

May 16, 1939.

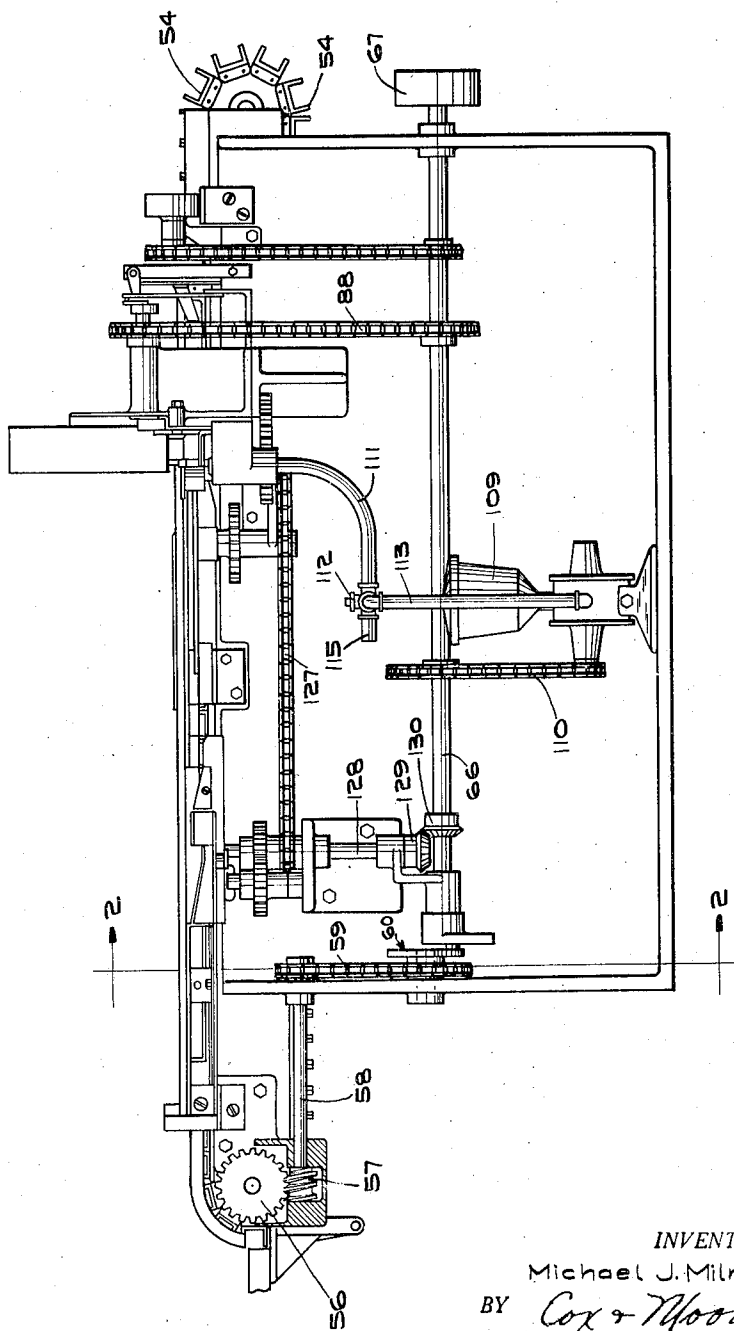
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2,158,335

FEEDING MECHANISM

Original Filed June 13, 1932 2 Sheets-Sheet 1

FIG. 1



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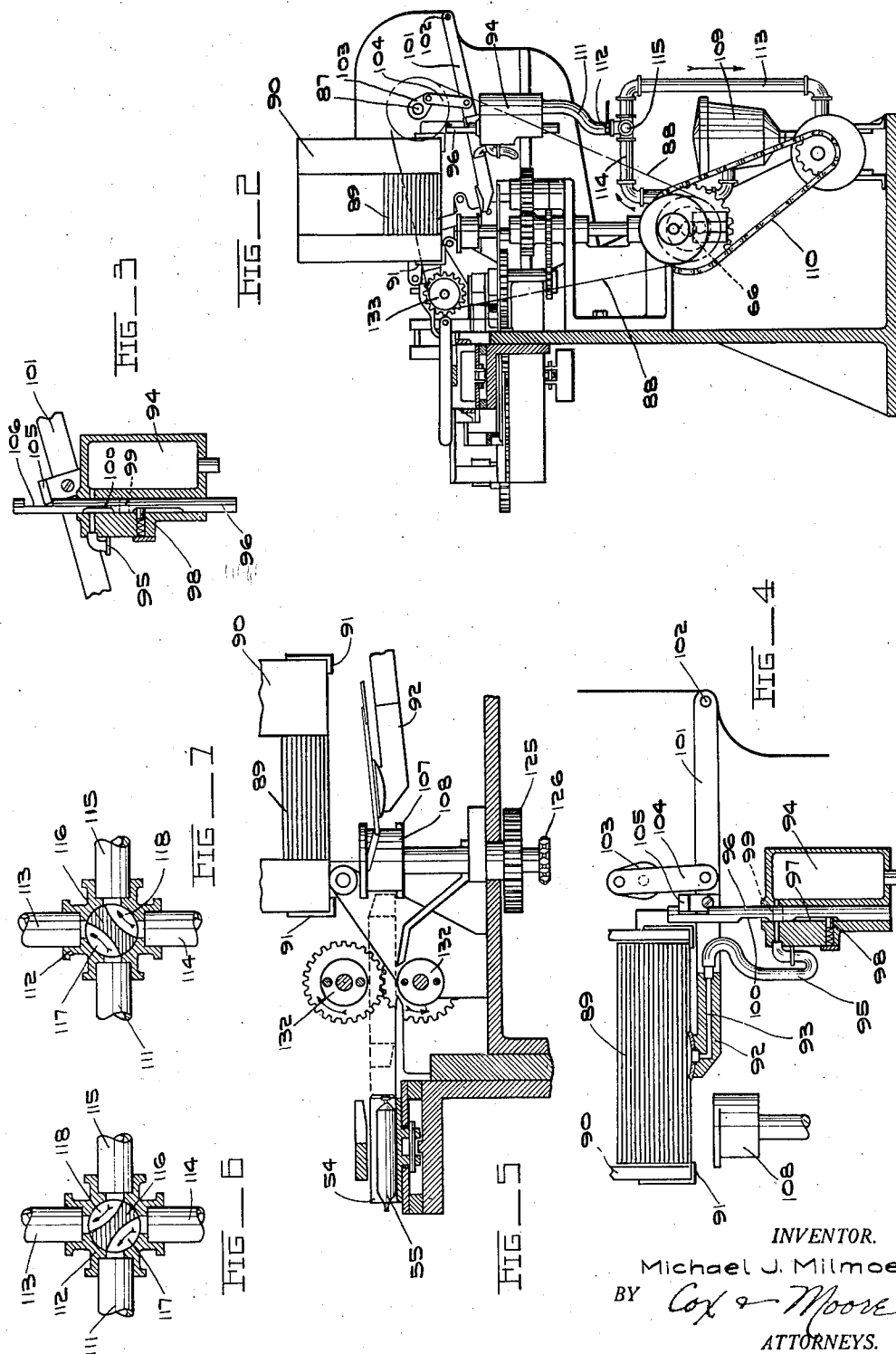
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UNITED STATES PATENT OFFICE

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FEEDING MECHANISM

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Original application June 13, 1932, Serial No.
616,857. Divided and this application April 5,
1937, Serial No. 135,085

5 Claims. (Cl. 271—29)

This invention relates to a sheet feeding mechanism particularly adapted for use with packaging machines and like devices.

It is an object of the invention to provide a feeding device, particularly for cartons, paper sheets and the like, of the fluid suction type which is inexpensive to construct and which is reliable and positive in operation. Further objects are to provide a sheet feeding device which will positively remove the sheets in order from a hopper or like storage receptacle and accurately position them at a selected point of delivery; and to provide a sheet feeding device of the fluid suction type wherein the fluid suction is operated in accurately timed relationship with the movements of the feeding mechanism.

Another object of the invention is to provide ready means for reversing the fluid flow through the feeding mechanism whereby to clean the parts or release a sheet held by the device as the occasion may require.

Other objects of this invention will appear hereinafter as the description of this invention proceeds, the novel features, arrangements, and combinations being set forth in the appended claims.

Referring to the drawings:

Fig. 1 is an elevational view of a packaging machine embodying the feeding mechanism of the present invention.

Fig. 2 is a cross sectional view of the machine shown in Fig. 1 taken substantially along the line 2—2 thereof.

Fig. 3 is a vertical cross section through the valve which controls the vacuum holder.

Fig. 4 is a cross section showing the manner in which the vacuum holder operates to strip the carton from the bottom of a stack of cartons in a hopper.

Fig. 5 is a cross section showing the vacuum holder in the position of delivery and the mechanism which feeds the carton from the vacuum holder to a packaging position, and

Figs. 6 and 7 are cross sections showing different positions of a valve provided in the vacuum line to the vacuum holder.

This application is a division of my application Serial No. 616,857, filed June 13, 1932.

In the drawings the feeding mechanism of the present invention is shown embodied in a packaging machine as the mechanism is particularly adapted for use in such devices. However, it is to be understood that the invention is equally applicable to other types of machines and to de-

vices generally employing sheet or like feeding means.

The machine illustrated in the drawings comprises a chain conveyor having a series of pockets 54 upon which articles to be packaged, such as indicated at 55 in Fig. 5, may be loaded in any desired manner. The chain conveyor is driven by means of a worm wheel 56 which meshes with a worm 57 secured to the shaft 58. The shaft 58 is in turn driven by a chain 58 10 connected by means of mechanism 60 to the main drive shaft 66 of the machine. The main drive shaft 66 has a pulley 67 thereon which may be driven in any suitable manner as by a belt from a motor. The main drive shaft also drives 15 a shaft 87, Fig. 2, by means of a chain 88. The function of this shaft will be later described.

The cartons 89 are stacked in a hopper 90 provided at the bottom thereof with projecting fingers 91 which normally support the cartons at their edges. The ends which are supported are those which have the flaps and therefore if a carton is pulled downwardly, the flaps give sufficiently to permit the carton to be withdrawn from the hopper. The means for withdrawing 25 the cartons is preferably a vacuum means in which a vacuum is periodically created and relieved as the cartons are withdrawn and fed between a pair of "squaring" rollers. In Fig. 4, it will be noted that the withdrawing means comprises a suction head 92 having a passage 93 30 there-through communicating with a vacuum chamber 94 by means of a flexible tube 95 and a valve 96. The valve 96 is recessed at 97 and a spring pressed plunger 98 rides in the recess 97 and limits the upward and downward movement of the valve 96. A port 99 in the form of a bore extending transversely through the valve 96 is adapted to form means whereby communi- 35 cation is established between the vacuum chamber 94 and the passage 93. An exhaust port 100 is also provided in the valve 96 and is periodically brought into a position in communication with the flexible tube 95 so as to permit the air to rush in and relieve the vacuum in the pas- 40 sage 93.

The suction head 92 is carried on the end of an arm 101 pivoted at 102 and rocked about the pivot 102 by a crank 103 and link 104 connected respectively with the crank 103 and arm 101. 45 The arm 101 carries a stop member 105 which operates within a recess 106 in the upper end of the valve 96, and as it alternately comes into engagement with the ends of the recess, it moves the valve in the direction of its length. In the 55

position shown in Fig. 4, the port 99 causes a communication between the vacuum chamber 94 and suction head 92 so that the suction head which is in engagement with the lower-most carton in the stack and has raised the complete stack slightly off the projections 91 will grip the carton and as the crank 103 continues its movement will withdraw the carton from the stack and move the same into a position between the rollers 107 and 108.

The crank 103 is on the end of the shaft 87, previously described. After the suction head has placed a carton between the rollers 107 and 108 in the position shown in Fig. 5, the suction is relieved within the suction head by means of the port 100 which by this time has been moved into communication with the flexible tubing 95 by the stop 105 which has engaged the lower-most end of the recess 106 and moved the valve to position the port 100 in its proper position. As the rollers feed the cartons to the left from the full line position to the dotted line position shown in that figure, the suction head 92 remains in a position below that shown in Fig. 5, or at least until the carton has been moved clear of the suction head, whereafter it is again moved upwardly into engagement with the next carton which is to be withdrawn from the stack.

The vacuum pump for creating a vacuum in the chamber 94 is shown particularly in Figs. 1 and 2 and is indicated by the reference character 109. This vacuum pump is operated by a chain 110 from the main drive shaft 66. The chamber 94 is connected by a flexible tube 111 to one arm of a cross 112. Two arms of the cross are connected to the pipes 113 and 114 leading from the pump, and the other arm of the cross has a short length of pipe 115 connected thereto and is in communication with the atmosphere. The pipe 113, I shall indicate as the intake, and 114 as the exhaust. In other words, the air is circulating through the pipes 113 and 114 in the direction illustrated by the arrows in Fig. 2. The cross 112 has a valve 116 therein provided with the ports 117 and 118. With these ports arranged in the manner illustrated in Fig. 7, the air is being drawn through the conduit 111 into the pipe 113 and out of the exhaust 115 through the pipe 114 and port 118. If a carton sticks to the suction head or for any other reason it is desired to blow out the suction head, it is only necessary to reverse the position of the valve 116 so that it occupies the position shown in Fig. 6. In this position of the valve, the air is drawn in from the surrounding atmosphere and forced into the chamber 94 whereby the air is forced out of the suction head instead of drawn in to the suction head. In this manner the suction head can be easily cleared of lint and cartons released from the suction head if the same adhere thereto.

The rollers 107 and 108 to which the carton is delivered by the suction head, have means for "squaring" the carton as it is drawn between the rollers. This "squaring" mechanism forms no part of the invention herein disclosed and accordingly will not be described in detail. The rollers are driven by means of gearing 125 operated by a sprocket 126. This sprocket is operated by a chain 127, Fig. 1, driven from shaft 128 which is in turn operated by the beveled gearing 129, 130 actuated from the main drive shaft 66.

From the "squaring" rollers 107, 108 the carton is delivered to a pair of feeding rollers 132, Fig. 5, driven by gearing 133, Fig. 2, operated by the chain 88. The feeding rollers move the carton

about the article 55 whereby to package the same. Thereafter the carton flaps are tucked into proper position by suitable mechanism forming no part of this invention.

In operation the cartons are stacked in the hopper 90 manually or by other suitable means, being held therein by the fingers 91. As the crank 103 is rotated during operation of the machine, the arm 101 is moved alternately from the withdrawal position of Fig. 4 to the delivery position of Fig. 5 whereby to remove cartons from the hopper one at a time. The positive withdrawal of the cartons and the accurate positioning of them at the delivery position is insured by the controlled operation of the suction mechanism. As the arm 101 is brought into the position of Fig. 4, the stop 105 operates the valve 96 to apply the suction of chamber 94 to the suction head. The carton is thus positively withdrawn from the hopper and accurately held in position during the lowering of the arm 101. When the arm 101 reaches its delivery position, as shown in Fig. 5, the stop 105 operates valve 96 to release the fluid suction by communicating the suction head with the atmosphere. This permits the ready withdrawal of the carton from the suction head 92 by the "squaring" rollers 107 and 108. These rollers "square" the carton and deliver it to the feeding rollers 132 which in turn feed it around the article 55 on the conveyor 54.

When it is desired to clean the suction head or to release a carton held thereon for any purpose, it is merely necessary to manipulate the valve 116 to reverse the fluid flow. By this means air may be blown outwardly through the suction head to clean it of all lint, dirt or collected foreign matter. This ready cleaning means is of distinct advantage in devices of the type described and insures proper operation of the suction feeding mechanism.

It is to be understood that the construction in the accompanying drawings is only illustrative of the invention described herein, and it is to be understood that various changes can be made within the scope of this invention without departing from the spirit thereof as defined by the appended claims.

Having thus fully described my invention, what I claim as new and desire to obtain by Letters Patent is:

1. A feeding mechanism comprising a suction member movable alternately from a position adjacent a source of supply to a position of delivery, suction means for applying suction to said member, means for controlling said suction applying means, and means movable with the suction member for operating said controlling means whereby the suction is applied to the member as the same is moved to the position adjacent the source of supply and released therefrom as the member is moved to the position of delivery.

2. A feeding mechanism comprising a suction head movable alternately from a position adjacent a source of supply to a position of delivery, a vacuum chamber, valve means for connecting the suction head either to the vacuum chamber or to atmosphere, and means movable with the suction head for controlling said valve means.

3. A feeding mechanism comprising a pivoted suction head movable alternately from a position adjacent the source of supply to a position of delivery, a vacuum chamber, valve means for connecting the vacuum chamber to the suction head when the head is in position adjacent the

source of supply and for connecting the suction head to atmosphere when the head is in a position of delivery, and abutment means carried by the suction head and having a lost-motion connection with the valve for controlling its operation.

4. A feeding mechanism comprising a suction head movable alternately from a position adjacent a source of supply to a position of delivery, suction means for withdrawing fluid from the head, means for controlling the suction means, means movable with the suction head for automatically operating said controlling means in synchronism with the movements of the head whereby fluid is withdrawn from the head when it is in position adjacent the source of supply, and means manually operable at will independently of the position of the suction head for reversing the fluid flow.

5. A sheet feeding mechanism comprising a suction head movable from a position adjacent the source of supply to a position of delivery, a fluid forcing means having a suction intake side and a pressure discharge side, a pair of conduits connected to the intake and discharge sides of said fluid forcing means, a conduit connected to said suction head, a conduit adapted to be connected to a source of fluid at a given absolute pressure, and a multi-way valve interconnecting said conduits for selectively connecting the suction intake side of said fluid forcing means to said suction head and said pressure discharge side of said fluid forcing means to said source of fluid or said suction intake side of said fluid forcing means to the source of the fluid and the pressure discharge side of said fluid forcing means to said suction head.

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