May 10, 1938. M. J. MILMOE 2,116,607

PACKAGING MACHINE

Filed June 13, 1932 9 Sheets-Sheet 1

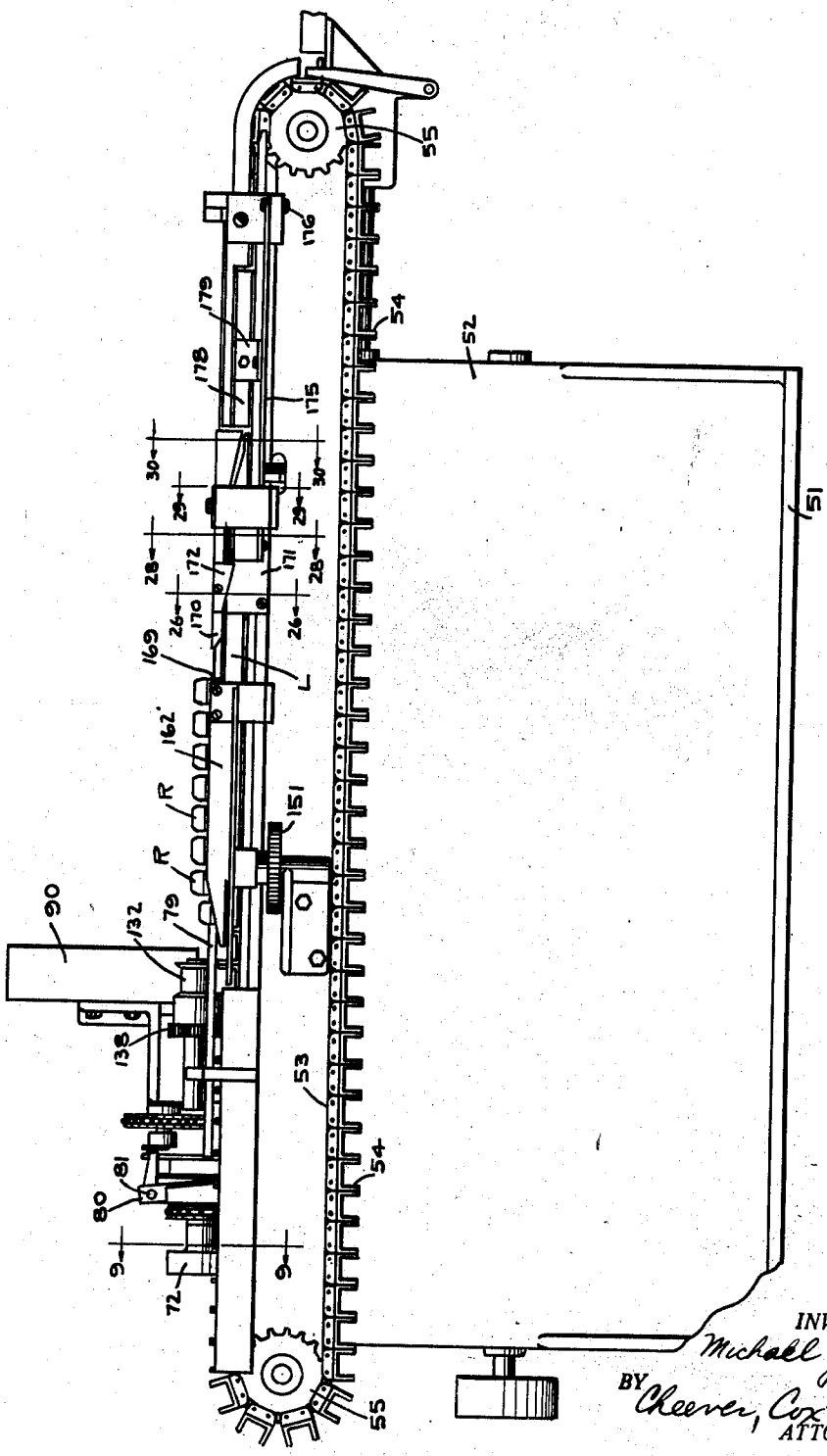

FIG. 1

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May 10, 1938. M. J. MILMOE 2,116,607

PACKAGING MACHINE

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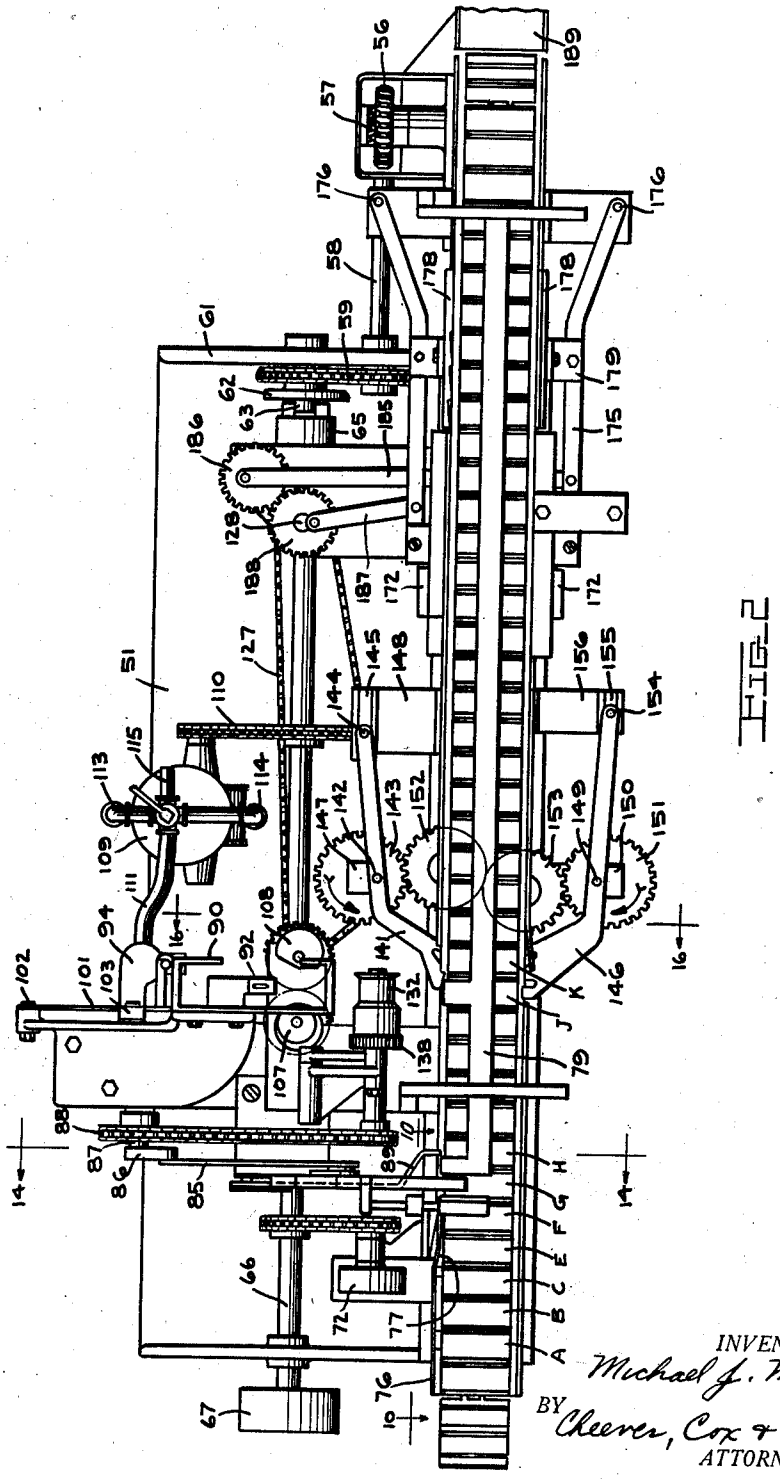

FIG. 2

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May 10, 1938. M. J. MILMOE 2,116,607

PACKAGING MACHINE

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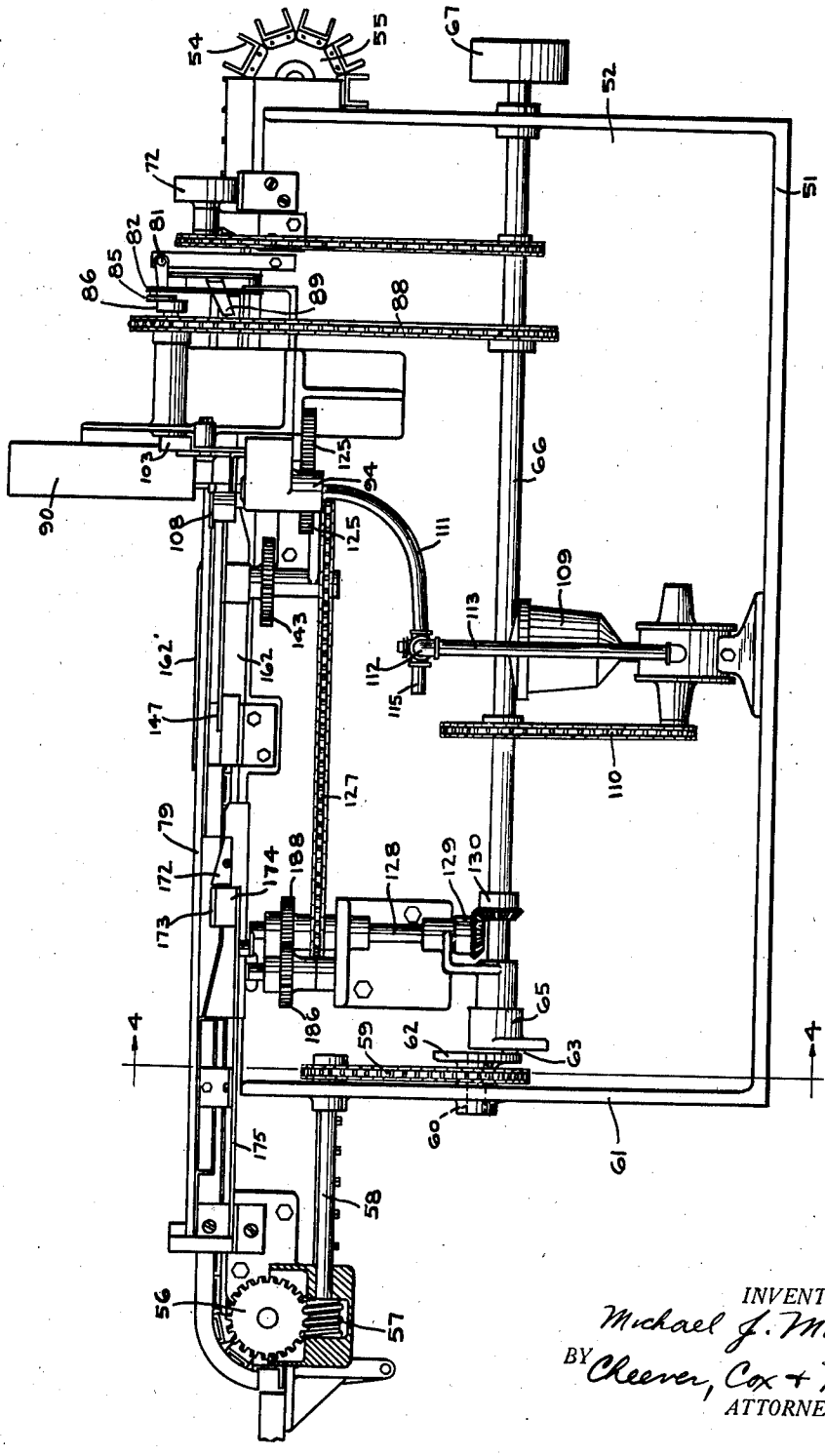

FIG. 3

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May 10, 1938. M. J. MILMOE 2,116,607

PACKAGING MACHINE

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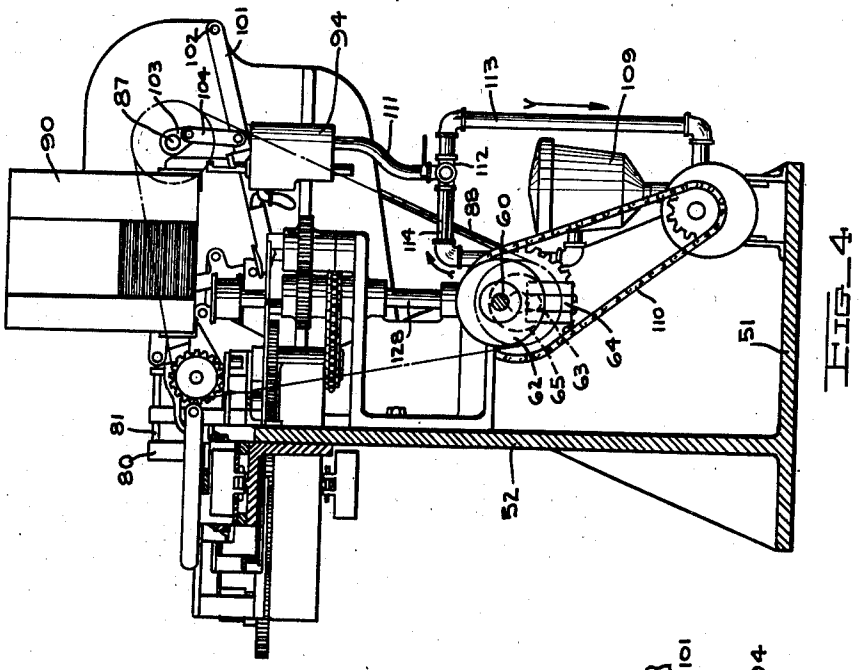

FIG. 4

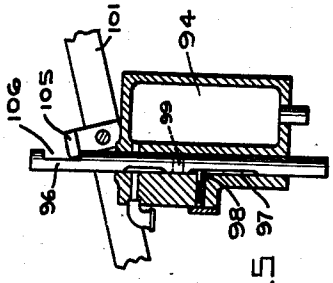

FIG. 5

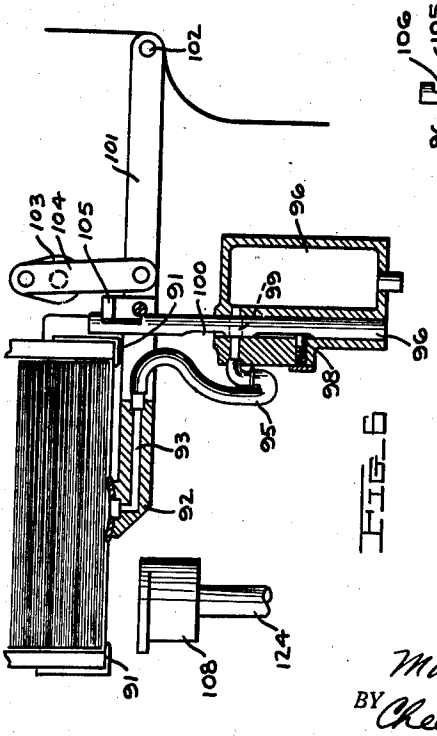

FIG. 6

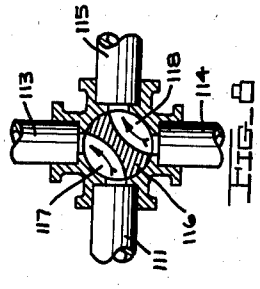

FIG. 8

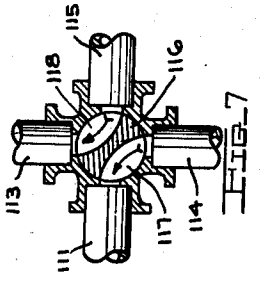

FIG. 7

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PACKAGING MACHINE

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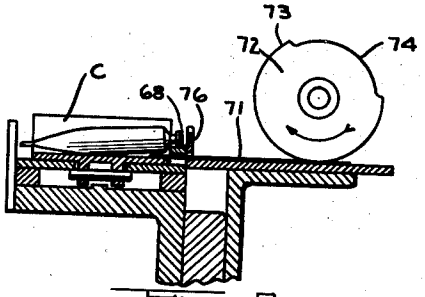

FIG. 9

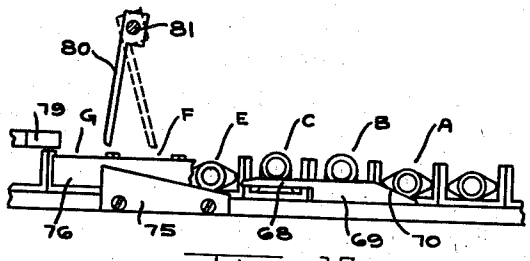

FIG. 10

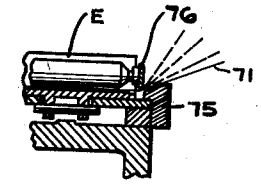

FIG. 11

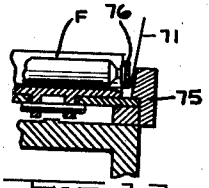

FIG. 12

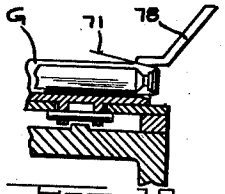

FIG. 13

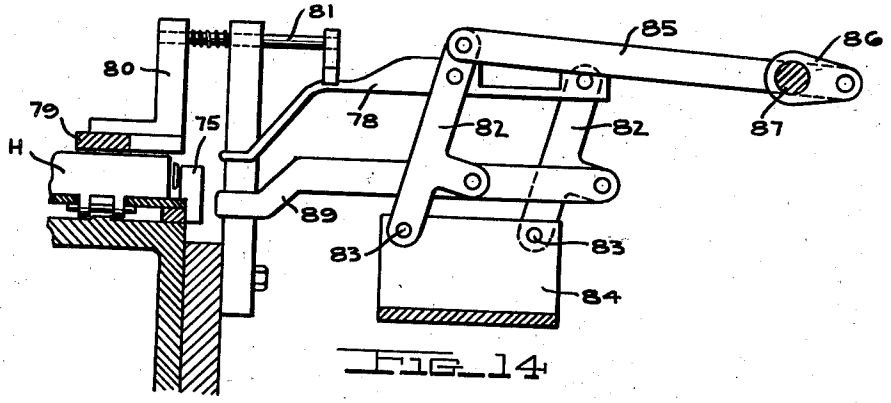

FIG. 14

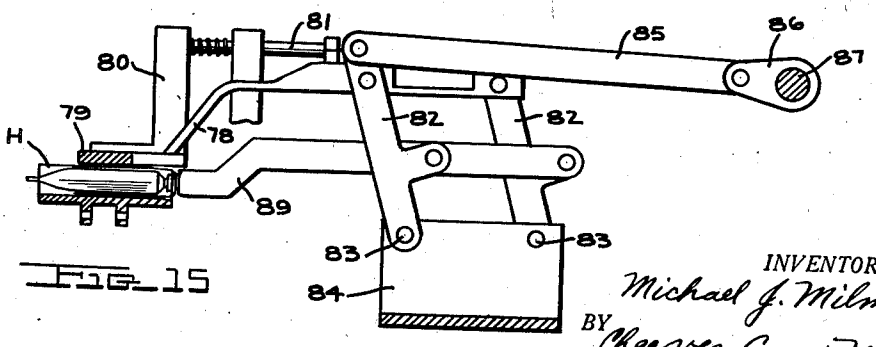

FIG. 15

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PACKAGING MACHINE

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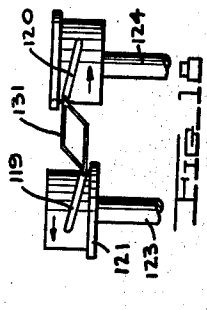


FIG. 18

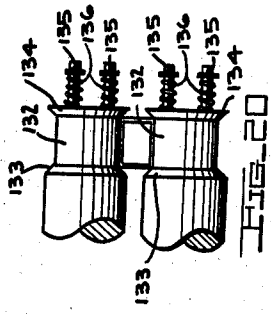


FIG. 20

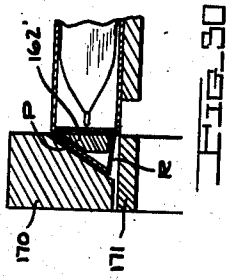


FIG. 30

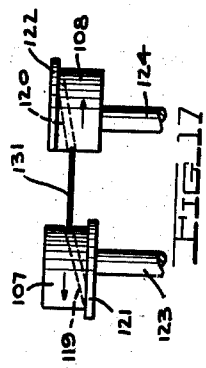
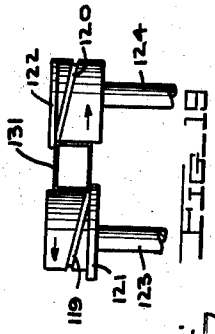


FIG. 17



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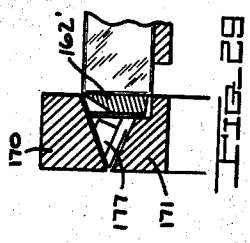

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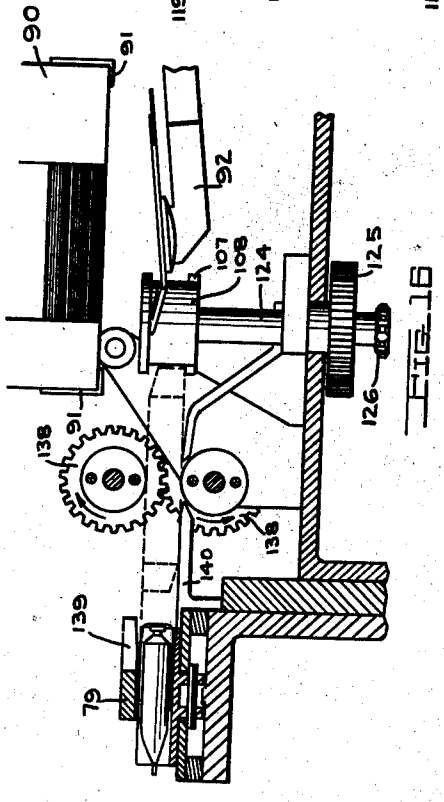

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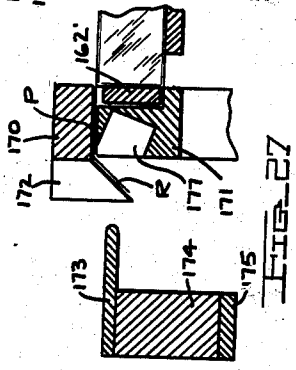

FIG. 27

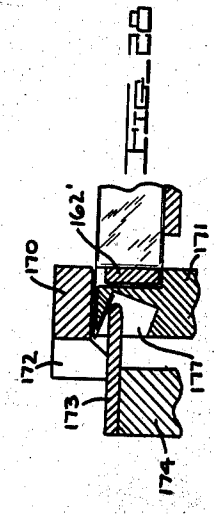

FIG. 28

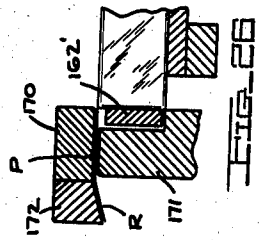

FIG. 26

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PACKAGING MACHINE

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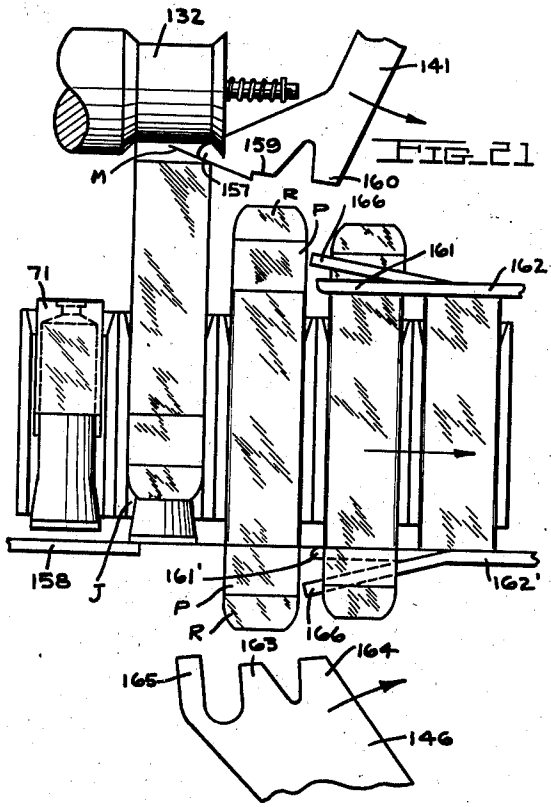

FIG. 21

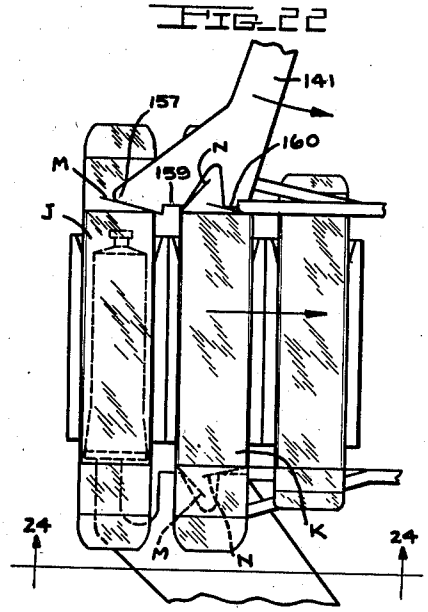

FIG. 22

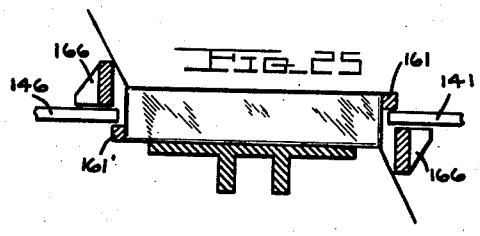

FIG. 25

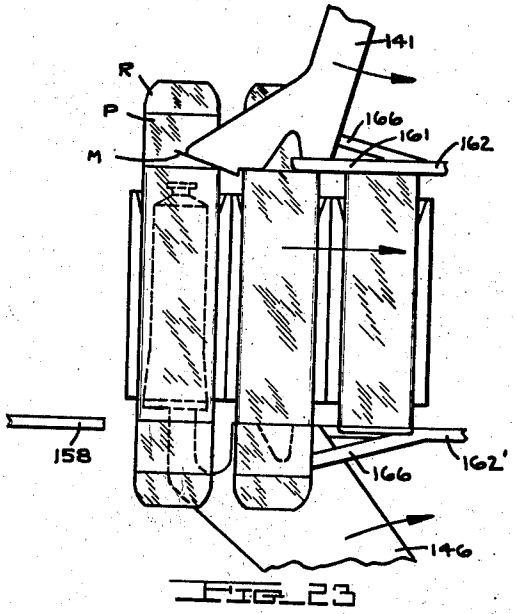

FIG. 23

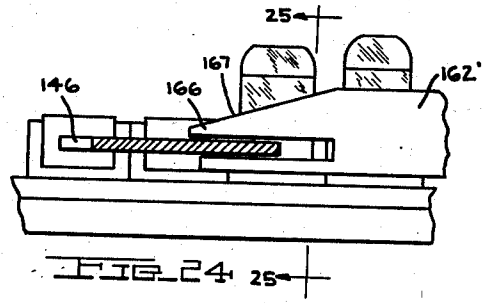

FIG. 24

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PACKAGING MACHINE

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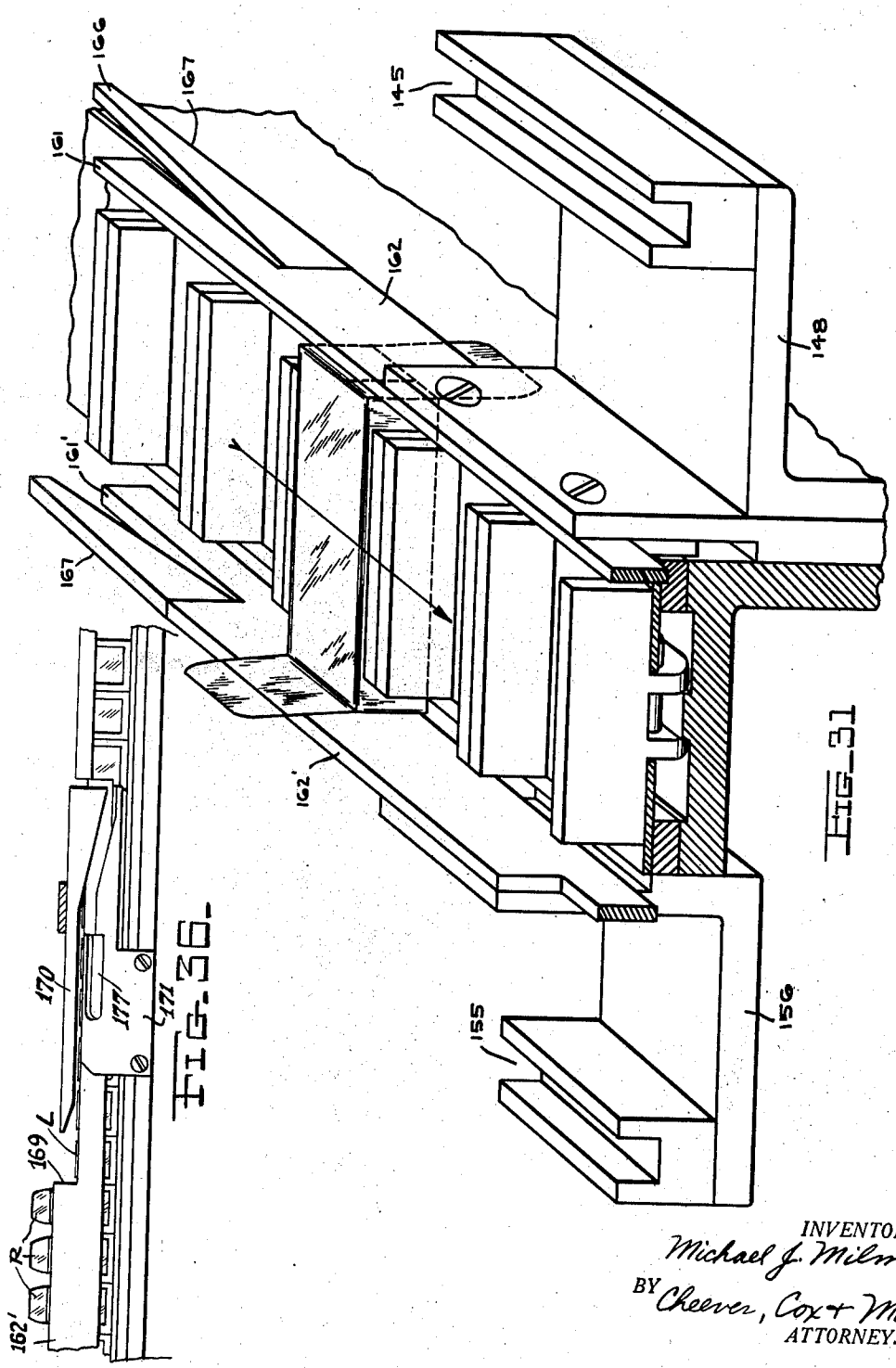

FIG. 31

FIG. 30

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PACKAGING MACHINE

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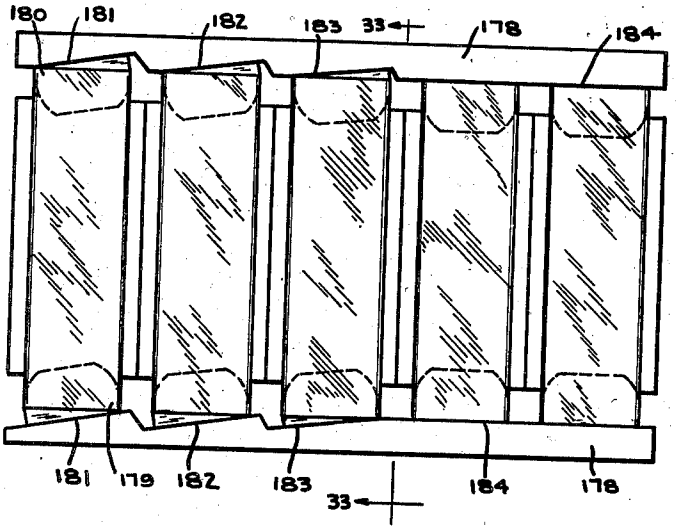

FIG. 32

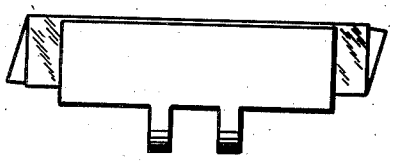

FIG. 33

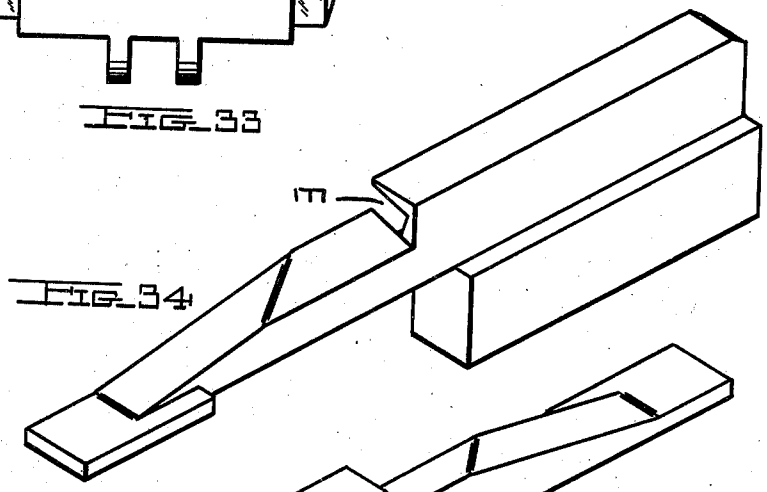

FIG. 34

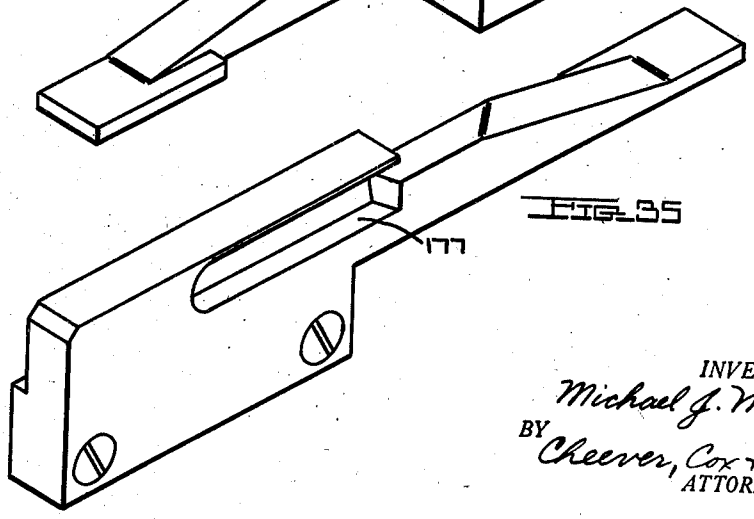

FIG. 35

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Patented May 10, 1938 2,116,607

UNITED STATES PATENT OFFICE

2,116,607

PACKAGING MACHINE

Michael J. Milmoe, Glen Ellyn, Ill., assignor to F. B. Redington Co., Chicago, Ill., a corporation of Illinois

Application June 13, 1932, Serial No. 616,857

58 Claims. (Cl. 93—6)

The present invention relates to packaging machines and particularly to that type of machine in which articles are placed in cartons and either sealed or as in the present instance closed by means of flaps having tabs which are tucked in to hold the flaps in position thereby enabling one to readily open the carton to withdraw the article therein.

One of the objects of this invention resides in the novel means for opening and feeding the cartons to the position in which they are filled.

Another object resides in the provision of means for placing the carton over the articles by an endwise movement rather than by moving the article into the carton. Several disadvantages of moving the article into the carton are that in inserting articles such as tooth paste tubes provided with a metal clip at the bottom, the means for moving the tube into the carton tends to jam the clip and in some instances loosens the clip to such an extent that the tube leaks. Furthermore, the tube does not present an attractive appearance where the same has been jammed out of shape. Also this sometimes results in preventing the article from being carried into the carton in the proper manner.

Another object of this invention resides in the novel means for tucking the flaps after the articles have been inserted in the cartons.

Still another object of this invention resides in the novel means for inserting advertising circulars or the like into the carton along with the article. This is accomplished by wrapping the circular about the end of the article while it is in the pocket and thereafter moving the carton over the circular and article.

Still another object of this invention resides in the novel means for stripping cartons from a stack of cartons in a hopper, such means preferably comprising a vacuum holder.

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 represents a front elevational view of a machine embodying my invention.

Fig. 2 is a plan view of the machine shown in Fig. 1.

Fig. 3 is a rear elevational view of the machine illustrated in Figs. 1 and 2.

Fig. 4 is a cross-section taken substantially along the line 4—4 of Fig. 3.

Fig. 5 is a vertical cross-section through the valve which controls the vacuum holder.

Fig. 6 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.

Figs. 7 and 8 are cross sections showing different positions of a valve provided in the vacuum line to the vacuum holder.

Fig. 9 is a cross-section taken substantially along the line 9—9 of Fig. 1.

Fig. 10 is a vertical sectional view of a portion of the means for inserting a circular in a pocket with the article therein, and is a view taken substantially along the line 10—10 of Fig. 2.

Figs. 11, 12 and 13 show successive positions of the circular as it is wrapped about the end of the article in the pocket.

Fig. 14 is a section taken substantially along the line 14—14 of Fig. 2, showing the means for completing the folding of the circular over the end of the article.

Fig. 15 is a view similar to Fig. 14 showing the parts in a different position of adjustment.

Fig. 16 is a cross-section taken substantially along the line 16—16 of Fig. 2, showing the means for squaring the cartons.

Figs. 17, 18, 19, and 20 are detail views showing additional stages in the squaring of the cartons by the means shown in Fig. 16.

Fig. 21 shows the cartons being inserted over the articles and the making of the preliminary folds of the extending flaps on the carton.

Figs. 22 and 23 are similar to Fig. 21 but show additional steps in the folding of the flaps of the cartons.

Fig. 24 is a view looking in the direction 24—24 in Fig. 22.

Fig. 25 is a cross-section taken substantially along the line 25—25 of Fig. 24.

Figs. 26, 27, 28, 29, and 30 show additional steps in the folding of the flaps of the cartons and tucking in the tabs thereon.

Fig. 31 is an isometric view showing a portion of the folding mechanism for folding the flaps against the ends of the cartons.

Fig. 32 shows the means for performing the last tucking operation.

Fig. 33 is a view looking in the direction 33—33 in Fig. 32.

Fig. 34 is a perspective view of a folding member looking from the side of the machine away from the operator.

Fig. 35 is a view of the same member looking from the operator's side thereof; and

Fig. 36 is a view similar to the right hand portion of Fig. 1 but showing some of the folding and tucking members removed therefrom to expose certain other parts to view.

The present invention is illustrated as applied to a machine for packaging tooth paste tubes and the like, but the principle of operation of this invention is equally applicable to the packaging of other articles. The articles are carried by means of a chain conveyer along a predetermined path, the conveyer having a series of pockets therein for receiving the articles. As the articles arrive at a predetermined position, a portion of a partially folded circular is placed beneath the article and then wrapped over one end thereof, the tube being raised slightly to permit the insertion of the circular between the tube and the bottom of the pocket. While the circular is held in this position, the tubes progress along their path of movement and a carton is moved over the article and circular.

The cartons themselves are withdrawn from a stack of cartons in a hopper and fed between pairs of "squaring" rollers which open the carton and present the same to a position adjacent the article over which the carton is to be placed. Additional means is provided for completing the movement of the carton over the article.

The article in the carton then continues along its path of movement while the flaps at the opposite ends thereof are folded in against the end of the carton, the last flap at each end being provided with a tab which is tucked in to hold the flaps in proper relation to the carton.

Referring now particularly to Figs. 1, 2, and 3, the machine embodies a base member **51**, having an upstanding web portion **52** upon which the operative portions of the apparatus are supported either directly or indirectly as by additional brackets secured to the web or base. A conveying chain designated generally by the reference numeral **53** has a plurality of article receiving pockets **54** and is trained over a pair of sprockets **55** suitably mounted for rotation on the frame at opposite ends thereof. This chain is driven by the means which is best illustrated in Fig. 3. One of the shafts upon which a sprocket **55** is mounted also carries a worm wheel **56** which meshes with the worm **57** secured to the shaft **58**. The shaft **58** is in turn driven by a chain **59** trained over a sprocket on the shaft **58** and a sprocket on a stub shaft **60** rotatably mounted on the web **61** of the frame. The shaft **60** also carries a disk **62** which is rigidly secured thereto and this disk has an eccentrically mounted pin **63** operating in a slot **64** in an adjacent member **65** secured to the main drive shaft **66**. 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 drive illustrated by the parts **60**, **62**, **63**, **64**, and **65** is more fully illustrated in my co-pending application, Serial No. 590,063, and my co-pending application, Serial No. 356,933. The motion which is imparted to the conveyer chain by this mechanism when the shaft **66** is continuously driven at a constant speed is such that the conveyer chain slows down to a very slow speed as the carton is being inserted over the article and after this has been accomplished, the conveyer moves at a more rapid rate so as to position the next article in a position to receive a carton there-over. In other words, there is an alternate slow and fast movement of the conveyer chain. The means for positioning a circular over the end of the article is perhaps best illustrated in Figs. 2, 9, 10, 11, 12, 13, 14, and 15. Fig. 9 shows a tube at the position C in Fig. 2 and in this position, as is best illustrated in Fig. 10, the end of the tube rests on a finger **68** forming an extension of the block **69** secured to the frame. The end of the tube is raised into the position shown at position C by means of the cam surface **70** on the block **69** which engages the articles at the position A, and lifts the same so that the end of the article rides over the upper surface of the block **69** onto the finger **68**. The finger **68** is as thin as practical and provides a space therebeneath through which the circular may be fed to a position beneath the article as is illustrated in Fig. 9, the circular being illustrated by the reference character **71**. The circular is fed by means of a wheel **72** having a concentric portion **73** for feeding the circular, and a second concentric portion **74** below the first portion which prevents the feeding of the circular during a portion of the revolution of the wheel. With this arrangement, it is only possible to feed the circular a given distance and at a given time, this time being at the time when the articles are at the position C.

As the articles progress along their path of movement to the positions E and F, the folding member **75** folds the circular at substantially right angles to the portion which lies beneath the article as is readily apparent from an inspection of Figs. 10, 11, and 12. It will be noted that as the circular is folded into the position shown in Fig. 12, it is folded over a strip designated by the reference numeral **76**. This strip **76** acts as an abutment against which the end of the article is held and guided, and prevents the article from projecting too far out of the pocket. This member, in fact, as is best illustrated in Fig. 2, extends along the path of movement of the conveyer from a position to the left of the position A, to the position G to be referred to later, and at **77** turns inwardly toward the end of the article so as to push all of the articles into the pockets as far at least as illustrated in Figs. 11, 12, and 13.

When the article arrives at the position G an auxiliary folding member **78** moves the upwardly projecting end of the circular over the top of the article and holds it there temporarily while the article moves to its next position H in which latter position, the upper side of the pocket is covered by a presser bar **79**.

The circular as it is being folded by the auxiliary folding member **78** may have a tendency to fold at an angle to the length of the tube rather than in a direction parallel thereto. This is partly due to the continuous movement of the conveyer. In order to overcome this difficulty, a pivoted plate **80** secured to the shaft **81** is provided and this rocks from the dotted line position shown in Fig. 10 to the full line position shown therein and tends to guide the circular as it is being folded by the member **78** into a position parallel with the length of the tube and to assist in holding the circular in position as it is guided beneath the presser bar.

The auxiliary folding member **78** is carried by parallel arms **82** pivoted at **83** to a bracket **84**. A link **85** connected to one of the parallel arms **82** and to a crank **86** rocks the arms **82** back and forth between the positions shown in Figs. 14 and 15 respectively as the shaft **87** upon which the crank **86** is mounted, is rotated. The shaft **87** is driven by means of a chain **88** trained over a

sprocket on the shaft 87 and a sprocket on the main drive shaft 66. An abutment member 89 also pivoted to the links 82 and off-set laterally as illustrated in Fig. 2 and Fig. 3 is adapted to contact with the circular at the position H to move the looped portion of the circular against the end of the article as by this time the circular has passed the end of the member 76 and there is a small clearance there-between. At the position H, therefore, the circular is firmly held about the article by means of the presser bar 79, the bottom of a pocket 54, and the abutment member 89. The articles with the folders wrapped about the ends thereof continue their movement to the position J, at which position the cartons are inserted over the articles.

The manner in which the cartons are inserted over the articles is perhaps best illustrated in Figs. 3, 4, 5, 6, 16, 17, 18, 19, and 20. The cartons 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 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. 6, it will be noted that the withdrawing means comprises a suction head 92 having a passage 93 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 communication 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 passage 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. 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 position shown in Fig. 6, 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 opposite to the end to which the crank 86 is secured, and is therefore driven in unison with the crank 86. After the suction head has placed a carton between the rollers 107 and 108 in the position shown in Figs. 16 and 17, 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. 16, 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. 3 and 4 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. 4. 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. 8, 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. 7. 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 have cam grooves 119 and 120 therein, and are provided with flanges 121 and 122 respectively. The rollers 107 and 108 are carried by shafts 123 and 124 which have inter-meshing gears 125 at their lower ends and the shaft 123 also carries a sprocket 126 secured to the lower end thereof which sprocket is driven by a chain 127 from a sprocket on the shaft 128 which in turn is driven from the main drive shaft through the intermediary of the bevel gears 129 and 130.

The rollers 107 and 108 have eccentric outer cam surfaces and rotate in the directions indicated by the arrows in Fig. 17. The adjacent surfaces of the rollers are farthest away from each other in Fig. 17 and closest together in Fig. 19, while Fig. 18 shows an intermediate position. The carton is received within the grooves 119 and 120 while the cam surfaces are farthest from each other and is in its folded or flat condition, but as the rollers 107 and 108 rotate, the carton is squeezed between the rollers and opens out first as illustrated in Fig. 18, and finally as illustrated in Fig. 19, the carton being indicated by the reference numeral 131 in these figures. The cam grooves guide the opposite corners of the carton so that one corner moves downward against the flange 121, and the other upward against the flange 122 whereby the carton is held in its squared position and is fed in between the two feeding rollers 132. Each of these feeding rollers 132 has a sloping surface 133 integral therewith

on one side of the carton engaging portion and has a disk member 134 on the opposite side of the carton engaging portion. Each disk member 134 has a sloping surface thereon similar to the sloping surface 133. The disk member 134 is slidable on the pins 135 and is spring pressed against the end of the roller 132 by means of springs 136. Since the cartons vary somewhat in their width, the spring pressed disk members 134 will yield outwardly slightly while substantially positively guiding the carton along the desired path. The rollers 132 also maintain the carton in its proper opened condition for receiving the article.

The rollers 132 are driven by means of a chain 88 trained over a sprocket on the shaft 87 and a sprocket on one of the shafts which supports one of the rollers. The other of the rollers is driven by means of the intermeshing gears 138 secured to the shafts on which the rollers are mounted.

With this arrangement, it will be noted that when the cartons are stripped from the stack and fed to the rollers 107 and 108, the flange 122 is positioned away from the carton and does not interfere with its insertion between the rollers, and the carton is brought into a position to be received by the grooves 119 and 120. Since the rollers 107 and 108 are constantly rotating, the carton is immediately picked up and conveyed and opened by the rollers 107 and 108, and as they are squared are passed on to the rollers 132 which in turn feed the carton into a position partially over the article and circular which is wrapped about the end of the article. It will be noted that the presser bar 79 has an extension 139 at the position J, and this extension 139 is tapered upwardly somewhat in a direction toward the rollers 132. Similarly, the bottom of the pocket 54 adjacent the rollers is tapered downwardly so as to facilitate the entry of the carton into the pocket. While the carton is being fed over the articles, it is supported by the member 140 which has the upper surface thereof on substantially the same level as the bottom of the pocket 54.

The rollers 132 will not, however, feed the carton entirely over the article and of course it is to be understood that at this position of the pocket, the conveyer is moving at a relatively slow rate due to the mechanism previously described. It is, therefore, necessary to provide auxiliary means for moving the carton entirely over the article and this is accomplished by means of one of the movable folding members 141 which at the same time folds one of the flaps of the carton into a position across the end of the carton. This means is best illustrated perhaps in Figs. 2, 21, 22, and 23. The folding member 141 is eccentrically pivoted at 142 to an arm 147 secured to the same shaft as the gear 143, and has the end opposite the folding end thereof pivoted at 144 and also slidable in a groove 145 in the bracket 148 so as to permit the folding end of the arm 141 to have a substantially orbital movement in a counter-clockwise direction as viewed in Fig. 2. The gear 143 is driven by means of the previously mentioned chain 127 which in addition to being trained over the sprocket on the shaft 128 and that on the shaft 124 is also trained over a sprocket on the lower end of the shaft which carries the gear 143; see particularly Figs. 2 and 3. A similar folding member 146 is eccentrically pivoted at 149 to an arm 150 secured to the same shaft as the gear 151. The gear 151 is driven from the gear 143 by means of gears 152 and 153. The right hand end of the arm 146 as viewed in Fig. 2 is pivoted at 154 and this pivoted end is also slidable in the groove 155 in the bracket 156. The movement of this arm is substantially similar to that of the arm 141 except the orbital movement is in a clockwise direction rather than in a counter-clockwise direction.

Now it will be seen from an inspection of Fig. 21 that as the cartons leave the rollers 132, the nose 157 of the arm 141 engages the flap M of the carton, folding it inwardly or to the left as viewed in Fig. 21, and simultaneously moves the carton to such a position that it lies completely over the article which is within the pocket at the position J, the article being prevented from sliding out of the pocket by means of an abutment plate 158 rigidly secured to the frame. The member 141 continues its movement until it arrives at the position indicated in Fig. 22 at which position the carton is completely over the article. In this position, the folding member 141 is in contact with three flaps. It has the nose 158 in contact with the flap M of the carton which has just been moved into position over the article at the position J. It also has the projections 159 and 160 in engagement respectively with the flap N of the carton at the position K, and the flap M of the carton at the position K. The conveying chain is moving to the right at this time and as this is being done, the member 141 is moving substantially in the same direction as the conveying chain and moves the flaps M and N into overlapping relation with each other at the position K and holds them in that position as they pass under the extension 161 of the bar generally designated by the reference numeral 162.

It will be noted that the folding member 146 is also provided with projections 163 and 164 corresponding respectively to the projections 159 and 160 on the member 141, and these fold the flaps M and N over each other at the opposite end of the carton and holds them in that position as they move under the extension 161' of the bar 162'. The folding member 146 also has a projection 165 which engages the end of the article in the pocket at the position J at about the time that the carton is moved fully into its operative position over the article. This is necessary in view of the fact that the stop 158 would ordinarily prevent the carton from being moved entirely to its operative position as it is obvious that the flap M at the lower end of the carton in Fig. 21 would engage the stop 158 in its movement into fully operative position over the article. It will be observed that as the carton is being moved over the article in Fig. 21, the conveyer chain is moving to the right and therefore by the time the carton is in a fully operative position, or in a position where the flap M might strike the stop 158, the chain has moved sufficiently to the right to permit the carton to move into its proper position as illustrated in Fig. 23 without striking the stop 158 as the pocket by this time has cleared the stop 158.

The next step is to fold the flaps P over the flaps M and N and tuck the tab R into the slot between the side of the carton and the adjacent edges of the folded flaps M and N. This is accomplished by means of the folding mechanism illustrated particularly in Figs. 23 to 36 inclusive. The description of this feature will be confined only to tucking the flap which is on the side nearest the operator, but it will be understood that this description applies equally well to the tucking of the flap on the other side except that

the parts are reversed in view of the fact that the flaps are connected to opposite sides of the carton. The flap which is on the operator's side of the carton is above the folding member indicated generally by the reference character 162' and above the finger 166, the bottom edge of which is in a plane parallel with the upper surface of the extension 161. The finger 166 has an upwardly sloping surface 167 thereon which turns the flap of the carton into a vertical position substantially as shown in Figs. 24 and 25, whereby the material of the carton is broken along the line of connection of the flap to the body of the carton. This makes the subsequent tucking operation easier as it weakens the material at this point. The flaps P extend upwardly in the position illustrated in Figs. 24 and 25 until they reach the portion 169 of the member 162', and thereafter at the position L, spring downwardly into a substantially horizontal position again and are thereafter guided into the slot formed between the member 170 and the member 171 in the manner best illustrated in Fig. 26. While the flap P is being guided by the members 170 and 171, the tab R, as is seen from an inspection of Figs. 26 and 1, is being turned down by a cam member 172. This finally brings the tab into the position illustrated in Fig. 27 and as it passes out from in under the member 172 as in Fig. 27, a folding member 173 carried by a member 174 on the end of an arm 175 pivoted at 176 moves inwardly against the tab and pushes the same into a recess 177 in the member 171 so that the tab finally occupies the position shown in Fig. 28. While the tab is being held in the position shown in Fig. 28, the conveying mechanism is still moving the carton and as the carton continues its movement, the flap P and the tab R are held in a sort of V-shaped position such as illustrated in Figs. 28 and 29 by the walls of the recess 177 which become narrower in the direction of movement of the conveyer at a position past the position in which the folding member 173 folds the tab R into the recess 177. The shape of the member 171 and the recess 177 between members 170 and 171 is best illustrated in Figs. 34 and 35. As will be seen from an inspection of Fig. 29 and Fig. 35, the recess 177 is first substantially U-shaped in cross-section as seen in Fig. 27 and then changes abruptly to a position substantially V-shaped in cross-section with the apex of the V-shaped portion continuing to move downwardly toward the bottom of the member 171 at points farther along the path of movement of the carton until finally the tab R and flap P have been moved into the position shown in Fig. 30, the upper part of the member 162' being cut away at the top so as not to interfere with the movement of the flap and the tab. Fig. 30 is a section taken substantially at the ends of the members 170 and 171, and these members as well as 162' terminate just a slight distance to the right as viewed in Fig. 1 from the section line 30—30 as will be clear from an inspection of Fig. 1, and the flaps and tabs thereafter are acted upon by the tucking elements 178 which are substantially of the form indicated in Fig. 32. These tucking elements 178 are rigid bars secured by means of the brackets 179 to the arms 175, and move with the arms 175 so that the folding members 173 and tucking members 178 move toward and from the ends of the carton in unison with each other. As will be seen from an inspection of Fig. 30, the tab R is ready to be tucked in and this is done by the bars 178 which force the tabs into the slot between the side of the carton and the adjacent edges of the flaps M and N.

The cartons always have a tendency to resume a collapsed position and therefore instead of the carton being perfectly square, the sides thereof form a figure somewhat like that in Fig. 18, but not to the same extent. The reason is that it is prevented from doing this by the sides of the pocket. However, the cartons must of necessity fit loosely within the pockets since they are very small in size and there must be some clearance to accommodate the cartons of all sizes and also permit sufficient clearance for permitting the ready insertion of the cartons within the pockets. This condition results in making it easier to insert one side of the tab more readily than the other, and it has been found from actual practice that it is preferable to first tuck in the side of the tab which is hardest to tuck in, which in the case of the tab on the operator's side of the machine is the side indicated in Fig. 32 by the reference character 179. As to the tab at the side away from the operator, the hardest side is that indicated by the reference character 180. The bars 178, therefore, are provided with sloping surfaces 181, 182, and 183 which engage the flaps and move the sides of the tabs which are hardest to insert into operative position first, each of the surfaces 182, and 183 sloping less than the surface 181 so as to additionally move the easy side of the tab into operative position. Finally the flat portions 184 of the members 178 engage the flaps P, and thereby move the tabs into complete operative positions within the cartons.

The arms 175 are each actuated by links, the arm 175 on the operator's side of the machine being connected by a link 185 to a gear 186 eccentric thereof so that as the gear 186 rotates the link oscillates the arm 175 about its pivot 176. The arm 175 farthest away from the operator is actuated by a similar but shorter link 187 connected to the arm 175 and eccentrically connected to the gear 188 on the end of the shaft 128. Gears 186 and 188 are in mesh with each other and therefore move in timed relation with each other to reciprocate the folding members 173 and the tucking members 178. The package is now complete and may be ejected from the pockets in any desired manner or merely fall into a receptacle. In Fig. 2, there is indicated a chute 189 into which the filled cartons may be moved by means of any suitable form of ejector, but since this is no part of the present invention, no further illustrations of this part of the mechanism have been made.

No mechanism has been shown for feeding the circulars to a position beneath the circular feeding wheel 72 as it is understood that any form of circular feeding means can be used for this purpose, or if desired, the circulars may be hand fed. In the embodiment of the machine which has been made, however, a known type of circular feeding means has been used for intermittently feeding circulars to the wheel 72.

The operation of the machine is as follows: The articles are placed by hand or by mechanical means in the pockets 54 and as they are carried along to the position A, the ends of the articles strike the cam surface 70 on the member 69 shown in Fig. 10, and ride up over the upper surface of the member 69 onto the finger 68, and at the position C, a circular is fed beneath the finger 68 by the wheel 72 and to the pocket beneath the article as is clearly indicated in Fig. 9. The article then drops off the finger 68 at the

position E and the cam member 75 folds the circular over the member 76 and subsequently the auxiliary folding member 78 folds the circular over the top of the article, this being accomplished at the position G. At the position H, the abutment member 89 engages the loop portion of the circular and moves it against the end of the article, and the circular is retained in this position by the presser member 79. As the articles arrive at the position J, a carton is fed over the article from between the rollers 132 which in return receive the cartons from the rollers 107 and 108 to which the cartons are fed by the suction head 92 in the manner previously described.

As the articles continue their movement to the right as viewed in Figs. 1 and 2, the members 141 and 146 fold the flaps M and N over the end of the carton and hold them in folded position until the cartons are engaged by the members 162 and 162' which thereafter retain these flaps in folded position until the third flap P is folded into position and the tab R contiguous therewith is tucked in to complete the package.

The flaps P are then folded outwardly to weaken the material where the flaps join the body of the carton. This is accomplished by means of the members 162' and 162. The cartons thereafter are permitted at the position L to snap back into their normal position and move between the members 170 and 171, and as the flaps and the tabs R are guided between the members 170 and 171, they are moved more and more into the final position for tucking. This position is shown in Fig. 30. After leaving the position shown in Fig. 30, the tabs are tucked in by means of the members 178 which gradually force first one side and then the other side of the tabs into the cartons. Thereafter the filled cartons may be removed from the pockets by manual means or by mechanical means as may be desired.

It will be noted that throughout the entire operation of this machine, the motion is entirely continuous and there is no jarring due to reciprocating parts which must come to rest suddenly and reverse their motion, or due to the use of cams for operating the parts or by the use of other reciprocating and cumbersome mechanisms which necessarily cause a great amount of vibration in the machine. Furthermore by having the parts running constantly and without interruption, it is possible to increase the capacity of the machine. In other words, the various parts of the mechanism are such that they insure a minimum loss of time and energy. Take for instance the means for squaring the cartons. This means not only provides a means whereby the cartons are quickly and efficiently squared, but also a means whereby the cartons are quickly inserted over the article, the article being the heavier of the two objects remaining at rest while the carton is slipped over the article, thereby preserving the original shape of the article and decreasing the amount of energy necessary to arrange the article within the carton. The conveying chain is also continuously moving and therefore there is no jarring of the machine due to the stopping and starting of the feed chain. Even the reciprocation of the members 173 and 178 is accomplished in a very smooth manner due to the use of the links 185 and 187 connected eccentrically to the continuously rotating gears 186 and 188 respectively.

This type of machine has also been used for the packaging of small glass phials of not over ⅜" in diameter and 2" long and which are very fragile. By moving the carton over the article, there is less possibility of any of these articles being broken, if the same are breakable.

It is to be understood that the construction in the accompanying drawings is only illustrative of the invention described hercin, 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. Mechanism for squaring cartons comprising a pair of feed rollers, means for feeding a carton between said feed rollers and for rotating said feed rollers, the opposing surfaces of said feed rollers moving toward each other as said rollers feed the carton there-between, whereby the pressure on the opposite edges of the folded carton opens the carton.

2. A squaring device for cartoning machines comprising a pair of feed rollers, means for feeding folded cartons between said feed rollers, and means on said feed rollers for exerting pressure against opposite edges of said cartons as they are fed by said feed rollers whereby the carton is opened.

3. A carton feeding means for cartoning machines and the like for opening and squaring cartons fed to said machine in a folded state comprising a feed roller, a member opposed to said feed roller, means for feeding cartons between said feed roller and said member, said feed roller being shaped to bring the active surface thereof continuously closer to said member as said carton is moved between said roller and said member, said carton being fed into the space between said roller and said member substantially with the flat surface of said folded carton extending at substantially right angles to the active surface of said roller.

4. A carton feeding means and the like comprising a pair of rotatable cams mounted in spaced relation with respect to each other with the active surfaces thereof opposed to each other, said cams having eccentric surfaces thereof rotatable in opposite directions and in such timed relation that the highest and lowest portions on said cams are brought into opposition with each other substantially simultaneously as said cams rotate, means for feeding a carton between the active surfaces of said cams while the active surfaces of said cams are farthest from each other, said active surfaces being thereafter operative to squeeze the carton there-between by pressure exerted on the opposite edges thereof whereby the carton is opened as it is fed between said cams.

5. A device as claimed in claim 4 in which said cams are each provided with helical grooves for receiving the edges of said carton when in its folded position, and for guiding said edges in opposite directions substantially parallel with the rotation of the axis of said cams whereby said carton is opened and opposite sides thereof are held against the opposing surfaces of said cams.

6. A carton feeding mechanism for packaging machines and the like comprising a pair of cams rotatable about substantially parallel axes, each of said cams having elements of their outer surface substantially parallel with their axes of rotation, the cam surfaces being eccentric in a peripheral direction so that as said cams rotate the opposing surfaces come closer to and move farther away from each other periodically, cam

grooves in said cam surfaces extending spirally about the axes of rotation of the respective cams, said cam grooves having portions thereof substantially opposed to each other when the opposing portions of said cam surfaces are farthest away from each other at which position of said cams, said cams receive a carton to be opened, means for feeding a carton into said cam grooves while said cams are in said position, means for rotating said cams, said cam grooves guiding the edges of the carton received therein in opposite directions with respect to the longitudinal axes of said cams while said cams exert an increased pressure as said cams rotate due to the opposing surfaces of said cams moving toward each other whereby said cartons are opened and opposite sides thereof brought into contact with the opposing surfaces of said cams.

7. A device as claimed in claim 6 in which said cams are each provided with a flange for preventing the collapse of said carton after said carton is opened.

8. A device as claimed in claim 6 in which a pair of flanged feed rollers receive the carton after it is squared and maintain said carton in squared position as it is fed from between said cams toward a carton filling position.

9. A cartoning device for machines of the class described comprising a pair of cams having the outer surfaces thereof opposed to each other and shaped so that the opposed portions of said surfaces move periodically toward and from each other, a pair of feed rollers adjacent said cams, means for feeding cartons to said cams, means for rotating said cams to open said cartons and feed said cartons to said feed rollers as said cartons are being opened, and means for rotating said feed rollers to feed the cartons received from said cams toward a carton loading position, the means for feeding cartons comprising an arm movable to and from a stack of cartons substantially in a direction parallel with the axis of rotation of said cams, and having a path of movement such that the cartons are fed between said cams in a direction substantially parallel with the axis of rotation of said cams.

10. A device as claimed in claim 9 in which the arm is provided with suction means for gripping and holding cartons as said arm is moved against and away from said stack, said suction means being rendered inoperative as said cams are operative to feed and open the carton fed therebetween.

11. In a cartoning machine, the combination with means for feeding a series of articles along a predetermined path to a loading position, and a plurality of feed rollers for feeding a collapsed carton to said position and for simultaneously opening said carton solely by their own action thereon during feeding thereof as it moves to said position.

12. A device as claimed in claim 11 in which there is provided means for feeding said cartons over said articles while on said feeding means and while said articles remain substantially in the same position with respect to said feeding means.

13. In a cartoning machine, the combination with a support movable along a predetermined path for supporting articles, means for temporarily raising articles as they arrive at a predetermined position, and means for inserting matter to be positioned in said carton with said article between said support and said article while said article is raised, and means for thereafter moving a carton over said article and said matter while said matter and article remain on said support.

14. A cartoning machine comprising a support for articles, means for moving said support along a predetermined path, means arranged in the path of movement of a portion of said article for engaging said article and raising the same partially off said support to permit a circular to be inserted there-beneath, a circular feeding mechanism for feeding a portion of a circular beneath said article while it is in raised position, means operable thereafter for folding another portion of said circular over said article, and means for feeding a carton and said article relatively toward each other with said circular retained in its folded position about said article whereby said circular and article are positioned within said carton.

15. In a cartoning machine or the like, the combination with an article support, means for moving said support along a predetermined path, a guide for positioning one end of said article in a predetermined plane as said article passes a given position, means for inserting a circular beneath said article at that position, means for folding said circular over said guide and article, said guide acting as a breaker for said circular as it is folded over said article, said support thereafter moving said article out of engagement with said guide, and supplemental means for tightly positioning said circular over said article prior to its insertion in a carton.

16. In a cartoning machine or the like, the combination with an article support, means for moving said support along a predetermined path, a guide for positioning one end of said article in a predetermined plane as said article passes a given position, means for inserting a circular beneath said article at that position, means for folding said circular over said guide and article, said guide acting as a breaker for said circular as it is folded over said article, said support thereafter moving said article out of engagement with said guide, and supplemental means for tightly positioning said circular over said article prior to its insertion in a carton, said supplemental means comprising a member for pressing the portion of the circular opposed to the end of the article against the article while the other portions of said circular are held substantially in their previous relation to said article.

17. In a cartoning machine, the combination with a support for conveying articles along a predetermined path, a stationary means arranged in the path of movement of said article for temporarily raising said article, means for feeding a portion of a circular beneath said article while said article is in raised position, said article dropping back into position against said circular after said article passes said raising means, means adjacent the end of said article for positioning the end of said article in predetermined relation to said support, folding means for folding said circular upwardly against said positioning means as said articles move with said support, movable means for thereafter moving the upwardly extending portion of said circular over said article so that said circular is arranged over one end and adjacent two sides of said article, and means for thereafter moving a carton relatively toward said article and circular for positioning said article and circular within said carton.

18. A device as claimed in claim 17 in which means is provided for guiding the last portion of said circular which is folded over said article

into proper relation therewith as said movable means moves that portion of the circular over said article.

19. A device as claimed in claim 17 in which means is provided for guiding the last portion of said circular which is folded over said article into proper relation therewith as said movable means moves that portion of the circular over said article comprising a pivoted plate, and an operative connection between said pivoted plate and said movable means for moving said pivoted plate against a side of said circular in a direction at right angles to the direction of movement of said movable means during its movement in folding said circular over said article.

20. In a cartoning machine, the combination with means for squaring cartons and for feeding cartons to a predetermined loading position, means for feeding articles to said last mentioned position, and means for folding a flap of said carton over one end thereof, said last mentioned means also forming part of said means for feeding said cartons to said loading position.

21. In a cartoning machine, the combination with means for feeding a plurality of articles along a predetermined path, means for feeding cartons over articles as they arrive at a predetermined position in said path, stationary means for holding said articles against movement in the direction of movement of said carton while said carton is being fed over said article, folding means for folding flaps of said carton over the end of said carton, an abutment on said folding means for preventing endwise movement of said article during the last portion of the movement of the carton over said article, said feeding means moving said articles out of operative engagement with said stationary means substantially at the time said abutment moves into engagement with said article, and means for moving said folding means into engagement with opposite flaps of said carton at the same end of said carton and for the purpose of folding said ends over the end of said carton substantially simultaneously with the movement of said abutment into engagement with the article arranged at a position preceding that position in which said flaps of said carton are being folded over the end of said carton by said folding means.

22. Means for folding and tucking flaps of a carton having two flaps to be folded in overlapping relation at one end thereof, and a third flap at the same end of said carton to be folded over said first two flaps having a contiguous tab to be tucked in between said first two flaps and the side of said carton, comprising folding means for folding said first two flaps into juxta-position, means for thereafter bending said third flap in a direction first outwardly from one side of said carton and then inwardly toward said carton and over said first two flaps, means for simultaneously folding said tab inwardly at an angle to said flap into a position to enter the space between the two folded flaps and the side of said carton, and means for progressively moving said tab and flap simultaneously toward operative position over said first two flaps comprising a member having a substantially V-shaped longitudinal slot therein opposed to the end of said carton, said V-shaped slot decreasing in depth in the direction of feeding movement of said carton until said tab has moved partially into the space between the side of the carton and the adjacent first two folded flaps, and means for thereafter moving said tab into completely tucked relation to said carton.

23. A device as claimed in claim 22 in which said last mentioned means comprises means for moving one side of the edge of said tab into completely tucked position prior to the movement of the other side of the same edge into completely tucked position.

24. A device as claimed in claim 22 in which said last mentioned means comprises means for moving one side of the edge of said tab into tucked position prior to the movement of the other side of the same edge into tucked position.

25. Means for tucking the tab on a flap of a carton into tucked relation comprising a movable member, and means for moving said member into engagement with the carton flap to tuck the same, the flap engaging portion of said member being shaped to move one side of the leading edge of said tab into the carton first and thereafter to move the other side of the same edge into said carton.

26. In a means for tucking the tab of a carton provided with a flap and contiguous tab which is to be tucked into the open end of said carton comprising a movable member, and means for moving said member into engagement with the carton flap to tuck the same, the flap engaging portion of said member being shaped to move one side of the advance edge of said tab into said carton first and thereafter to move the other side of the same edge into said carton.

27. In a cartoning machine, the combination with means for feeding an article along a predetermined path, of means for inserting a circular over said article while said article is in motion, and means for moving a carton over said article.

28. In a cartoning machine, the combination with a conveyer for conveying articles along a predetermined path, of means for inserting circulars alongside said articles while said articles move along said path, and means for moving cartons over said articles while said articles are in motion along said path.

29. In a cartoning machine, the combination with a conveyer for conveying articles along a predetermined path continuously, means for feeding cartons over said articles, and means for feeding circulars alongside of said articles while said articles are in motion and before said cartons are moved over said articles.

30. In a cartoning machine, the combination with a conveyer for conveying articles along a predetermined path, means for feeding open cartons over said articles while said articles are in motion along said path, and means for arranging descriptive circulars about said articles while said articles are in motion and prior to the movement of the cartons over said articles.

31. In a packaging machine, the combination with a conveyer for presenting articles at a loading position, a hopper for cartons which are to receive the articles carried by said conveyer, a fluid-operated means for withdrawing cartons from said hopper and for presenting the same to a squaring mechanism, squaring mechanism including a pair of opposed rollers between which cartons are adapted to be moved and squared prior to being presented to the articles to be cartoned, means for guiding the cartons after they are squared over articles at said loading position as said articles are presented at said position by said conveyer, and means operable after the article has been received within said carton for closing the ends of said carton.

32. In a packaging machine, the combination with a hopper for receiving collapsed cartons which, when expanded, have opposite parallel sides substantially at right angles to each other, of means for withdrawing articles from said hopper and for presenting the cartons to a squaring mechanism, a squaring mechanism including a pair of opposed rollers for engaging opposite corners of the carton while the carton is in a collapsed state, said rollers being eccentrically mounted so that as the same rotate, the opposed surfaces thereof are brought closer together and the carton is opened due to the pressure on the opposite corners thereof, guide rollers for feeding said carton and for maintaining the same in squared relation after the carton is open, said last mentioned rollers also feeding the carton over an article at a loading position, means for presenting a series of articles to said loading position in timed relation with the presentation of the cartons at that position, and means for thereafter closing the open ends of said carton.

33. In a packaging machine, the combination with a hopper for receiving collapsed cartons which, when expanded, have opposite parallel sides substantially at right angles to each other, of means for withdrawing articles from said hopper including a pneumatic gripping device for gripping the carton and for moving the same into a position between said rollers, and for releasing the same after said carton is in operative position between said rollers, and for presenting the cartons to a squaring mechanism, a squaring mechanism including a pair of opposed rollers for engaging opposite corners of the carton while the carton is in a collapsed state, said rollers being eccentrically mounted so that as the same rotate, the opposed surfaces thereof are brought closer together and the carton is opened due to the pressure on the opposite corners thereof, guide rollers for feeding said carton and for maintaining the same in squared relation after the carton is open, said last mentioned rollers also feeding the carton over an article at a loading position, means for presenting a series of articles to said loading position in timed relation with the presentation of the cartons at that position, and means for thereafter closing the open ends of said carton.

34. In a packaging machine, the combination with a hopper for receiving collapsed cartons which, when expanded, have opposite parallel sides substantially at right angles to each other, of means for withdrawing articles from said hopper including a pneumatic gripping device for gripping the carton and for moving the same into a position between said rollers, and for releasing the same after said carton is in operative position between said rollers, and for presenting the cartons to a squaring mechanism, a squaring mechanism including a pair of opposed rollers for engaging opposite corners of the carton while the carton is in a collapsed state, said rollers being eccentrically mounted so that as the same rotate, the opposed surfaces thereof are brought closer together and the carton is opened due to the pressure on the opposite corners thereof, guide rollers for feeding said carton and for maintaining the same in squared relation after the carton is open, said last mentioned rollers also feeding the carton over an article at a loading position, means for presenting a series of articles to said loading position in timed relation with the presentation of the cartons at that position, and means for thereafter closing the open ends of said carton, said cartons having a flap adapted to be tucked into the carton after others of the flaps have been folded over the open end thereof, and said means for closing the open ends of said carton including a continuous guide having a slot therein into which said flap which is to be tucked is positioned and folded to bring the portion thereof to be tucked into proper position to be tucked and for thereafter gradually moving the tucked portion into operative position between others of the flaps which have been folded into position across the open end of the carton and an adjacent side of said carton.

35. In a cartoning machine, the combination with means for feeding cartons to a predetermined loading position, means for feeding articles to said last mentioned position, and means for folding a flap of said carton over one end thereof, said last mentioned means also forming part of said means for feeding said cartons to said loading position.

36. In a cartoning machine, the combination with an article support, means for moving said support along a predetermined path, means for inserting a circular beneath said article at a given position of said article in its path of movement, a breaker arranged adjacent said latter position, and means for folding said circular over said breaker and article, said guide acting as a breaker independent of said article for producing a fold in said circular as the same is moved over said article, and said support thereafter moving said article at the position adjacent said breaker.

37. Mechanism of the class described having means for feeding cartons provided with opposed extending flaps arranged initially in substantially parallel relation with each other, the combination with means for feeding a carton endwise to a loading position with said tabs extending to the rear of said carton, of means for moving a carton from said loading position to a position substantially parallel thereto, and tab folding means having a portion thereof adapted to engage one of said tabs before said carton arrives at said loading position to move the same inwardly toward the other tab over the open end of said carton to preliminarily give to said first tab a position at an appreciable angle to its original position with respect to said carton, another portion of said folding means engaging two tabs of a similar carton located at the aforesaid position subsequent to the loading position for moving both of said tabs inwardly into overlapping relation with each other substantially simultaneously with the movement of said tab on said first carton into said angular position with respect to its initial position.

38. A device as set forth in claim 37, in which the portion of said folding means first mentioned also constitutes a portion of said feeding means to move said carton into the loading position.

39. A device as set forth in claim 37, in which the portions of said folding means engaging said cartons at said loading position and said subsequent position are rigidly fixed with respect to each other and move in unison.

40. A device as set forth in claim 37, in which the said folding means first moves inwardly toward said cartons and then subsequently in the direction of movement of said cartons when moving from said loading position to said subsequent position.

41. Tab folding means for folding parallel extending tabs on a carton into overlapping rela-

tion with each other comprising a member engageable with one tab of a carton located at one position and substantially simultaneously engageable with two tabs of a similar carton located at a subsequent position, the folding means moving the first tab into a position at a substantial angle to its initial position with respect to said carton, and moving the tabs on said carton at said second position into overlapping relation with each other, one of which was previously moved to an angular position with respect to its initial position at the first position of said carton, whereby when engaged by said folding means, the same is moved inwardly over the end of the carton before the other tab is so moved.

42. Folding means as set forth in claim 41, in which said folding means moves during the latter part of its folding movement in the general direction in which said cartons move when passing from said first to said subsequent position.

43. In a packaging machine, a conveyor for moving articles along a predetermined path of movement, a stationary cam abutment adjacent said conveyor adapted to be engaged by an end of an article as the latter is moved by said conveyor whereby said end is moved into spaced relation from said conveyor, and means to feed a circular between said end and said conveyor.

44. A cartoning machine comprising a conveyor for conveying a composite article to a cartoning position, means for clamping the parts of the composite article together in predetermined relation as said article is moved to said position by the conveyor and while the article remains immovable relative to the conveyor, and means for passing a carton around said composite article at the cartoning position.

45. In a cartoning machine, a continuously moving conveyor for moving a carton having end flaps along a predetermined path, a pair of opposed flap folding members engageable with said end flaps to fold the same while the carton is on the conveyor, and means for moving said members in an orbital path whereby as said members are moved toward said conveyor into engagement with said flaps they are also moved with said conveyor to maintain contact with said flaps.

46. In a cartoning machine, a conveyor for conveying articles successively to a cartoning position and then to a second position, a member movable toward said conveyor for moving a carton having end flaps over an article at said cartoning position, said member having a portion engageable, as said member is moved, with a flap of the carton on a preceding article in said second position whereby to fold the same.

47. In a cartoning machine, a conveyor for conveying articles successively to a cartoning position and then to a second position, means for passing a carton having end flaps around an article in said cartoning position, a member movable to engage with said article in said cartoning position to hold said article on said conveyor as the carton is passed therearound, said member having a portion engageable, as said member is moved, with a flap of the carton on a preceding article at said second position whereby to fold the same.

48. In a cartoning machine, a conveyor for conveying articles through successive positions, a member movable toward said conveyor from one side thereof, said member being operable as it is moved to feed a carton having end flaps around an article in a first position, and being operable to fold an end flap of a carton on an article in a second position, and a second member movable toward said conveyor from the opposite side thereof, said second member having a portion engageable, as it is moved, with the article in said first position to hold the same, and a portion engageable with the end flap of the carton on the article in said second position whereby to fold the same.

49. In a cartoning machine, a conveyor for conveying a carton along a given path of travel, said carton having at each of its ends a pair of flaps to be folded in overlapping relation and a third flap to be folded over said pair of flaps, a member movable toward said conveyor and engageable with said pair of flaps to fold the same, a fixed guide adapted to be engaged by said flaps after they are folded to hold them in folded position, and a second fixed guide adapted to be simultaneously engaged by said third flap to hold it for folding.

50. The method of tucking the tabs on the end flaps of cartons of the type having an upper flap on one carton end and a lower flap on the other carton end, which comprises moving the tab edge of said upper flap into the carton with that part of the edge adjacent one side wall of the carton in advance, and moving the tab edge of said lower flap into the carton with that part of the edge adjacent the other side wall of the carton in advance.

51. In a cartoning machine having a conveyor for conveying an article along a given path of travel to a cartoning position and means for arranging a circular in juxtaposition to the article upon the conveyor; means for clamping the circular and article together in predetermined fixed relation as said article is moved to said cartoning position, and means for passing a carton around said article and circular at the cartoning position and while the article and circular remain immovable relative to the conveyor.

52. In a cartoning machine, a conveyor for feeding an article to a cartoning position, means for feeding a carton having a plurality of end flaps to said position, a member for passing the carton around the article at said position, said member having a portion engageable with one of the flaps for folding the same during the passing operation, and stationary cam means engageable with other of the flaps for folding the same as the article and carton are moved from the cartoning position by said conveyor.

53. In a cartoning machine, a conveyor for feeding an article to a cartoning position, means for feeding a carton having a plurality of end flaps to said position, a member for passing the carton around the article at said position, said member having a portion engageable with one of the flaps for folding the same during the passing operation, means engageable with said flap for holding it in folding position as the article and carton are moved from the cartoning position by said conveyor, and stationary cam means engageable with other of said flaps for folding the same as the carton and article are so moved.

54. In a cartoning machine of the type adapted to handle cartons having a plurality of end flaps including an overlying tucking flap; tucking means for said tucking flap, said tucking means comprising a tucker movable into engagement with the tucking flap, said tucker having its flap engaging surface angularly disposed with respect to the longitudinal axis of the carton whereby

to tuck one edge of the flap into the carton in advance of the other edge, and a second tucker movable into engagement with the flap thereafter having its flap engaging surface similarly angularly disposed but of reduced angularity.

55. In a cartoning machine of the type adapted to handle cartons having a plurality of end flaps including an overlying tucking flap; a conveyor for moving the cartons through successive positions, and tucking means for said tucking flaps, said tucking means comprising a tucker bar movable into engagement with the flaps, said tucker bar having a plurality of tucker portions engageable with cartons in successive positions, said tucker portions being angularly disposed with respect to the longitudinal axis of the cartons and of successive decreasing angularity.

56. In a cartoning machine of the type adapted to handle cartons having a plurality of end flaps including an overlying tucking flap, the tucking flaps at the ends of the carton being contiguous to opposite carton sides; a conveyor for moving the carton along a given path of travel, and tucker members engageable with the tucking flaps at the ends of the carton, said tucker members comprising a pair of elongated bars having their flap engaging surfaces angularly disposed with respect to the longitudinal axis of the carton whereby to first tuck the leading edge of one tucking flap into the carton and the trailing edge of the other flap into the carton.

57. In a cartoning machine of the type adapted to handle cartons having a plurality of end flaps including an overlying tucking flap, the tucking flaps at the ends of the carton being contiguous to opposite carton sides, and said carton being slightly out of square; tucker members having flat surfaces engageable with the tucking flaps at the ends of the carton, said surfaces when in operative tucking position being relatively parallel and angularly disposed with respect to the longitudinal axis of the carton whereby to first tuck the edges of the tucking flaps into those corners of the carton wherein the side form the greater angle.

58. In a cartoning machine of the type adapted to handle cartons having end flaps including an overlying tucking flap, said cartons being slightly out of square; tucking means for said tucking flaps comprising a plurality of tucker members movable into engagement with the tucking flaps at opposite ends of the carton, said members having their flap engaging surfaces angularly disposed with respect to the longitudinal axis of the carton whereby to first tuck the flaps into those corners of the carton wherein the carton sides join to form the greater angle.

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