

April 17, 1956

W. DE BACK

2,742,285

FEED MECHANISM FOR CARTON FORMING MACHINES AND THE LIKE

Filed Oct. 5, 1950

5 Sheets-Sheet 1

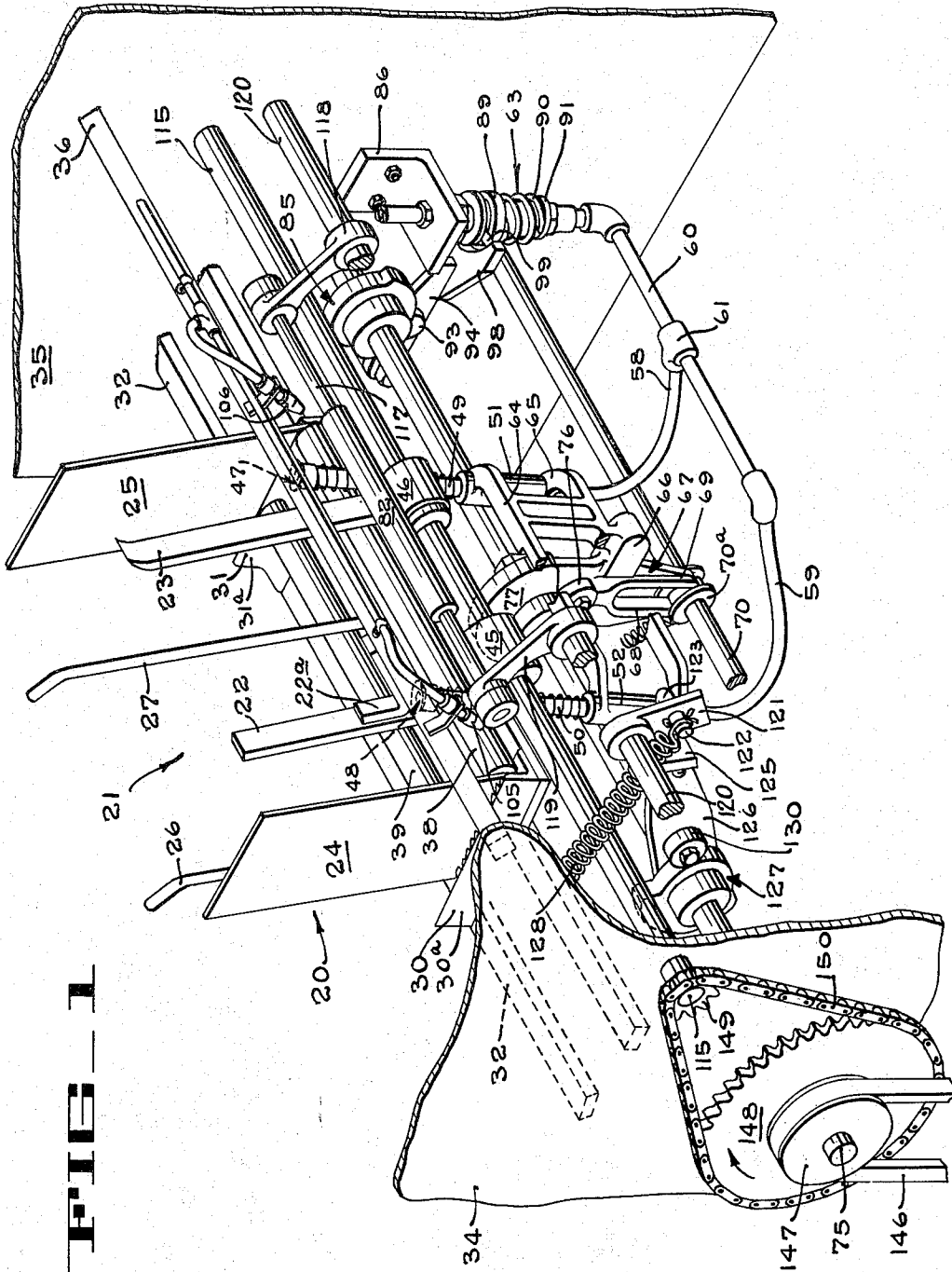


FIG. 1

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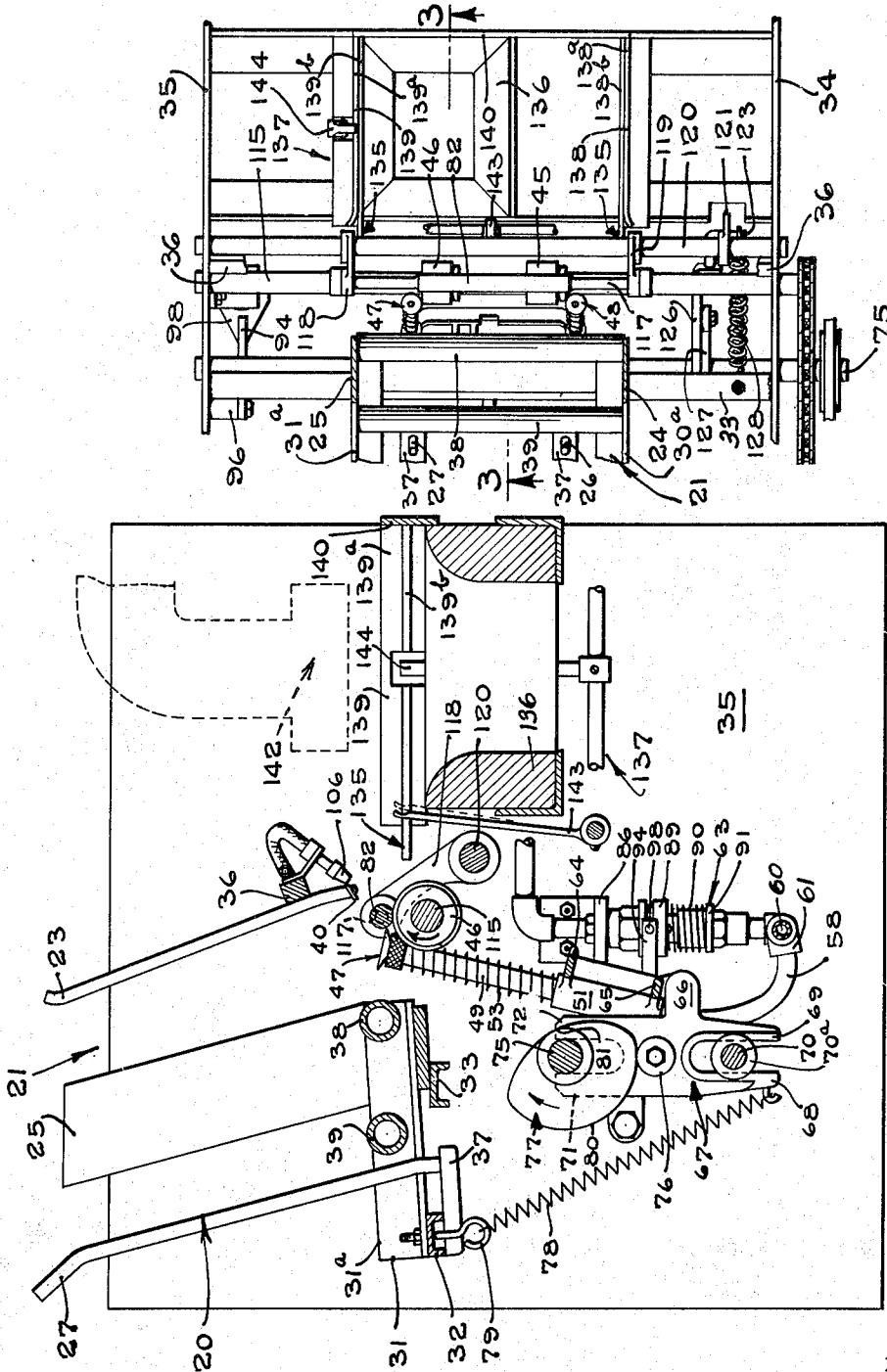


FIG. 3

FIG. 2

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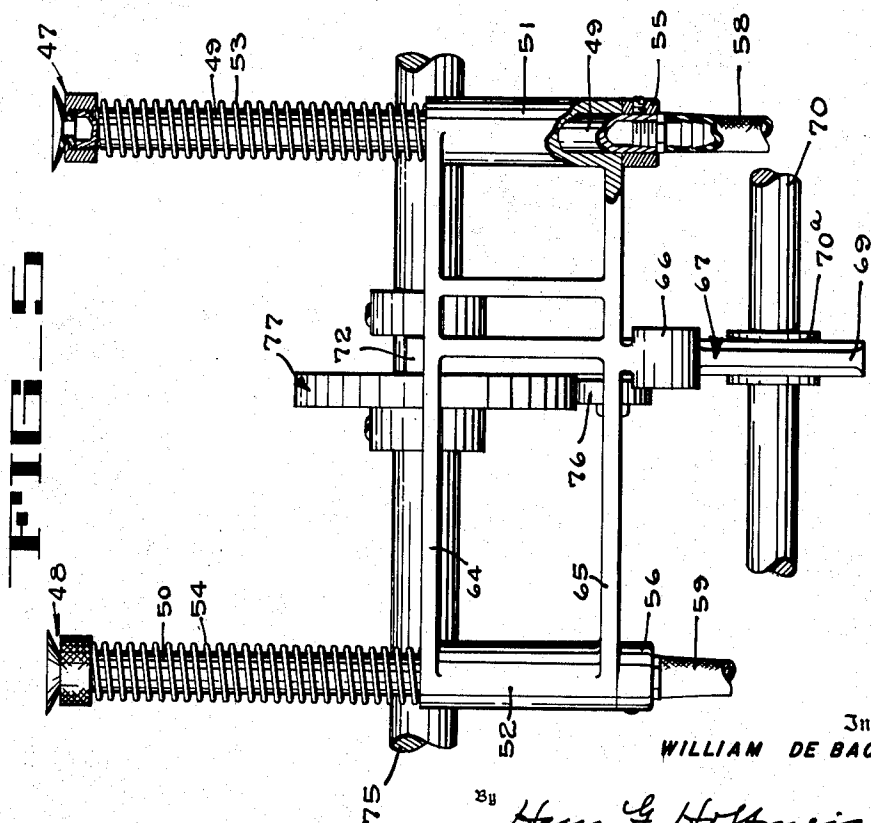
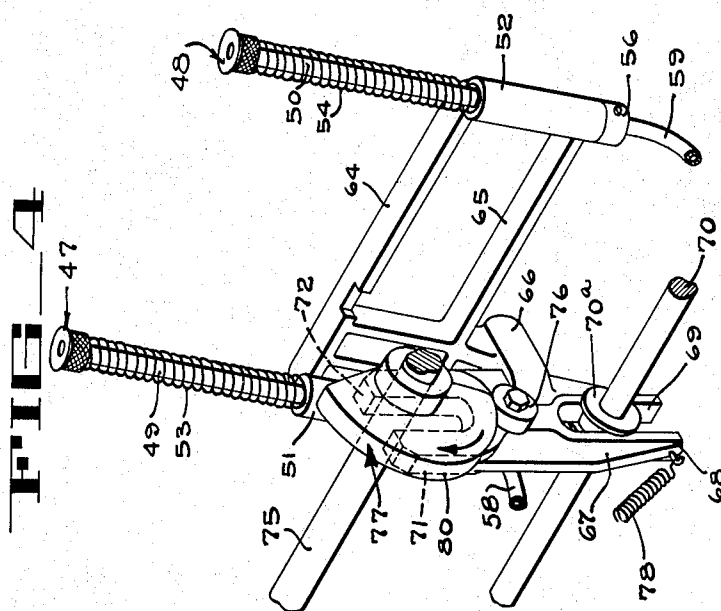
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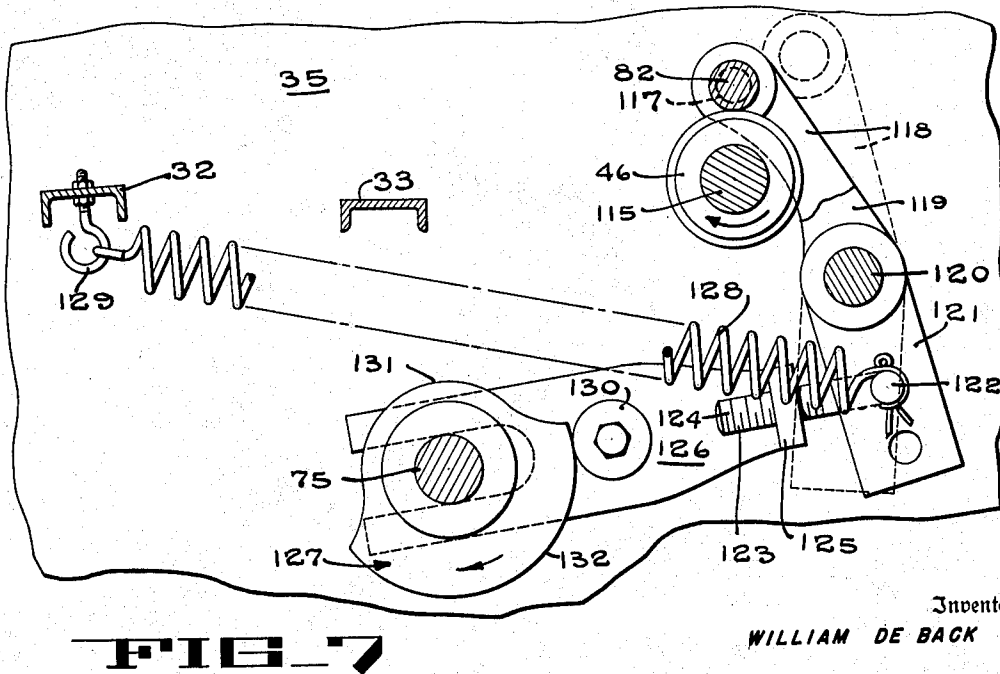
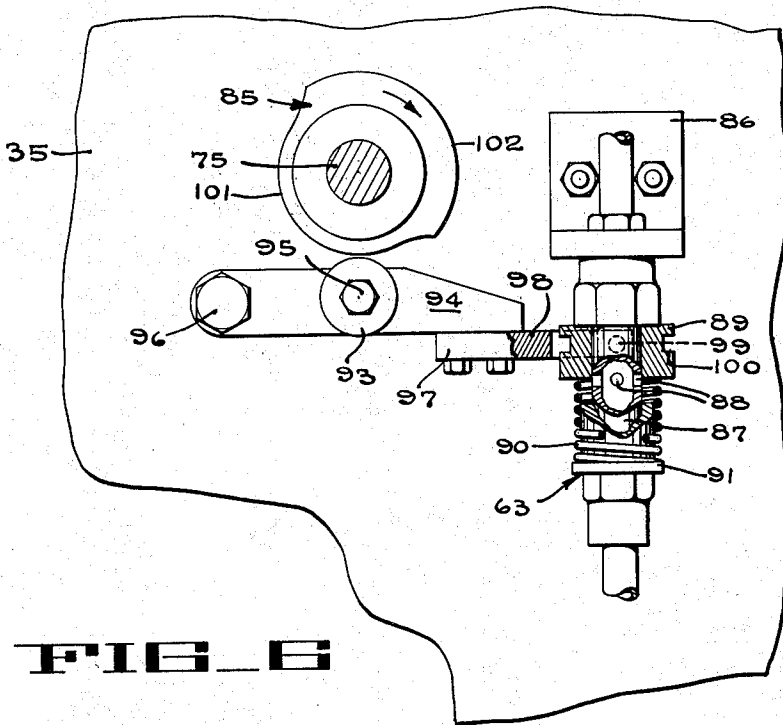
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5 Sheets-Sheet 4



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FEED MECHANISM FOR CARTON FORMING MACHINES AND THE LIKE

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Application October 5, 1950, Serial No. 188,636

6 Claims. (Cl. 271—29)

The present invention relates to mechanisms for feeding planiform articles of a flexible material, such as sheets of paper, cardboard or the like, singly and in rapid succession from a stack of such articles to machines which process them individually. The invention is especially addressed to mechanisms for feeding carton blanks individually from the bottom of a stack to a carton forming machine.

It is an object of the invention to provide a mechanism, of the type referred to, that combines simplicity of construction with dependability in operation.

Another object is to provide a mechanism, of the type referred to, that is thoroughly dependable when operated at high speeds.

Furthermore, it is an object to provide a feed mechanism, that is specifically suited for handling cellophane lined carton blanks, such as are used to form cartons for frozen foods.

When carton blanks of this type are handled at high speeds, there is a danger that the cellophane linings may be detached from the cartons, and the curled edges thereof may foul up the operation of both the feed mechanism and the carton forming machine to which the blanks are delivered.

It is an important object of the invention, therefore, to provide a feed mechanism, of the type referred to, that is adapted to handle lined carton blanks and wherein separating and curling or folding back of the cellophane lining are effectively counteracted.

These and other objects of the invention will be apparent from the following description of the accompanying drawings which illustrate a preferred embodiment thereof and wherein:

Figure 1 is a fragmentary perspective of a carton blank feed mechanism embodying the invention;

Figure 2 is a plan view of said carton blank feed mechanism and of the carton forming machine to which the mechanism feeds the carton blanks;

Figure 3 is a vertical section through the mechanisms illustrated in Figure 2 taken along line 3—3 thereof and viewed in the direction of the arrows associated with said line.

Fig. 4 is a perspective of the carton blank gripping device comprised in the mechanism illustrated in Figs. 1, 2 and 3, viewed from a different point than in Fig. 1;

Fig. 5 is a rear elevation of the same device;

Figs. 6 and 7 are side elevational detail views of other components of the carton blank feed mechanism illustrated in Figs. 1, 2 and 3, and of the actuating mechanisms therefor;

Fig. 8 is a plan view of a cellophane lined carton blank as it is positioned in the magazine of the carton blank feed mechanism illustrated in Figs. 1, 2 and 3; and

Fig. 9 is a phase diagram illustrating the manner in which the active phases of the various implements comprised in the carton feed mechanism of the invention are related to one another.

Having first reference to Figs. 1, 2 and 3, the feed

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mechanism of the invention comprises a magazine 20 in the form of a nearly vertically descending chute 21 that is formed by a pair of front straps 22 and 23, a pair of side straps 24 and 25 and a pair of rear bars 26 and 27 arranged to define a space adapted to receive a stack of vertically superposed carton blanks 28 of the conformation illustrated in Fig. 8. The side straps 24 and 25 rise from a pair of slightly inclined parallel angle irons 30 and 31 that rest upon a pair of transverse bars 32 and 33 (Figure 3) which are supported at their opposite ends from a pair of side panels 34 and 35. The front straps 22 and 23 are held in their proper position by another transverse bar 36 that is likewise supported from the side panels 34 and 35. An inwardly offset relation of straps 22 as determined by the carton blank conformation is attained by the use of an angle member 22a connecting said strap to the transverse bar 36. The rear bars 26 and 27 rise from a pair of arms 37 (Figure 3) that are secured to the rearwardly positioned transverse bar 32. The upper ends of the front straps 22 and 23 and the upper ends of the rear bars 26 and 27 are preferably flared outwardly to facilitate insertion of a new supply of blanks into the magazine. Rotatably supported from the vertical flanges 30a and 31a of the hereinbefore mentioned angle irons 30 and 31 are two rollers 38 and 39 that extend transversely across the bottom of the magazine chute 21 (Figures 2 and 3). Said rollers form the floor of the magazine upon which the stack of carton blanks may rest in a slightly inclined position, and they are displaced somewhat toward the rear bars 26 and 27 of the chute, as clearly shown in Fig. 3, so as to leave the front portion of the stack of blanks without positive support except for a pair of spring fingers 40 that are secured to the bottom ends of the front straps 22 and 23 and project with their tips a limited distance underneath the front edge at the lowest blank within the chute 21.

In accordance with the invention pneumatic transfer means are provided below the bottom of the magazine. Said transfer means are arranged to grip the bottom surface of the lowest blank in the magazine at points intermediate of the roller 38 and the tips of the fingers 40 to pull said blank downwards past said finger tips into contact with a pair of co-axially disposed and continuously turning feed rollers 45 and 46 (Figures 1 and 3).

Having reference to Figs. 4 and 5 said pneumatic transfer means comprises two suction cups 47 and 48 mounted upon the upper ends of tubes 49 and 50 which are slidably received within, and extend through, tubular sockets 51 and 52. Expansion springs 53 and 54 are coiled around said tubes 49 and 50, respectively, intermediately of the suction cups and the upper ends of the tubular sockets to maintain the tubes resiliently in upwardly projected positions determined by suitable stop collars 55 and 56 that are pinned to the projecting lower ends of the tubes 49 and 50 below the sockets 51 and 52 thereof. Flexible conduits 58 and 59 secured to the bottom ends of the tubes 49 and 50, respectively, are joined into a common conduit 60 as indicated at 61 in Fig. 1 and said conduit 60 is connected to a vacuum pump (not shown) through a control valve 63 whose construction and operation will be presently described.

The pneumatic transfer means are arranged to rise until the suction cups come into contact with the bottom surface of the lowest carton blank in the magazine near its forward edge, with the control valve 63 in such a position that the suction cups are effectively connected to the suction pump, causing said cups to take hold of the unsupported front portion of said lowest carton blank. Thereafter said suction cups are arranged to descend to pull the gripped end of the carton blank down-

wardly past the spring fingers 40, which act to retain the other blanks within the magazine, into contact with the previously mentioned feed rollers 45 and 46. At this moment additional means in the form of a presser roller 82 enter into effect which urge the forward edge of the gripped blank into operative contact with said rollers, while the valve 63 is operated to destroy the vacua in the suction cups so that said cups may release the blank as it is gripped by said rollers 45, 46 which advance it rapidly toward the carton forming machine while the suction cups move again upwardly to withdraw another carton blank from the magazine.

Having reference to Figs. 1, 3, 4 and 5 the sockets 51 and 52 of the pneumatic transfer device are rigidly connected by a pair of transverse bars 64 and 65; and an arm 66 integral with the lower bar 65 rigidly connects the resultant frame structure to a bracket 67 shaped in the manner of an H. Said bracket 67 straddles with its lower pair of legs 68 and 69 a roller 70a mounted upon a horizontal shaft 70 which extends transversely between and is firmly held in the side panels 34 and 35. The upper pair of legs 71 and 72 of said H-shaped bracket 67 straddles another transverse shaft 75 that is rotatably supported in said side panels 34 and 35. Said shaft 75 is in continuous rotation during operation of the machine and carries the control cams for the various components comprised in the machine so that it may be termed the "cam shaft" of the mechanism. Pivoted to one of the sides of the H-shaped bracket 67 at a level below the cam shaft is a roller 76 that is held in engagement with the contour of a cam 77 by means of a coil spring 78 that is tensioned between the lower leg 68 of the H-shaped bracket 67 and a hook 79 secured to the hereinbefore mentioned transverse bar 32. Said cam 77 is firmly mounted upon the cam shaft 75 and during operation of the mechanism the shaft 75 is arranged to turn the cam 77 in clockwise direction as viewed in Figures 3 and 4. The contour of the cam 77 comprises a circular lobe 80 extending over almost 180° of its periphery which is of such radius as to maintain the suction cups in the lowered position illustrated in said Fig. 3 when it engages the roller 76. From said lobe the edge of the cam drops steeply into a depression 81 which permits the spring 78 to elevate the suction cups into contact with the lowermost carton blank in the magazine 20 as hereinbefore described. Said depression 81 in the contour of the cam 77 is of relatively small angular width and from said depression the contour of the cam returns gradually to the previously mentioned lobe 80. This forces the H-shaped bracket 67 to slide downwardly against the urgency of the spring 78, and thus lowers the suction cups gradually until the front edge of the carton blank gripped by said suction cups contacts or at least comes close to the surfaces of the feed rollers 45 and 46 which are in a continuous state of rotation in clockwise direction as viewed in Fig. 3.

To properly activate the suction cups so that they may grip a carton blank whenever they are elevated toward the magazine and pressed against the lowest carton blank contained therein, and in order that they may promptly release the gripped blank whenever they have brought its front edge close to, or into contact with, the feed rollers 45, 46, and the presser roller 82 has closed down upon it, a cam 85 (Figure 6) firmly mounted upon the cam shaft 75 is arranged to appropriately control the aforementioned valve 63 in the vacuum line 60. For this purpose said valve is secured to the side panel 35 at a point near said shaft 75 by means of a bracket 86, as shown in Figures 1 and 6, and its cylindrical body 87 is provided with apertures 88 which establish communication between the interior of the valve and the outside atmosphere. A collar 89 arranged around the valve body is adapted to close said apertures 88 but is urged into a position wherein it leaves them open by means of a spring 90 coiled around the valve body below said collar

89 and bearing against a flange 91 provided around said valve body at the lower end thereof. The aforementioned valve control cam 85 is engaged by a cam follower roller 93 that is pivoted to a lever arm 94 at an intermediate point 95 thereof. One end of said lever arm is rotatably supported from the side panel 35 as shown at 96, while its opposite end is arranged to overlies the tail 97 of a stirrup 98 that embraces the above mentioned collar 89 and is operatively connected to said collar by means of opposed pins 99 that engage an annular groove 100 provided in said collar. The contour of the cam 85 (Figure 6) is divided into two segments of different radii 101 and 102, respectively. When the roller 93 engages the segment 101 which is of smaller radius, the spring 90 maintains the collar 89 in its upper position wherein the apertures 88 are uncovered so that operation of the vacuum pump will be unable to establish vacua in the suction cups. However, as soon as the cam 85 presents its large diameter segment 102 to the roller 93, the lever 94 depresses the tail 97 of the stirrup 98 and forces the collar 89 to slide downwardly against the urgency of the spring 90. This closes the apertures 88 so that the evacuating action of the vacuum pump is effectively applied to the suction cups and vacua will be created in said cups when the cups are pressed against a carton blank. However, as soon as the roller 93 drops from the cam segment 102 onto the cam segment 101, the spring 90 returns the collar 89 to its raised position above the apertures 88, and the vacua in the cups are instantaneously destroyed by the rush of air from the outside into the interior of the suction tubes. Thus, by properly proportioning the angular width of the two cam segments 101 and 102 and by properly relating their angular position upon the cam shaft 75 relative to the angular position of the suction-cup reciprocating cam 77, matters may be arranged in such a manner that the suction cups become effective as soon as they are pressed against the lowest blank in the magazine, and will release said blank as soon as it is gripped by the rollers 45 and 46 in cooperation with the presser roller 82 so that there is no danger that portions of the carton may be unduly stretched or the suction cups be subjected to excessive wear.

Suitably supported from the previously described cross bar 36 are two air nozzles 105 and 106 (Figure 1), that may be connected to any suitable source of air pressure such as the exhaust of the above mentioned vacuum pump. Said air nozzles (Figure 3) are located slightly above the level of the lowermost blank in the magazine in such a manner that they direct downwardly slanting air jets against the two leading corners of the carton blank as its front portion is being bent downwardly from the bottom of the magazine in the above described manner.

As previously pointed out the feed mechanism of the invention is particularly suited to handle cellophane lined carton blanks such as, for instance, the type of blank shown in Fig. 8. Such cellophane-lined blanks are placed into the magazine 20 with their cellophane linings 111 on top, and whenever the front portion of such a blank is bent downwardly from the bottom of the magazine by the suction cups, which grasp the cardboard portion 112 thereof, the nozzles 105 and 106 direct air jets against the upper surface of the bent blank portion which impinge upon the leading corners of the blank at about the points marked *p* in Figure 8 and prevent the free edges of the cellophane lining from curling up and folding backwards during the rapid downward movement of the front portion of the blank to the feed rollers 45 and 46.

When the suction cups, while grasping a carton blank, reach their lowermost position, the leading edge of the gripped blank overlies the feed rollers 45 and 46, as explained hereinbefore, and at this moment the previously mentioned presser roller 82 swings down from above into engagement with the upper surface of the leading edge portion of the blank and forces it into firm engage-

ment with the feed rollers to enable said rollers to pull the blank in its entirety from the magazine and pass it on to the carton forming machine.

Having reference to Figs. 1, 3, and 7 the feed rollers 45 and 46 are mounted in axially spaced relation upon a transverse shaft 115 that is journaled in the aforementioned side panels 34 and 35 and which is kept in continuous rotation during operation of the mechanism. The presser roller 82 is mounted upon another transverse shaft 117 that is rotatably supported above the feed rollers in the ends of a pair of arms 118 and 119. Said arms rise from, and are firmly mounted upon, yet another transverse shaft 120 that is journaled in the side panels 34 and 35. Fixed to and depending from said shaft 120 is another arm 121 (Figures 1 and 7) which is pivotally engaged by the short bar 122 of an L-shaped stud 123. The long bar 124 of said stud 123 is threaded and adjustably engages an ear 125 formed in the end of a link 126. The opposite end of said link 126 is forked and straddles the aforementioned cam shaft 75, and firmly mounted upon said cam shaft at a point adjacent to said link in a rotary cam 127. A spring 128 tensioned between the short bar 122 of the pivot stud 123 and a hook 129 anchored in the transverse bar 32 urges a roller 130 pivoted to the link 126 into constant engagement with the edge of said cam 127. The contour of said cam (Figure 7) is divided into two segments of different radii 131 and 132, respectively, and whenever the cam 127 presents its segment of smaller radius i. e., segment 131 to the roller 130, the spring 128 holds the arm 121, the shaft 120, and the arms 118 and 119 in the position shown in broken lines in Figure 7, wherein the presser roller 82 is withdrawn from the feed rollers 45 and 46. However, whenever the suction cups have moved the carton blank with its leading edge close to, or into contact with, said feed rollers 45 and 46 and are about to release the blank due to the action of the control cam 85 upon the valve 63, as hereinbefore described, the cam follower roller 130 encounters, and is forced to climb upon, the cam segment 132 of larger radius. This forces the arm 121 in counterclockwise direction, as viewed in Fig. 7, from the position shown in broken lines to the position shown in full lines, which brings the presser roller 82 down toward the feed rollers 45 and 46 and forces the leading edge of the blank into operative engagement with said feed rollers. Since the suction cups are arranged to release the blank at this moment, as previously pointed out, the feed rollers pull the blank fully out of the magazine 20 and deliver it rapidly onto an adjacently positioned track 135 that extends above the die 136 of a carton forming machine 137 (Figures 2 and 3). Said track 135 may suitably be formed by a pair of horizontally positioned parallel angle bars 138 and 139 the vertical flanges 138a and 139a of which are spaced sufficiently far apart from each other to accommodate the ejected blank intermediately thereof. Said angle bars 138 and 139 have narrow inwardly turned horizontal flanges 138b and 139b to provide a support for the blank along which it may slide until its leading edge hits a suitable stop plate 140 arranged at the end of the track. The location of said stop plate 140 is so positioned that it places the blank into its proper position above the die 136 and below the plunger 142 of the carton forming machine 137 (Fig. 3).

It will be understood that the operation of the carton blank feed mechanism must be very accurately synchronized with the operation of the carton forming machine so that the plunger 142 will descend upon the blank and remove it in downward direction from the track 135 as soon as it arrives, and will, after having molded the blank into a carton, return to its initial position above the track 135 before another blank arrives, so that said new blank may slide unhindered into its proper place above the die 136. Modern carton forming molds of the type briefly outlined above are capable of operating at extremely rapid speeds forming as many as a

hundred cartons per minute and accordingly the feed mechanism of the invention must be operated to feed blanks at an equally rapid rate from the magazine 20 to the machine 137. When flexible carton blanks, of the type here under consideration, are delivered at such rapid rates against positioning stops, such as the stop plate 140, they have a tendency to rebound and slide backward on the track. In consequence, thereof, they may be inappropriately positioned above the die by the time the plunger 142 descends resulting in frequent failures of the carton forming operation and an excessively large number of rejects. In accordance with the invention a retaining finger 143 may therefore be provided intermediately of the angle bars 138 and 139 at a point ahead of the stop means 140 by a distance equal to the length of the processed blanks; said finger may be arranged to rise from below the level of the horizontal flanges 138b and 139b of the angle bars 138 and 139 into the path of the blanks at the very moment when a blank hits said stop means, and by the time the plunger 142 of the carton forming machine has returned to its initial position, said finger 143 is arranged to withdraw below the level of said horizontal flanges 138b and 139b, so as to free the track for the arrival of a new blank. Said finger may conveniently be operated in properly timed relation from the aforementioned cam shaft 75 of the blank feed mechanism by a suitable power train (not shown). Similarly a positioning finger 144 may be provided at one or both sides of the track 135 and may be arranged to move inwardly from the vertical angle bar flanges 138a and/or 139a, respectively, and back to their initial positions adjacent to said vertical flanges in timed relation with the arrival of a blank so as to properly position the blank above the die transversely of the track.

All the moving parts of the described carton blank feed mechanism may conveniently be driven from a common source of power. Thus, the drive shaft of an electric motor (not shown) may be operatively connected by a belt 146 (Figure 1) with a pulley 147 that is firmly mounted upon one of the projecting ends of the cam shaft 75. Likewise mounted upon said projecting end of the cam shaft is a sprocket 148 of relatively large diameter which drives another sprocket 149 of relatively small diameter by means of a sprocket chain 150. Said second sprocket 149 is firmly mounted upon the end of the shaft 115 which carries the feed rollers 45 and 46. Due to the indicated difference in the size of the gears 148 and 149 said rollers 45 and 46 are driven at a rapid rate as compared with the speed of the cam shaft 75.

In practical operation a stack of carton blanks of the type illustrated in Fig. 8 is deposited into the magazine 20 with the cellophane linings up, and rests upon the rollers 38 and 39 with its front portion unsupported except for the spring fingers 40. At the beginning of the machine operation the suction cups 47 and 48 may be in their lowered or retracted position which is established when the cam follower roller 76 dwells upon the circular lobe 80 of the suction-cup-reciprocating cam 77. In the phase diagram shown in Figure 9, the operation of the suction cups 47, 48 is represented by the outermost circle 160, with the arc 160a drawn in a thin line indicating the idle phase of said cups when they are retracted by engagement of the roller 76 with the circular lobe 80 of cam 77, as pointed out hereinbefore. As the cam shaft 75 turns, however, the roller 76 descends into the depression 81 of the cam 77 permitting the spring 78 to lift the H-shaped bracket 67 and elevate the suction cups into contact with the front portion of the lowermost carton blank in magazine 20. This is represented by the arc 160b drawn in a wave line which marks the time required for the suction cups to move into operative position, and the arc 160c drawn in a heavy line which marks the period over which the suction cups remain in their extreme elevated position. At the moment when the suction cups start to rise from their retracted position, the

control cam 85 for the vacuum valve 63 presents its segment 101 of smaller radius to the cam follower roller 93, permitting the spring 90 to hold the collar 89 above the apertures 88 of said valve which renders the suction cups ineffective. In the phase diagram shown in Figure 9 the period over which the vacuum control valve 63 disables the suction cups is represented by the thin arc 161a of the intermediate circle 161. While the cups 47, 48 rise to their elevated positions, however, the roller 93 encounters the large diameter segment 102 of the valve control cam 85 which forces the collar 89 downward over the apertures 88 of the valve 63, as represented by the short arc 161b which is drawn in a wave line. Hence, by the time the suction cups have reached their uppermost position in which they are pressed against the lowermost carton blank in magazine 20, the evacuating action of the continually operating vacuum pump is fully applied to said suction cups, as indicated by the heavy arc 161c of circle 161. As a result thereof the elevated cups grip the blank firmly, and as the cam follower roller 76 of the suction-cup-reciprocating cam 77 climbs back to the large diameter segment 80 of said cam, as represented by the wave line arc 160d of circle 160, the cups remain effectively connected to the vacuum pump, as indicated by the co-extensive portions of sector 161c of circle 161 and sector 160d of circle 160. The cups 47, 48, therefore, pull the forward end of the gripped carton blank downwardly from the bottom of the magazine 20 past the spring fingers 40, while the air jets emitted from the nozzles 105 and 106 impinge upon the upper surface of the downwardly bent blank and prevent curling or folding back of the cellophane lining thereof. As the front end of the carton blank is pulled downwards in the described manner, the cam follower roller 130 of the pressure roller control cam dwells upon the small diameter segment 131 of said cam which enables the spring 128 to hold the pressure roller 82 in its open or raised position as represented by the thin arc 162a of the innermost circle 162. As the suction cups are about to reach their lowermost position, however, where they pull the front edge of the gripped carton blank close to, or into contact with, the upper segments of the continuously rotating feed rollers 45 and 46, the cam follower roller 130 commences to ascend the large diameter segment 132 of the control cam 127 and pulls the presser roller 82 down upon the front edge portion of the carton blank, as represented by the wave-line arc 162b of circle 162. As the presser roller descends upon the front edge of the carton blank, the roller 93 of the vacuum-valve-control cam 85 drops from the large diameter segment 102 of said cam onto the small diameter segment 101 thereof, permitting the spring 90 to lift the collar 89 above the apertures 88 in the vacuum control valve 63, as represented by the wave line arc 161d of circle 161. Thus, by the time the pressure roller 82 bears fully upon the edge of the carton blank, as marked by commencement of the heavy arc 162c of the innermost circle 162, the suction cups have released the blank. Said blank is now firmly gripped between the pressure roller 82 and the rotating feed rollers 45, 46 which latter pull it from the magazine, with the pressure roller 82 remaining in its lowered or closed position for a suitable length of time, as indicated by the length of the heavy arc 162c, to insure that the blank is totally withdrawn from the magazine, and is fed fully onto track 135. Thereafter, the pressure roller returns to its raised or open position in ample time to allow the suction cups, during the subsequent operational cycle of the machine, to bend another carton blank without interference into contact with the feed rollers as indicated by the relative angular position of the wave line arc 162d and the wave line arc 160d.

While I have explained my invention with the aid of an exemplary embodiment thereof, it will be understood that I do not wish to be limited to the specific constructional details shown and described which may be de-

parted from without departing from the scope and spirit of the invention.

I claim:

1. Mechanism for individually feeding from a stack of carton blanks having liner blanks attached thereto, said mechanism comprising means adapted to support from below a substantially vertical stack of such carton blanks with their attached liner blanks uppermost while leaving a portion of the lowermost carton blank in the stack extending beyond said support means, cyclically operable means adapted to grip said extending portion of said lowermost carton blank and remove said extending portion together with the corresponding portion of its attached liner blank from said stack by bending same downwardly away from said stack, pressure fluid means arranged to impinge a jet of pressure fluid upon the upper face of said attached liner blank in a manner to prevent separation of same from its correlated carton blank during the downward bending movement of their extending portions, and means operating in timed relation with said cyclically operable means to engage the downwardly bent portions of said lowermost carton blank and its attached liner blank for effecting complete withdrawal thereof from said stack.

2. Mechanism for individually feeding from a stack of carton blanks having liner blanks attached thereto, said mechanism comprising means adapted to support from below a substantially vertical stack of such carton blanks with their attached liner blanks uppermost while leaving a portion of the lowermost carton blank in the stack extending beyond said support means and substantially without positive support, cyclically operable means adapted to grip said extending portion of said lowermost carton blank and remove said extending portion together with the corresponding portion of its attached liner blank from said stack by bending said portions downwardly away from said stack, pressure fluid means mounted to impinge jets of pressure fluid upon the upper face of said attached liner blank in a direction substantially perpendicular thereto for preventing separation of same from its correlated carton blank during the downward bending movement of their extending portions, means operating in timed relation with said cyclically operable means for intermittently actuating said pressure fluid means, and means operating in timed relation with said cyclically operable means to engage the downwardly bent portions of said lowermost carton blank and its attached liner blank for effecting complete withdrawal thereof from said stack.

3. Mechanism for individually feeding from a stack of carton blanks having liner blanks attached thereto, said mechanism comprising means adapted to support from below a substantially vertical stack of such carton blanks with their attached liner blanks uppermost while leaving a portion of the lowermost carton blank in the stack extending beyond said support means, cyclically operable means adapted to engage said extending portion of the lowermost carton blank and remove said extending portion together with the corresponding portion of its attached liner blank from said stack by bending said portions downwardly away from said stack, a nozzle arranged to direct a current of air against and substantially perpendicular to the upper face of the downwardly bent portion of said attached liner blank in a manner to prevent separation of same from its correlated carton blank during the downward bending movement of their extending portions, and means operating in timed relation with said cyclically operable means to engage the downwardly bent portions of said lowermost carton blank and liner blank for effecting complete withdrawal thereof from said stack.

4. Mechanism for individually feeding from a stack of carton blanks having liner blanks attached thereto, said mechanism comprising means adapted to support from below a substantially vertical stack of such carton blanks with their attached liner blanks uppermost while leaving a portion of the lowermost carton blank in the stack

extending beyond said support means, cyclically operable means adapted to engage the extending portion of said lowermost carton blank and remove said portion together with the corresponding portion of its attached liner blank from said stack by bending the same downwardly away from said stack, a pair of nozzles arranged to direct currents of air at suitably spaced intervals against and substantially perpendicular to the upper face of the downwardly bent portion of said attached liner blank in a manner to prevent separation of same from its correlated carton blank during the downward bending movement of their extending portions, and means operating in timed relation with said cyclically operable means to engage said downwardly bent portions of the lowermost carton blank and its attached liner blank for effecting complete withdrawal thereof from said stack.

5. Mechanism for individually feeding from a stack carton blanks having liner blanks attached thereto, said mechanism comprising a substantially vertical magazine adapted to receive in superposed relation a stack of such carton blanks with their attached liner blanks uppermost and possessing a floor having an open section arranged to expose a side portion of the lowermost carton blank in the magazine, said exposed side portion becoming the leading portion of said blank upon its removal from said magazine, a horizontally disposed feed roller located a distance below the open section of said floor, means for continuously rotating said feed roller, a resiliently mounted suction cup disposed below the open section of said floor, means operable to vertically reciprocate said suction cup between a lowered position substantially in level with said feed roller and an elevated position in level with and within the open section of said floor, means operable in timed relation with said suction cup reciprocating means to activate said suction cup when the same is in its elevated position so that said suction cup may grip the exposed side portion of said lowermost carton blank and remove said side portion together with the corresponding side portion of its attached liner blank from said magazine by bending said side portions downwardly and outwardly therefrom, and to disable said suction cup when the same reaches its lowered position so that said suction cup may release the downwardly bent side portions of said lowermost carton blank and its attached liner blank when said downwardly bent side portions are brought close to said feed roller, an air nozzle positioned above and adjacent the open section of said floor and arranged to direct a jet of air against and substantially perpendicular to the upper face of the downwardly bent side portion of said attached liner blank coincident with the downward bending of the same in a manner to prevent separation thereof from its correlated carton blank, a presser roller arranged a distance above said feed roller in parallelism thereto, and means operable in timed relation with said suction cup reciprocating means to temporarily lower said presser roller from its elevated position upon said downwardly bent side portions of said lowermost carton blank and its attached liner blank to press said side portions against said continuously rotating feed roller when said suction cup reaches its lowered position in level with said feed roller to enable the latter to completely withdraw said lowermost carton blank with its attached liner blank from said magazine.

6. Mechanism for individually feeding from a stack carton blanks having liner blanks attached thereto, said mechanism comprising a substantially vertically disposed magazine adapted to receive in superposed relation a stack of such carton blanks with their attached liner blanks uppermost, said magazine possessing a floor adapted to support said stack of liner carton blanks in a manner exposing a side portion of the lowermost carton blank in the magazine, said exposed side portion becoming the leading portion of said blank upon its removal from said magazine, a plurality of horizontally disposed feed rollers mounted for rotation below the exposed portion of said carton blank, means for continuously rotating said feed rollers, a plurality of resiliently mounted suction cups disposed below the exposed side portion of said carton blank, means operable to vertically reciprocate said suction cups between a lowered position substantially level with said feed rollers and an elevated position in contact with the lowermost carton blank in the magazine, means operable in timed relation with said suction cup reciprocating means to activate said suction cups when the same are in contact with the lowermost carton blank so that said suction cups may grip the exposed side portion of said lowermost carton blank and remove said exposed side portion together with the corresponding side portion of its attached liner blank from said magazine by bending said side portions downwardly and outwardly therefrom, and to disable said suction cups when they reach their lowered position substantially level with said feed rollers so that said suction cups may release said downwardly bent side portions of said lowermost carton blank and its attached liner blank when they have bent said side portions upon said feed rollers, a plurality of air nozzles arranged to direct jets of air against and substantially perpendicular to the upper face of the downwardly bent side portion of said attached liner blank as it is bent downwardly and outwardly from the magazine by said suction cups in a manner to prevent separation of same from its correlated carton blank, a presser roller arranged above said continuously rotating feed rollers in parallelism thereto, and means operable in timed relation with said suction cup reciprocating means to temporarily lower said presser roller from an elevated position above and affording access to said feed rollers into contact with said downwardly bent side portions of said lowermost carton blank and its attached liner blank to enable said feed rollers and said presser roller to jointly withdraw said lowermost carton blank and its attached liner blank completely from the magazine.

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