

July 26, 1960

O. E. COTE

2,946,165

METHOD OF AND MACHINE FOR FORMING PACKAGES

Filed June 12, 1956

8 Sheets-Sheet 1

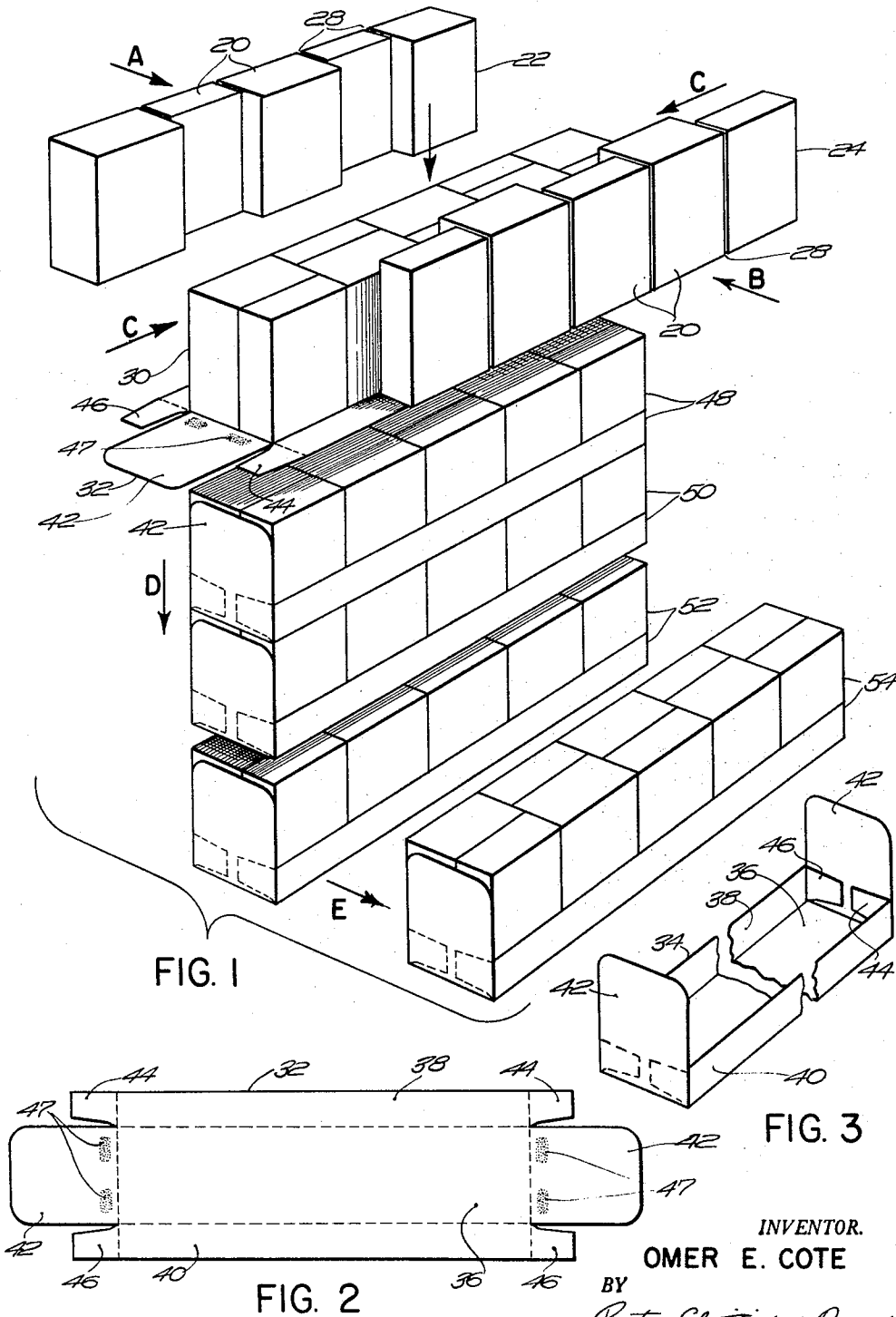


FIG. 1

FIG. 2

FIG. 3

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8 Sheets-Sheet 2

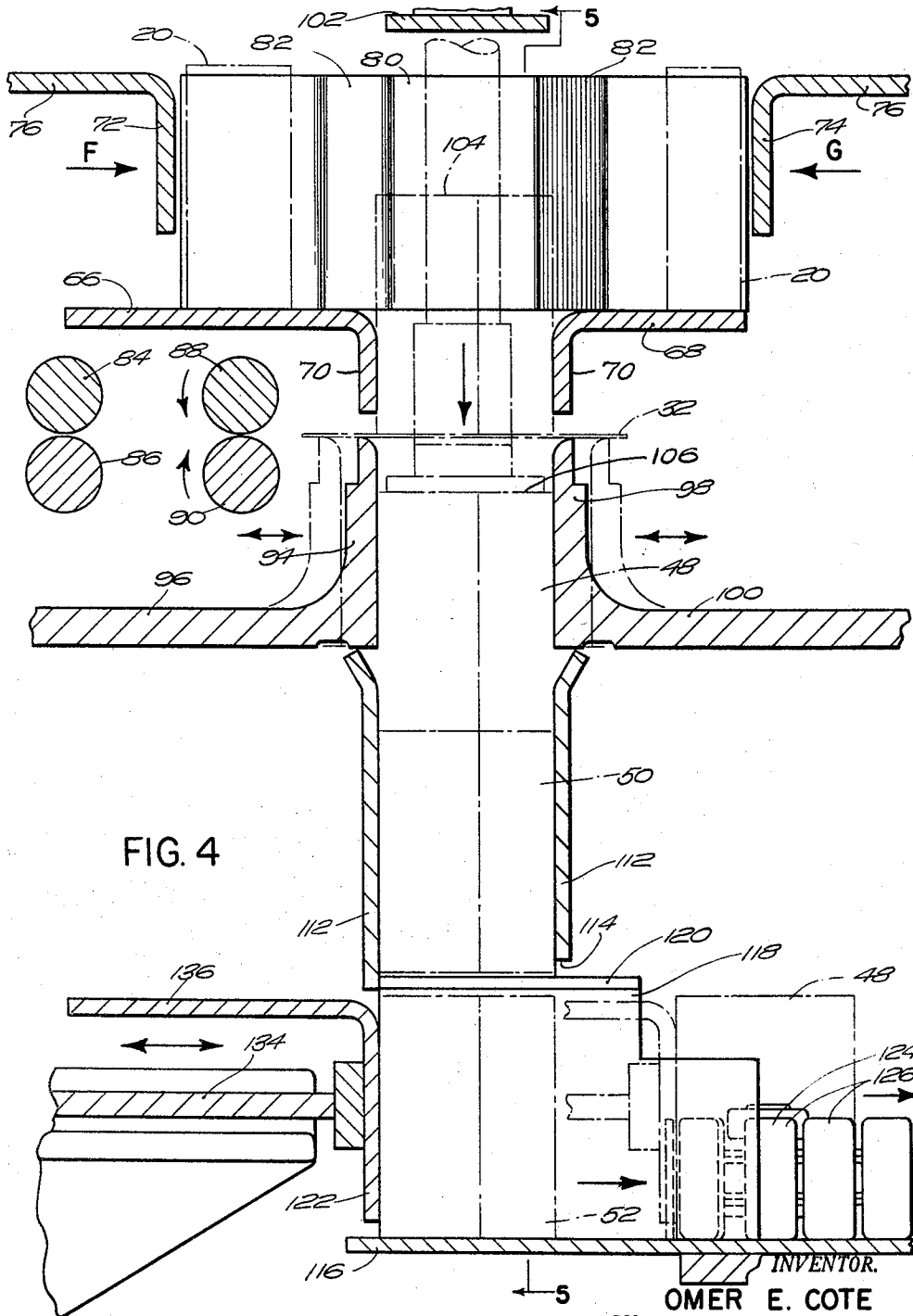


FIG. 4

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8 Sheets-Sheet 3

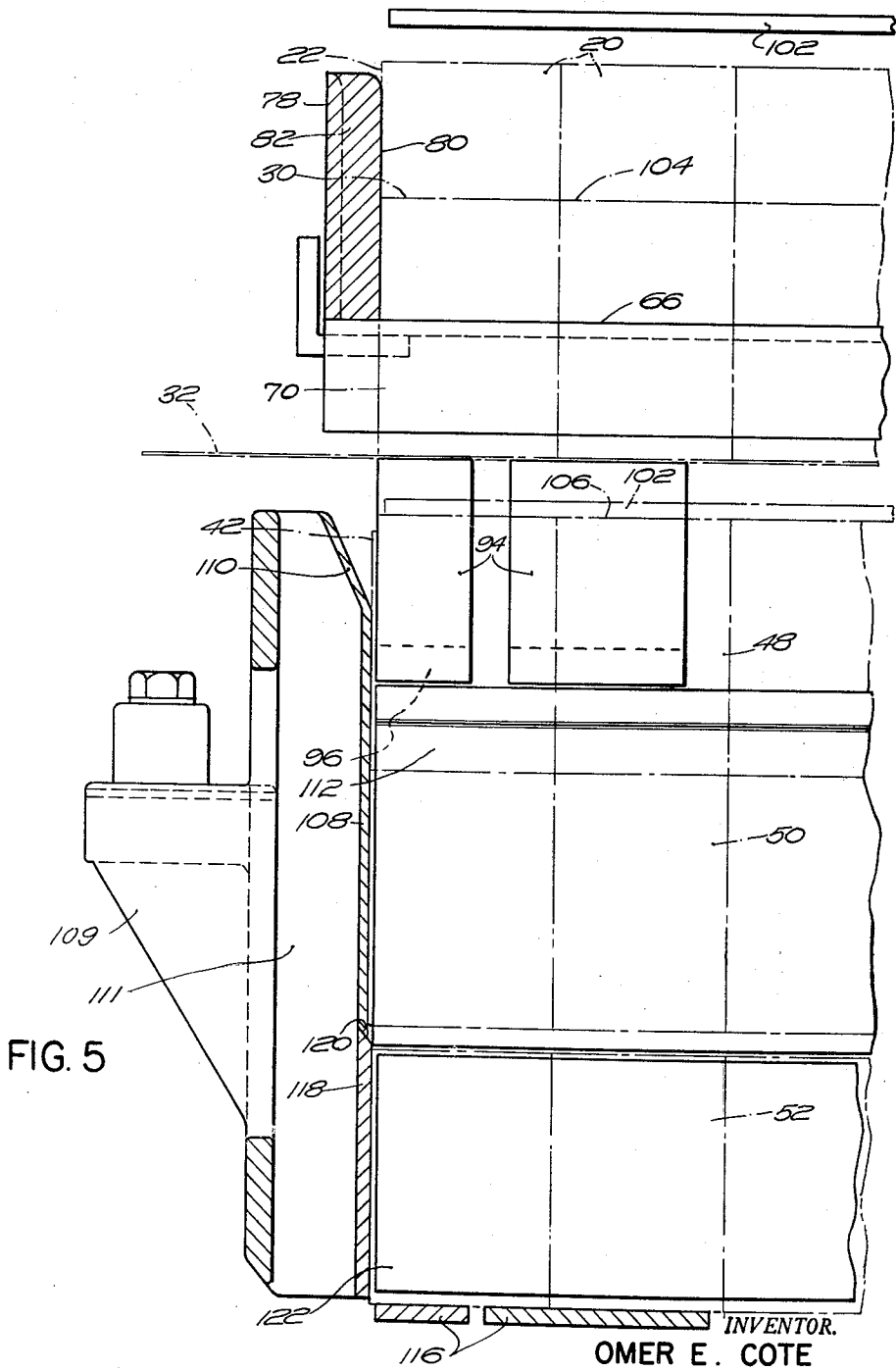


FIG. 5

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8 Sheets-Sheet 4

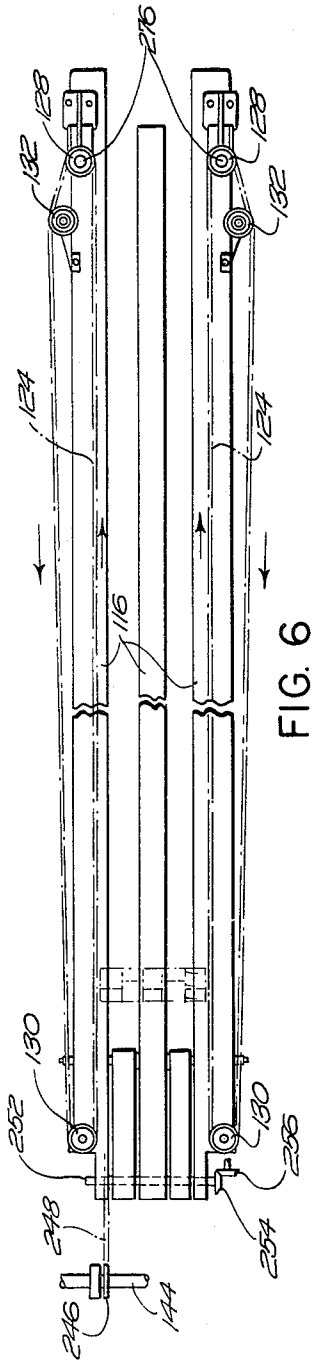


FIG. 6

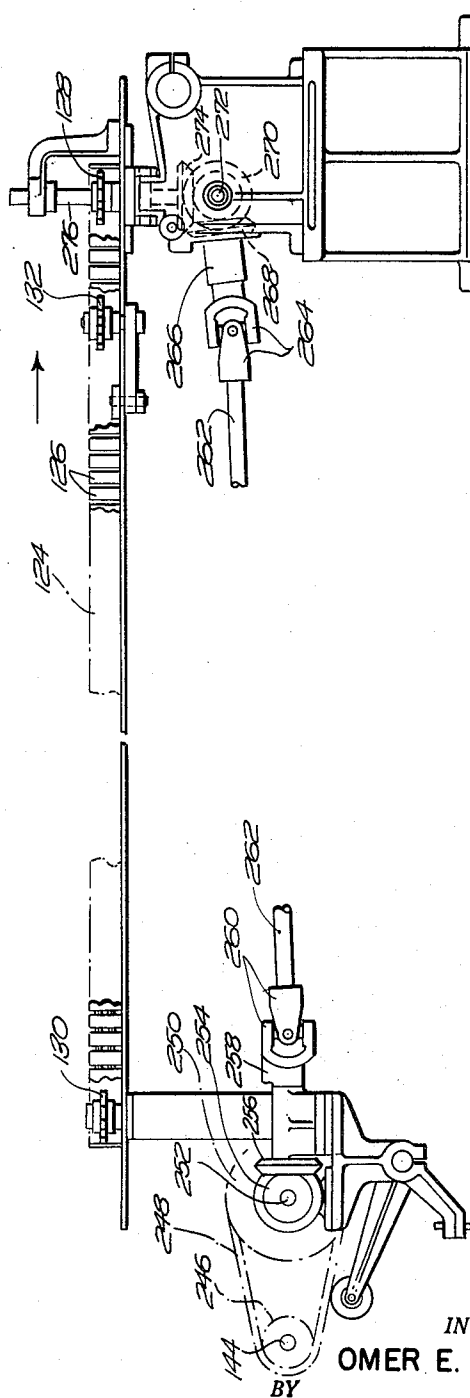


FIG. 7

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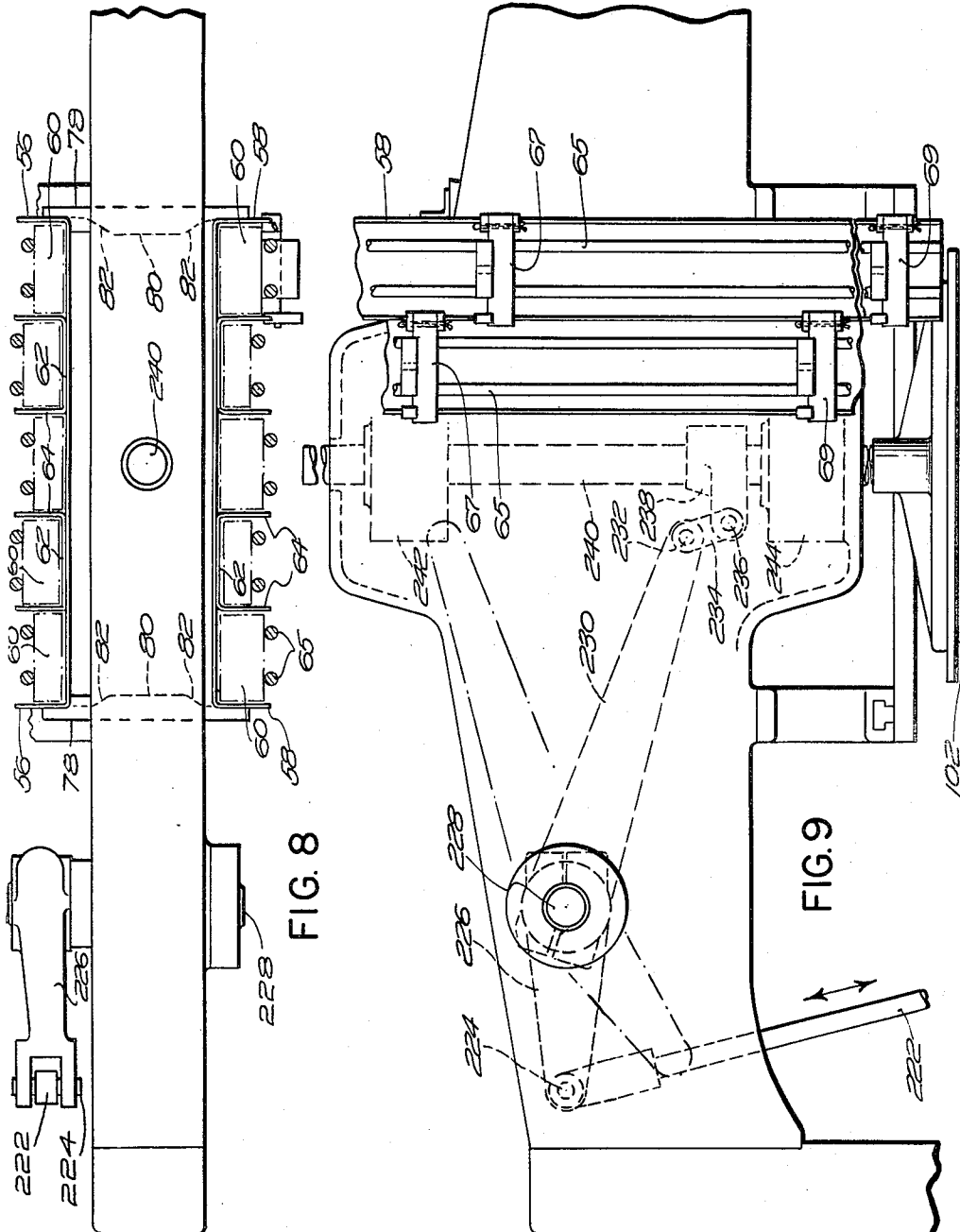
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8 Sheets-Sheet 6

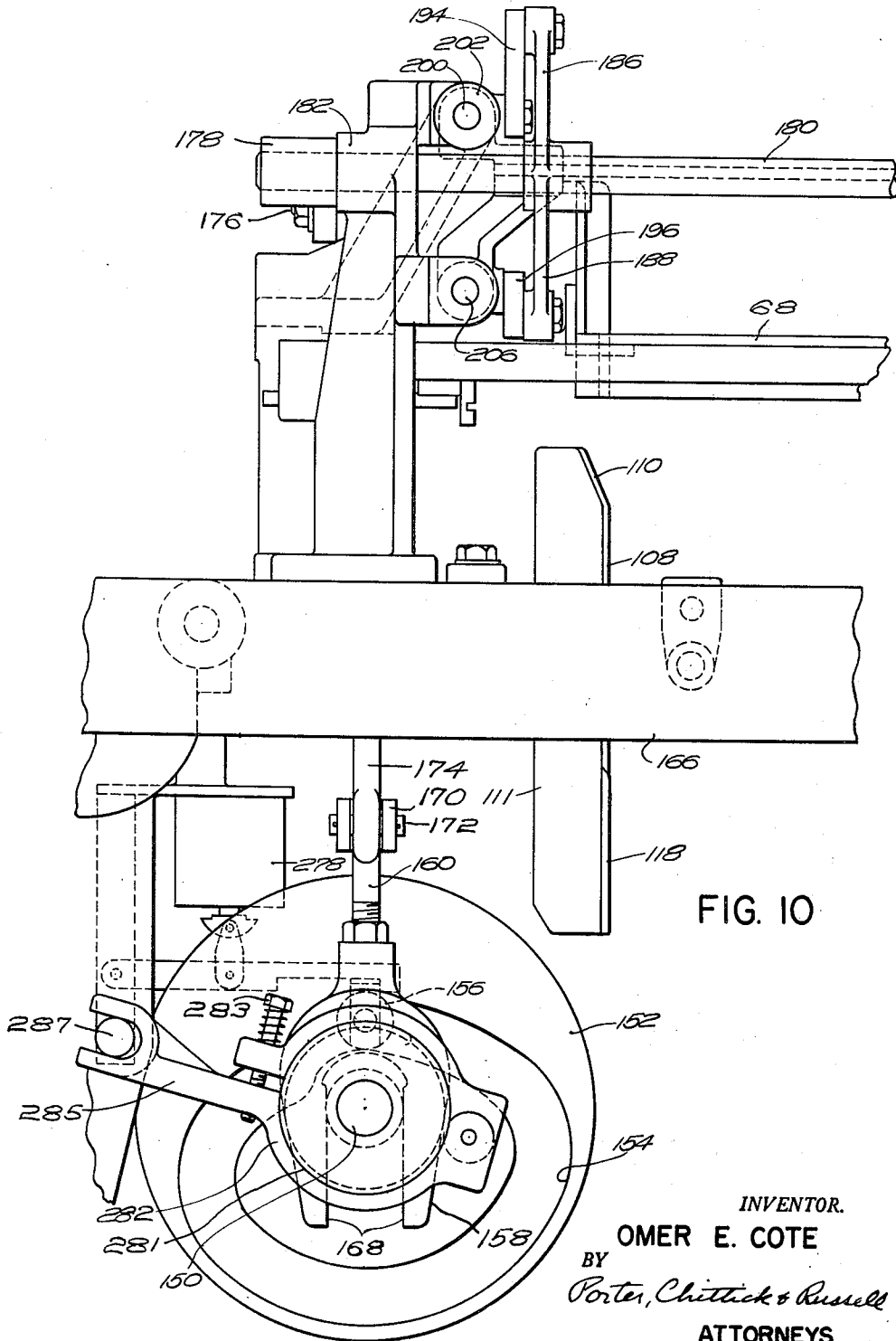


FIG. 10

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METHOD OF AND MACHINE FOR FORMING PACKAGES

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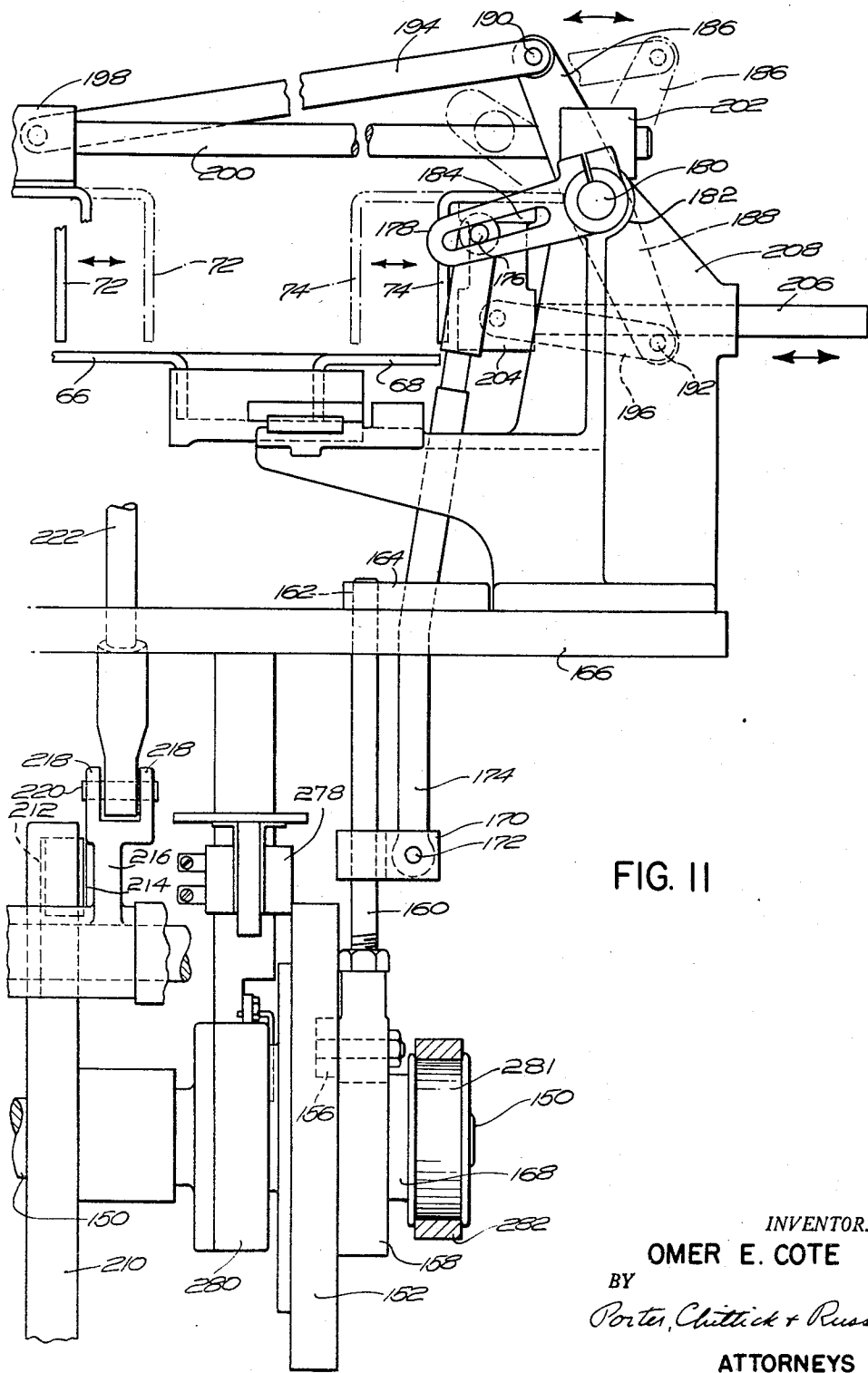


FIG. II

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METHOD OF AND MACHINE FOR FORMING PACKAGES

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8 Sheets-Sheet 8

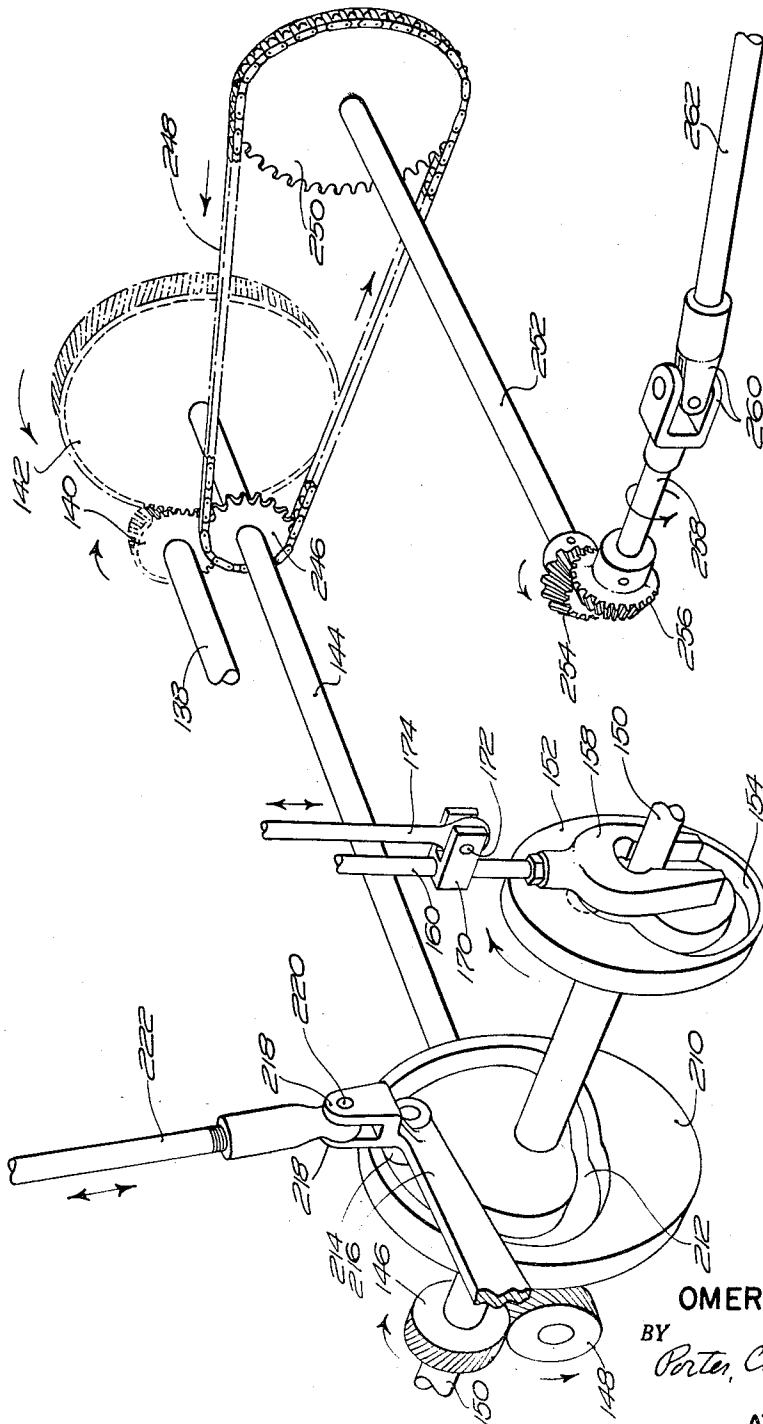


FIG. 12

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2,946,165

METHOD OF AND MACHINE FOR FORMING PACKAGES

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Filed June 12, 1956, Ser. No. 590,937

15 Claims. (Cl. 53—26)

This invention relates to methods of and machines for forming packages. The invention is herein disclosed with reference to a machine for combining a plurality of separate articles such as individual cereal boxes into a unitary package comprising an open-topped box or tray in which the individual articles are contained.

The common practice is to make up such packages by first forming flat blanks, suitably scored, into trays and then placing the individual articles in each tray by hand. The tray forming operation is ordinarily done by a machine which folds the blanks about a mold with the parts thereof maintained in position by previously applied adhesive, but the subsequent manual operation of loading the trays, however, is laborious and time consuming. In a still further operation, unrelated to either current practice or the present invention, the packages may be wrapped in cellophane or other suitable material.

It is an object of the present invention to provide an improved method of forming a package consisting of a tray holding a plurality of individual articles. In carrying out this method, the articles are assembled upon a flat blank and the blank is thereafter formed about the assembly into a tray containing the articles. The package comprising the tray and the articles within it is advanced to a convenient point of delivery while a continuous pressure is maintained upon it to insure setting of the adhesive.

It is a further object of the invention to provide a machine which both forms and loads trays with articles to make a package, thereby eliminating the manual operation of loading the trays which has hitherto been necessary.

In accordance with the second mentioned object, a feature of the machine disclosed herein consists in the provision of means for delivering the material to be packaged to a flat blank on a support and means cooperating with the support to form the blank into a tray about the material, thereby to produce a complete package. As shown herein, the articles to be packaged, such as individual cereal boxes, are stacked in a plurality of upright chutes with the lowest member of each stack of articles resting upon a second support. Means are provided for simultaneously moving the lowermost article of each stack off the support to a position wherein it will drop upon a blank resting on the first mentioned support. The illustrated machine has two sets of such chutes, each set comprising a row of chutes arranged to deliver a row of articles in side by side relation and in spaced opposed relation to the articles delivered by the other set of chutes. The moving means operates to move the two opposed rows toward each other to bring the articles into face to face relation at a locality wherein they will drop through a central opening in the second support and upon the blank resting on the first support.

A further feature consists in a provision for maintaining under pressure the localities of the blank which are to be bonded, after the tray has been formed, by adhesive previously applied, this pressure being relatively light to

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avoid crushing the material and also being continued for an appreciable period to enable the adhesive to set.

These and other objects and features of the invention will be readily understood upon a reading of the following description with reference to the accompanying drawings, in which

Fig. 1 is a schematic perspective view illustrating the improved method and also showing the operations performed by an illustrative machine embodying the invention;

Fig. 2 is a plan view of a flat blank scored to determine lines of fold;

Fig. 3 is a perspective view of the blank folded on the score lines to form a tray, but with the contents removed from the tray;

Fig. 4 is a side elevation in section of certain portions of the machine;

Fig. 5 is a sectional view in front elevation taken on the line 5—5 of Fig. 4;

Fig. 6 is a plan view of a conveyor for delivering finished packages from the machine;

Fig. 7 is a side elevation of the conveyor shown in Fig. 6 drawn to an enlarged scale;

Fig. 8 is a plan view looking down on the top of Fig. 9 showing means for guiding the individual boxes to be packaged;

Fig. 9 is a front elevation of Fig. 8 with parts broken away showing the box guiding means and additionally a plunger and connections for operating the plunger;

Fig. 10 is a front elevation in enlarged scale of parts located below those shown in Fig. 9 and showing mechanism for operating certain pushing members;

Fig. 11 is a side elevation of the mechanism shown in Fig. 10; and

Fig. 12 is a schematic perspective view of the operating mechanisms.

The improved method and also the operations performed by the illustrated machine will be understood upon reference to Fig. 1 in the upper portion of which are shown five articles 20, such as cereal boxes, arranged side by side in a row 22 which is parallel to and spaced from a similar row 24 of five articles 20. The row 22 is pushed in the direction of the arrow A, and the row 24 is pushed in the direction of the arrow B until the individual articles of each row come into face to face contact with the individual articles of the other row; and while the rows are being pushed toward each other, the end articles of each row are moved toward each other, as indicated by the arrows C, to close slight endwise spaces 28 between the articles, as will later be explained.

The two rows of articles, thus assembled, are indicated by the reference numeral 30 and are shown as resting upon a flat blank indicated generally by the reference numeral 32. The flat blank 32 is shown in Fig. 2 as divided by score lines into panels, and the blank is now folded along these score lines about the assembly 30 in the form of an open-topped tray 34 with the articles of assembly 30 remaining continuously therein. The tray, which has now become a container for the articles, has a bottom 36, a back wall 38, a front wall 40, walls 42, a pair of bonding tabs 44 at opposite ends of the back wall 38 respectively, and a pair of bonding tabs 46 similarly arranged with respect to the front wall 40. Like reference numerals on Fig. 2 designate the panels destined to become the corresponding parts of the tray 34. Spots of adhesive 47 have already been applied to each end wall 42 to bond the tabs 44 and 46 thereto.

Except for the omission of a lid, the tray 34 per se is substantially like the box illustrated in Figs. 1 to 5, inclusive of United States Letters Patent 2,697,968 granted December 26, 1954, upon the application of Omer E. Cote and George H. Nilsen.

The tray 34, with the assembly 30 of articles within it, constitutes a package 48 (Fig. 1) and the package 48 is pushed down (see arrow D) to a position indicated by the reference numeral 50. During such downward movement the end walls 42 of the tray 34 are held by relatively light pressure against the tabs 44 and 46 to facilitate the setting of the adhesive. The package 48, under the influence of the downward movement of another assembly of articles like the assembly 30 and directly above it, then drops to a position indicated by the reference numeral 52 and is then pushed forward in the direction of the arrow E to a position indicated by the reference numeral 54 wherein it is engaged by a conveyor and advanced to a convenient point of delivery, the conveyor being constructed and arranged to maintain and continue light pressure upon the ends of the tray to insure time enough for proper setting of the adhesive without crushing the articles.

The machine illustrated herein is provided with upright rearward and forward guides 56 and 58 (Figs. 8 and 9) in which are stacked a supply of articles 20 to be operated upon. Each of these guides is divided into five chutes 60 by channel shaped members 62 providing party walls 64 between adjacent chutes. Each chute is provided with a part of upright rods 65 for retaining the articles 20. Each pair of retaining rods is carried by upper and lower supporting members 67 and 69 hinged to one of the side walls of the chute and latched to the other side wall. The rods 65 of each chute may thus be swung to open position to permit replenishing the articles 20 stacked within the chutes. The lowermost articles are guided by the rearward guide 56 to rest upon a rearward shelf 66 (Figs. 4 and 5) while the lowermost articles guided by the forward guide 58 rest upon a forward shelf 68. The articles on the rearward shelf 66 constitute the row 22, and the articles on the forward shelf 68 constitute the row 24. The shelves 66 and 68 may be considered collectively as a support for the articles 20 stacked in the guides 56 and 58, and these shelves are separated widely enough to provide a space or central opening through which an assembly 30 of articles can drop freely upon a flat blank 32. Each shelf has a depending flange 70 to guide the assemblies 30 as they drop.

The guides 56 and 58 terminate high enough above the shelves 66 and 68 to enable the rows 22 and 24 of articles resting on the shelves to be moved out from under the articles stacked upon them and away from the guides. The rearward row 22 is moved forwardly (arrow F on Fig. 4) toward the opening between the shelves by a pusher 72, and the forward row 24 is moved rearwardly (arrow G) toward said opening by a pusher 74. These pushers move the rows 22 and 24 toward each other until the individual articles of each row come into face to face contact with the individual articles of the other row at a locality directly over the central opening between the shelves and, upon retraction of the pushers, the two rows drop as an assembly 30 upon the central panel 36 of the flat blank 32 and just cover the area of said panel. Each pusher has a horizontal flange 76 to support the articles stacked above the lowermost article.

Because of the party walls 64 and provision for free running clearance of the articles 20 in the chutes 60, the articles will be delivered to the shelves 66 and 68 with the slight spaces 28 (already mentioned) between them. These spaces 28 are closed by stationary cams 78 (Figs. 4, 5 and 8) engageable with the end articles of each of the rows 22 and 24 as the rows are pushed toward each other. Each cam 78 has a central vertical surface 80 extending lengthwise of the machine, and a pair of vertical surfaces 82 at opposite sides of and adjoining the central surface 80, the surfaces 82 being angularly related, as shown in Fig. 8, to the central surface so as to exert a camming action on the end articles of the rows as the rows move toward each other. The extent of endwise movement caused by the cams 78 is insufficient to

crush the articles, such as boxes of cereal, and is just enough to take up the spaces between the articles resulting from the thickness of the party walls and the provision for free running clearance of the articles in the chutes.

The blanks 32 are fed into forming position by mechanism similar to a corresponding mechanism of the machine disclosed in Letters Patent 2,697,968 above referred to and, except for two pairs of feed rolls 84 and 86, and 88 and 90, no detailed disclosure of the feeding mechanism herein is necessary. Before reaching the forming position, the blank 32 passes under a conventional glue or adhesive applying mechanism (not shown herein) which applies the two spots 47 of adhesive to each of the end panels 42 for subsequent bonding of the tabs 44 and 46.

The mechanism for folding the flat blank about the score lines shown in Fig. 2 is an obvious simplification of a corresponding mechanism disclosed in Letters Patent 2,697,968, and a detailed disclosure herein is unnecessary. It should be kept in mind, however, that the blank 32 is formed not about a plunger or forming block such as that numbered 34 in said Letters Patent, but about the material, i.e. the assembled articles 20, to be packaged.

Insofar as it is disclosed herein, the forming mechanism of the present machine comprises a plurality of folding plates 94 (Figs. 4 and 5) extending up from a horizontal slide 96 and a like plurality of folding plates 98 extending up from a horizontal slide 100. The slides 96 and 100 are reciprocated forwardly and rearwardly of the machine to move the folding plates 94 and 98 toward and from each other, as shown in Fig. 4. Each flat blank 32 is delivered to forming position wherein it rests upon the upper edges of the folding plates 94 and 98, by the feed rolls 84 to 90 inclusive, when the folding plates are at their widest separations. Since the blank 32 rests upon the folding plates, the latter may be considered also as a support for the blank.

After the assembly 30 has dropped upon the flat blank 32 as above explained, a plunger 102 (Figs. 4, 5 and 9) descends and engages the tops of the articles which comprise the assembly, said tops being now at a level indicated by the reference numeral 104. During continued downward movement of the plunger 102 the folding plates 94 and 98 operate to fold the back and front panels 38 and 40 up to form back and front walls of the tray 34. The folding mechanism, which includes means not shown herein for folding the tabs 44 and 46 about the ends of the assembly 30 into position to be engaged by the spots of glue 47, is more fully described in Letters Patent 2,697,968. The assembly 30 is thus pushed down by the plunger 102 until the tops of the articles 20 of the assembly are brought to a level indicated by the reference numeral 106. During such descent of the assembly, the end panels 42 of the blank 32 engage stationary end plates 108 (one of which is shown in Fig. 5) having inclined upper end portions 110 which fold the end panels 42 up into end walls of the tray. The end plates 108 have supporting flanges 111 mounted on stationary brackets 109, one of which is shown in Fig. 5.

It is evident that the originally flat blank 32 has now been formed into the open-topped tray containing the articles 20. This tray, together with its contents, constitutes the package 48.

The end walls 42 of the tray 34 must be held against the tabs 44 and 46 with moderately light pressure long enough to enable the adhesive 47 to set. To this end the plates 108 (Fig. 5) extend vertically down a considerable distance below their inclined upper portions 110 and thus serve not only to guide the package 48 but also to hold the end walls 42 against the tabs 44 and 46 as the package is forced down to position 50 by the package above it on the next downward stroke of the plunger 102. As the package 48 descends between the end plates 108

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to position 50, it passes also between a pair of guide plates 112 (Fig. 4) which keep the back and front walls 38 and 40 in upright position, thus maintaining the tabs 44 and 46 in proper bonding position while the adhesive sets. The downward thrust of the plunger 102 overcomes the frictional resistance of the guide plates 112 and 108.

The package 48, now at position 50, is again pushed down by the package above it on the next downward stroke of the plunger 102. The forward guide plate 112 has a lower horizontal end 114 (see Fig. 4) which is somewhat higher than the lower horizontal end of the rear guide plate 112 and, when the top of the package 48 comes below the end 114, friction on the package is reduced sufficiently to enable the package to drop a short distance until, at position 52, it rests upon a horizontal forwardly extending slideway 116.

The lower terminations of the end plates 108 are substantially at the level of the bottom of the package when the package occupies position 50, from which level there extend downwardly somewhat thicker end plates 118 (Figs. 4 and 5) having upper edges 120 which are beveled, the purpose of the end plates 118 being to impose a greater end squeeze on the package as it is moved from position 50 to position 52 by the down movement of plunger 102 and the packages in the intermediate positions. The frictional resistance to downward movement of the package applied by end plates 118 is such that the package will reach or substantially reach slideway 116.

As soon as the package 48 has reached the slideway 116, it is advanced along the slideway by a pusher 122 (Figs. 4 and 5) until the ends of the package are gripped between a pair of elements of a delivery conveyor 124 (Figs. 4, 6 and 7). The end plates 118, as shown in Fig. 4, extend forward to continue the endwise squeeze on the package 48 until the package is engaged by the delivery conveyor 124. The delivery conveyor 124 is of a conventional type, in which the elements above mentioned comprise sprocket chains carrying work engaging plates 126 and running constantly between driven sprocket wheels 128 and idler sprocket wheels 130. Other idler sprocket wheels 132 are provided for adjusting the tension of the sprocket chains. The work-advancing runs of the sprocket chains are backed by suitable guides which hold the plates 126 in position to apply moderate pressure against the ends of the packages 48 as they are moved from the entering to the discharge end of the conveyor.

The pusher 122, mentioned in the foregoing paragraph, is reciprocated forwardly and rearwardly by a rod 134. To insure against packages falling down behind the pusher 122 when this pusher is at or near the forward limit of its stroke, the pusher has a rearwardly extending top flange 136.

The driving instrumentalities of the illustrated machine comprise a main drive shaft 138 (Fig. 12) driven from any suitable source of power and driving, through gears 140 and 142, a transverse shaft 144. This transverse shaft 144 drives, through gears 146 and 148, a cam shaft 150 extending forwardly and rearwardly of the machine.

The pushers 72 and 74 are driven from the cam shaft 150 through connections now to be described. A cam 152 (see also Figs. 10 and 11) fixed on the shaft 150 has a track or cam groove 154 engaged by a cam roll 156 mounted on a guide yoke 158 secured upon the lower end of a rod 160. The upper end of the rod 160 is guided for heightwise reciprocation by a bearing 162 formed in a block 164 mounted upon a frame member 166 of the machine. The guide yoke 158 has a pair of bearing surfaces 168 which embrace the cam shaft 150 to hold the yoke and the lower end of the rod 160 against movement lateral of the machine while permitting heightwise movement. Longitudinal movement, relative to the machine, is prevented by the engagement of a face of the cam 152 with one face of the yoke 158 and by the engagement of

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a collar 168 with the opposite face of the yoke. Fixed upon the rod 160 is a block 170 having a slot bridged by a pin 172 on which is pivotally mounted, for oscillation longitudinal of the machine, the lower end of a rod 174 (Fig. 11). The upper end of the rod 174 is pivotally connected by a pin 176 to a rocker arm 178 fixed upon a rock shaft 180 journaled in fixed bearings 182, one of which is shown in Fig. 10. A radially extending slot 184 formed in the rocker arm 178 provides for adjustment of the pin 176 to vary the throw of the rocker arm.

Also fixed upon the rock shaft 180 are two oppositely extending rocker arms 186 and 188 pivotally connected by pins 190 and 192 to ends of links 194 and 196 respectively. The opposite end of the link 194 is pivotally connected to a block 198 secured upon a rod 200 which is reciprocated forwardly and rearwardly of the machine by the link 194 and is guided for such movement by bearings 202, one of which is shown in Fig. 11. The block 198 carries the rear pusher 72. The opposite end of the link 196 is pivotally connected to a block 204 secured upon a rod 206 which is reciprocated forwardly and rearwardly of the machine by the link 196 and is guided for such movement by a suitable bearing formed in a bracket 208 mounted on the frame member 166. The block 204 carries the front pusher 74. It is evident that, through the connections just described, the pushers 72 and 74 will be reciprocated in opposite directions in unison and that the extent of their approach, which is critical, can be adjusted by varying the position of the pin 176 in the slot 184.

The plunger 102 is driven from the cam shaft 150 through connections now to be described. A cam 210 (Figs. 11 and 12) fixed on the shaft 150 has a track 212 engaged by a cam roll 214 carried by one end of a guide rod 216, the opposite end (not shown) of the guide rod being pivotally mounted to restrict the movement of the guide rod to heightwise oscillation. Extending up from the free end of the guide rod 216 are a pair of ears 218 bridged by a pin 220 which pivotally connects the guide rod to the lower end of a rod 222. The upper end (Fig. 9) of the rod 222 is pivotally connected by a pin 224 to a rocker arm 226 fixed on a rock shaft 228. Also fixed on the rock shaft 228 is another rocker arm 230 pivotally connected at its free end by a pin 232 to the upper end of a short link 234. The lower end of the link 234 is pivotally connected by a pin 236 to a block 238 on an upright rod 240. Upper and lower bearings 242 and 244 restrict the movement of the rod 240 to heightwise reciprocation. The plunger 102 is secured upon the lower end of the rod 240.

The folding plates 94 and 98, and also the blank delivering mechanism including the rolls 84, 86, 88 and 90, are driven by connections from the cam shaft 150. Since, as has already been pointed out, the folding mechanism and also the blank delivering mechanism of the machine illustrated herein will be readily understood upon reference to Letters Patent 2,697,968, no further disclosure of the connections for driving these parts need be made herein.

The pusher 122 for advancing the packages 48 to the delivery conveyor 124, is driven from a suitable cam (not shown) on the cam shaft 150.

It will be evident that all the above described operating parts of the machine, except the uniformly running delivery conveyor 124, being driven from the same cam shaft 150, will perform their functions in timed relation to one another.

The delivery conveyor 124 is driven by connections, now to be described, from the transverse shaft 144. A sprocket wheel 246 (Fig. 12) on said transverse shaft drives, through a sprocket chain 248 (see also Fig. 7), a sprocket wheel 250 on another transverse shaft 252. A bevel gear 254 on the shaft 252 drives a bevel gear 256 on a shaft 258 which shaft, through a universal joint 260, drives a long transmission shaft 262. Said transmission shaft, through a universal joint 264, drives a shaft 266.

A bevel gear 268 on the shaft 266 drives a bevel gear 270 on a transverse shaft 272. The bevel gear 270 drives a bevel gear 274 on one of a pair of upright shafts 276, on which upright shafts are mounted the sprocket wheels 128 of the delivery conveyor 124. The other upright shaft 276 is driven from the shaft 272 by bevel gears (not shown) similar to the gears 270 and 274.

While not so indicated in Fig. 12, the cams 152 and 210 and brake drum 281 are all integrally connected as best shown in Fig. 11. Cam shaft 150 rotating continuously and extending through the cam and brake is arranged to be connected to the cam and brake by a clutch 280. When the clutch is engaged, the cam and brake drum rotate with shaft 150. When the clutch is disengaged, the cams immediately stop rotation under the braking force applied by brake shoe 282 to the brake drum 281. The brake shoe is constantly acting on drum 281, but the force is not so great as to cause overheating. The brake may be adjusted by adjustment 283.

The clutch 280 is actuated by a conventional photoelectric device (not shown) which operates through a solenoid 278 (Fig. 10) to disengage the clutch and thereby disconnect the shaft 150 from the cams 152 and 210 whenever any blank 32 is missing from the normal sequence of blanks. This causes instant stoppage of rotation of the cams and related movement of plunger 102 and pushers 72 and 74, so that no articles on shelves 66 and 68 will be moved to the area between members 70 unless and until a blank 32 is in position on the supports 94 and 98.

Immediately on restoring the proper feeding sequence, the clutch 280 will reengage restoring the original connection between shaft 150 and the cams 152 and 210, thereby putting all of the operative elements back in correct timed relation.

Rotation of brake band 282 is prevented by brake arm 285 secured by its fork end to the fixed frame element 287.

The operation of the machine will now be briefly reviewed. A supply of articles 20 is stacked in the guides 56 and 58 and the machine is started running. The pushers 72 and 74 move the lowermost rows (22 and 24) of stacked articles toward each other along the shelves 66 and 68 until the individual articles of the respective rows come into face to face contact with each other. As the lowermost rows are thus moved, the end articles of each row engage the stationary cams 78 and are thus cammed toward each other to close the spaces between the individual articles of each row and bring the articles into side-wise contact with each other. When the pushers 72 and 74 reach the ends of their operative strokes, the articles will be directly over the central opening between the shelves 66 and 68 whereupon the articles will drop as assembly 30 upon a blank 32 resting on the folding plates 94 and 98, to which the blanks are delivered in timed relation to the operation of the pushers. The plunger 102 descends and forces the assembly 30 down between the folding plates 94 and 98 while the folding plates, operating in timed relation to the plunger 102, move according to known procedures to fold the panels 38 and 40 up to become the back and front walls of the tray 34. Related means, already mentioned, operate to fold the bonding tabs 44 and 46 into position to be engaged by the adhesive 47 on the end walls 42 as the latter are folded upwardly by the stationary end plates 108. The package 48 (Fig. 4), thus formed, is pushed down to position 50, on the next down stroke of the plunger 102, by a similar assembly immediately following it. On the third down stroke of the plunger 102, the package 48 continues its downward movement between the stationary guide plates 112 and downward extensions of stationary end plates 108 which maintain the tray 34 in position about the assembly 30 while the adhesive begins to set. As the package 48 nears the completion of its downward movement under the influence of third down stroke of the plunger, it moves an additional short distance to position 52 and to rest on the slideway 116, with the end walls 42 engaged by the end

plates 118 to maintain a light endwise pressure while the adhesive continues to set. The pusher 122 thereupon advances the package 48 into position to be gripped and fed forwardly by the delivery conveyor 124, the plates 126 of which continue the light endwise pressure until the packages reach their point of delivery, thus giving the adhesive ample opportunity to set notwithstanding the lightness of the endwise pressure which is necessary when operating on articles that are easily crushed.

It is my intension to cover all changes and modifications of the example of the invention herein chosen for purposes of the disclosure which do not constitute departures from the spirit and scope of the invention.

I claim:

1. In a packaging machine, means for successively forming flat blanks having adhesive applied to selected areas thereof about the bottom and sides only of articles to be packaged, thereby combining the blanks and the articles into packages, a delivery conveyor having opposed vertical faces between which said packages may be held to maintain the portions of the formed blanks having adhesive thereon under pressure while the adhesive sets, and means for transferring the packages from the forming means to the conveyor.

2. In a packaging machine, a support for a flat blank, said blank having dimensions which are less than the corresponding circumferences of an article to be packaged, a vertically disposed guide for a stack or articles, a support for the lowermost article of the stack, means for moving said lowermost article off the second mentioned support to a position wherein it will drop upon an unsupported area of a blank on the first mentioned support, and means cooperating with the first mentioned support to form the blank into an open top container about the article, thereby to form a complete package.

3. In a packaging machine, a support for a flat blank, a heightwise extending guide for a plurality of boxes arranged side by side in rows and also end to end in stacks, a second guide for similarly arranged boxes, said guides being spaced apart with the rows in each guide parallel to the rows in the other, means for supporting the boxes of the lowermost rows, means for pushing toward each other the lowermost rows to bring the individual boxes of each row into face to face contact with the individual boxes of the other row, said box supporting means being constructed and arranged to let the two rows of boxes in face to face contact drop upon an unsupported area of a blank positioned on the said blank-support, and means cooperating with the blank-support to form the blank into a container about said two rows of boxes to form a package by forcing said boxes downwardly and through said blank support.

4. In a packaging machine, movable container forming elements having parallel vertical faces and upper edges adapted to support a flat blank, means for successively placing blanks upon the upper edges of said forming elements, means for causing material to be packaged to drop simultaneously on said blank, a plunger, means operating in timed relation to the blank placing means for depressing the plunger to force the material and the blanks down between the container forming elements, and means operating in timed relation to the plunger for causing the faces of the forming elements to move toward each other in parallelism to cooperate with the plunger in folding the blank about the material.

5. In a packaging machine, means for simultaneously forming the edges of a flat blank upwardly about all the sides of a row of boxes arranged in side by side relation to one another to make a package, a plurality of chutes vertically arranged to deliver rows of boxes in said relation, said chutes including vertical parallel party walls for guiding the boxes in their vertical descent, means for transferring from the chutes to the forming means in a direction at right angles to the chutes a row of boxes in said relation, and means cooperating with said transfer-

ring means for causing the boxes of each row to move toward each other to close the spaces resulting from the thickness of the party walls.

6. In a packaging machine, movable container forming elements having upper edges adapted to support a flat blank, means for successively placing blanks upon the said upper edges of said forming elements, means for forming a flat placed blank about a row of boxes arranged in side by side relation to one another to make a package, a stationary support, means for delivering to said support a row of boxes arranged loosely in side by side relation, means for transferring said row of boxes from the support to said blank while still flat to a position for actuation thereon by the forming means, said transferring means including means for moving the row of boxes along the support in a direction which is lateral with respect to the row and parallel to the direction of approach of said blanks to said forming elements, and a pair of stationary cams engageable respectively with the end boxes of the row for urging the end boxes toward each other to bring all the boxes of the row into side by side contact as the row is moved laterally.

7. In a packaging machine, means for successively forming flat blanks about the sides only of articles thereby combining the blanks and the articles into packages, said blanks having adhesive applied to selected areas thereof which areas will be in vertical portions of the formed blanks, means for guiding the packages down away from the forming means, said guiding means being constructed and arranged to exert a light side squeeze on the packages to hold the parts having adhesive therebetween in contact without crushing the contents of the packages and means for forcing the packages through said guiding means against the friction thereof, said forcing means being operable in timed relation to said forming means to push packages one on top of another down along said guiding means and said guiding means extending down far enough to accommodate a plurality of said packages, thereby prolonging said side squeeze and facilitating the setting of the adhesive.

8. In a packaging machine having package forming instrumentalities, a pair of vertically arranged chutes oppositely disposed for guiding stacks of articles to be packaged, a support for the lowermost article of each chute, said support having an opening between the chutes and over the forming instrumentalities, a pair of pushers engageable respectively with the lowermost articles, and means for moving said pushers in unison toward each other to bring the lowermost articles together directly over said opening thereby enabling the articles to drop through the opening, whereupon the articles will be operated upon by the forming instrumentalities.

9. A machine according to claim 8, wherein each pusher comprises a vertical flange for engagement with the article to be moved and a horizontal flange for temporarily supporting the remaining articles of the stacks.

10. In a packaging machine, a pair of spaced guides each having a plurality of chutes in which articles to be packaged can be stacked, means for bringing the lowermost of the articles from each guide into contact with the lowermost articles from the other guide, means for forming flat pre-cut blanks about the articles on the bottom and sides only and thus to make a package, said blanks having adhesive applied to selected side localities thereof to maintain the blanks in formed condition about the articles, means for moving the packages to a convenient point of delivery, and means associated with said moving means for maintaining a light lateral pressure on the packages as they are thus moved to insure setting

of the adhesive before the packages reach the point of delivery.

11. In a packaging machine, means for forming a flat blank about the bottom and sides only of an article to make a package, said blank having adhesive applied to selected localities thereof which localities will comprise parts of the sides of the formed blank and will act to maintain the blank in formed condition, means for moving the package downwardly step by step from the position at which said blank is formed about said article to a convenient point of delivery and means for maintaining a light pressure on the selected localities of the package to insure setting of the adhesive before the package reaches the point of delivery.

12. In a packaging machine, means for assembling a plurality of articles to be packaged, means for forming about the bottom and sides only of the assembled articles a flat blank to make a package, said blank having adhesive applied to selected localities thereof to maintain the blank in formed condition, said localities comprising parts of the sides of the formed blank, means for moving the package to a convenient point of delivery, and means for maintaining a light lateral pressure on the selected localities to insure setting of the adhesive before the package reaches the point of delivery.

13. The method of making up a package of individual articles which consists in moving two opposed groups of articles toward each other in a horizontal plane, dropping said groups when brought together upon a suitably scored flat blank located at a lower level and to which blank adhesive has been applied at selected areas, forming the blank into a tray about the assembled articles with the said selected areas comprising parts of opposed walls of the tray, and maintaining the said opposed walls of the tray in position about the articles until the adhesive sets.

14. The method of making up a package of individual articles which consists in applying adhesive to selected localities of a flat blank, maintaining said blank in horizontal position, dropping an assembly of articles onto said blank, forming the blank about the vertical sides only of said assembly of the articles to make a package in which the formed blank is on the bottom and sides only and advancing the package to a convenient locality of delivery while maintaining it under continuous lateral pressure to insure setting of the adhesive.

15. In a packaging machine a pair of container forming elements having parallel faces and being movable toward and away from each other and having upper edges adapted to support a flat blank, means for placing material to be packaged upon a blank supported by said upper edges while in spread position, a plunger, means for depressing said plunger to force the material and the blank down between the container forming elements, and means operating in timed relation to the plunger for causing the forming elements to move toward each other to cooperate with the plunger in folding the blank upwardly about all of the sides of the material.

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