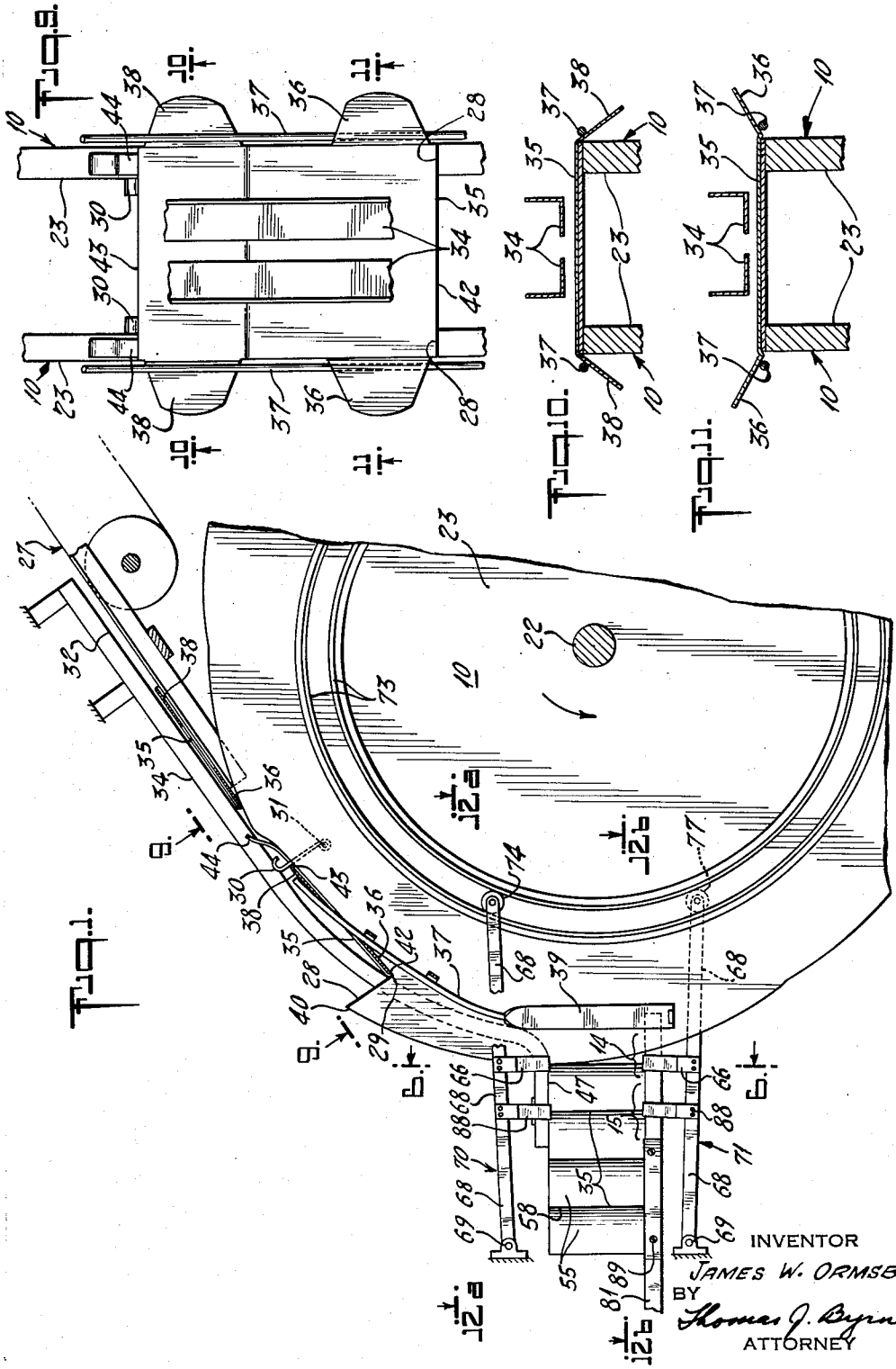
Feb. 16, 1954 J. W. ORMSBY 2,669,076

APPARATUS FOR PACKAGING ARTICLES

Filed Aug. 31, 1950 5 Sheets-Sheet 1

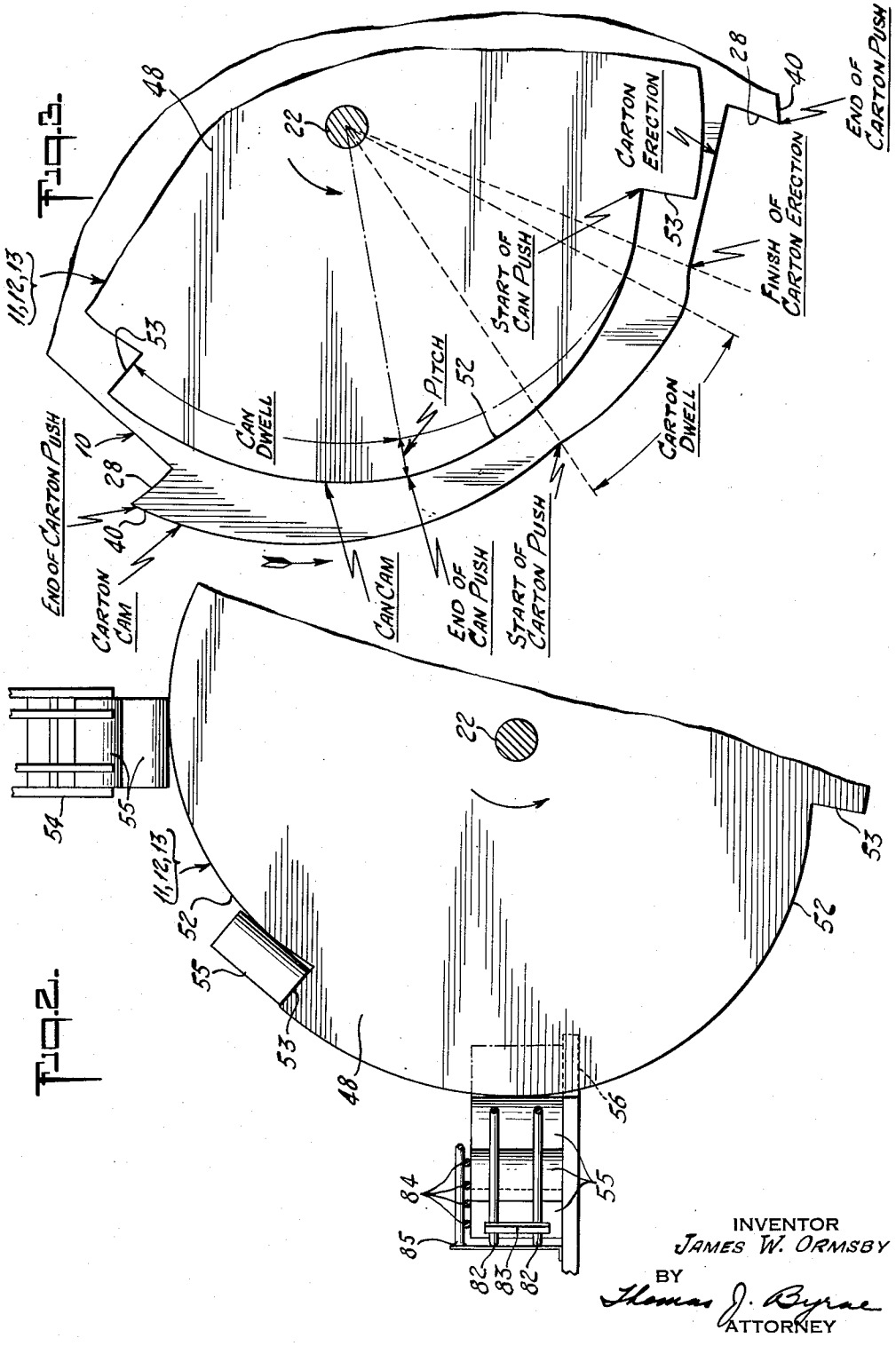


INVENTOR
JAMES W. ORMSBY
BY
Thomas J. Byrne
ATTORNEY

Feb. 16, 1954 J. W. ORMSBY 2,669,076

APPARATUS FOR PACKAGING ARTICLES

Filed Aug. 31, 1950 5 Sheets-Sheet 2



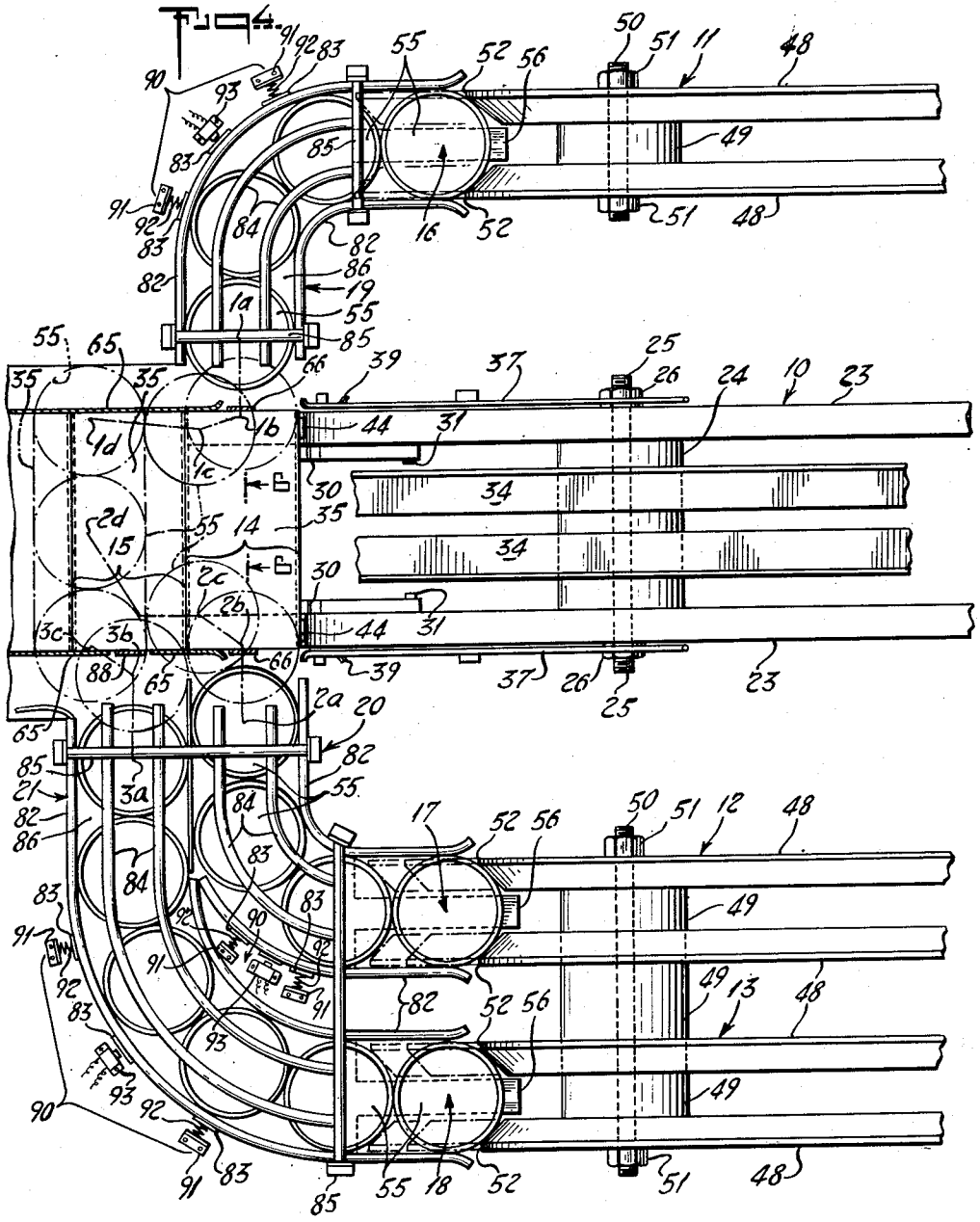
INVENTOR
JAMES W. ORMSBY
BY
Thomas J. Byrne
ATTORNEY

Feb. 16, 1954 J. W. ORMSBY 2,669,076

APPARATUS FOR PACKAGING ARTICLES

Filed Aug. 31, 1950 5 Sheets-Sheet 3

FIG. 4.



INVENTOR
JAMES W. ORMSBY
BY
Thomas J. Byrne
ATTORNEY

Feb. 16, 1954 J. W. ORMSBY 2,669,076

APPARATUS FOR PACKAGING ARTICLES

Filed Aug. 31, 1950 5 Sheets-Sheet 4

Fig. 5a.

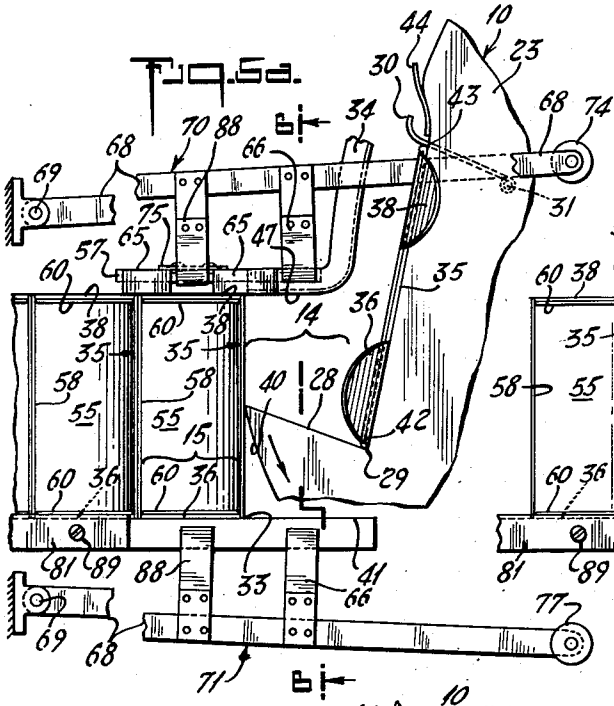


Fig. 5b.

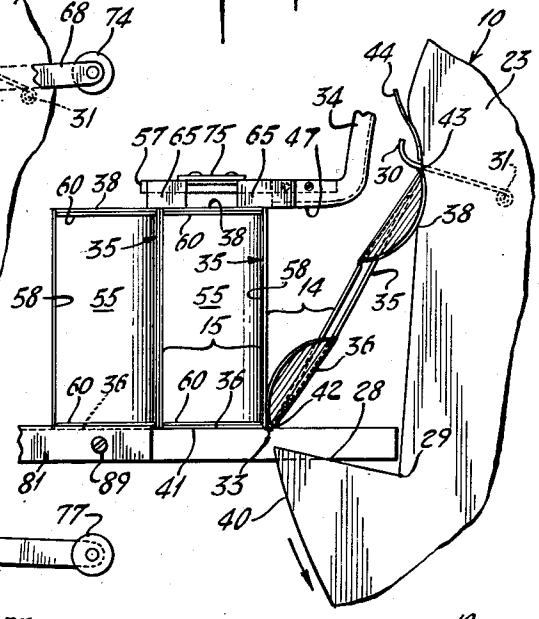


Fig. 5c.

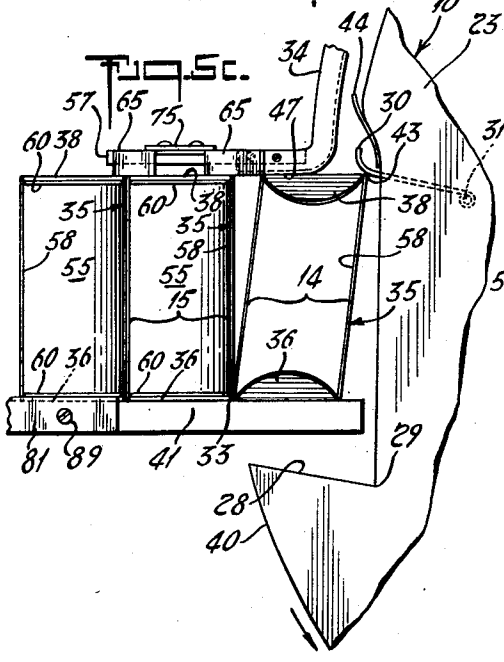
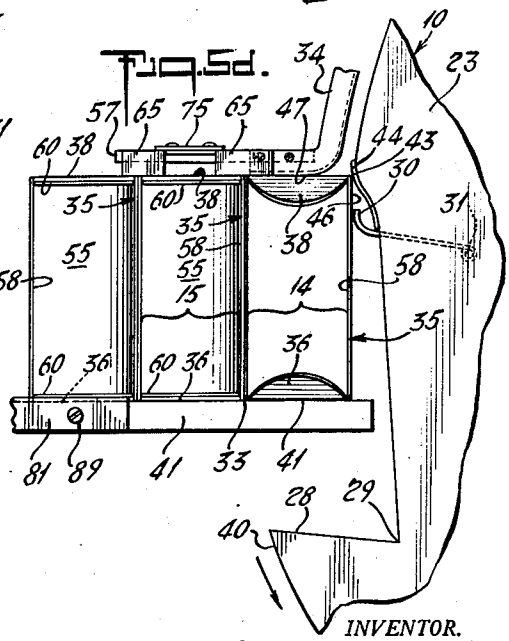


Fig. 5d.



INVENTOR.
JAMES W. ORMSBY
BY
Thomas J. Byrne
ATTORNEY.

Feb. 16, 1954 J. W. ORMSBY 2,669,076

APPARATUS FOR PACKAGING ARTICLES

Filed Aug. 31, 1950 5 Sheets-Sheet 5

Fig. 12a.

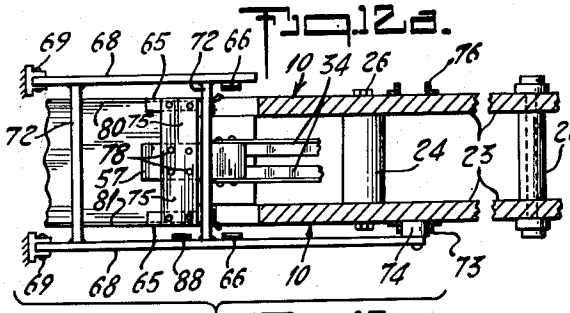


Fig. 12b.

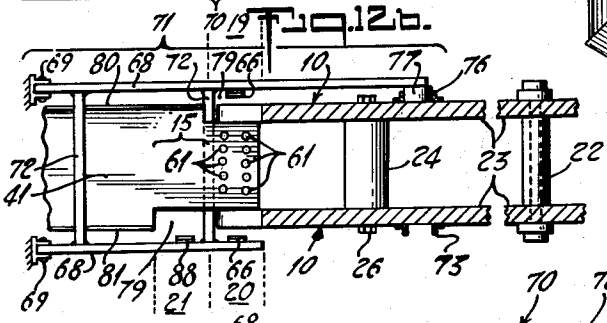


Fig. 8.

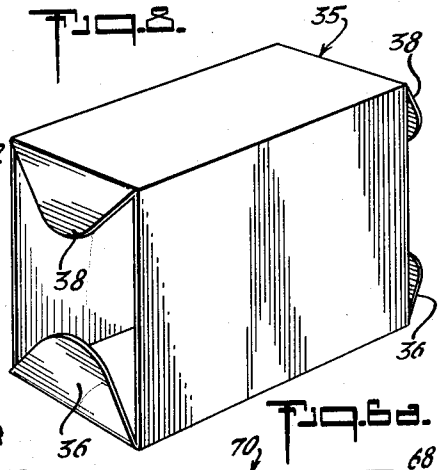


Fig. 6a.

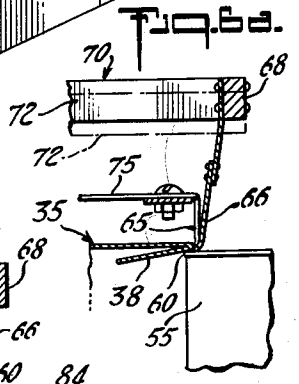


Fig. 6.

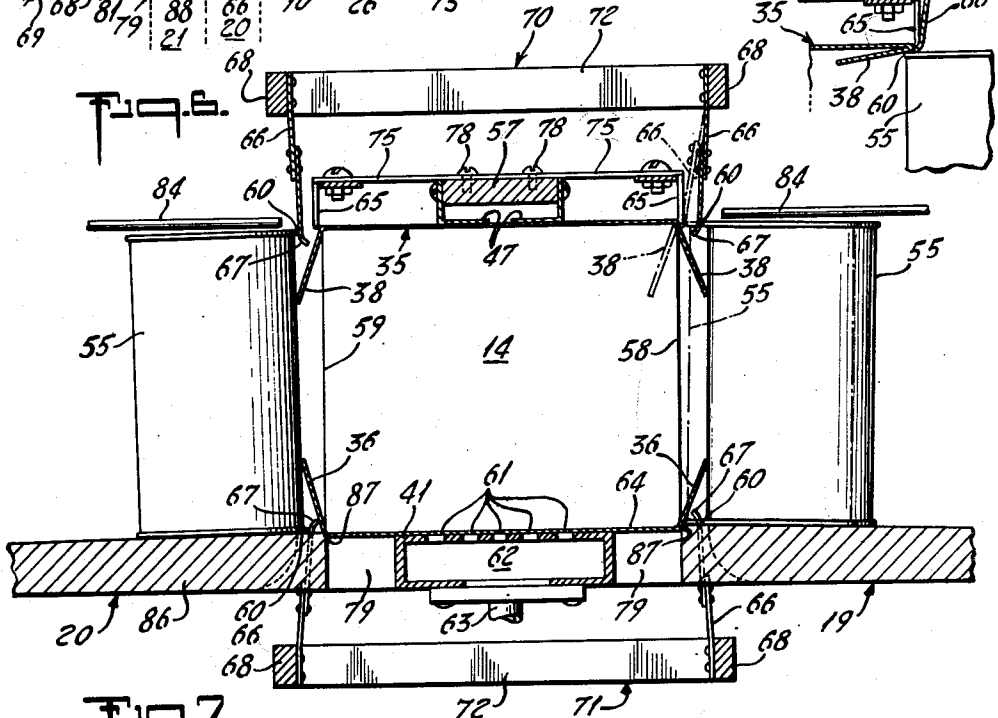
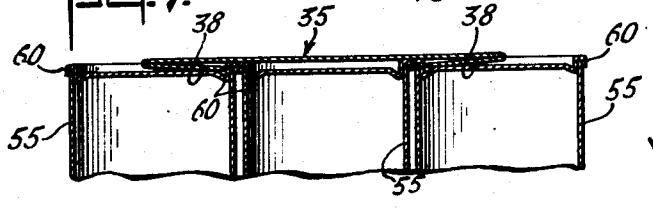


Fig. 7.



INVENTOR
JAMES W. ORMSBY
BY
Thomas J. Byrne
ATTORNEY

Patented Feb. 16, 1954 2,669,076

UNITED STATES PATENT OFFICE

2,669,076

APPARATUS FOR PACKAGING ARTICLES

James William Ormsby, New York, N. Y.

Application August 31, 1950, Serial No. 182,471

10 Claims. (Cl. 53—91)

1

This invention relates to packaging machines and more particularly to means for opening or erecting a folded carton and assembling canned goods therein.

One type of carton or package carrier which has been adopted for packaging canned goods is rectangular in shape and has open ends. The canned goods are disposed in the carton in side-by-side in-line relationship to each other. The outer cans protrude from the open ends of the carton slightly less than half the round of said outer cans. Flaps are provided at the top and bottom of the open ends of the carton and when folded into the said open ends they act as means for locking the outer cans in the carton by engaging the upper and lower chines of said outer cans.

The present invention is directed to apparatus for opening folded carton and assembling canned goods therein and to illustrate the invention, apparatus is described for opening a carton of the type described above and assembling cans therein. However, it will be appreciated that the invention may be utilized for the opening of cartons of different sizes and shapes and the assembling of canned or other articles in said containers or cartons, and that the present description as it relates to specific apparatus is merely illustrative of one form in which the invention may be practiced.

Another important object of the present invention is to provide a simplified packaging machine in which the apparatus for feeding folded containers or cartons is provided with means for opening the cartons in an opening station and additional means for moving the opened carton out of the opening station.

Another object of the invention is to provide a fully automatic means for opening cartons and assembling articles therein.

A further object of the invention is to provide an automatic apparatus for assembling canned goods in open-ended cartons wherein the outer cans are retained in said cartons by flaps in the open ends, or cut-outs in the top and bottom portions of the cartons adjacent to the open ends, engaging the chines of the cans.

Another object of the invention is to provide a means of delivering canned goods or other articles and progressively feeding them forward.

The invention comprises a rotatable carton feeding member having means on its periphery for receiving folded cartons and delivering them to a carton opening station, means in said carton opening station and means on said periphery

2

adapted to cooperate to effect the opening of the carton as the carton feeding member is rotated toward said opening station and rotatable article feeding members having article carrying means disposed on their respective peripheries having associated means for delivering articles to said carrying means and article receiving stations disposed adjacent to the peripheries of the article feeding members, means in said article receiving stations for intercepting the articles disposed in the carrying means on the article feeding members as the latter are rotated toward said article receiving stations, trackways between said article receiving stations and an assembly station wherein the articles can be assembled with the carton or container which has been opened. Cam surfaces are provided on the periphery of the carton feeding member to engage the carton and move it out of the carton opening station subsequent to the opening operation and cam surfaces are provided on the peripheries of the respective article feeding devices for engaging the articles after they have been received in the article receiving stations and thereafter move said articles out of said article receiving stations and along said trackways toward the assembly station.

For a more detailed description of the invention, reference is made to the drawings illustrating one form of apparatus embodying the invention:

Fig. 1 is a side view of the carton feed portion of the apparatus;

Fig. 2 is a side view showing one of the can or article feeding portions of the apparatus;

Fig. 3 shows the relationship of the carton feed member and the can feed members when mounted on a common shaft;

Fig. 4 is a plan view of a portion of the apparatus;

Figs. 5*a*, 5*b*, 5*c* and 5*d* are enlarged side views of the carton opening and the assembly stations showing a carton and the carton feed member, in the several successive positions during the carton opening operation;

Fig. 6 is an enlarged end view taken along the line 6—6 in Figs. 1 and 4;

Fig. 6*a* is a portion of the view in Fig. 6 at a different stage of the operation;

Fig. 7 is a longitudinal section through a carton which has cans assembled therein;

Fig. 8 is a perspective view of the carton before the cans have been inserted;

Fig. 9 is a top view of the folded carton on the

carton feed member as viewed from line 9—9 in Fig. 1;

Fig. 10 is a partial section along the line 10—10 in Fig. 9;

Fig. 11 is a partial section along the line 11—11 in Fig. 9; and

Figs. 12a and 12b are top views of the can guides as viewed along the lines 12a—12a and 12b—12b, respectively, in Fig. 1.

The apparatus embodying the invention which is shown in the drawings consists of a carton feed member 10 best shown in Figs. 1 and 4, can feed members 11, 12 and 13 shown in Figs. 2 and 4; a carton opening and first assembly station 14 shown in Figs. 1 and 4; a second assembly station 15, and can receiving stations 16, 17 and 18, shown in Fig. 4 with trackways 19, 20 and 21 connecting several can receiving stations with the first and second assembly stations. The carton feed member 10 and the can feeding members 11, 12 and 13 are fixed on a common shaft 22, which is adapted to be power driven, to rotate the several members in the direction indicated in Figs. 1, 2, and 3.

Referring to Fig. 4, the carton feeding member 10 may be comprised of side portions 23 separated by spacers 24 and maintained in parallel relation by suitable means such as bolts 25 and nuts 26. The peripheries of the side portions 23 of the carton feed member 10 have successive cam arcs 40 and steps 28 formed therein, as indicated in Figs. 1 and 3.

Folded cartons 35 are fed to the periphery of the carton feed member 10, i. e. to the peripheries of the side portions 23 which form the periphery of the member 10, by any suitable feeding mechanism such as the chain and sprocket device, indicated generally at 27 in Fig. 1. Each carton is passed through a slideway 32 and is delivered to the periphery of the carton feed member 10. As the latter rotates to the cam step 28, the carton slides into position against the base 29 of the cam step and is maintained against displacement by the fingers 30 which are resiliently mounted at pins 31 on the inside of the side portions 23. The carton is also maintained against displacement by the guide members 34 which are fixed above the periphery of the member 10. As the carton 35 is received from the slideway 32 and becomes seated against the base 29 of the cam step 28 it is held against lengthwise displacement of the fingers 30.

The leading flaps 36 extending from the sides of the carton (see Fig. 9) are folded upward by the guide rails 37 adjacent the outer sides of the side portions 23 of the member 10, as shown in Fig. 11. The trailing flaps 38 are urged downwardly by the rails 37, as shown in Fig. 10. The angle at which the flaps of the flat carton intercept guide rails 37 as the carton is received on the periphery of the member 10 enables the rails 37 to dispose themselves initially so that the leading flaps 36 are above said rails and the trailing flaps 38 are beneath said rails. As the member 10 is rotated in the direction indicated in Fig. 1, the carton is moved down and around so that the flaps engage the flattened plow-like members 39 which cause the flaps to be folded to a position substantially at right angles to the plane of the carton, the leading flaps 36 being folded upward and the trailing flaps 38 being folded downward at right angles, as indicated in Fig. 5a. The members 39 are omitted in Fig. 5a to show the positions of the flaps.

As the member 10 continues to rotate the cam arc surface 40, on the carton feed member 10, pushes the previously opened and partially filled carton from station 14 to station 15 thereby clearing the station 14 to receive the new carton 35 which is to be opened. The clearing action of the cam arc 40 is best shown in Fig. 5a.

Fig. 5b illustrates the manner in which the folded carton 35, carried on the periphery of the member 10, is intercepted by the floor portion 41 of the carton, opening and first assembly station 14. The leading edge 42 of the carton slides across the floor 41 until it is stopped by abutment against the lower edge 33 of the preceding carton which has already been opened and moved into station 15.

As the member 10 continues its rotation, the fingers 30 pressing against the trailing edge 43 of the carton 35 causes the folded carton to flex open in the manner shown in Fig. 5c. The resilient members 44 which are mounted on the peripheries of the portions 23 are adapted to continue pushing against the trailing edge 43 and the adjacent side 46 of the carton 35 to complete the opening operation. Guide plates 47, which are continuations of guides 34, are fixed directly above the opening station 14 to insure that the opened carton is squared properly and to maintain it in erected and open position in the station 14.

Referring to Figs. 2 and 4, the can feeding members 11, 12 and 13 each consist of side portions 48 which are held in spaced relationship by spacers 49, bolts 50 and nuts 51. The peripheries of the several can feeding members have formed therein successive cam arcs 52 and cam steps 53. Cans 55 are delivered to each of the several can feeding members by suitable separate delivery means such as the magazine or rack 54, shown in Fig. 2, in which the cans 55 are held in side-by-side relationship with their respective axes horizontal. The bottom can in each rack 54 is restrained by portions 48 of members 11, 12, 13.

As the can feeding members 11, 12 and 13 are rotated by the main shaft 22, successive cans are fed to the peripheries of each of the can feeding members as a cam step 53 is presented beneath and adjacent to the respective delivery racks 54 supplying each can feed member.

The can feeding members 11, 12, 13 rotate in unison, and the cans 55 which are seated on the peripheries of said members against the cam steps 53 are intercepted at the can receiving stations 16, 17 and 18 by the floor portions 56 extending between the sides 48 of the several can feeding members (see Figs. 2 and 4).

Continued rotation of the can feeding members causes the cans to be pushed out of the can receiving stations, along the trackways 19, 20 and 21 in the directions indicated. The pushing movement is effected by the cam arc surfaces 52 which engage the sides of the cans 55 and move the forward as the radius of each of the cam arcs increases. In Fig. 4 the solid lines indicate the positions of the can feeding members 11, 12 and 13 at the time of delivery of the cans to the can receiving stations 16, 17 and 18 and the successive dot dash lines to the left of the solid lines indicate the several positions of the can feeding members as the radius of each of the cam arcs 52 increases, thereby pushing the cans along the several trackways as the cam arcs are rotated. The side portions 48 of the can feed members may be bevelled on the inside, as shown in Fig. 4, to cradle the cans and prevent their lateral displacement.

Fig. 3 indicates the relative cam action of the

carton feeding and can feeding members. Starting at the end of the carton push at the lower right-hand end of the figure, the several phases of the carton opening and advancing and can advancing are illustrated. As the several feeding members are rotated about the common axis, on shaft 22, the carton opening or erecting is initiated. During the carton opening phase, cans are positioned in the several can receiving stations 16, 17 and 18, as shown in Fig. 4, and the cam arc surfaces 52 on the can feeding members 11, 12 and 13 begin to advance the cans along the respective trackways 19, 20 and 21 toward the assembly stations 14 and 15.

After the carton is fully opened there is a period of dwell in station 14 while the cam arcs 52 of the can feed members continue to push the cans forward along the trackways. When the trackways are filled with cans as shown in Fig. 4, the pushing movement by the can feed members on the can adjacent the can receiving stations causes all the cans in the trackway to advance approximately the pitch of one can diameter so that the cans adjacent the assembly stations 14 and 15 will move into the open ends of the cartons. Referring again to Fig. 3, while the cans continue to be pushed so that they enter the open ends of the carton, the cam surface 40 on the member 10 engages the side of the carton and starts to push it out of station 14 toward station 15. After the carton has been pushed part way out of station 14, the can pushing stops and the cans dwell in the trackways until the next operation starts. The carton cam arc 40 continues to push the carton until it has moved completely out of station 14 and is positioned in station 15. The apparatus has thus completed one operation. A carton has been fed to station 14, opened and two cans were fed into the carton, one entering the open end of the carton adjacent trackway 19 and the other entering the open end of the carton adjacent trackway 20.

During the operations, recited above which take place in station 14, the carton which was displaced previously from station 14 to station 15 receives a third can through the open end of the carton adjacent trackway 21.

Turning now to the details of the assembly operation, the carton when it has been fully opened in station 14, as shown in Figs. 6 and 8, is in position to receive cans which are pushed forward along trackways 19 and 20. Referring to Fig. 6, resilient flap fingers 66 have hooked ends 67 to intercept the outer edges of the upper and lower chines 60 of the cans entering the station 14. Flap fingers 66 are attached to arms 68 disposed above and below the cartons, each of the arms 68 is pivotally mounted to brackets 69, as shown in Figs. 1, 5*a*, 12*a* and 12*b*. The arms 68 are connected by a cross brace 72. The frame, including the arms 68 and cross brace 72, to which the upper flap fingers 66 are connected, is designated generally as 70 in Figs. 1, 5*a*, 6 and 12*a*. The frame 70 is connected to a cam track 73 provided on the outer face of one side portion 23 of the member 10. A cam follower 74 journaled in the free end of one of the arms 68 moves along the track 73. The frame, to which the lower flap fingers 66 are connected, is designated generally as 71 in Figs. 1, 5*a*, 6 and 12*b*. The frame 71 is connected to a cam track 76 by means of a cam follower 77 journaled in the free end of one of the lower arms 68.

Referring to Fig. 6, as the cans 55 advance along the trackways 19 and 20 toward the open ends 58 and 59 of the carton 35, they move from a position as illustrated by the cans shown in solid line to the position shown in dot dash lines (at opening 58). By this movement the upper and lower chines 60 of the can contact the members 66 and press them toward the carton opening and, in turn, the crooked portions or ends 67 on the members 66 press against the flaps 36 and 38 causing the flaps to fold into the open ends of the carton. When the cans have reached the dot dash line position shown in Fig. 6, the frame 70 is raised upward and the frame 71 is drawn downward by the cam action imparted to said frames by the cam followers 74 and 77 moving in respective cam tracks 73 and 76. The movement of the frames 70 and 71 causes the flap fingers 66 to move out of their positions between the chines 60 and the flaps, providing a guiding or "shoe-horn" effect for the cans 55 as they move into the openings 58 and 59, as shown in Fig. 6*a*. The cans move farther into the openings 58 and 59 and the chines 60 continue the folding of the flaps.

It will be understood that the upper flap fingers 66 of both sides of station 14 and the lower flap fingers 66 of both sides of station 14 move in unison. However, for purposes of illustration, the flap fingers at the left side of Fig. 6 shown in full line indicate the position of the flap fingers before the cans move into the station 14 and the dot dash line shown at the upper right-hand side of the figure illustrate the action of the flap fingers as the can begins its movement into the station.

Referring to Fig. 4, as the cans move along the trackways 19 and 20, they are guided by side rails 82 which may be suitably supported as by posts 83 spaced along the trackways. The cans are maintained against vertical displacement by guides 84 which are held in position by supports 85 as shown in Fig. 4.

The floor portions 86 are inclined slightly upward at their ends 87 adjacent the station 14, as shown in Fig. 6, to assist the cans in passing over the lower edges of the carton openings as the cans enter said station. The ends 87 also serve as abutments for said lower edges to prevent lateral displacement of the carton during the assembly operations.

Referring to Fig. 4, during the dwell of the carton in station 14, the can in trackway 19 is advanced from the position *1a* to *1b* and the can in trackway 20 is moved from *2a* to *2b*. As the carton begins to move out of station 14 to station 15 the cans continue their inward movement until they reach the positions *1c* and *2c*. During the subsequent can well the carton is moved to station 15 and is directly in line with trackway 21.

As the carton dwells in station 15 the next can push moves the can in trackway 21 from the position *3a* to *3b*; thereafter as the carton begins its movement out of station 15, the can from trackway 21 continues to advance into the carton until it reaches the position 3c. The cans which were assembled in the carton at station 14 are moved to their final positions, *1d* and *2d* by the movement of the third can from *3b* to *3c*.

The cans are now fully assembled in the carton as shown in Fig. 7, the outer cans are retained in position by the flaps engaging the inner sides of the rims or chines 60, and the center can is held between the two outer ones. It will be noted that the can from trackway 19 is pushed inward to *1c* and thereafter is moved outward to *1d*.

The purpose of the additional movement is to insure that the flaps are correctly positioned against the inner sides of the chines 60.

It will be understood that, while one carton is being erected or opened in station 14 and is receiving two cans, the preceding carton, which was previously opened and into which two cans were assembled, is in station 15 receiving the third can. However, for purposes of illustration, the description of the assembly operations was confined to a single carton as it moved from assembly station 14 to assembly station 15.

To assist the cans moving from trackway 21 into the carton in station 15, upper and lower flap fingers 88 (see Figs. 1, 5a, 12a and 12b) are provided. The flap fingers 88 are fixed to arms 68 and function in unison with and in the same manner as flap fingers 66.

As the cans move laterally into the open ends 58 and 59 of the carton 35 in the stations 14 and 15, it is desirable to hold the carton against lateral displacement and to insure uniform entry of the cans into the said open ends. To prevent displacement, the floor 41, in station 14, is provided with perforations 61 connected to a vacuum chamber 62 below the floor, as shown in Fig. 6. A tube 63 connected to the chamber 62 is attached at its other end to suitable evacuating or suction means (not shown). By evacuating the air from chamber 62 when the carton is disposed in open position in station 14, the carton is maintained in position on the floor 41, the bottom 64 of the carton being held tightly against the perforations 61. The vacuum is released at the time the carton is pushed from station 14 to station 15.

In addition to the suction or vacuum means, and also the raised ends 87 of the trackways 86, which act to prevent lateral displacement of the lower part of the carton, resilient side guides 65, as best shown in Figs. 6 and 6a, are disposed at the top edges of the carton to prevent displacement of the upper part of the carton. Side guides 65 are fixed to the member 57, disposed between guide plates 47, by resilient leaf springs 75 by suitable means such as screws 78. As shown in Figs. 4 and 5a, the side guides 65 are so spaced that the flap fingers 66 may move freely into contact with the cartons at stations 14 and 15.

Because of the closeness of the fit of the cans in the carton some distortion of the carton at the top and bottom of openings 58 and 59 occurs during the assembly operations. To allow for the distortion at the bottom of the carton, spaces 79 are provided between the floor 41 of the assembly stations and the trackway floors 86, as best shown in Figs. 6 and 12b. The upper side guides 65 are sufficiently resilient to accommodate the distortion at the top of the carton openings. The spaces 79 also permit the passage of the side portions 23 of the member 10 as the cam arc 40 of the carton feed pushes the carton out of station 14.

Lower side guides 80 and 81, shown in Figs. 12a, 12b, are provided to prevent lateral displacement of the cartons when they have moved beyond the raised ends 87 of the trackway floors 86. The lower side guide 80 begins adjacent trackway 19 and extends past station 15 to the delivery point (not shown) beyond said last-mentioned station. Lower guide 80 acts as an abutment in conjunction with the upper guide 65 on that side of the carton, i. e. the side having opening 59 therein, to prevent lateral displacement as the third can 55 is pushed into opening 58 from trackway 21, while the carton is positioned in station 15.

Lower side guide 81 begins adjacent trackway 21 and extends to the delivery point beyond station 15. The lower side guides 80 and 81 are thin rigid strips of metal or other material and may be affixed by suitable means, such as screws 89, to the sides of floor 41, as shown in Figs. 5a–5d. As shown in Fig. 12b, the floor 41 is the width of the carton, i. e. the dimension between open ends 58 and 59 in the area in which lower side guides 80 and 81 are attached. The guides project above the plane of the floor 41 a distance equal to the bottom thickness of the carton to act as curbs and retain the carton against lateral displacement as it moves from station 15 to the point of delivery.

After cartons have been filled as described they move out of station 15 to a delivery chute or other delivery means.

Apparatus of the type described may be provided with any suitable automatic means for stopping the machine in the event that the articles become misplaced or, in some manner, the operation becomes jammed. Such safety devices may be provided by having the side guide rails 82 as shown in Fig. 4, and their supporting posts resiliently displaceable outwardly at the curves of the trackways 19, 20 and 21, in the areas designated generally at 90. Fixed stanchions 91 may be disposed out from the support posts 83 and springs 92 may be interposed between the stanchions 91 and the posts 83. Springs 92 act to bias the posts 83 and their associated guide rails 82 against outward movement during the ordinary pressures of operation, but permit the rails 82 to move outward when excessive pressure is exerted. Suitable means, such as micro switches 93, may be positioned so as to be contacted by central posts 83 as the rails 82 are displaced outward under excessive pressure. The micro switches 93 may be connected to main controls of the apparatus to stop the device when all or any one of them is contacted by a rail 82. Therefore, obstruction in the delivery or assembly operations will cause the actuation of the mircro switches.

In the apparatus described and illustrated, the carton and article feeding and advancing members are mounted upon a common shaft and are rotated in unison. However, it will be appreciated that the several members may be mounted on separate shafts, e. g. in such an arrangement that the article feeding members rotate about axes at right angles to the axis of the carton feed, and so that the axes of said article feeding members are parallel to the path along which the carton is advanced during the erecting and assembling operations.

In the illustrated apparatus, the carton and article feeding members are designed to effect three operations in each complete rotation about their common axis. Thus, when the apparatus is in full operation, i. e. with the trackways fully loaded and with cartons in stations 14 and 15, and the shaft 22 is rotated at 20 R. P. M., 60 completely loaded cartons will be delivered every minute. By increasing or decreasing the size or shape of the feed and advancing members or the rate of their rotation the output of the apparatus may be varied. Similarly, by changing the shapes of the cam arcs and varying of the depth of the cam steps, the apparatus may be adapted for erecting cartons or containers of

different sizes and shapes and for packing therein articles of different sizes and shapes. Also, by slight modification, the illustrated apparatus could be used to open and fill cartons having multiple article receiving chambers, i. e. one or more additional compartments alongside the single compartment shown herein.

The apparatus set out in the specification and the invention embodied in the described apparatus efficiently fulfills the objects and purposes of the invention and provides an efficient and rapid continuous operational system for opening folded cartons and assembling articles therein. The invention may be employed with equal advantage in many types of assembling operations.

In accordance with the provisions of the patent statutes, the principles of this invention have been described together with the best mode of applying those principles. However, it should be understood that the structure disclosed is but one mode of utilizing the invention, and the structure disclosed is merely illustrative, for the invention can be carried out by other and alternative means. Also, while it is contemplated to use various features and elements in the combinations and relations described, some of these may be altered and modified in ways other than those suggested, without departing from the spirit and scope of the invention.

Having thus described my invention, I claim:

1. A packaging machine for placing three cans in an open-ended carton in side-by-side single line relationship, the combination, comprising, a main shaft adapted to be power driven, a carton feed member fixed on said shaft for rotation therewith having means on its periphery to receive a folded carton, a carton opening and first assembly station disposed adjacent the periphery of said carton feed member, means for delivering a folded carton to the carton receiving means of said carton feed member, means on the periphery of said carton feed member adapted to co-act with means in the carton opening and first assembly station to open the carton and release it from the periphery of the carton feed member as said member is rotated, a plurality of can feed members fixedly mounted on said main shaft for rotation therewith, can receiving means provided on the peripheries of said can feeding members, can receiving stations disposed adjacent the peripheries of said several can feeding members, trackways connecting said can receiving stations with the carton opening and first assembly station, a second assembly station disposed beyond said first assembly station, a trackway connecting at least one of said can receiving stations with said second assembly station, cam surfaces on said can feeding members for moving cans along said trackways from said can receiving stations to said first and second assembly stations, cam surfaces on the periphery of the carton feed member for moving the opened carton which has been partially filled with cans out of the carton opening and first assembly station and into said second assembly station.

2. In a packaging machine, wherein three cans are assembled side by side and in line, in an open-ended carton, and wherein the outer cans adjacent the open ends of the carton are retained by carton flaps folded into the open ends of the carton which engage the upper and lower chines of the said outer cans, the combination, comprising, a main shaft adapted to be power driven, a carton feed member fixed on said shaft and adapted for rotation therewith, means on the periphery of said member to receive a folded carton, means for delivering a folded carton to the carton receiving means, a carton opening and first assembly station disposed adjacent the periphery of said member, means on the periphery of said carton feed member adapted to co-act with means in the carton opening and first assembly station to open the carton and release it from the periphery of said carton feed member as the latter is rotated, means for folding the flaps into the open ends of the carton, at least two can feeding members fixedly mounted on said main shaft for rotation therewith and disposed on opposite sides of the carton feeding member, can carrying means provided on the peripheries of said can feeding members, means for delivering cans to said carrying means, can receiving stations disposed adjacent the peripheries of said can feeding members, means at said can receiving stations for intercepting cans carried on said can feeding members, trackways for guiding cans from the can receiving stations to the carton opening and first assembly station, cam surfaces on said can feeding members for engaging cans in the can receiving stations and pushing them out of said receiving stations along said trackways toward the carton opening and first assembly station, a second assembly station disposed beyond said first assembly station, a trackway from at least one of said can receiving stations to said second assembly station, and cam surfaces on the periphery of the carton feeding member for engaging the open, partially filled, carton and pushing it out of the first assembly station to said second assembly station wherein at least one additional can is assembled in the carton.

3. The apparatus of claim 2 wherein means for folding the flaps into the open ends of the carton comprise flap-folding guides fixed adjacent and at the sides of the path of the periphery of the carton feeding member between the carton delivering means and the carton receiving and opening station and cam actuated resilient flap-folding means positioned above and below the carton opening station at the open ends of the carton and in the path of cans entering said open ends, said cam actuated flap-folding means being carried on arms pivotally fixed at one end and having cam followers at the other, said cam followers engaging cam tracks provided on the sides of the carton feeding member, the flap-folding means having hooked ends adapted to fold the flaps into the open ends of the carton when cans move into engagement with said flap-folding means, the fixed flap-folding guides adjacent the path of the carton feeding member are arranged so as to guide the flaps to a position where they may be engaged by the cam actuated flap-folding means, said flap-folding means being moved out of the path of the cans as the latter enter the open ends by the cam action.

4. A carton opening apparatus for opening a folded rectangular carton and folding the flaps extending from the open ends of said carton into said ends, comprising, a main shaft adapted to be power driven, a carton feed member fixed on said shaft and adapted for rotation therewith, means on the periphery of said member to receive a folded carton with the lines of the folds parallel to the axis of the main shaft, a carton opening station disposed adjacent the periphery of said carton feed member, means for delivering a folded carton to the carton receiving means, means on the periphery of said member adapted to engage the trailing end of said folded carton

and means provided in the carton opening station to co-act with said carton-edge engaging means to open the carton as the carton feed member is rotated toward the carton opening station, said carton edge engaging means being sufficiently resilient to release the carton edge when the latter is opened by the co-acting means in the carton opening station and means for folding the flaps into the open ends of the carton, a cam surface provided on the periphery of the carton feed member to engage the side of the opened carton in the carton opening station and to push it out of said station to permit the positioning of a successive carton in said carton opening station.

5. A can feeding apparatus for use in assembling cans in cartons wherein said cans are assembled in vertical upright position by moving laterally into a receiving carton, comprising, in combination, a main shaft, at least one can feeding member fixedly mounted on said shaft for rotation therewith, means provided on the periphery of said can feeding member adapted to carry cans, means for delivering cans to said can carrying means, a can receiving station disposed adjacent the periphery of said can feeding member, means disposed at said can receiving station for intercepting cans disposed in said can carrying means on the periphery of the can feeding member, an assembly station, at least one trackway for guiding cans from the can receiving station to an assembly station, at least one cam surface on said can feeding member for engaging cans in the can receiving station and pushing them out of said station along said trackway toward the assembly station.

6. In a packaging machine for opening and erecting cardboard cartons and feeding articles into said erected cartons, the combination comprising a carton erecting station, a rotatable carton feeding member having means on its periphery for receiving folded cartons and delivering them to a carton erecting station, means for delivering folded cartons to said carton receiving means, means in said carton erecting station and on said periphery to effect the erection of the carton as the carton feeding member is rotated toward said erecting station, rotatable article feeding members having article carrying means disposed on their respective peripheries, means adjacent said peripheries for delivering articles to said carrying means, article receiving stations disposed adjacent to the peripheries of the articles feeding members, means in said article receiving stations for intercepting the articles disposed in the carrying means on the article feeding members as the latter are rotated toward said article receiving stations, at least one assembly station, trackways between said article receiving stations and said assembly station wherein the articles can be assembled with the erected carton, cam surfaces provided on the periphery of the carton feeding member to engage the carton and push it out of the carton erecting station subsequent to the erecting operation and cam surfaces provided on the peripheries of the respective article feeding devices for engaging the articles after they have been received in the article receiving stations and for pushing said articles out of said receiving stations and along said trackways toward the assembly station.

7. In a packaging machine a carton feeding opening and advancing device comprising, a shaft adapted to be power driven, a carton feed member fixed on said shaft and adapted for rotation therewith, at least one means on the periphery of said member to carry a folded carton, means for delivering a folded carton to said carton carrying means, a carton receiving and opening station disposed adjacent the periphery of said member, a floor in said station for intercepting the carton as the carton carrying means on said member rotates toward said station, means for abutting the leading edge of said folded carton after it has been received in said station, resilient means at the periphery of said carton feed member adapted to engage the trailing edge of said folded carton and coacting with the abutting means in said station to open the carton as the resilient means moves toward the opening station during the rotation of said carton feed member, said carton edge engaging means being sufficiently resilient to release the trailing edge of the carton as the carton opens in the station, a cam surface provided on the periphery of the carton feed member to engage the side of the opened carton and push it out of the station to permit the positioning of successive cartons in said carton opening station.

8. In a packaging machine for assembling articles in a container having at least one assembly station on a path along which containers are moved comprising, a floor for receiving containers in the path, said containers having at least one opening adjacent one side of the path, an assembly station on said path, at least one article delivering means positioned at the side of the path adjacent the assembly station for delivering articles into the open end of the container, means for preventing lateral displacement from said path including means for periodically applying a vacuum to the container to maintain it in fixed position on the floor while it is positioned at the assembly station, lower guide means along the sides of the path extending upward above the plane of the floor and adapted to engage the lower edges of the sides of the containers, and upper guide means resiliently mounted above the path and adapted to engage the upper edges of the sides of the cartons.

9. In a packaging machine, an article feeding and advancing apparatus comprising, an article carrying and feeding member rotatably mounted having successive cam arcs and cam steps formed in its periphery, an article delivery means disposed adjacent to the periphery of said member, said delivery means being positioned so that the article at the end of the delivery means adjacent the said periphery is in contact with the periphery, an article receiving station adjacent to the said periphery and spaced from the delivery means, the cam steps providing pockets to receive articles from the delivery means, means for rotating the member so that articles carried on the periphery move toward the receiving station, means in said receiving station for intercepting articles carried on the periphery of the member, the cam arcs on the periphery increasing in radius, between cam steps, in the direction of the rotation at least the width of the successive articles intercepted in the receiving station, and guide means for guiding articles as they are pushed out of said receiving station.

10. An apparatus for opening a folded rectangular carton having four sides joined by folds, comprising, a carton feed member rotatably mounted means on the periphery of said member so that the plane of the carton is tangent to the path of rotation of the member and the folds

are parallel to the axis of rotation, a carton opening station disposed adjacent to the periphery of the member, a floor portion in said station adapted to engage the leading edge of the folded carton at an angle such that the carton slides across the floor away from the point of interception, means for arresting the leading edge of the carton at a point in the opening station remote from the periphery of the said carton feed member, means on the periphery of the feed member for engaging the trailing edge of the carton, said means moving the trailing edge toward the arrested leading edge as the feed member is rotated toward the opening station, guide plates fixed above and parallel to the floor of the opening station, and adapted to engage the top of the carton as the latter is opened in the station, the trailing edge-engaging means being

sufficiently resilient to release the carton when the latter is opened in the station.

JAMES WILLIAM ORMSBY.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,275,759	Russell	Aug. 31, 1918
1,824,432	Hendry	Sept. 22, 1931
1,935,269	Jones	Nov. 14, 1933
1,987,789	Mudd	Jan. 15, 1935
1,993,079	Wild	Mar. 5, 1935
2,050,547	Thayer	Aug. 11, 1936
2,124,962	Ferguson et al.	July 26, 1938
2,249,201	Ferguson	July 15, 1941
2,314,434	Toelke	Mar. 23, 1943
2,318,208	First et al.	May 4, 1943
2,441,372	Quigley et al.	May 11, 1948
2,510,251	Perilli	June 6, 1950