

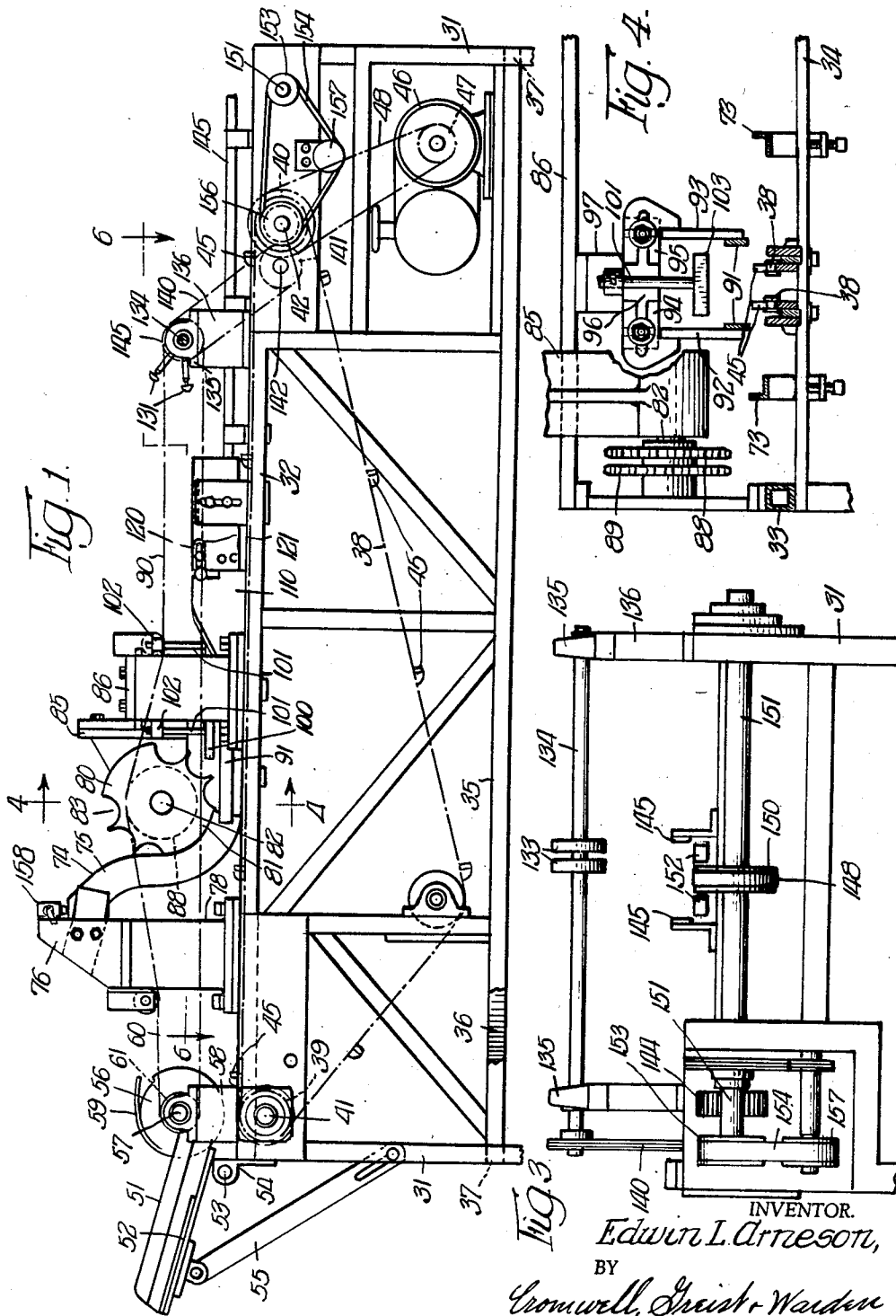
April 5, 1960

E. L. ARNESON
CAN PACKAGING MACHINE

2,931,152

Filed June 30, 1958

4 Sheets-Sheet 1



INVENTOR.
Edwin L. Arneson,
BY
Cromwell, Shick & Warden
Attys

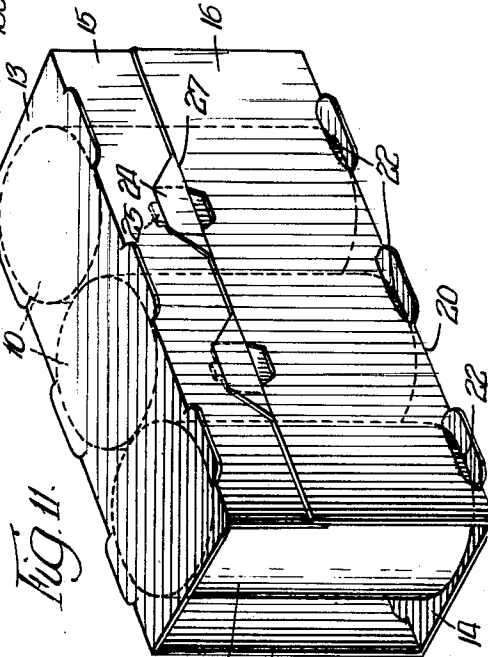
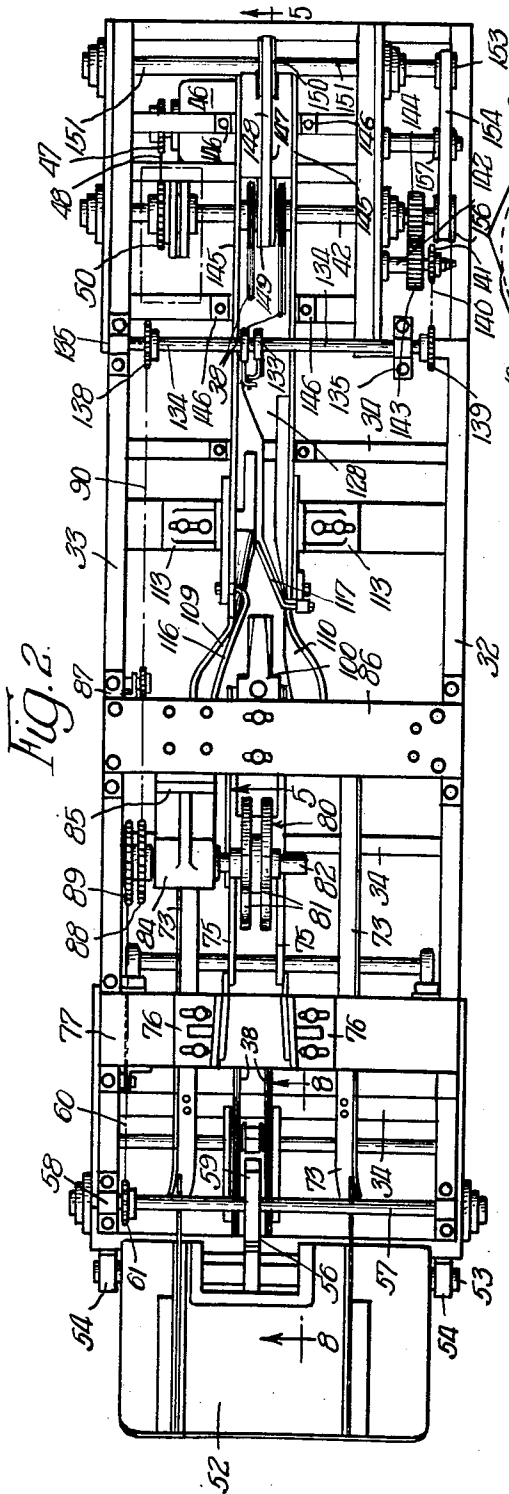
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4 Sheets-Sheet 2



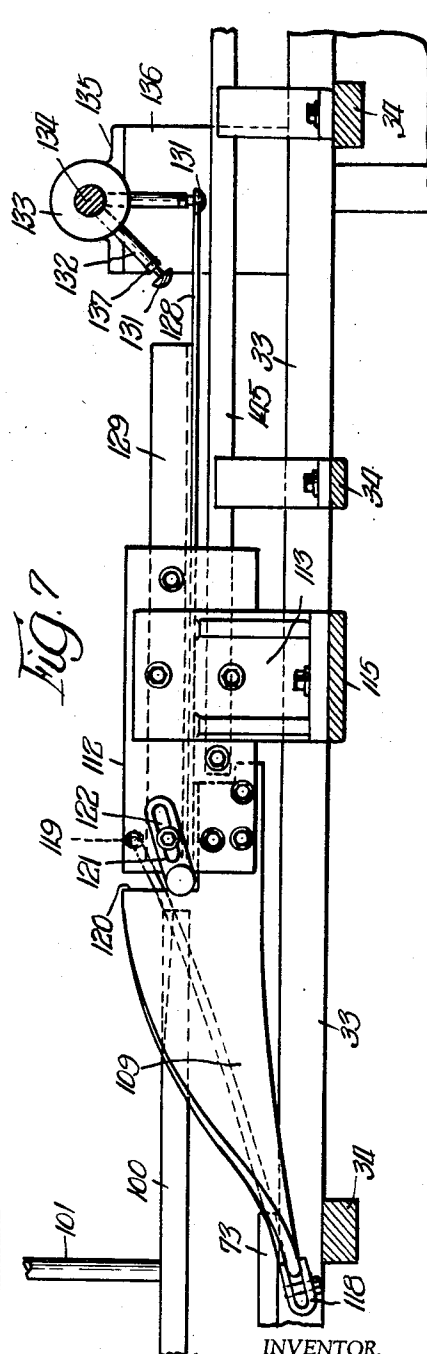
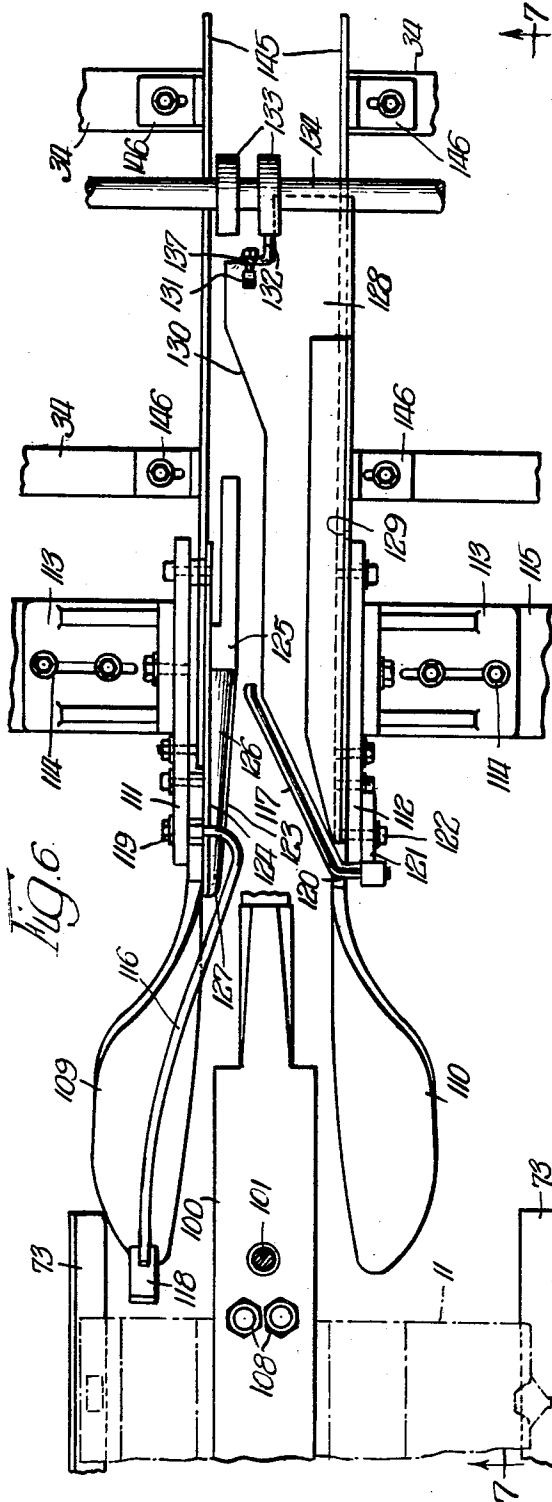
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4 Sheets-Sheet 3



INVENTOR.
Edwin L. Arneson,
BY
Cromwell, Christ & Warden
attys

April 5, 1960

E. L. ARNESON
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4 Sheets-Sheet 4

Fig. 5.

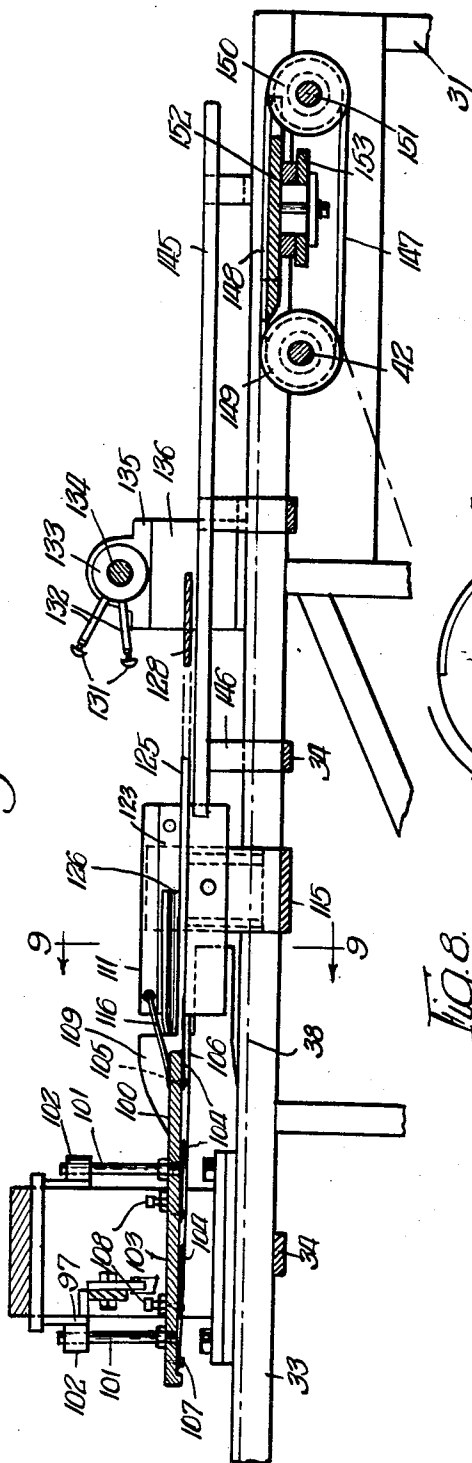


Fig. 8.

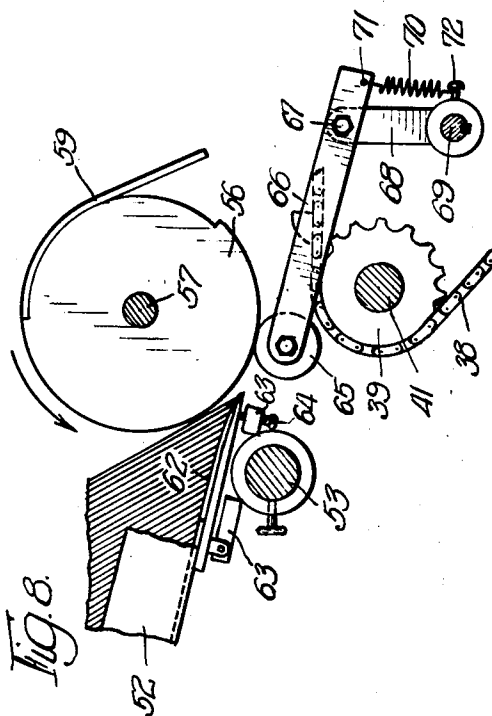
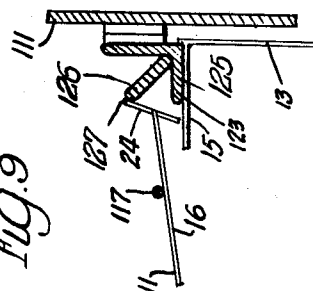


Fig. 9.



INVENTOR.
Edwin L. Arneson,
BY
Cromwell, Christ-Warden
attys

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2,931,152

CAN PACKAGING MACHINE

Edwin L. Arneson, Morris, Ill., assignor to Federal Paper Board Company, Inc., Bogota, N.J., a corporation of New York

Application June 30, 1958, Serial No. 745,369

10 Claims. (Cl. 53—209)

This invention relates to packaging and is particularly concerned with a machine for enclosing generally cylindrical articles, such as cans, in a paperboard wrapper which is foldable about the articles.

It is a general object of the invention to provide a machine having a conveyor mechanism which is adapted to advance successive wrapper blanks, formed of foldable paperboard material, to a position beneath the discharge end of a vertically extending magazine containing a supply of cans or other cylindrical articles, where a plurality of the articles in single row forming relation are deposited on a side wall forming member of each wrapper blank and mechanism for thereafter progressively folding the adjoining wall forming members of each wrapper into article engaging relation whereby to enclose the articles in the wrapper and form a package.

It is a more specific object of the invention to provide an apparatus for enclosing in a foldable paperboard blank a single row of cans or similar articles wherein the wrapper blank is adapted to be supplied in opened out unfolded condition with crease lines separating the same into a plurality of hingedly connected wall forming panels, which apparatus comprises an endless chain conveyor supported on spaced end sprockets and adapted to advance successive wrapper blanks which are placed thereon to an article feeding station, a magazine at the article feeding station in which a supply of the articles are received and fed by gravity to a discharge opening in the bottom thereof, an article feeding wheel at the discharge opening of the magazine for delivering the articles on to the successive wrapper blanks as the latter are moved into position at the feeding station, guide members for holding the articles in aligned row forming relation as they are advanced by the conveyor, plow members associated with the conveyor beyond the article feeding wheel which are adapted to engage laterally projecting end portions of the wrapper blanks and progressively fold the same into wall forming relation with the articles positioned thereon, lock engaging members for manipulating locking elements provided on the overlapping marginal portions of the wall forming panels at opposite ends of the wrapper blank to interengage the locking elements and thereby lock the folded blank into tubular carton forming relation on the cans, and mechanism for operating the conveyor, the article feeding wheel, and the lock engaging members in timed relation.

These and other objects and advantages of the invention will be apparent from a consideration of the apparatus which is shown by way of illustration in the accompanying drawings wherein:

Figure 1 is a side elevation of the machine for assembling groups of cans or similar articles on successive wrapper blanks and for thereafter folding the end portions of the blanks into article enclosing relation;

Figure 2 is a plan view of the machine;

Figure 3 is a cross section taken on the line 3—3 of Figure 2, to an enlarged scale, and with portions broken away;

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Figure 4 is a partial cross section taken on the line 4—4 of Figure 1, to an enlarged scale;

Figure 5 is a partial longitudinal section taken generally on the line 5—5 of Figure 2, to an enlarged scale;

Figure 6 is a partial horizontal section taken on the line 6—6 of Figure 1, to an enlarged scale;

Figure 7 is a partial, longitudinal section taken on the line 7—7 of Figure 6;

Figure 8 is a partial section taken on the line 8—8 of Figure 2, to an enlarged scale;

Figure 9 is a fragmentary detail section taken on the line 9—9 of Figure 5;

Figure 10 is a perspective view of a typical wrapper member which is adapted to be employed with the machine; and

Figure 11 is a perspective view of the completed package which is produced with the machine.

The machine which is illustrated in the drawings is particularly adapted for packaging a series or group of cylindrical articles, such as cans of food, beverage, or other merchandise of cylindrical outline, in an open ended container or wrapper formed by folding and securing a blank of paperboard or similar sheet material about the articles.

A typical form of multiple unit can package, which is adapted to be produced on the machine, is illustrated in Figure 11. The package comprises a group of three cans 10 arranged in single row formation and enclosed in a tubular wrapper or container which is formed of a blank 11 illustrated in Figure 10. The machine is, of course, not limited to the production of the package shown in Figure 11 but other packages of a similar nature may be formed thereon.

The wrapper or carton forming blank 11 is initially supplied to the machine in the flat opened out condition as illustrated in Figure 10, with the blank being cut and scored to provide a rectangular central panel 12 which is adapted to form the vertical side wall of the completed package (Figure 11), adjoining panels 13 and 14 of lesser width and which are adapted to form the top and bottom walls of the completed package, and end panels 15 and 16 adjoining the top wall forming panels 13 and 14 which are adapted to have their margins overlapped and locked together to form the other side wall of the package. The respective wall forming panels are separated from each other by longitudinally spaced parallel transverse crease lines 17, 18, 19 and 20, said crease lines forming hinged corner connections between the wall panels. The crease lines 17, 18, 19 and 20 are interrupted by generally C-shaped cuts 21 which are spaced transversely of the blank in accordance with the spacing of the cans 10 and which are arranged to form aligned pairs of apertures 22 in the top and bottom edges of the side wall forming panels for receiving oppositely disposed portions of the chine of each can at each end thereof, the wrapper 11 being folded tightly around the cans 10 so that the chine portions are seated in the apertures 22 and the cans 10 are securely held in the wrapper.

The end panels 15 and 16 of the blank 11 are provided with locking elements which are adapted to be interengaged to hold the panels in wall forming relation. The panel 15 is provided with a pair of locking elements in the form of generally rectangular apertures or openings 23 which are spaced in the lateral direction of the blank adjacent the end margin of the same. Cooperating male locking elements in the form of tongue-like members 24 are provided at the opposite end margin of the blank along the marginal edge of the wall forming panel 16 and are spaced laterally of the blank to correspond with the spacing of the female locking apertures 23. Each of the locking tongues 24 has a portion pro-

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jecting from the marginal edge of the blank which is provided with converging lateral edges giving it the shape of a truncated triangle and which has a small tab portion 25 projecting from the marginal edge 26 thereof. Each locking tongue 24 is adapted to hinge about a score line 27 which coincides with the base of the projecting portion and with the end edge of the body of the panel 16 and which is interrupted at its center portion by a generally C-shaped cut 28 providing an inwardly extending tab portion 29 which is integral with the projecting portion of the tongue and which is adapted to swing with the latter about the score line 27 as a hinge.

When the wrapper 11 is assembled about a row of three cans as shown in Figure 10, the panel 16 is arranged with its marginal portions overlapping the marginal portions of the panel 15 and the inner tab 29 on each of the locking tongues 24 is inserted within the cooperating locking aperture 23 and rests against the inside face of the marginal portion of the panel 15 which forms a keeper therefor, while the main body of the tongue 24 remains against the outside face of the panel 15 with the outer end tab 25 being inserted within the aperture 23 and bearing against the inside face of the panel 15 in the area between the aperture 23 and the score line 17, the latter forming a keeper for the tab 25. In this manner the two side wall forming panels 15 and 16 are mechanically locked together by engagement of the tabs 25 and 29 of the locking tongues 24 in the apertures 23.

The machine 30 for wrapping the blank 11 around the cans 10 comprises an upright rectangular supporting structure (Figures 1 to 4) which includes corner posts of legs 31, laterally spaced top side rails 32 and 33, which connect longitudinally spaced pairs of the posts, and an intermediate frame structure comprising longitudinally spaced top cross braces 34, laterally spaced bottom side rails 35 and 36, and bottom cross rails 37.

A double chain conveyor 38 is mounted on longitudinally spaced pairs of end sprockets 39 and 40 on the cross shafts 41 and 42, the latter constituting the main drive shaft of the machine. The cross shafts 41 and 42 are, of course, mounted in suitable bearings at opposite ends of the machine and extend between the side frame members of the same. The conveyor 38 has its upper run supported on a pair of laterally spaced, longitudinally extending track forming rails 43 (Figure 4) arranged intermediate the side rails 32 and 33 of the frame and bolted or otherwise secured on the longitudinally spaced cross braces or bars 34. The conveyor 38 comprises two identical chains 44 which carry upstanding lugs or fingers 45, the latter being in transversely aligned pairs which are adapted to engage with the rear or trailing edges of successive carton or wrapper blanks 11 for advancing the same through the machine. The conveyor 38 is driven by a motor and speed reduction unit 46 which is supported on a platform extending between the side rails 35 and 36 on the lower portion of the frame and at one end thereof. The motor unit 46 has its power output pulley 47 connected by a chain 48 with a sprocket 50 on the cross shaft 42, forming the main drive for the machine.

An automatic blank feeding apparatus is provided at the blank receiving end of the conveyor 38 (Figures 1, 2 and 8). The blank feeding apparatus comprises a tray 52 which is supported in tilted relation at the end of the frame on a cross bar or shaft 53 which is in turn supported in laterally spaced bearing members 54 extending upwardly of the main frame structure. The tray 52 is held in tilted relation by an adjustable brace 55 which is pivoted at the upper end to the bottom of the tray 52 and adjustably connected at the lower end to the frame structure by a bolt and slot or similar connection. A blank feeding roller 56 is supported at the leading end of the tray 52 on a cross shaft 57 which is mounted in bearing members 58 supported on the top

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side rails 32 and 33 of the main frame of the machine. The roller 56 has a rubber feed pad 59 on its peripheral surface for engaging successive blanks and is driven by means of a chain 60 engaging with the sprocket 61 secured at one end thereof, the chain 60 being driven in a manner which will be described. A blank retarding pad member 62 is arranged in a cut out portion of the bottom of the tray and pivotally mounted at one end of a bracket member 63 which is adjustably secured on the cross shaft 53. An adjusting screw 64 is provided at the other end of the bracket 63 for adjusting the tilt of the pad member 62 relative to its support and the bottom of the tray 52. A rubber backup wheel 65 is mounted beneath the feed wheel 56 on the upper end of an inclined arm 66 which is pivoted intermediate its ends at 67 to the upper end of an upstanding bracket member 68 adjustably supported on a cross shaft 69. A tension spring 70 is connected at 71 to the lower end of the arm 66 in spaced relation beyond the pivot 67 and to a screw 72 extending from the base of the bracket 69, the spring urging the roller 65 against the feed roller 56. The blanks are arranged in shingled relation on the tray 52 and are fed to the conveyor 38 by operation of the feeding wheel 56 and the cooperating backup wheel 65, the rotation of the feeding wheel 56 being timed to correspond to the advancing movement of the conveyor 38.

As each blank 11 leaves the feeding mechanism it is held in alignment by laterally spaced guide rails 73 (Figures 4 and 6) which are provided on opposite sides of the conveyor 38 and secured to the cross bars or braces 34 for guiding the edges of the blanks as they are advanced from the blank feeding mechanism 51 to the article delivery station by the conveyor 38.

The cans 10 are fed to the machine by means of a generally vertical inclined feed chute 74 which comprises two laterally spaced channel members 75 arranged with their open sides in opposed spaced relation to receive between them a supply of the cans 10 in side wall engaging relation and with the long axis thereof extending transversely of the machine. The channel members 75 forming the feed chute or magazine 74 are secured on the upright flanges of a pair of laterally spaced angle brackets 76 mounted on the top plate 77 of an inverted U-shaped cross frame having its leg forming brackets 78 extending upwardly from and secured to the top frame members 32 and 33. The lower ends of the channels 75 forming the chute 74 are curved forwardly to provide a forwardly extending opening which faces in the direction of the advance of the blanks 11 on the conveyor 38.

The cans 10 advance in the feed chute 74 by gravity through the bottom discharge opening and a star wheel 80 is arranged at the lower end of the chute 74 adjacent the bottom opening to control the feed of the cans 10 onto the blanks 11 as the latter are advanced by the conveyor 38 into proper position beneath the discharge opening of the chute. The star wheel 80 comprises a pair of axially spaced plates 81 secured on a supporting shaft 82 and having edge recesses 83 for engagement with the cans 10. The shaft 82 is supported in a hub formation 84 extending rearwardly of a support bracket 85 which is secured to the vertical edge of a top bar or plate 86 of an inverted U-shaped cross frame which extends transversely of the machine and which has its leg forming end bracket members 87 secured to the side rail members 32 and 33. The star wheel shaft 82 also carries at one end a pair of sprockets 88 and 89, the latter being connected by the chain 60 with the sprocket 61 on the blank feeding mechanism 51, and the former being driven by a chain 90 which is connected with the main drive mechanism in a manner which will be described.

The cans 10 are held in alignment as they leave the chute 74 by laterally spaced side guide bars 91 (Figure 5) each of which is attached to the lower ends of a pair of depending bracket rods 92 and 93, the latter being

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secured in laterally adjustable relation on a pair of bracket members 94 and 95 which are bolted to opposite ends of a cross bar or plate 96 depending from a center bracket 97 which is supported on the cross frame plate 86 at the center of the path of the cans. The bracket 97 carries in centered relation between the two side guides a center hold down device 100 which is supported on two depending rods 101 secured at their upper ends in angle brackets 102 on the support bracket 97. The hold down device 100 (Figures 4 to 6) comprises an elongate phenolic strip or plate 103 of substantial thickness and with a portion of its leading end reduced in width. The hold down plate 103 has arranged on its bottom face a series of longitudinally spaced spring members 104, each of which is attached to the bottom of the plate 103 at its trailing end by a rivet 105 and a relatively long spring plate 106 attached at its trailing end to the plate 103 by the rivet 107. Pairs of tension adjusting screws 108 are associated with each of the spring plates 104 and all of the plates 104 and 106 are adapted to resiliently press on the top of the cans which pass beneath the plate 103 and hold the cans against the wrapper blank 11 carried on the conveyor 38.

The conveyor 38 advances the wrapper blank 11 to a folding station where it is folded on the crease lines 17, 18, 19 and 20 about a row of cans by moving the blank and can assembly past a series of blank engaging plow members. The plow members or blank folders comprises a pair of laterally spaced, bent plates 109 and 110 (Figures 5 to 7) which are attached at their leading ends to the trailing ends of upstanding laterally spaced bracket plates 111 and 112, the latter being secured to the vertical flanges of a pair of laterally spaced identical angle brackets 113. The angle brackets have their horizontal flanges adjustably secured by bolt and slot connections 114 to a cross plate 115 extending between the side rails 32 and 33. The folding plow members 109 and 110 have their trailing ends extending below the horizontal plane in which the side wall forming panels 15 and 16 of the blank 11 are traveling as the respective blanks are advanced by the conveyor 38 to the plow members. The upper blank engaging surfaces of the plow members 109 and 110 gradually turn from horizontal at the trailing ends to vertical at the leading ends where they are attached to the vertical support plates 111 and 112 so that the end portions of the blanks 11 which extend beyond the end of the cans 10 are folded into vertical planes about the crease lines 18 and 19 to bring the top and bottom forming panels 13 and 14 into engagement with the ends of the cans.

The plow members 109 and 110 have panel turning plow rods 116 and 117 associated with them which turn the two end panels 15 and 16 of the blank over the uppermost side wall portions of the cans to form a side wall for the package. The plow rods 116 and 117 are carried on the vertical support plates 111 and 112, respectively. The plow rod 116 is also supported at its trailing end on the trailing end of the plow member 109 by a clamp member 118. At its other end the rod 116 is bent on an outward angle and bolted at 119 to the vertical plate 111. The plow rod 117 is positioned in advance of the plow rod 116 so that the two wall forming panels 15 and 16 of the blank are turned down successively. The plow rod 117 comprises a rod member bent at the angle shown in Figure 6 with its trailing end extending through a vertical slot 120 in the plow member 110 and attached to a clamp plate 121 which clamp plate has a bolt and slot connection 122 with the vertical support plate 112.

A hold down member 123 (Figures 5, 6, 7 and 9) is arranged to engage the panel 15 as it is turned down into its final position by the plow rod 116. The hold down member 123 is angular in cross section and arranged with a vertical flange 124 bolted to the vertical support plate 111 and with a horizontal flange 125 extending in

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a plane slightly above the top of the row of cans so as to hold down the panel 15 as it advances beyond the plow rod 116. The hold down device 123 carries a bar or plate member 126 which is secured in angular upwardly and inwardly directed position at the juncture of the flanges 124 and 125 of the angular bar 123, and which has a tapered inner edge 127 for engaging beneath the extending tabs 25 of the locking tongues 24 as the panel 16 is moved downwardly into position against the top surface of the cans by the plow rod 117. The bar 126 tilts or hinges the locking tongues 24 about their hinge lines 27 to position the inner tab portion 29 for insertion in the locking apertures 23 in the panel 15 which is held in horizontal position by the bottom flange 125 of the member 123. A hold down plate 128 is secured on the inside face of the vertical support plate 112 by an angle support bar 129 having its vertical flange bolted to the plate 112. The hold down plate 128 extends in the direction of the advance of the package assembly and has a tapered edge portion 130 which engages the locking tongues 24 and presses them downwardly against the outer surface of the wall panel 15 where they are in proper position for insertion of the locking tabs 25 in the apertures 23.

A lock tab engaging device is positioned at the leading end of the hold down plate 128 for forcing the locking tongues 24 downwardly and into the openings 23 in the panel 15, which device comprises rotatably mounted lock engaging finger members in the form of buttons 131. The buttons 131 are carried on radial arms 132 extending from a hub 133 which is adjustably secured on a supporting cross shaft 134, the latter being mounted at its ends in suitable bearing brackets 135 on the upper ends of support members 136 which are secured to and project upwardly above the top of the end portion of the main support frame. The buttons 131 are mounted on the bent over or angled outer ends 137 of the support arms 132 and the carrying hubs 133 on the shaft 134 are adjusted axially and circumferentially so that in the form shown the two buttons 131 move in a common vertical path and are spaced so that they move successively into engagement with the two locking tongues 24 to depress the same sufficiently to cause the tabs 25 to snap into the openings 23 and engage in locking relation with the inside surface of the panel 15. The hold down plate 128 is cut away at the end to accommodate the buttons 131. The shaft 134 carries at one end a sprocket 138 which carries the one end of the chain 90 while at the other end the shaft 134 carries a sprocket 139 which is connected by a chain 140 with a sprocket 141 on a stub shaft 142 which in turn is supported in suitable bearings on a subframe at the end of the main support frame and which is connected in driving relation by the gear 143 with a cooperating drive gear 144 on the main drive shaft 42.

A pair of laterally spaced guide bars 145 extend from the vertical support plates 111 and 112 to the discharge end of the machine which engage the end wall panels 13 and 14 of the blank and can assembly and hold these panels against the top and bottom ends of the cans as the assembly advances and the locking operations are performed. The laterally spaced bars 145 are supported on a series of angle brackets 146 with the latter adjustably bolted to longitudinally spaced frame cross bars 34 and having upstanding flanges on the upper ends of which the bars 145 are secured. The bars 145 are also secured at their trailing ends to vertical support plates 111 and 112.

A package discharge conveyor 147 is arranged at the discharge end of the machine to receive the completed package from the chain conveyor 38. The conveyor 147 comprises a belt 148 mounted at one end on a pulley 149 on the main drive shaft 42 and at the other end on a pulley 150 on a cross shaft 151 which is supported at the end of the machine in suitable bearings on the

main frame structure. The upper run of the belt 148 is supported on a platform structure 152 supported on a cross bar or plate member 153 extending between the top side rail members 32 and 33 of the main frame structure. The cross shaft 151 is connected at one end in driving relation with the drive shaft 42 by a timing belt 144 having a toothed inner surface which engages a gear 155 on the cross shaft 151 and a gear 156 on the shaft 42 and which has its lower run supported by an idler 157.

The machine may be provided with suitable electrical control devices such as the arm actuated switch indicated at 158 (Figure 1) associated with the can supply chute 74 which will stop the machine when the supply of cans is exhausted.

In operation, the can feeding chute 74 is loaded with cans 10 and the conveyor 38 is actuated with the tray 52 having a supply of blanks 11. As the blanks 11 are fed to the conveyor 38, and advanced beneath the discharge opening of the chute 74, a row of three cans is fed to the blank by the feed wheel 80. The blank 11 with the cans 10 in row forming relation thereon is advanced by the conveyor 38 past the plow members 109 and 110 and through the associated folding rods and bars which fold over successively the end wall and side wall panels bringing the marginal edge portions of the side wall panels 15 and 16 into overlapping relation and swinging the locked tongues 24 to bring the inner tabs 29 into the openings 23 in the panel 15. Thereafter, the package advances to the lock engaging buttons 131 which rotate on the shaft 134 in proper timed relation and engage successively the locking tongues 24 and depress the same sufficiently to cause the outer end tabs 25 to snap through the openings 23 and position the same in engagement with the inner face of the side wall panel 15 which completes the locking of the panels and the completed package is thereafter delivered by the conveyor 147 from the machine.

While specific materials and particular details of construction are referred to in describing the illustrated form of the machine, it will be understood that other materials and different structural details may be resorted to within the spirit of the invention.

I claim:

1. A machine for forming a package which is characterized by a group of cylindrical articles enclosed in a paperboard wrapper, the wrapper being in the form of a blank divided into hingedly connected side and end wall forming panels, with one end panel of the blank having lock openings and the other end panel having cooperating hinged locking tongues which are adapted to be swung to engage oppositely disposed edge portions in the openings when the margins of the two panels are overlapped, said machine comprising a supporting frame structure, an endless chain conveyor mounted on end supporting sprockets carried at opposite ends of said frame structure, said conveyor having means for supporting the upper run for travel in a generally horizontal path and means thereon for engaging and advancing successive wrapper blanks which are delivered thereto in opened out upwardly facing condition at one end thereof, an article magazine extending above the upper run of the conveyor and having means at the lower end for delivering successive groups of articles onto successive wrapper blanks carried on the conveyor beneath the lower end of the magazine, plow members supported at opposite sides of the conveyor, said plow members being spaced to engage beneath the projecting end portions of the wrapper blanks, said plow members extending upwardly of the conveyor and being shaped to fold the end portions of each blank into upstanding relation with the top and bottom ends of the articles, other plow members supported on the frame structure above the conveyor and adapted to engage with the upwardly projecting end portions of the wrapper blank and to

fold the end panels thereof downwardly into overlapping relation, with the panel carrying the openings lying beneath the panel carrying the locking tongues, a latch swinging plate associated with the plow members for engaging the end portions of the locking tongues to swing the same for positioning opposite side edge portions thereof for insertion within the openings in the underlying panel, a hold down plate for holding the uppermost panels in folded position and having a portion thereon for engaging the locking tongues and for folding the same into flattened relation over the openings in the underlying panel, and locking tongue depressing buttons carried on a rotatably mounted member and operated in timed relation to the movement of the blank advancing conveyor for engaging the locking tongues and for forcing the same downwardly to snap the outer edge portions into the openings so as to engage with the inner surface of the underlying panel and hold the two panels in folded and locked relation.

2. A machine for forming a package which is characterized by a group of cylindrical articles enclosed in a paperboard wrapper, the wrapper being divided into hingedly connected side and end wall forming panels, with one end marginal panel having lock apertures and the other end marginal panel having cooperating locking tongues hinged thereon which are adapted to be swung to engage oppositely disposed edge portions in the apertures when the marginal portions of the two panels are overlapped, said machine comprising a supporting frame structure, an endless conveyor mounted on said frame structure, means for supporting the upper run of said conveyor for travel in a generally horizontal path and means thereon for engaging and advancing successive wrapper blanks which are delivered thereto at one end thereof, an article magazine extending above the upper run of the conveyor and having means at the lower end for delivering successive groups of articles onto successive wrappers carried on the conveyor past the lower end of the magazine, plow members supported at opposite sides of the conveyor and having their trailing ends positioned to engage beneath the projecting marginal end portions of the wrapper blanks, said plow members extending upwardly of the conveyor and being arranged to fold the end portions of each blank into upstanding relation with the top and bottom wall forming panels engaging the top and bottom ends of the articles, other plow members supported on the frame structure above the conveyor and adapted to engage with the upwardly projecting end portions of the wrapper blank and fold the end panels thereof downwardly into partially overlapping relation with the panel carrying the locking apertures being beneath the panel carrying the locking tongues, a plate mounted adjacent the plow members for engaging the terminal end portions of the locking tongues, said plate being shaped to swing the tongues for positioning tab members thereon for insertion within the apertures in the underlying panel when the panels are closed on each other, a hold down member for holding the uppermost panels in folded position and having a portion thereon for engaging the locking tongues and for swinging the same into flattened relation over the openings in the underlying panel and locking tongue depressing members carried on a rotatably mounted member and operated in timed relation to the movement of the blank advancing conveyor for engaging the locking tongues and for forcing the same downwardly to snap the tab members at the outer edge portions into the apertures so as to engage with the inner surface of the underlying panel and hold the two panels in folded and locked relation.

3. A machine for forming a package which is characterized by a group of cylindrical articles and a paperboard blank wrapped about the ends and portions of the side walls thereof, the blank being divided into hingedly connected side and end wall forming panels,

with one end panel of the blank having lock apertures and the other end panel having on its end edge cooperating hinged locking tongues which are adapted to be swung to engage oppositely disposed edge portions thereof in the apertures when the two panels are moved into overlapped relation, said machine comprising a supporting frame structure, an endless conveyor mounted on end supporting members carried on said frame structure, said conveyor having means for supporting the upper run for travel in a generally horizontal path and means thereon for engaging and advancing successive blanks which are delivered thereto in opened out upwardly facing condition adjacent one end thereof, an article feed mechanism above the upper run of the conveyor and having means for delivering successive groups of articles onto successive blanks carried on the conveyor, fold forming plow members supported at opposite sides of the conveyor, which plow members are positioned to engage beneath the projecting end portions of the blanks, said plow members extending upwardly of the conveyor and being shaped to fold the end portions of each blank into upstanding relation at opposite sides of the articles, other fold forming members positioned on the frame structure to engage with the upwardly projecting end portions of the blank and fold the end panels thereof downwardly into overlapping relation, a locking tongue engaging bar member associated with the fold forming members for engaging the locking tongues to swing the same for positioning opposite side edge portions thereof for insertion within the openings in the underlying panel when the panels are moved into overlapping relation, a hold down member for holding the uppermost panels in folded position and having a portion thereof positioned for engaging the locking tongues so as to fold the same into overlying flattened relation relative to the apertures in the underlying panel, and locking tongue depressing members carried on a movably mounted member which is operated in timed relation to the movement of the blank advancing conveyor for pressing the locking tongues downwardly to engage the outer edge portions in the locking apertures and hold the two panels in folded and locked relation.

4. A machine for forming a package which is characterized by a group of cylindrical articles enclosed in a paperboard wrapper, the wrapper being divided into hingedly connected side and end wall forming panels with an end marginal panel having apertures and another end marginal panel having locking tongues hinged thereon so as to be positioned to engage oppositely disposed edge portions in the apertures when the two panels are overlapped, said machine comprising a supporting frame structure, an endless conveyor mounted on said frame structure having means for supporting the upper run of said conveyor for travel in a generally horizontal path and means thereon for engaging and advancing successive wrapper blanks which are delivered thereto, an article feed device extending above the upper run of the conveyor and having means at the lower end for delivering successive groups of articles onto successive wrappers carried on the conveyor past the lower end of the magazine, blank folding members supported at opposite sides of the conveyor and having their ends positioned to engage beneath the projecting end panels of the wrapper blanks, said blank folding members extending upwardly of the conveyor and being arranged to fold the end portions of each blank into upstanding relation along opposite sides of the articles, fold bars supported on the frame structure above the conveyor and adapted to engage with the upwardly projecting end portions of the wrapper blank and fold the end panels thereof downwardly into overlapping wall forming relation with the panel carrying the locking apertures being folded beneath the panel carrying the locking tongues, a locking tongue engaging plate mounted adjacent the plow members in position for engaging the projecting outer portions of the locking

tongues to swing the tongues so that inner edge portions thereof will move into the apertures in the underlying panel, a member for holding the uppermost panels in folded position with the locking tongues overlying the apertures in the underlying panel, and tongue depressing members movably carried on the frame structure and operated in timed relation to the movement of the blank advancing conveyor for engaging the locking tongues and for forcing the same downwardly sufficiently to snap the outer edge portions into the apertures so as to engage with the inner surface of the underlying panel and hold the two panels in folded and locked relation.

5. A machine for forming a package which is characterized by a group of cylindrical articles enclosed in a relatively flexible wrapper blank, the wrapper blank being divided into hingedly connected side and end wall forming panels, with the end panels of the blank having cooperating lock openings and locking tongues which may be swung to engage opposite edge portions in the lock openings when the two panels are overlapped, said machine comprising a supporting frame structure, an endless conveyor mounted on end supporting members carried on said frame structure, means for supporting the upper run of said conveyor for travel in a generally horizontal path and lugs thereon for engaging and advancing successive wrapper blanks which are delivered thereto in opened out outwardly facing condition, an article feed means extending above the upper run of the conveyor and having means at the lower end for delivering successive groups of articles onto successive wrapper blanks carried on the conveyor, curved plow members supported at opposite sides of the conveyor in position to engage beneath the projecting end portions of the wrapper blanks and to fold the end portions of each blank into upstanding relation along opposite sides of the group of the articles, rod-like plow members supported on the frame structure in position to engage with the upwardly projecting end portions of the wrapper blank and fold the end panels thereof downwardly into overlapping relation, a member having a slanted edge positioned for engaging the outer portions of the latch tongues to swing the same and guide the inner side edge portions thereof into the openings in the underlying panel, a hold down member for retaining the uppermost panels in folded position and for folding the locking tongues into flattened relation with outer portions aligned over the openings in the underlying panel, a rotatable support member above the conveyor, arms on said rotatable support member and buttons carried on said arms in position to engage with said locking tongues when said support member is rotated in timed relation to the movement of the blank advancing conveyor for forcing the locking tongues downwardly so as to move the outer edge portions thereof into the openings and into engagement with the inner surface of the underlying panel whereby to lock the two panels in folded relation.

6. A machine for forming a package which is characterized by a group of cylindrical articles enclosed in a paperboard wrapper blank, the wrapper blank being divided into hingedly connected side and end wall forming panels, with the end panels thereof having lock openings and cooperating hinged locking tongues which are adapted to be swung to engage oppositely disposed edge portions in the openings when the two panels are overlapped to form a wall of the package, said machine comprising a supporting frame structure, an endless conveyor mounted on said frame structure, said conveyor having means for supporting the upper run for travel in a generally horizontal path and means thereon for engaging and advancing successive wrapper blanks which are delivered thereto in opened out outwardly facing condition, an article feeding means extending above the upper run of the conveyor for delivering successive groups of cans onto successive wrapper blanks carried on the conveyor, plow members supported at opposite

sides of the conveyor, which engage beneath the projecting end portions of the wrapper blanks and fold the same into upstanding relation so that the wall forming panels engage opposite sides of the group of articles, other folding members supported on the frame structure in position to engage with the upwardly projecting end portions of the wrapper blank and to fold the same downwardly into overlapping relation on the top of the group of articles, with the panel carrying the openings being beneath the panel carrying the locking tongues, a bar positioned for engaging the end portions of the locking tongues to swing the same upwardly and guide opposite side edge portions thereof into the openings in the underlying panel, means for holding the uppermost panels in folded position and for folding the locking tongues into flattened relation on the underlying panel, a rotatable cross shaft having hub formations thereon, radial arm on said hub formations and button-like members carried on said arms, and means to rotate said cross shaft in timed relation to the movement of the blank advancing conveyor for engaging the locking tongues and forcing the same downwardly so as to snap the outer edges of the tongues into the openings and lock the two panels in wall forming relation.

7. A machine as recited in claim 6, and said hub formations are adjustable on said cross shaft to vary the positions of said button-like members.

8. A machine for forming a package which is characterized by a group of generally cylindrical articles arranged in row forming relation and enclosed in a paper-board wrapper, which machine comprises a supporting frame structure, an endless conveyor mounted on end supporting members carried on the frame structure and having its upper run traveling in a generally horizontal path, said conveyor having means for engaging and advancing successive wrapper blanks which are delivered in opened out upwardly facing condition at one end thereof, an article feeding means supported adjacent the conveyor for feeding successive groups of articles onto successive wrapper blanks as the latter are advanced by the conveyor, guide means along opposite sides of the conveyor for holding the articles in a longitudinal path as they are advanced by the conveyor, a plate-like hold down member supported above the path of the articles and having a series of presser plates of resilient material on the lower face thereof with one of said presser plates for resiliently engaging and holding the articles in position on the wrapper as the articles and the wrapper are advanced by the conveyor.

9. A machine for forming a package which is characterized by a group of generally cylindrical articles arranged in row forming relation and enclosed in a paper-board wrapper, which machine comprises a supporting frame structure, an endless conveyor mounted on end

supporting members carried on the frame structure and having its upper run traveling in a generally horizontal path, said conveyor having means for engaging and advancing successive wrapper blanks which are delivered in opened out upwardly facing condition at one end thereof, an article feeding means supported adjacent the conveyor for feeding successive groups of articles onto successive wrapper blanks as the latter are advanced by the conveyor, guide means along opposite sides of the conveyor for holding the articles in alignment as they are advanced by the conveyor, a hold down device comprising a base plate supported above the path of the articles, a series of relatively short, elongate, longitudinally spaced spring plates secured at their trailing ends on the lower face of said base plate, and a relatively long thin spring plate secured at its trailing end at the trailing end of said base plate and extending over the lower faces of said spring plates for resiliently wiping over the tops of the articles and for holding the same in position on the wrapper as the articles and the wrapper are advanced by the conveyor.

10. A machine for forming a package which is characterized by a group of generally cylindrical articles arranged in row forming relation and enclosed in a paper-board wrapper, which machine comprises an upright supporting frame structure, an endless chain conveyor mounted on end supporting sprocket members carried on the frame structure and having their upper run traveling in a generally horizontal path, said conveyor having lugs thereon for engaging and advancing successive wrapper blanks which are delivered in opened out upwardly facing condition at one end thereof, an article feeding chute supported above the conveyor and a star wheel for feeding successive groups of articles from the chute onto successive wrapper blanks as the latter are advanced by the conveyor beneath the chute, guide means along opposite sides of the conveyor for holding the articles in alignment as they are advanced by the conveyor, a hold down plate supported above the conveyor adjacent the star wheel, a series of relatively thin, elongate, spring presser plates each attached at their trailing end to the lower face of said hold down plate in position for resiliently engaging the articles and for retaining the articles in aligned relation on the wrapper as the articles and the wrapper are advanced by the conveyor, and tension adjusting screws mounted in said hold down plate and engaging each of said spring plates.

References Cited in the file of this patent

UNITED STATES PATENTS

2,276,129	Wesselman	Mar. 10, 1942
2,751,730	Gentry	June 26, 1956
2,817,196	Singler	Dec. 24, 1957
2,817,197	Anness	Dec. 24, 1957