Feb. 17, 1959 L. E. ARNESON 2,873,565

METHOD AND APPARATUS FOR PACKAGING CANS AND THE LIKE

Original Filed Jan. 7, 1954 2 Sheets-Sheet 1

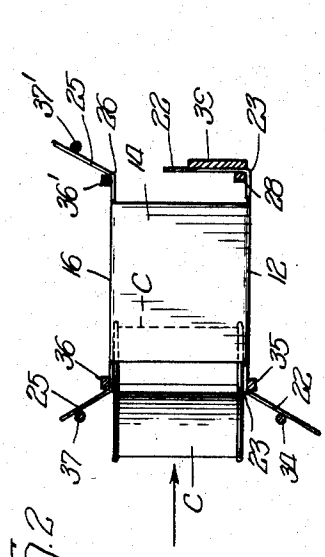


Fig. 2

Fig. 1

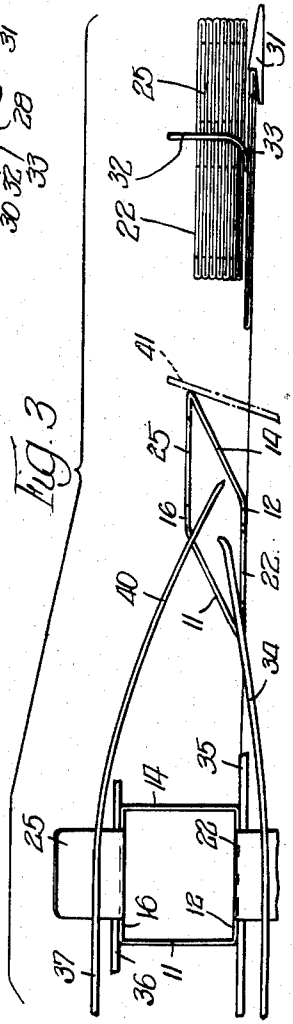


Fig. 3

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Fig. 4

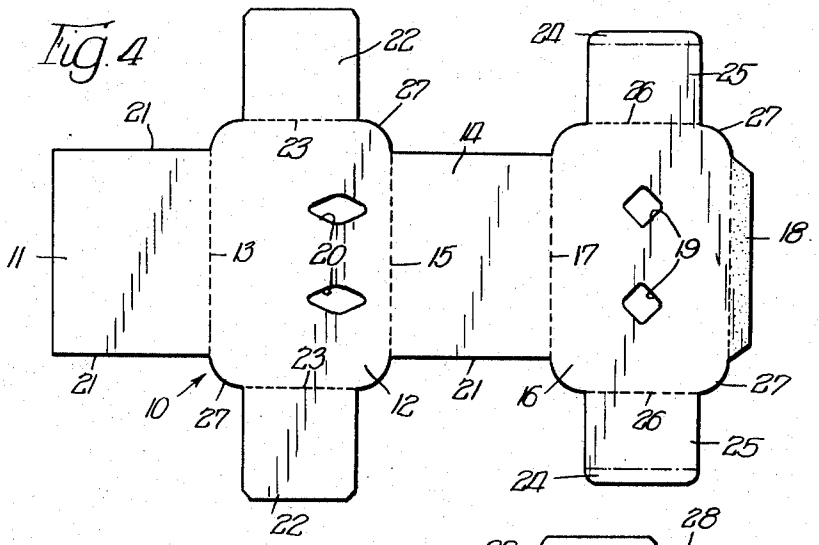


Fig. 5

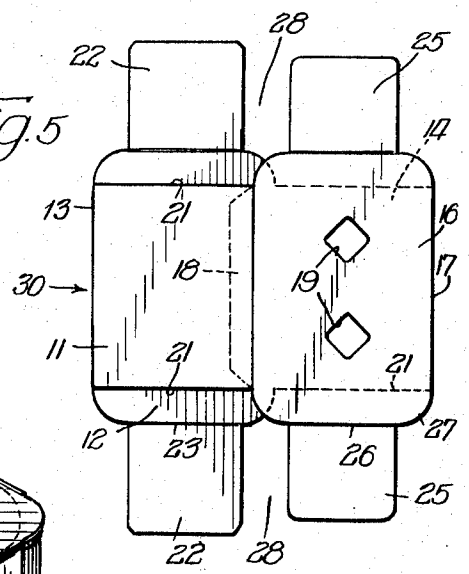
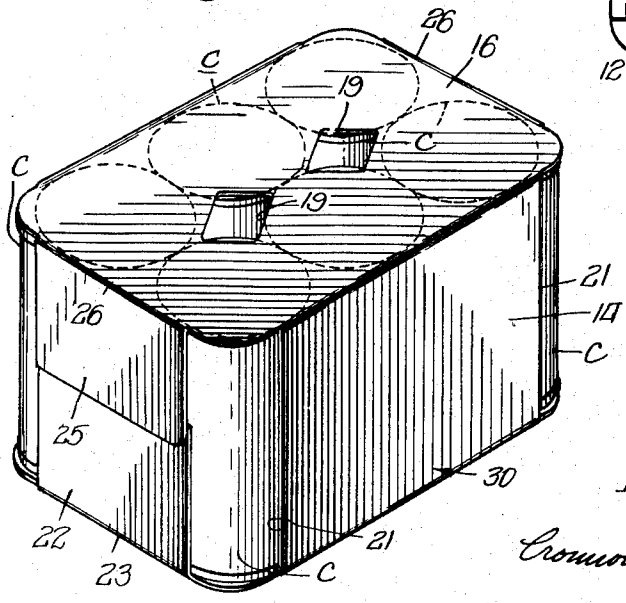


Fig. 6



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METHOD AND APPARATUS FOR PACKAGING CANS AND THE LIKE

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Original application January 7, 1954, Serial No. 402,628. Divided and this application January 3, 1955, Serial No. 479,391

6 Claims. (Cl. 53—29)

The present invention relates to an improved method and apparatus for producing a portable paperboard carrier package for cans of foodstuffs, beverages, etc. The present application is a division of my copending application, Serial No. 402,628, filed January 7, 1954, now abandoned. General objectives of the invention are to improve, expedite and simplify the packaging operation by affording a simplified sequence of method steps in the manipulation of the carrier in loading the same; and, as a consequence of the above considerations, to provide improved packaging equipment, of considerably less cost of manufacture and considerably more compact than comparable apparatus now in use.

A can carrier package as formed by the method and apparatus consists of a paperboard carrier of rectangular, sleeve-like outline having parallel top and bottom panels disposed in flatwise relation to the tops and bottoms of, say, six cans arranged in two rows, these panels being hingedly connected by vertical side wall panels in snug engagement with the upstanding cylindrical surfaces of the cans of each row. The top and bottom panels are contoured at their corners to conform with the rounded contour of the top and bottom beads or chimes of the cans and securing flaps are integrally hinged to opposite ends of the top and bottom panels. These flaps are of less width than the top and bottom panels, and are overlapped and adhesively secured to one another, forming end walls which extend vertically throughout the height of the package. Yet quarter segments of the four corner cans of the package are displayed to view at the open corners of the carrier, enabling a purchaser to ascertain the nature of the packaged commodity readily. This permits the entire exterior of the paperboard carrier to be decorated attractively.

In accordance with the present improvements the packaging procedure is simplified and expedited and certain machine parts and driving provisions therefor, essential in the loading and sealing of previous related types of package, are dispensed with. Furthermore, inasmuch as the overlapped, vertically extending end panels on the top and bottom of the carrier are adhesively secured to one another at an elevation midway between the top and bottom of the package, well spaced from the beads of the end cans, the apparatus is enabled to perform a better pressure sealing at the adhesive connection. Sealing pressure is applied directly against the cylindrical surfaces of cans, which act as a platen or anvil at each end of the package.

In performing the packaging procedure of the invention, a lowermost knocked-down paperboard container or carrier in a stack or hopper is mechanically fed forwardly into a loading and sealing line, and in this initial phase certain structural provisions are made in the equipment to prevent end flaps on the top forming panel of the collapsed carrier, which project from that panel at a right angle to the direction of feed and are at the trailing end of the carrier, from snagging the corresponding,

more forward end flaps of the bottom panel of the carrier immediately above that fed forwardly. This is necessary because of the existence of a space between the respective sets of flaps of the collapsed carrier and because of the lesser width of the flaps than the width of the panels with which they are associated. The flat knocked-down carriers are roughly H-shaped, the legs of the H being in the direction the flaps extend. The machine provisions to the above end take the form of downwardly and forwardly curved plates mounted in the space between such legs and terminating just in underlying relation to the rear of the forward pair of flaps on the bottom forming panel of the carrier which is immediately above the one being forwarded.

As the lowermost carrier feeds forwardly, it is deposited on a continuously moving, chain type conveyor, which has projecting pusher arms. These commence the operation of spreading the carrier to rectangular cross sectional outline, with the assistance of a pair of rearwardly and downwardly curved flap-manipulating rods. The rods diverge laterally as they incline downwardly toward the level of advance of the carrier, in effect spearing into the spaces between the two sets of flaps, referred to above, and engaging beneath the end flaps on the top trailing panel of the carrier. The latter is sufficiently spread at this time to receive the rods without interference. As this happens, the flaps come under the control of further fixed flap controlling members. One member engages over the top of the end flap on the bottom forming panel to cam or plow it downwardly, while two others ride over the end margins of the top forming panel, restraining the same as its flaps are being plowed upwardly by the spearing rods previously referred to. A further rod rides over the end margin of the bottom forming panel, at the end thereof remote from the end to be loaded, and the flap adjoining that margin is simultaneously plowed upwardly about this member as a fulcrum by a final fixed control member or plate.

Thus the body of the carrier is erected in part with the assistance of the flaps of the top and bottom panels, particularly those on the bottom panel, under which the first mentioned rods spear. The flaps at the loading end of the carrier are progressively spread widely relative to one another to expose that end fully for loading, the bottom panel flap is properly positioned and held upright relative to that panel for final sealing, being well out from adjacent ends of the side walls and being supported for abutment by cans fed into the loading end, and the remaining top panel flap is spread well up above it to receive a glue stripe when that phase of the operation is reached.

The empty but squared carrier now successively passes three rotary, star wheel type loading heads, each of which has pockets shaped to successively pick a pair of cans from a radially advancing belt conveyor and to advance them transversely across the carrier conveyor and into the carrier mouth, as the carrier flaps at that end are held vertically spread by the provisions referred to above. Having passed the three rotary loading heads, or any number thereof determined, as is also the design or number of the star wheel pockets, by the intended capacity of the package, the carrier is ready for the sealing of its end flaps. In this, the loading end flaps of the bottom panel are plowed or permitted to snap upwardly past their control rods and the top panel flaps at each end are progressively plowed downwardly to a horizontal position. A pair of glue wheels on opposite sides of the path of advance of the partially completed package each applies a stripe of adhesive to the same, whereupon these flaps are downwardly plowed to overlapping relation to

the upturned lower flaps, and are sealed thereto by longitudinally travelling side sealing belts. These compress the overlapped areas against the can sides to effect a very strong and secure seal of the flaps, constituting the same end walls for the package which tightly confine the packaged cans.

The foregoing statements are indicative in a general way of the nature of the invention. Other and more specific objects will be apparent to those skilled in the art upon a full understanding of the method and machine aspects thereof. In each case a single embodiment is presented for purpose of illustration. It will be appreciated that the invention may be incorporated in other modified forms coming equally within the scope of the appended claims.

In the drawings:

Fig. 1 is a schematic perspective view illustrating the improved apparatus and procedure used in erecting a flat, knocked-down carrier container and in further manipulating the same, as well as the objects to be packaged;

Fig. 2 is a view in enlarged section, also somewhat schematic, along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary schematic view in side elevation more clearly illustrating improved means to perform an early operation in the packaging method;

Fig. 4 is a top plan view of a flat paperboard blank from which the carrier is fabricated;

Fig. 5 is a top plan view of the can carrier in its completed, flat or knocked-down condition; and

Fig. 6 is a perspective view of the filled and sealed package.

An understanding of the nature of the carrier manipulated by the apparatus will facilitate an understanding of the functions performed by the latter. With this in mind, reference should first be had to Figs. 4, 5 and 6. A flat blank **10** of flexible paperboard, from which the carrier is made, is illustrated in Fig. 4. It comprises an articulated series of top, bottom and side forming panels which are each generally rectangular in shape. These include a rectangular side wall panel **11** to which a bottom panel **12** is integrally hinged by a transverse crease **13**, a further side wall panel **14** hinged to panel **12** by a crease **15** paralleling crease **13**, and a top forming panel **16** hinged by crease **17** to side wall panel **14**. Top panel **16** is provided with a terminal glue lap **18**, hinged thereto by transverse crease, and has formed therein a pair of transversely spaced finger holes **19**, through which the fingers of the user are inserted to grasp the panel **16** in spaces between cylindrical cans in the carrier. Bottom forming panel **12** is also provided with a pair of off center apertures **20** to facilitate refrigeration.

Top and bottom panels **16, 12**, respectively, are of substantially larger area than side wall panels **14**, extending equidistantly beyond opposite end margins **21** of the side walls. At their four corners the panels **12, 16** are rounded so that their area and shape represent that of the extreme outer generally rectangular perimeter of a set of cylindrical cans, for example six cans arranged in two longitudinal rows of three each, at the usual enlarged top or bottom beads of the cans.

Panels **12, 16** are each provided at opposite ends thereof with a pair of end wall flaps. These flaps of the bottom panel **12**, designated **22**, are integrally hinged to the ends of the respective panels by longitudinally extending creases **23**. The end wall flaps on the top panel **16** are designated **25**, being integrally hinged to that panel by longitudinally extending creases **26**. In the packaging procedure, longitudinally extending stripes of adhesive are applied to areas **24** across the extreme outer ends of the top panel flaps **25**.

Assuming rounded corners **27** of the top and bottom panels to be of roughly 90° arc or of quadrant shape, the width of the flaps **22, 25** approximately equals the distance between the outer, mutually facing extremities of the respective corner arcs **27**. Similarly, the transverse width of the side wall panels **11, 14** approximately equals the distance between the other mutually facing extremities of the quadrants.

In completing the carrier to its flat, knocked-down condition, the top panel **16** is folded 180° upwardly, inwardly and downwardly about crease **17** and onto side wall panel **14**, whereupon side wall panel **11** is similarly folded 180° about crease **13** adhesively secured in overlapping relation to glue lap **18**. This provides a flat, knocked-down carrier in the condition illustrated in Fig. 5.

It will be noted that a space **28** of substantial width intervenes between the respective sets of bottom end wall flaps **22** and top end wall flaps **25** at opposite ends of the carrier, these flaps extending outwardly in parallel relation to the panel hinging creases **13, 15, 17** and to glue lap **18**, the panels **22** projecting still further outwardly beyond the end extremities of the respective flaps **25**.

The packaging procedure and machine of the invention are depicted in Figs. 1, 2 and 3, in a very schematic way, and in considering these views it should be borne in mind that many structural details which are old and well known in the art have been omitted in the interest of simplicity. However, Fig. 1, supplemented by Figs. 2 and 3, affords a complete and adequate representation of what happens in the operation of the improved packaging machine and process.

A stack of the flat, collapsed carriers, generally designated **30**, is appropriately supported in a suitable hopper, which is not shown other than in respect to novel provisions for controlling the bottom out-feed of the carriers The structure provided for this purpose includes a reciprocatory pusher **31** actuated in any suitable fashion to engage and forward the lowermost carrier **30**, and a pair of upstanding outfeed control plates **32**. Each of these is fixedly positioned on the machine in a space **28** between the respective sets of lateraly projecting end flaps **22, 25** on the forwardly disposed bottom forming panel **12** and on the rearwardly disposed or trailing top forming panel **16**.

Each plate **32** is shaped adjacent its bottom in the form of a forwardly projecting, curved restraining presser foot **33**, whose free edge terminates just before and slightly below the rear edge of a forward, end wall flap **22**. It is the purpose of these feet to direct the trailing end wall flaps **25** beneath the flaps **22** of the carrier next above, without snagging the same as the bottom carrier is advanced forwardly by the push bar **31**.

The flat carriers are advanced directly onto a continuously travelling, chain-type conveyor (not shown) which is provided with upwardly projecting arms to engage behind the carrier and forward the same through the ensuing operations of spreading, filling and sealing the carrier.

The erecting and flap spreading provisions of the machine consist primarily of a set of fixed, longitudinally extending, shaped plow rods or members acting slidingly on the carrier **30** as it progresses along the machine. A set of rotary, star wheel can inserting heads and gluing and belt sealing devices also operate on the carrier and cans, designated C, to complete the package.

The control or spreader rods are constituted as follows: In relation to the apparatus depicted in Fig. 1, a longitudinally extending bottom rod **34**, on the near side of the machine as viewed in Fig. 1, acts on the near forward end flap **22** as carrier **30** passes it to commence downward swinging of that flap. A fixed rod supports bottom panel **12** as this is done. A fixed rod **36** on the near side similarly restrains top panel **16** adjacent crease **26** as the flap **25** is picked up by an adjacent shaped rod **37** and swung upwardly to expose the loading mouth of the carrier; and the shape and functions of rods **36, 37** are duplicated at the opposite end of the carrier by rods designated by the same reference numerals, primed. Since it is ultimately desired to swing the bottom panel's far end flap **22** upwardly for gluing, the panel is restrained

adjacent its crease 23 by a fixed rod 38 (Fig. 2) under which it passes. Finally, a fixed, shaped plow plate 39 acts inwardly against said flap 22 to swing it to the vertical position of Fig. 2.

Each of the rods 37, 37' has an integral, downwardly and outwardly curved rear extremity of substantial length, specially designated 40, which terminates somewhat above the path of the conveyor. So positioned the portions 40 will "spear" into the spaces 28 between the forward and trailing flaps 22, 25, respectively (see Fig. 3) as the carrier, partially spread by a chain conveyor arm 41 is advanced to and along the rods. This causes the rear pair of flaps 25 to ride upwardly on rods 37, 37'. The camming or plowing action further squares the carrier in a rectangular outline as its near flaps 22, 25 and far flaps 25 are simultaneously swung outwardly, to the approximate positions of Fig. 2.

The advancing and squared carrier 30 first passes a rotary loading head 42 of a star wheel type. It has a pair of outwardly spacing adjacent can-receiving recesses or pockets 43 on a segment of its otherwise cylindrical periphery, and as a squared carrier approaches the same the head 42 receives a pair of cans C in these two recesses, forwarded to the head by a belt conveyor generally designated 44, and swings them inwardly and forwardly, in synchronism with the advancing carrier 30. Thus the first pair of cans is traversed across the carrier conveyor and partially inserted into the carrier, to the position indicated in dotted lines in Fig. 2. Second and third rotary star wheel loaders 45 and 46 are spaced longitudinally to the rear of loader 42; they are identical to the latter, being supplied by can conveyors 44 and they operate in the same fashion. When the carrier has passed the third loader it will have received a full complement of six cans, arranged in two parallel rows of three cans apiece.

At this point the near flap 22 of the carrier passes upwardly past its control rod 34, and an inward and upward curvature 47 of that rod then engages beneath said flap and swings it up to a position corresponding to that of the companion far flap 22 in Fig. 2, i. e., in vertical side contacting relation to the adjacent pair of end cans which have been last loaded in the carrier. Flaps 22 are held in this position as the carriers advance past a pair of glue pots 48, whose glue wheels 49 now engage and deposit stripes of adhesive on the free outer extremities 24 (Fig. 1) of the top end wall flaps 25. When this is done, forwardly and inwardly converging portion 50 of the rods 36, 36' becomes effective to plow the flaps 25 downwardly and to adhere their glued areas to the flaps 22, in vertically overlapped relation. This completes the shaping of the package; it is only necessary to tightly seal the glued flaps. The operation is performed by a pair of opposed, endless horizontal belts 51 trained around longitudinally spaced pulleys 52 and driven in any appropriate fashion. The belts press the overlapped areas of the flaps under high unit pressure directly against midpoints of end cans at either end of the carrier, with the result that a very tight seal is effected. The set of six cans is very snugly encased by the carrier end and side walls and a very compact and block-like package is produced.

I claim:

1. An apparatus for erecting and filling paperboard containers characterized in a flat, knocked-down condition by pairs of opposed end flaps integrally hinged by longitudinal creases to and extending transversely from each opposite end of a pair of top and bottom forming panels, which are in turn integrally hinged to a pair of side wall panels by transverse creases paralleling the direction of said flaps, the flaps of one of said panels being longitudinally spaced from those of the other panel, said apparatus comprising means to advance a lowermost container from a stack of said knocked-down containers in the direction of said longitudinal creases, with the flaps of one panel trailing those of the other, and bottom separator plates disposed in the spaces of said stack between said longitudinally spaced flaps, said separator plates being provided with downwardly and forwardly curved lower extremities whose forward edges are positioned below and closely adjacent to the rear of the forward flaps of the lowermost container, whereby to vertically restrain and guide the trailing flaps of that container and prevent snagging thereof with a container above.

2. An apparatus for erecting and filling paperboard containers characterized in a flat, knocked-down condition by pairs of opposed end flaps integrally hinged by longitudinal creases to and extending transversely from each opposite end of a pair of top and bottom forming panels, which are in turn integrally hinged to a pair of side wall panels by transverse creases paralleling the direction of said flaps, the flaps of one of said panels being longitudinally spaced from those of the other panel, said apparatus comprising means to advance a lowermost container from a stack of said knocked-down containers in the direction of said longitudinal creases, with the flaps of one panel trailing those of the other, bottom separator plates disposed in the spaces of said stack between said longitudinally spaced flaps, said separator plates being provided with downwardly and forwardly curved lower extremities whose forward edges are positioned below and closely adjacent to the rear of the forward flaps of the lowermost container, whereby to vertically restrain and guide the trailing flaps of that container and prevent snagging thereof with a container above, and means to erect said container to a rectangular cross sectional outline including a pair of longitudinally extending rods having rear extremities which angle downwardly toward said lowermost container, and are engageable beneath the forward edges of said trailing flaps in the spaces between the flaps of the respective top and bottom panels.

3. A method of packaging cans and like articles in a collapsible paperboard container featuring hingedly articulated top, bottom and side panels and pairs of opposed end wall flaps hinged to opposite extremities of said top and bottom panels, said method comprising advancing a lowermost, flat, knocked-down container from a generally vertical stack thereof in a generally horizontal direction with the flaps on said top panel trailing those on said bottom panel, engaging said top panel flaps from beneath the lower forward edges thereof and progressively elevating said top panel while continuing forward travel of said container and restraining said bottom panel flaps against vertical movement, whereby to urge said container toward a rectangular cross sectional outline, swinging a pair of corresponding top and bottom panel flaps in opposite vertical directions to expose an open end of the container, inserting a complement of articles into said open end to completely fill the container and folding and sealing said corresponding end flaps in vertically overlapped relation.

4. A method of packaging cans and like articles in a collapsible paperboard container featuring hingedly articulated top, bottom and side panels and pairs of opposed end wall flaps hinged to opposite extremities of said top and bottom panels, comprising advancing a lowermost, flat, knocked-down container from a stack thereof with the flaps on said top panel trailing those on said bottom panel, engaging said top panel flaps from beneath the lower forward edges thereof and progressively elevating said top panel and vertically restraining the bottom panel by slidingly engaging the same from above while continuing forward travel of said container whereby to urge said container toward a rectangular cross sectional outline, swinging a pair of corresponding top and bottom panel flaps in opposite vertical directions to expose an open end of the container, inserting a complement of articles into said open end to completely fill the container and folding and sealing said corresponding end flaps in vertically overlapped relation by pressure applied along a

longitudinal line and in a vertical zone of the package located substantially midway of its height.

5. An apparatus for erecting and filling paperboard containers characterized in a flat, knocked-down condition by pairs of opposed end flaps integrally hinged by longitudinal creases to and extending transversely from each opposite end of a pair of top and bottom forming panels, which are in turn integrally hinged to a pair of side wall panels by transverse creases paralleling the direction of said flaps, the end flaps of one of said panels having their forward edges longitudinally spaced from the rearward edge of the other panel, said apparatus comprising means for supporting a stack of said knocked-down containers, means associated with said stack supporting means to advance the endmost container edgewise from the stack in the direction of said longitudinal creases, with the flaps of one panel longitudinally spaced from and trailing those of the other, and separator plates associated with said stack supporting means and disposed in the spaces of said stack between said longitudinally spaced flaps, said separator plates extending to the end of the stack and having forwardly curved end portions whose forward edges are positioned beneath and closely adjacent to the rear of the forward flaps of the endmost container, whereby to restrain and guide the trailing flaps of that container and prevent snagging thereof with the next adjacent container in the stack.

6. An apparatus for erecting and filling paperboard containers characterized in a flat, knocked-down condition by pairs of opposed end flaps integrally hinged by longitudinal creases to and extending transversely from each opposite end of a pair of top and bottom forming panels, which are in turn integrally hinged to a pair of side wall panels by transverse creases paralleling the direction of said flaps, the flaps of one of said panels

being longitudinally spaced from those of the other panel, said apparatus comprising means to support a plurality of said knocked-down containers, which are arranged in superimposed stack forming relation, means to advance the lowermost container from the stack in the direction of said longitudinal creases, with the flaps of one panel spaced from and trailing those of the other, bottom separator plates associated with said stack supporting means and disposed in the spaces of said stack between said longitudinally spaced flaps, said separator plates having downwardly and forwardly curved lower portions whose forward edges are positioned below and closely adjacent to the rear of the forward flaps of the lowermost container, whereby to vertically restrain and guide the trailing flaps of the lowermost container as it is advanced from the stack and prevent snagging thereof with the next adjacent container in the stack, and means to erect said container to a rectangular cross sectional outline including a pair of longitudinally extending rods having rear end portions which angle downwardly toward said lowermost container, and are engageable beneath the forward edges of said trailing flaps in the spaces between the flaps of the respective top and bottom panels and means spaced vertically from said rods for engaging the leading flaps and restraining them against vertical movement as the container is advanced away from said stack supporting means.

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