

Jan. 24, 1967

M. E. SINGER

3,299,615

CARTON CLOSING APPARATUS

Filed May 1, 1964

7 Sheets-Sheet 1

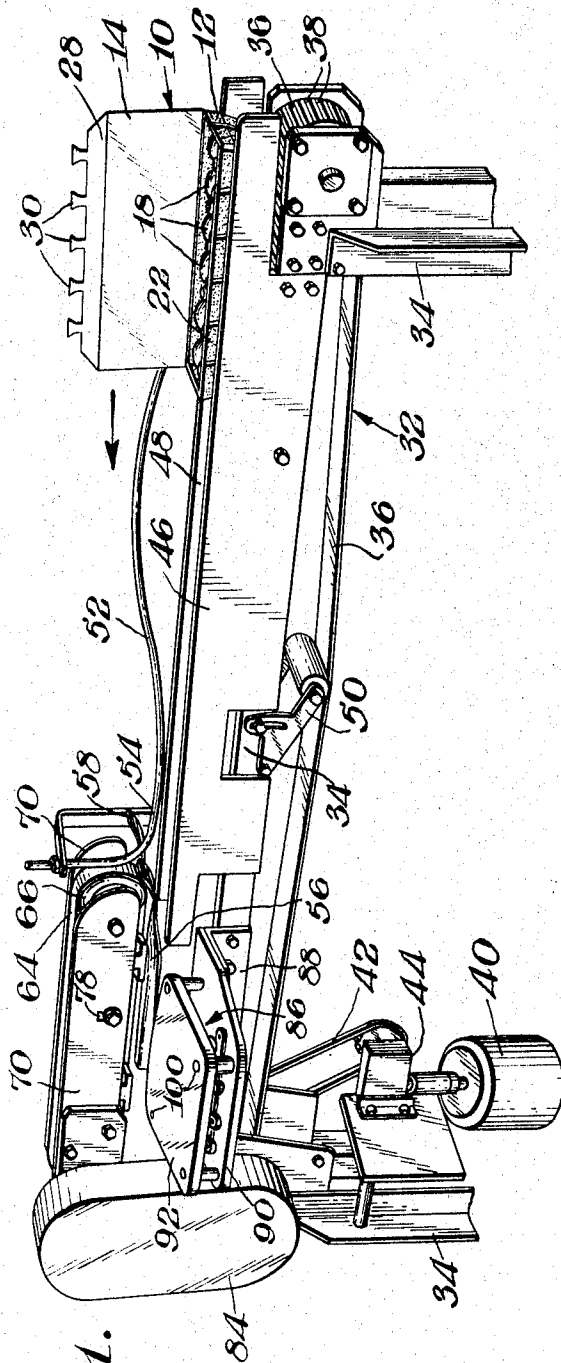


Fig. 1.

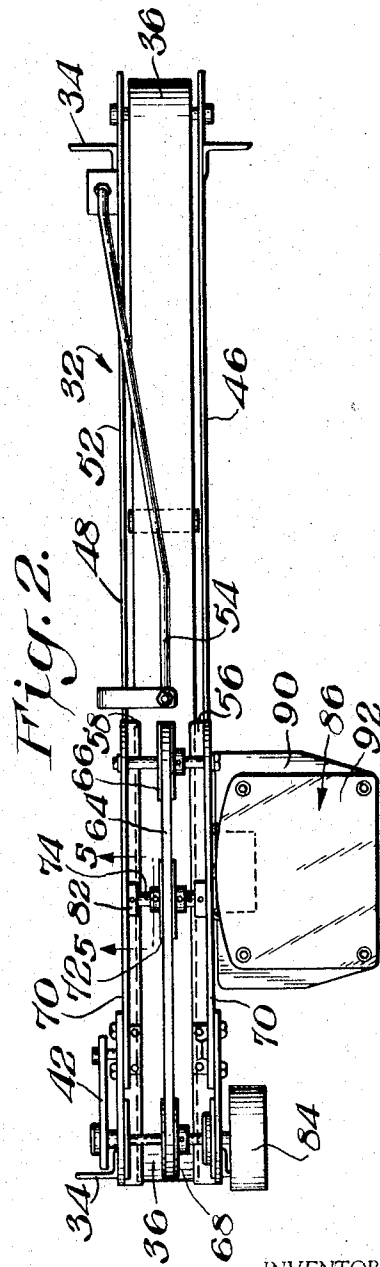


Fig. 2.

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Fig. 3.

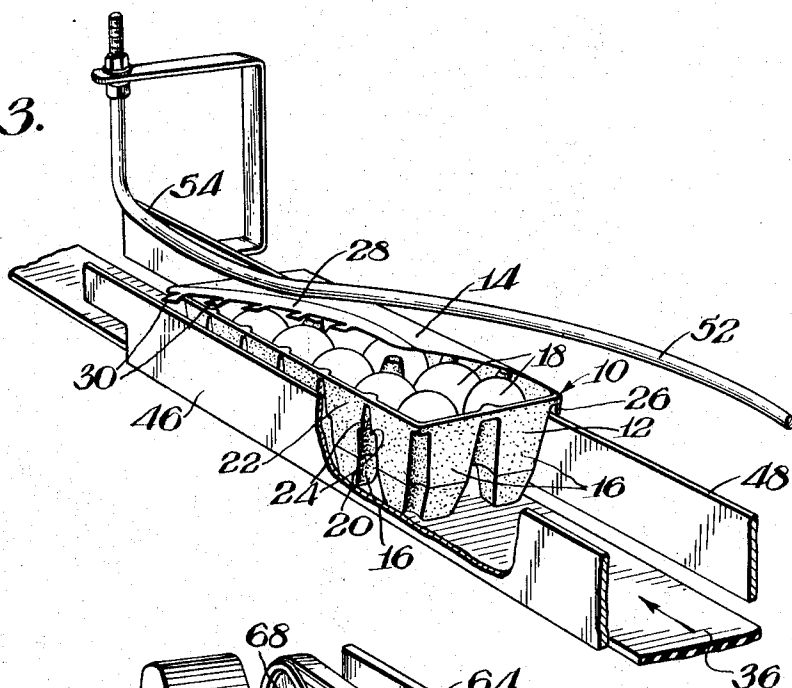
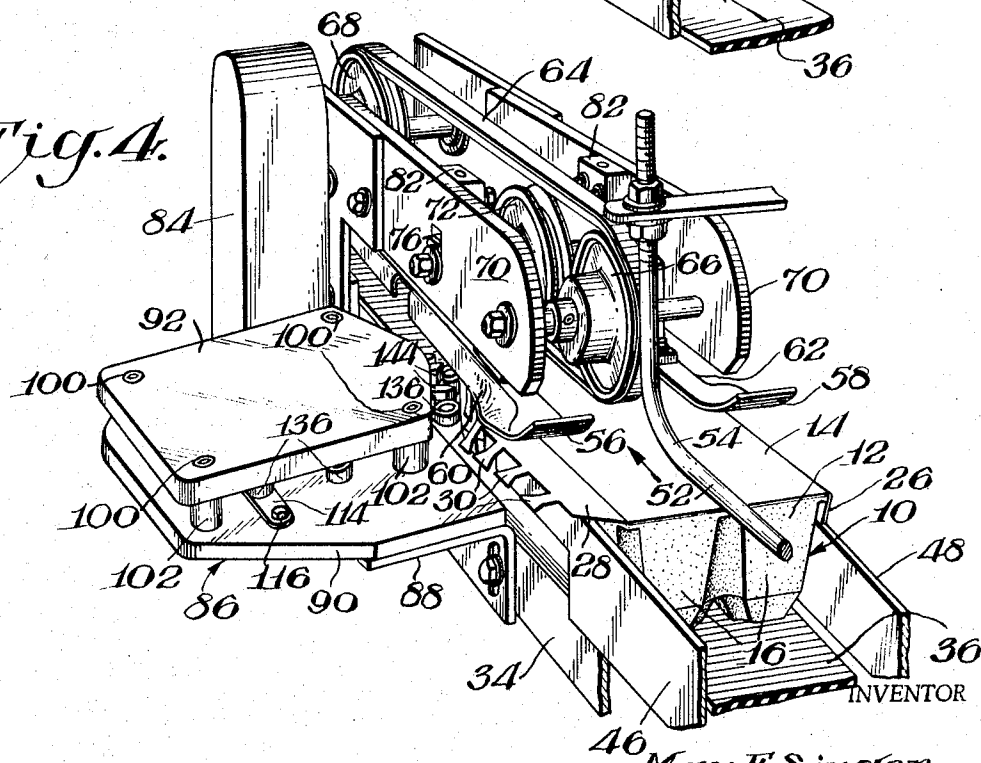


Fig. 4.



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Fig. 9.

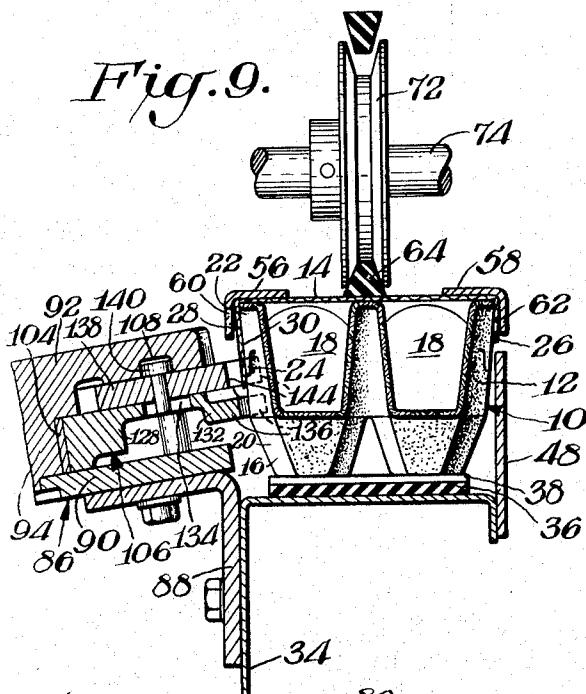


Fig. 6.

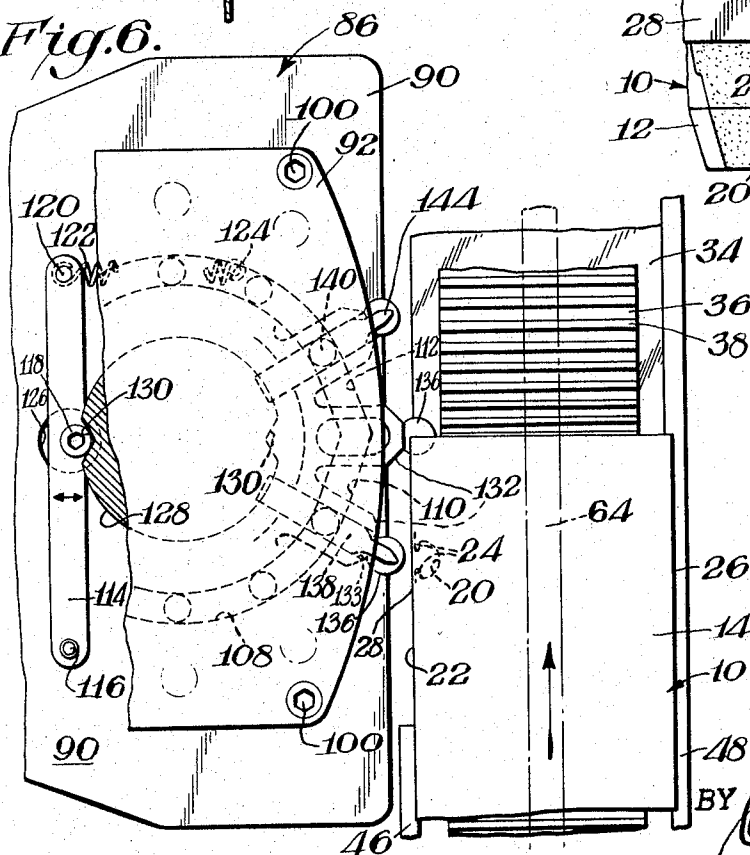
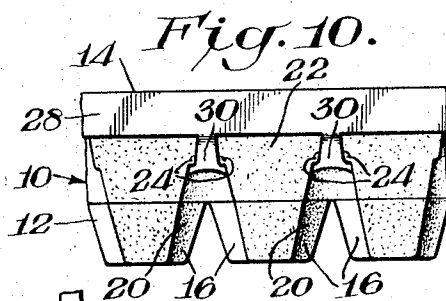
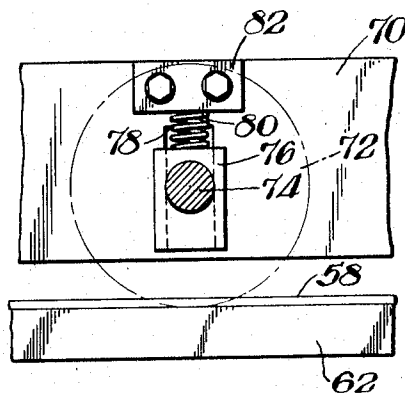


Fig. 5.



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Fig. 7.

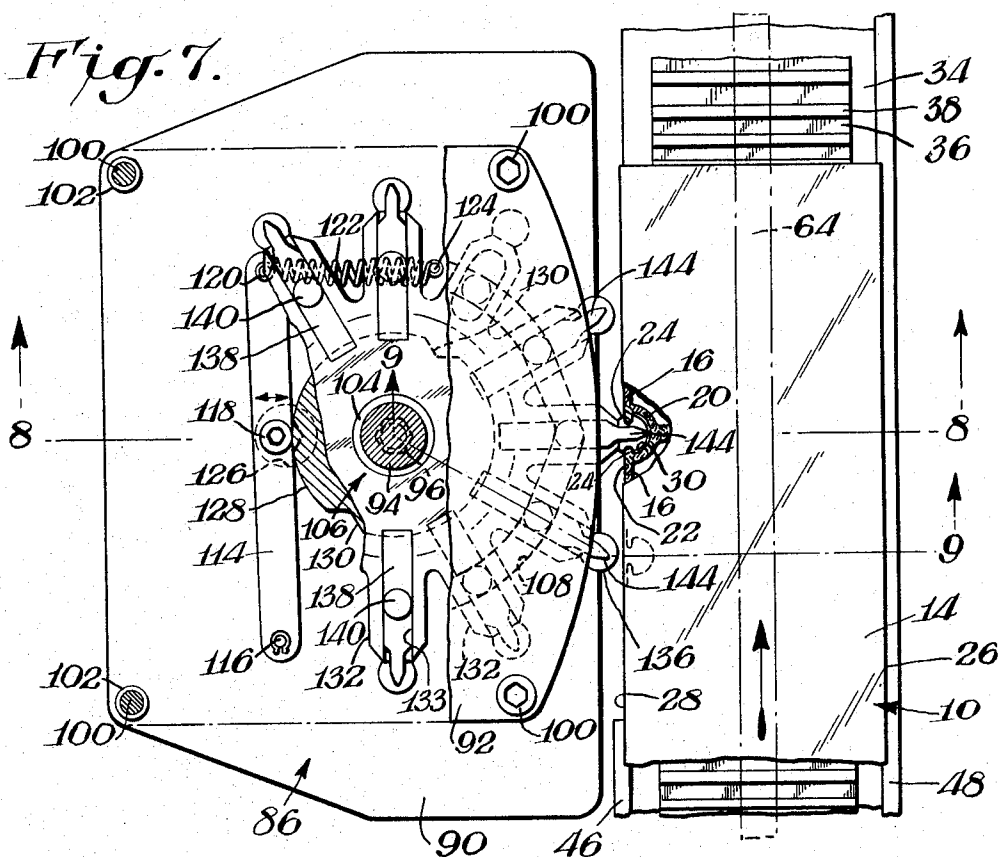
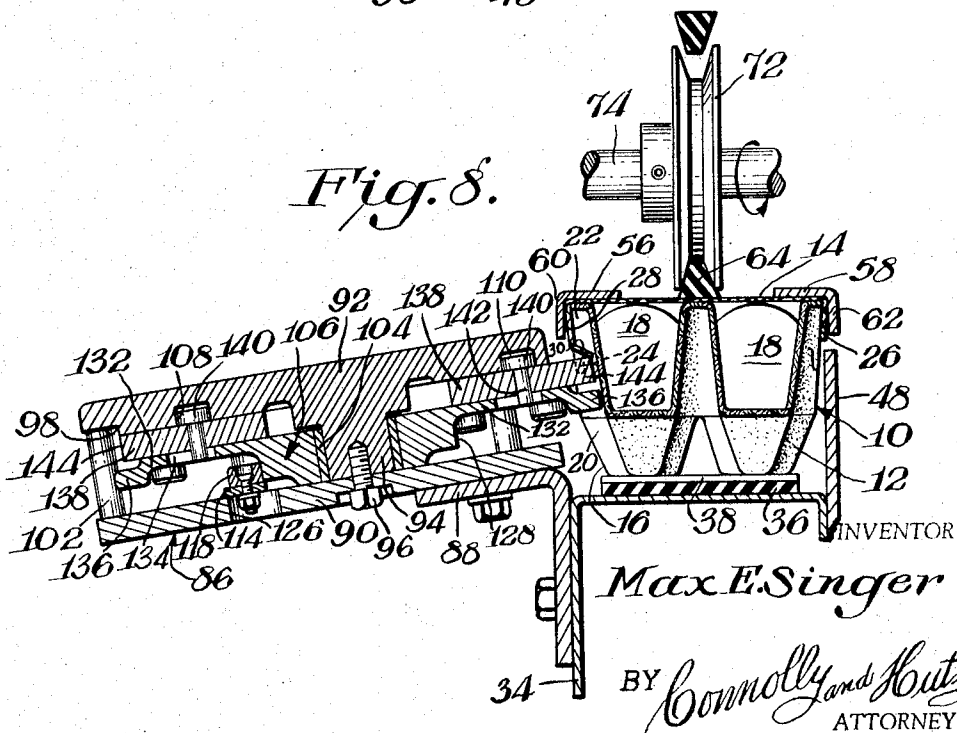


Fig. 8.



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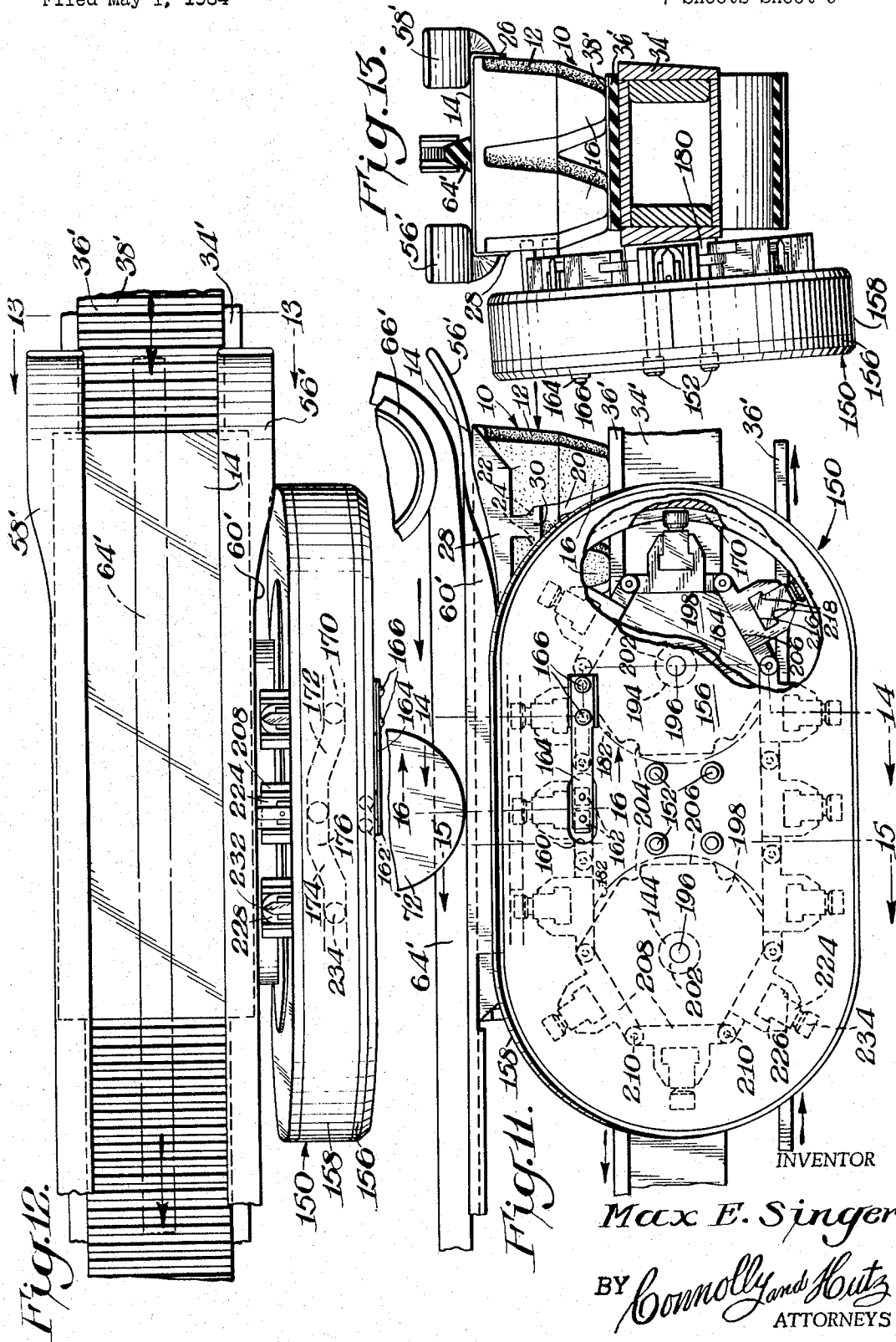
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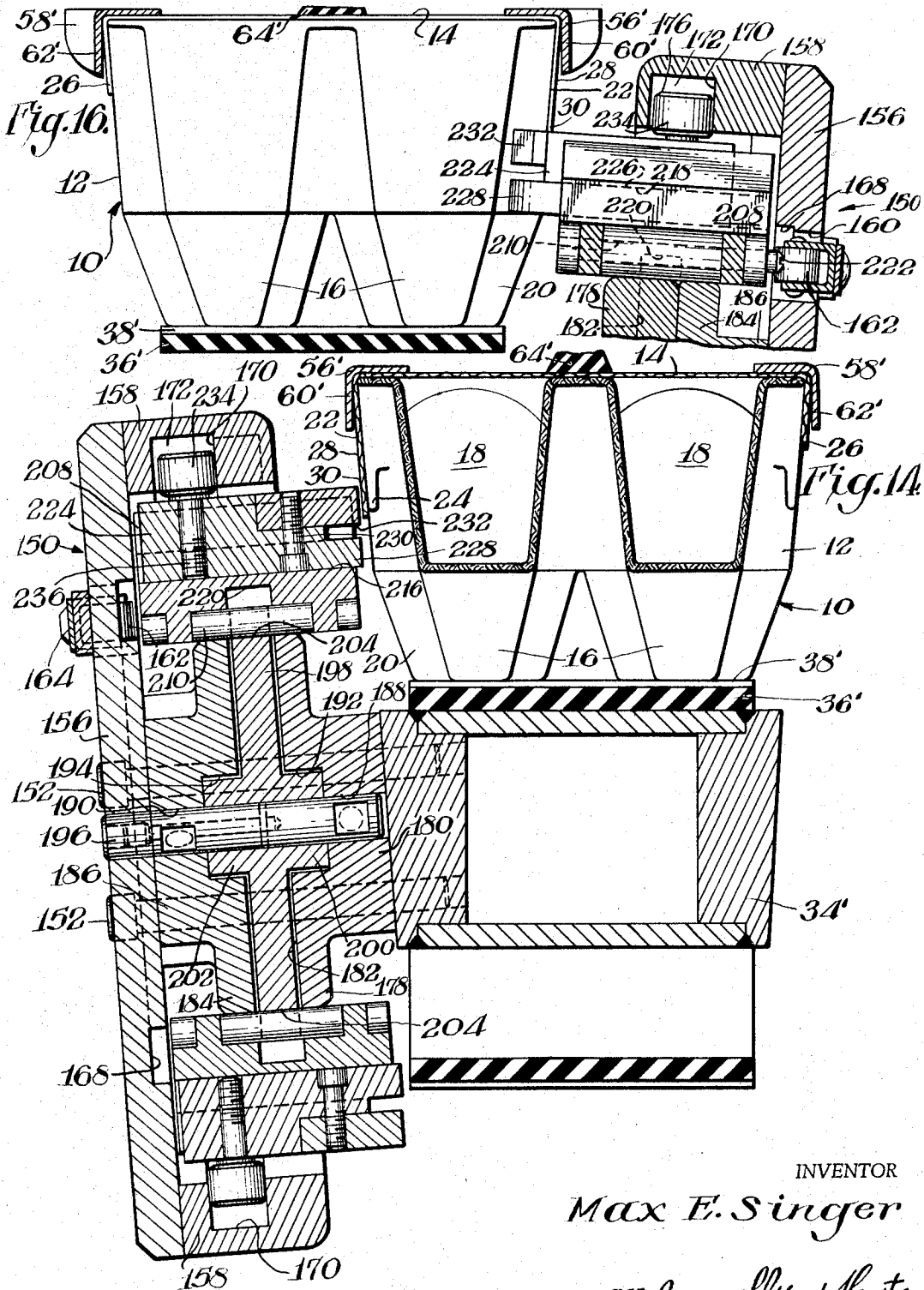
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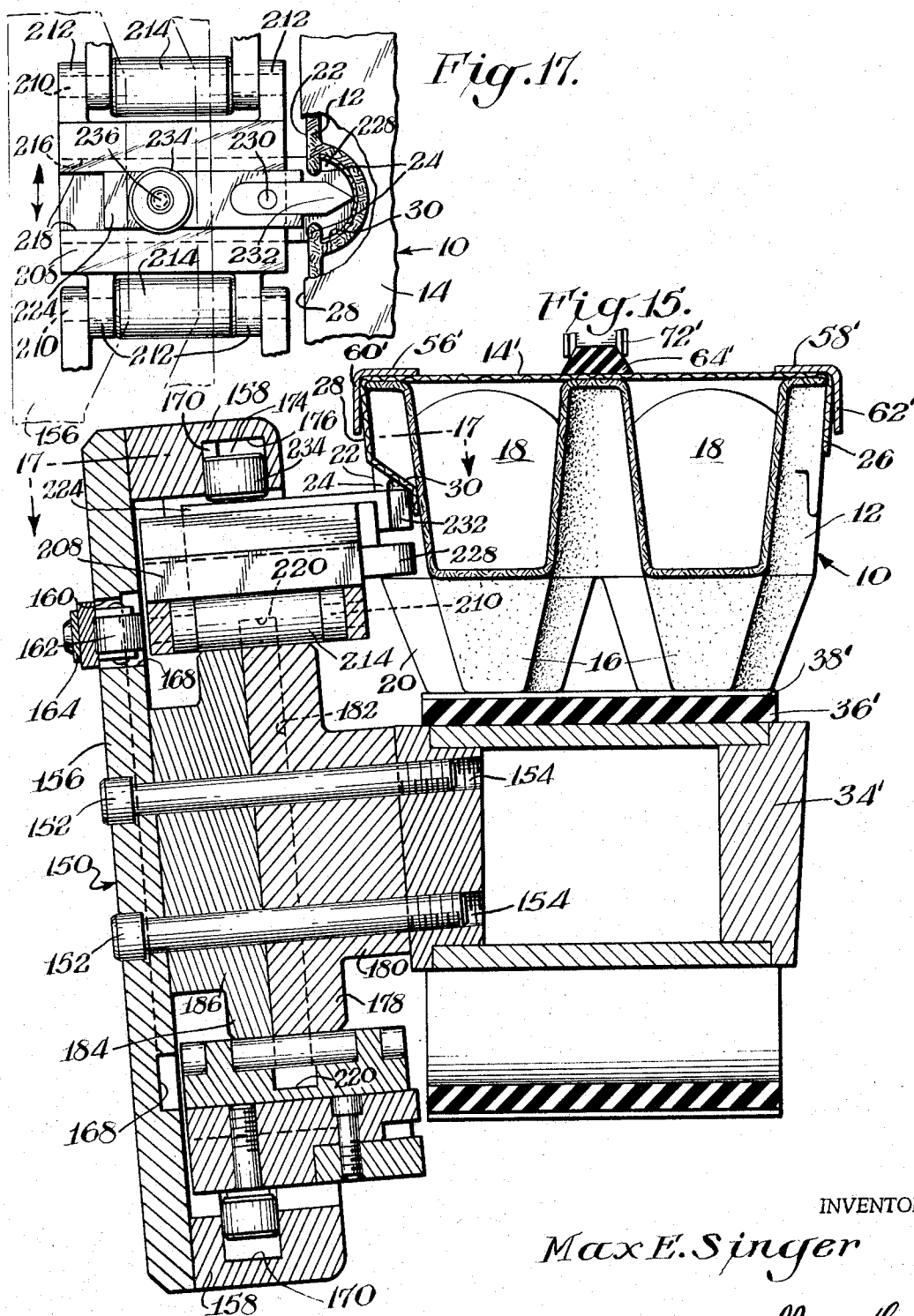
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7 Sheets-Sheet 7



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CARTON CLOSING APPARATUS

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Filed May 1, 1964, Ser. No. 364,075
10 Claims. (Cl. 53—376)

This invention relates to apparatus for latching a pair of cooperating members together, and more particularly to machinery for closing and latching cartons having adjacent wall portions one of which has latching aperture means and the other of which has latching member means to be inserted positively in the latching aperture means.

Prior to the present invention, carton closing machinery has been proposed for handling a wide range of cartons, including proposals for inserting latching members in latching apertures to secure cartons in the closed condition. One problem, however, connected with such proposals is the inability to consistently insure proper registry of the latching mechanism with the portions of a carton which are to be latched. Especially on high speed machines for processing large volumes of cartons on a production line basis, existing proposals which include mechanisms intricate enough to insure proper registry frequently lack characteristics such as ruggedness and dependability.

Accordingly, it is an object of the present invention to provide carton closing machinery wherein cartons having adjacent wall portions one of which has latching apertures and the other of which has latching members are closed and latched in an extremely rapid and highly dependable manner.

Another object of the present invention is to provide carton closing machinery wherein shiftable carton latching mechanism is driven by the very carton upon which it is to act.

Another object of the present invention is to provide carton closing machinery adapted to co-act with a specific type of molded pulp egg carton having chipboard lids glued or otherwise secured to one longitudinal edge of the carton and which have tabbed latching members which cooperate with latching apertures formed in the molded pulp carton itself.

Other objects and advantages of the present invention will become apparent to one skilled in the art from a reading of the following description in conjunction with the accompanying drawings, wherein similar reference characters refer to similar parts and in which:

FIG. 1 is a perspective view of one embodiment of carton closing machine according to this invention showing a single carton in the open condition beginning its passage therethrough;

FIG. 2 is a plan view of the machine of FIG. 1, with the carton removed for purposes of clarity;

FIG. 3 is a fragmentary perspective view with parts broken away showing details of the carton as well as details of the cover closing mechanism;

FIG. 4 is a fragmentary perspective view showing further details of the cover closing mechanism and the tab latching mechanism of the machine of FIG. 1;

FIG. 5 is a fragmentary sectional elevational view on line 5—5 of FIG. 2 showing details of the biasing means for the cover engaging belt;

FIG. 6 is a fragmentary plan view with parts broken away showing a carton coming into engagement with the shiftable latching mechanism of the machine of FIG. 1;

FIG. 7 is a fragmentary plan view similar to FIG. 6 showing the latching mechanism inserting a latching member of a carton cover into a latching aperture of a carton base;

FIG. 8 is a transverse sectional elevational view on

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line 8—8 of FIG. 7 showing details of the means for camming the latching mechanism outwardly;

FIG. 9 is a transverse sectional elevational view on line 9—9 of FIG. 7 showing a latching finger prior to outward camming thereof;

FIG. 10 is a fragmentary front elevational view showing the carton latch members in the closed or latched condition;

FIG. 11 is an elevational view of another embodiment of carton closing machine according to this invention;

FIG. 12 is a top plan view of the apparatus of FIG. 11; FIG. 13 is a transverse sectional elevational view on line 13—13 of FIG. 12;

FIG. 14 is a transverse sectional elevational view on line 14—14 of FIG. 11 on an enlarged scale showing portions of the tab-tucking mechanism;

FIG. 15 is a transverse sectional elevational view on line 15—15 of FIG. 11 on an enlarged scale showing other portions of the tab-tucking mechanism;

FIG. 16 is a fragmentary transverse sectional elevational view on line 16—16 of FIG. 11 with the chain shifted by one-half a link to show other details of the detent mechanism; and

FIG. 17 is a sectional plan view on line 17—17 of FIG. 15 with parts omitted showing further structure of the link mechanism.

Referring in more particularity to the drawings, an exemplary carton 10 suitable for closing by machinery according to this invention may comprise a base portion 12 and a fold-over type cover 14. The base 12 desirably is formed of molded pulp and includes a plurality of depending pocket portions 16 designed to securely position a plurality of articles such as one dozen eggs 18 arranged in two parallel rows of six eggs each. The depending pockets 16 are spaced to define therebetween a plurality of openings or recesses 20 along at least the front wall 22 of the bottom portion of the carton. Each opening 20 is characterized by an opposed pair of overhanging, depending shoulders 24 in the plane of the front wall 22 of the carton bottom.

The cover 14 of the carton 10 may be of chipboard, molded pulp, plastic, or other suitable material having a rear marginal hinge edge 26 which preferably is glued or otherwise pre-secured to the upper portion of the rear wall of the carton bottom. The front margin of the cover 14 includes a longitudinal flap 28 adapted to be folded downwardly over the upper portion of the front wall 22 of the carton. The outer or lower edge of the foldable cover flap 28 includes a plurality of inverted "T" shaped locking tabs formed integrally therealong. Each locking tab 30 is adapted to be retained behind the pair of shoulders 24 associated with each opening 20 between the depending pockets 16 of the carton bottom. It will be clear that many other varieties of latching mechanisms may be closed by machinery according to this invention, and the above described carton is to be taken as merely an exemplary or illustrative version.

The machine 32 for closing and latching cartons according to a first embodiment of this invention as seen in FIGS. 1—9 includes suitable framework 34 for supporting an endless belt 36 having a plurality of lateral serrations 38 upon which a carton 10 may be placed to be carried through the machine. Drive mechanism powered by a suitable source such as an electric motor 40 driving a chain 42 through a speed reducing gear box 44 may be employed for imparting generally continuous motion to the belt 36. A pair of longitudinal side walls 46 and 48 are provided on the framework 34 to guide cartons in end-to-end alignment as they are conveyed through the machine by the belt 36. A belt tightening device 50 may be provided in the conventional manner to insure proper tensioning of the belt 36.

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A cover closing device advisably includes a fixed folding plow member 52 contoured to engage the carton cover 14 and fold it over and down across the top of the carton bottom 12 as the carton is conveyed through the machine. The final portion 54 of the closing plow 52 positions the cover 14 horizontally across the top of the carton with the front marginal flap 28 and its associated tabs 30 projecting laterally beyond the front wall 22 of the carton.

A front flap folding member 56, and a rear reaction member 58, are secured to the framework 34 in position to co-act with the carton as it leaves the final portion 54 of the closing plow 52. The members 56 and 58 (omitted for clarity in FIGS. 6 and 7) may be similar in shape, in mirror image fashion, to act on opposite longitudinal upper corners of a carton. The member 56 includes a down-turned folding portion 60 adapted to bend the front marginal flap 28 of the cover downwardly from its laterally projecting position so as to hold it in final folded condition closely overlying the upper portion of the front wall of the bottom of the carton. Similarly, the reaction member 58 may include a down-turned portion 62 adapted to resist lateral forces applied against the passing carton by the latching mechanism described below. It will be noted that the down-turned folding portion 60 of the member 56 engages only the flap 28 of the carton cover and does not overlie the locking tabs 30 depending downwardly therefrom.

A combination carton hold-down and tab aligning means may include an endless belt 64 running between a front pulley 66 and a rear pulley 68 appropriately journaled in cantilevered portions 70 of the fixed framework 34 of the machine. The pulleys 66 and 68 position the lower reach of the belt 64 for engagement with the upper surface of the closed carton cover 14 approximately along its longitudinal centerline.

A third pulley 72 engages a mid-point of the lower reach of the belt 64 to maintain contact of a predetermined force with the carton cover. The pulley 72 is conveniently mounted on a shaft 74 mounted for rotation at either end in pillow blocks 76 mounted for limited vertical travel in guide ways 78 in the cantilevered frame portions 70. A compression coil spring 80 is positioned to act between the upper side of each pillow block 76 and an abutment member 82 secured to the upper portion of each frame member 70 to provide a downward bias on the pulley 72 to maintain the belt 64 in contact with the upper surface of the covers of passing cartons.

The belt 64 may be driven by rear pulley 68 which in turn may be suitably power rotated by chain and sprocket motion transfer mechanism contained within a protective housing 84. Preferably, as can be understood, the power take-off for such drive means may act from the drive sheave for the conveyor belt 36 to coordinate the speed of the belt 64 with the conveyor 36. Furthermore, the motion transfer mechanism within the housing 84 may include differential speed ratio means whereby the pulley 68 drives the belt 64 so that the lower reach thereof has a surface speed somewhat in excess of the surface speed of the conveyor 36. This insures that the closed covers of cartons are propelled at a slightly greater speed than the bottoms of the cartons to compensate for drag encountered during cover closing from the fixed plow member 52. Shifting of the cover 14 forwardly relatively to the bottom 12 of each carton insures proper registry of the locking tabs 30 with the proper latching openings 20 defined by the shoulders 24 between each pocket portion of the carton bottom. The above described apparatus is essentially similar in both described embodiments of the present invention.

To insert the latching tabs or members 30 in the latching apertures 20, the machine according to the first embodiment of this invention further includes shiftable latching mechanism 86 secured to the framework 34 of the machine by an appropriate cantilevered bracket 88. The mechanism 86 includes a base plate 90 which supports an

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upper cam plate 92 which in turn includes a depending central portion 94 tapped to receive a central securing screw 96. The lateral undercut portion 98 of the upper plate 92 are additionally supported by fastening means 100 at the periphery which act in cooperation with spacer sleeves 102.

A bearing sleeve 104 positioned on the depending central portion 94 of the upper member 92 acts as a central pivot for a shiftable finger positioning member 106. The undercut portion 98 of the upper member 92 includes a cam groove 108 machined therein in generally circular shape with a rise contour 110 and a connecting fall contour 112 at the inner portion thereof adjacent the path of the passing carton. The lower member 90 includes an oscillating arm 114 pivoted at 116 thereto and carrying a detent roller 118 on the upper portion thereof mid-way of the length of the arm. The outer end of the arm 114 is connected at 120 with a coiled tensioned spring 122 anchored at its other end at 124 to the base member 90. A cut-out portion 126 in the base 90 may be provided to receive the lower portion of the pivot pin mechanism for the detent roller 118.

The shiftable finger positioning member 106 pivoted on the bearing sleeve 104 includes a lower circular portion 128 including a pair of diametrically spaced, inwardly directed detent cuts 130. The circular portion 128 is adapted to be engaged by the roller follower 118 on the spring loaded arm 114 to releasably secure the finger positioning member 106 in either of two positions spaced 180° apart, as can be understood. Above the circular portion 128, the finger positioning member 106 further includes twelve radially arranged slide extensions or arms 132. Each extension 132 includes a radial slideway 133 milled therein and a radial guide slot 134 as well as an outer semi-circular tooth portion 136. The spacing of the tooth or carton engaging portions 136 coincides with the spacing of the openings 20 between the pocket portions 16 of the cartons. The radial distance of each portion 136 from the axis of rotation of the finger positioning member 106 is such that each portion 136 is rotated along an endless path intersecting the path of passing cartons.

Ten of the twelve radially extending arm members 132 further include radially shiftable latching fingers 138 mounted for sliding motion in the slideways 133 on the upper surface thereof. The two diametrically opposed members 132 aligned with the two detent portions 130 do not include such shiftable latching fingers 138. Each latching finger 138 includes a roller follower 140 on a pivot pin 142 extending downwardly through the finger 138 and sufficiently far therebelow to ride in the radial guide groove 134 of the extended arm portions 132 of the rotary finger positioning member. The roller followers 140 of each finger are positioned to ride in the grooved cam track 108 to control radial positioning of the fingers 138. The outer radial extremity of each finger 138 includes a tab engaging portion 144 designed to be cammed radially outwardly and inwardly to latch tabs 30 beneath the pair of opposed shoulder portions 24 of the passing carton bottoms.

In operation, this machine operates continuously to propel cartons therethrough in end-to-end relationship at a rate of speed suitable for high volume production lines. It will be appreciated that cartons may be fed automatically by other automatic machines in the production line to the entrance end of the machine, and may be conveyed away from the exit end of the machine by other suitable automatic machines in the production line. At the entrance end of the machine, each carton engages the conveyor belt 36 and is carried thereby through the machine. The lateral walls 46 and 48, at first, and the upper corner guide members 56 and 58, thereafter, maintain each passing carton in properly aligned longitudinal relationship.

As each single carton passes the closing plow 52 at the forward or entrance end of the machine, the cover 14 is folded over the top of the carton bottom (FIGS.

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1 and 3). Because of the stationary character of the folding bar 52, the cover 14 of the carton may be dragged rearwardly in relation to the driven bottom portion 12 of the carton during this operation.

As each single carton leaves the final portion 54 of the cover closing bar 52, the front flap fold-down member 56 bends the front margin 28 of the cover 14 downwardly to overlie the upper portion of the front wall of the carton bottom 12 (FIG. 4). As this is taking place, the upper surface of the carton cover 14 comes into engagement with the oversped closer and hold-down belt 64. The spring loaded central pulley 72 insures firm contact of the belt 64 with the carton cover, and the differential speed ratio driving mechanism in the housing 84 imparts forward travel to the cover 14 of a velocity slightly greater than the velocity imparted to the carton bottom by the conveyor 36. This serves to properly align the locking tabs 30 depending from the front fold-down flap 28 of the cover with the locking apertures 20 of the carton bottom. Thus, as the tabs 30 are folded downwardly with their carrying flap 28, they are properly aligned with their associated locking apertures by the time the carton reaches the latching mechanism.

As seen specifically in FIG. 6, the front corner of the leading end of each single carton initially engages the circular tooth portion 136 of one of the two radially extending arm members 132 which do not carry shiftable tucking fingers 138. The shiftable finger positioning member 106 at this point is releasably held by the spring loaded roller 118 in the proper rotational orientation so that the non-finger carrying tooth 136 will be engaged by the carton. As the carton continues its rapid advance through the machine, the finger positioning member 106 is rotated by the passing carton itself as each circular tooth portion 136 is rotated into the path of the carton to there be picked up by an opening 20 between depending pockets 16 of the carton. In other words, the carton itself acts as a driving rack to impart rotational motion to the finger positioning member 106 in the manner of a driven pinion. This insures that the latching mechanism acts in proper timed relationship to the passing carton even though the carton may not be moving at the exact speed of the conveyor belt 36.

As the next circular tooth member 136 is rotated into an opening 20 of the passing carton, the radially shiftable tucking finger 138 carried thereby is cammed radially outwardly by the rise portion 110 of the grooved cam track 108. This propels the finger 138 radially outwardly with a rapid tucking motion to punch the inverted "T" shaped tab 30 beneath the pair of depending shoulders 24 of the locking aperture (FIGS. 7 and 8). As each such finger carrying tooth member 136 is rotated first into and then out of the path of the passing carton (FIG. 9), its associated tucking finger 138 is likewise shifted radially outwardly and inwardly to secure each latching member in the appropriate locking aperture.

As the last tab 30 is latched properly (FIG. 10) in its appropriate locking aperture, the next tooth member 136 to be rotated into the carton path is the opposite non-finger carrying one. As this tooth reaches its carton engaging rotational location, the opposite detent 130 allows inward spring urged motion of the roller follower 118 of the detent mechanism to arrest rotation of the finger positioning member 106. This insures proper orientation of this member no matter what the spacing between the trailing end of the carton just past and the leading end of the next carton to be conveyed through the machine.

By using cam 108 to operate the fingers 144, the fingers can be held retracted away from cartons until the tab is practically opposite the rotational center of the finger and can then be inserted in a more nearly perpendicular manner while the carton is traveling through a relatively short distance. This tends to avoid misorientation of the tab which might occur if the finger mere-

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ly rotated into and out of the path of the particular carton disclosed without the out and in camming action.

According to another embodiment of this invention, a modified machine for closing and latching cartons is illustrated in FIGS. 11-17. The basic machine is generally identical with the machine illustrated in FIGS. 1 and 2, except that a modified tab-tucking assembly 150 replaces the assembly 86 illustrated in connection with the first embodiment. The carton illustrated in connection with FIGS. 11-17 is identical with the one illustrated in connection with the embodiment of FIGS. 1-9, and similar reference characteristics have been employed to designate similar parts of the carton throughout. The parts of the machine which are similar to those disclosed above in connection with FIGS. 1-9 are designated in FIGS. 11-17 by similar reference characters with the addition of a prime mark ('). Furthermore, overall views of the entire machine have not been repeated, as it can readily be understood that the modified portion is confined to the tab-tucking or latching mechanism 150.

The latching mechanism 150 is secured by suitable fastening members such as bolts 152 received in tapped holes 154 in the side of the framework 34' of the machine at a location adjacent the lid fold down members 56' and 58'. The mechanism 150 includes an outer, generally oval casing member 156 occupying an almost vertical plane parallel with carton front walls and supporting around its periphery by suitable means, not shown, an annular cam track member 158. An aperture 160 through the upper mid-portion of the casing member 156 is provided to permit positioning of a pair of detent rollers 162 secured by a "U" bracket to one end of a leaf-spring 164. The other end of the leaf-spring 164 is secured as at 166 to the casing member 156 to allow yieldable displacement of the detent rollers 162 in a manner described below. The aperture 160 registers with an annular groove 168 on the inner face of the casing member 156 which accommodates detent pintle members, described below.

The cam track member 158 secured to the periphery of the casing member 156 includes an internal track 170 following a continuous path generally parallel with the planar casing member 156 except at an upper zone where a rise portion 172 and a fall portion 174 connect with a short extended track portion 176.

A base support member 178 is positioned adjacent the framework 34' of the machine by the securing bolts 152. The support 178 has a spacer boss 180 on the inner side thereof, and a pair of semi-circular milled recesses 182 at opposite horizontal ends thereof for receiving a pair of positioning sprockets, as explained below. A second support member 184 also includes a central spacer boss 186 and is sandwiched between the spacer member 178 and the casing member 156 by the securing bolts 152. The support members 178 and 184 include aligned bores 188 and 190, respectively, therethrough at spaced horizontal locations concentric with the semi-circular milled recesses 182. Additionally, the support members 178 and 184 include larger stepped openings 192 and 194, respectively, on their mating faces located concentrically with the bores 188 and 190, respectively.

A pair of sprocket shafts 196 positioned in the bores 188, 190 each support an idler sprocket member 198 in the semi-circular milled recesses 182. Each sprocket 198 includes axially lengthened central bearing shoulders 200 and 202 received in the recesses 192, 194, respectively, with a working fit to provide stability against axially applied forces at the periphery of each sprocket. As best seen in FIG. 11, each sprocket 198 includes a plurality of roller receiving recesses 204 spaced by flat link support zones 206 around the periphery thereof.

A plurality of link members 208 connected in end-to-end continuous fashion by pintles 210 form a link chain arrangement trained about the pair of idler sprockets 198 and within the peripheral cam track member 158. Each link 208 includes spaced pintle receiving ears 212 at op-

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posed ends thereof, FIG. 17. Rollers 214 may thus be mounted on the pintles 210 between the spaced ears 212 for rolling engagement with the sprockets 198 in the well-known manner. Each link 208 further includes a lateral guideway 216 including overhanging shoulder arrangements 218 adapted to receive laterally shiftable drive and tucking assemblies. Longitudinally extending lateral guide grooves 220 are adapted to ride over the link support zones 206 of each sprocket to maintain alignment.

Twelve such links are provided in the disclosed embodiment, and all are of essentially identical structure. Additionally, twelve of the pintles 210 are provided; however, two of such pins, at oppositely spaced locations on the endless chain, further include laterally protruding detent abutments 222, FIG. 16. These two abutments protrude beyond the normal lateral boundaries of the link chain structure, and the endless groove 168 on the inner face of the casing member 156 is provided to accommodate their endless travel. The leaf-spring 164 supports the pair of detent rollers 162 through the aperture 160 in the casing member 156 to normally occupy a position in the path of the detent protrusions 122. Thus, as can be understood, the rollers 162 act to orient the positioning of the link members when one of the protruding abutment members 222 is positioned therebetween. Similarly, it will be clear that forces applied longitudinally of the link chain arrangement bias the rollers outwardly on their leaf-spring 164 to permit travel of the links.

Slidably received with a working fit in the guideway 216 of each link 208 is a combined drive and tab-tucking arrangement 224. Each shiftable slide arrangement 224 includes a pair of shoulders 226 which matingly engage the overhanging portions 218 of the guideways 216 to establish rectilinear motion of the members 224 laterally of the link chain arrangement. On the inner end of each member 224, a semi-circular driving tooth 228 is provided to engage with the recesses 20 in the front walls 22 of passing cartons to impart longitudinal motion to the link chain arrangement. Secured as at 230 to each member 224 is a pointed tucking finger arrangement 232 adapted to punch the inverted "T" tabs 30 of the front margins 28 of carton lids beneath the depending shoulders 24 of the recessed portions 20 of the cartons. Finally, each shiftable member 224 includes a roller cam follower 234 secured as at 236 thereto. Each roller 234 extends beyond the normal confines of the link chain arrangement and is adapted to ride in the recessed endless cam track 170 provided in the peripheral member 158.

In operation, the tab-tucking mechanism 150 of the second embodiment functions to lock passing cartons in the closed condition in a continuous fashion irrespective of the speed of the cartons and of the spacing between cartons. As with the embodiment of the machine disclosed in connection with FIGS. 1-9, the conveyor 36' of the present embodiment operates to continually propel cartons 10 with lids properly closed past the mechanism 150. When no cartons are being shifted past the mechanism, the link chain structure is motionless and is properly oriented to receive the next carton by the confinement of one of the detent protrusions 222 between the pair of yieldable detent rollers 162. In this position, all the shiftable slide members 224 are in the retraction position except two. The off-set portion 176 of the cam track 170 positions two of the slide members 224 in the outward or extended position adjacent the path of passing cartons.

When a carton is conveyed by the belt 36' to the tucking mechanism 150, the front corner of the carton end or side wall engages the first of the two outwardly cammed drive fingers 228, as can be seen in FIG. 16. Continued travel of the carton imparts motion of a similar velocity to the endless link chain arrangement. As each following link passes the rise portion 172 of the cam track 170,

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the roller followers 234 of the slides 224 shift the drive fingers 228 outwardly into the spaced openings 20 between egg pockets 16 of the cartons to provide continued driving engagement between the carton and the link chain. Simultaneously, each of the tucking fingers 232 bends the inverted "T" tabs inwardly behind the carton shoulders 24 to latch the covers 14 of the cartons in the closed condition. As each driving finger 228 and its associated tucking finger 232 is driven by the passing carton beyond the rise portion 176 of the cam track 170 where retraction thereof is induced by the fall portion 174, the slide 224 of the following link has been extended by the rise portion 172 of the fixed cam track.

The continuous driving relationship between the carton and the link chain is established with a minimum of contact therebetween. Furthermore, the tucking motion of the fingers 232 of the second embodiment is strictly perpendicular to the carton to insure direct tucking action without danger of misaligning the tabs with the shoulders provided on the carton walls.

Thus, machinery has been disclosed for closing and latching the foldable lid or cover of a carton such as a molded pulp 2 x 6 egg carton. An oversped closer belt is utilized to insure proper registry of the latching portions of the carton by compensating for closing plow drag. Moreover, latching mechanism operates in cooperation with the oversped closer belt to properly engage the latching members of the cartons with the latching apertures thereof. The latching mechanism includes means for insuring proper registry with passing cartons irrespective of the speed or spacing of cartons conveyed through the machine. Finally, the carton closing machine of this invention employs extremely rugged mechanism capable of critical time and space manipulation, and operable to effect essentially direct, perpendicular tucking action.

It will be appreciated that the apparatus of this invention is readily adaptable to securing both sides of a lid to a carton either simultaneously or in rapid sequence. Thus if lids having tabs on both fold-down margins were to be fed into position atop filled carton bottoms, the provision of tab tucking arrangements on both sides of the conveyor belt would operate to latch carton lids in the closed condition.

While the above described embodiments constitute preferred modes of practicing this invention, other embodiments and equivalents may be resorted to within the scope of the actual invention, which is claimed as follows.

What is claimed is:

1. Machinery for closing cartons having adjacent wall portions one of which has latching apertures and the other of which has latching members to be inserted in the latching apertures to latch the portions together comprising power driven means for conveying cartons along a predetermined path past a latching station, latching member inserting means at the latching station shiftable adjacent the predetermined path and in the same direction as passing cartons, carton engaging means connected to shift the latching member inserting means at a speed correlated to the speed of passing cartons, and means connected to extend the latching member inserting means laterally into the path of passing cartons to insert latching members in latching apertures.

2. Machinery for closing cartons having adjacent wall portions one of which has latching apertures and the other of which has latching members to be inserted in the latching apertures to latch the portions together comprising power driven means for conveying cartons along a predetermined path past a latching station, latching member inserting means at the latching station shiftable in one direction along an endless path having a portion adjacent the predetermined path, carton engaging means connected to shift the latching member inserting means in the same direction and at the same speed as passing cartons, and operating means connected to extend the latching member inserting means laterally into the path

of passing cartons where the paths are adjacent to insert latching members in latching apertures.

3. Machinery for closing cartons having adjacent wall portions one of which has latching apertures and the other of which has latching members to be inserted in the latching apertures to latch the portions together comprising power driven means for conveying cartons along a predetermined path past a latching station, latching member inserting means at the latching station including carton engaging means and laterally extensible means, support means connected to carry the carton engaging means and the laterally extensible means in an endless path having a portion adjacent the predetermined path with the carton engaging means positioned so that passing cartons drive the support means in the same direction and at the same speed as passing cartons, cam follower means connected with the laterally extensible means, and stationary cam means engaged by the cam follower means to shift the laterally extensible means into the path of adjacently positioned passing cartons where the paths are adjacent to insert latching members in latching apertures.

4. Machinery for closing cartons having bottom portions and lid portions one of which has latching apertures and the other of which has latching members to be inserted in the latching apertures to latch the portions closed comprising power driven means for conveying bottom portions and lid portions of cartons along a predetermined path past a lid closing station and a latching station, means at the lid closing station connected to position lid portions and bottom portions in closed relationship with the latching members adjacent the latching apertures, latching member inserting means at the latching station shiftable adjacent the predetermined path and in the same direction as passing cartons, and means connected to extend the latching member inserting means laterally into the path of passing cartons to insert latching members in latching apertures.

5. Machinery for closing cartons having bottom portions and lid portions one of which has latching apertures and the other of which has latching members to be inserted in the latching apertures to latch the portions closed comprising power driven means for conveying bottom portions and lid portions of cartons along a predetermined path past a lid closing station and a latching station, means at the lid closing station connected to position lid portions and bottom portions in closed relationship with the latching members adjacent the latching apertures, latching member inserting means at the latching station shiftable adjacent the predetermined path and in the same direction as passing cartons, power driven means connected to arrange lid portions and bottom portions in

proper positional relationship for latching as cartons pass the latching station, and operating means connected to extend the latching member inserting means laterally into the path of passing cartons to insert latching members in latching apertures.

6. Machinery for closing cartons having bottom portions and lid portions one of which has latching apertures and the other of which has latching members to be inserted in the latching apertures to latch the portions closed comprising power driven means for conveying bottom portions and lid portions of cartons along a predetermined path past a lid closing station and a latching station, means at the lid closing station connected to position lid portions and bottom portions in closed relationship with the latching members adjacent the latching apertures, latching member inserting means at the latching station including carton engaging means and laterally extensible means, support means connected to carry the carton engaging means and the laterally extensible means in an endless path having a portion adjacent the predetermined path with the carton engaging means positioned so that passing cartons drive the support means in the same direction and at the same speed as passing cartons, cam follower means connected with the laterally extensible means, stationary cam means engaged by the cam follower means to shift the laterally extensible means into the path of adjacently positioned passing cartons, and power driven means connected to arrange lid portions and bottom portions in proper positional relationship for latching as cartons pass the latching station to insure insertion of latching members in latching apertures by the laterally extensible means.

7. Machinery for closing cartons as in claim 6 wherein the laterally extensible means is cammed individually relative to the carton engaging means.

8. Machinery for closing cartons as in claim 6 wherein the support means comprises a turret arrangement pivoted for rotary motion.

9. Machinery for closing cartons as in claim 6 wherein the laterally extensible means and the carton engaging means are cammed together as a unit.

10. Machinery for closing cartons as in claim 6 wherein the support means comprises a link chain arrangement trained around a plurality of idler sprockets.

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