement of separation to said bag holding elements subsequent to the release thereof from the said applied bag.

5. In an automatic bag feeding machine adapted to transfer bags individually from a magazine to filling spouts of a filling machine associated therewith, a main supporting frame, a bag retaining magazine mounted on said frame, rotatable bag transfer mechanisms including at least one set of opposed movable bag holding elements, a bag receiver, bag feeding means adapted to feed individual bags from said magazine to said receiver, continuously operable means including cam and lost motion linkage connections for rotating said bag transfer mechanisms to move said bag-holding elements into and out of registry with said bag receiver and into and out of registry with a filling spout of the associated filling machine and for stopping rotation of said transfer mechanisms each time said bag holding elements are in registry with said bag receiver and to cause movement of said elements into bag engaging position, said rotation stopping means being also effective to stop rotation of said transfer mechanisms each time said bag holding elements are in registry with a filling spout of the associated filling machine, means for imparting a movement of separation to said bag holding elements to thereby open the mouth of the bag held thereby, and means to cause upward projection of said bag holding elements to apply the bag held thereby to a spout of the associated filling machine.

6. In an automatic bag feeding machine adapted to transfer bags individually from a magazine to filling spouts of a filling machine associated therewith, a main supporting frame, a bag retaining magazine mounted on said frame, rotatable bag transfer mechanisms including at least one set of opposed movable bag holding elements, a bag receiver, bag feeding means adapted to feed individual bags from said magazine to said receiver, continuously operable means including cam and lost motion linkage connections for rotating said bag transfer mechanism to move said bag-holding elements into and out of registry with said bag receiver and into and out of registry with a filling spout of the associated filling machine and for stopping rotation of said transfer mechanisms each time said bag holding elements are in registry with said bag receiver and to cause movement of said elements into bag engaging position, said rotation stopping means being also effective to stop rotation of said transfer mechanisms each time said bag holding elements are in registry with a filling spout of the associated filling machine, means for imparting a movement of separation to said bag holding elements to thereby open the mouth of the bag held thereby, means to cause upward projection of said bag holding elements to apply the bag held thereby to a spout of the associated filling machine, means for releasing engagement of said bag holding elements from the bag held thereby, and means for imparting an additional movement of separation to said bag holding elements subsequent to the release thereof from the said applied bag.

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