Jan. 24, 1961 R. J. HICKIN 2,968,898

PACKAGING METHOD AND APPARATUS

Filed Dec. 10, 1958 7 Sheets-Sheet 1

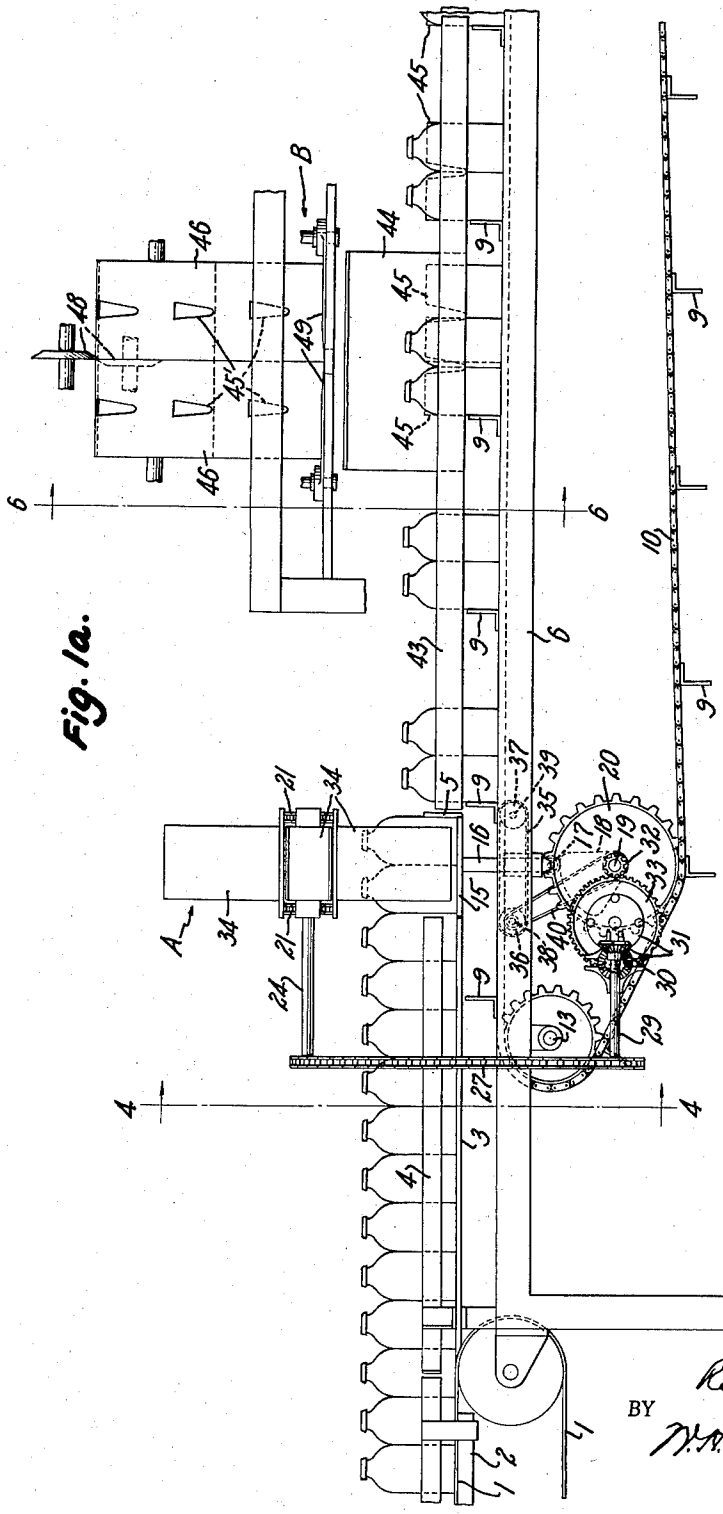

Fig. 1a.

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PACKAGING METHOD AND APPARATUS

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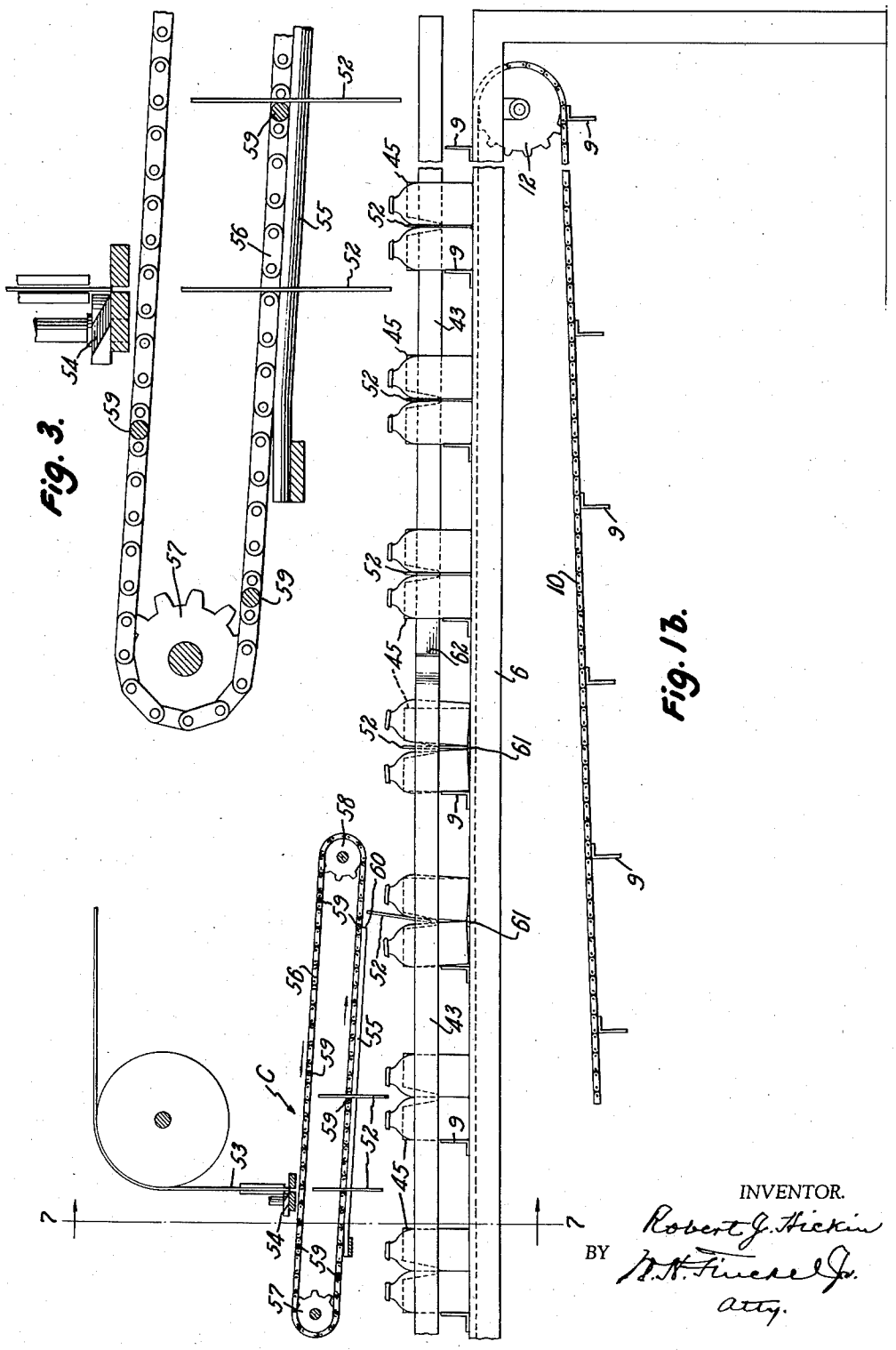

Fig. 3.

Fig. 1b.

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PACKAGING METHOD AND APPARATUS

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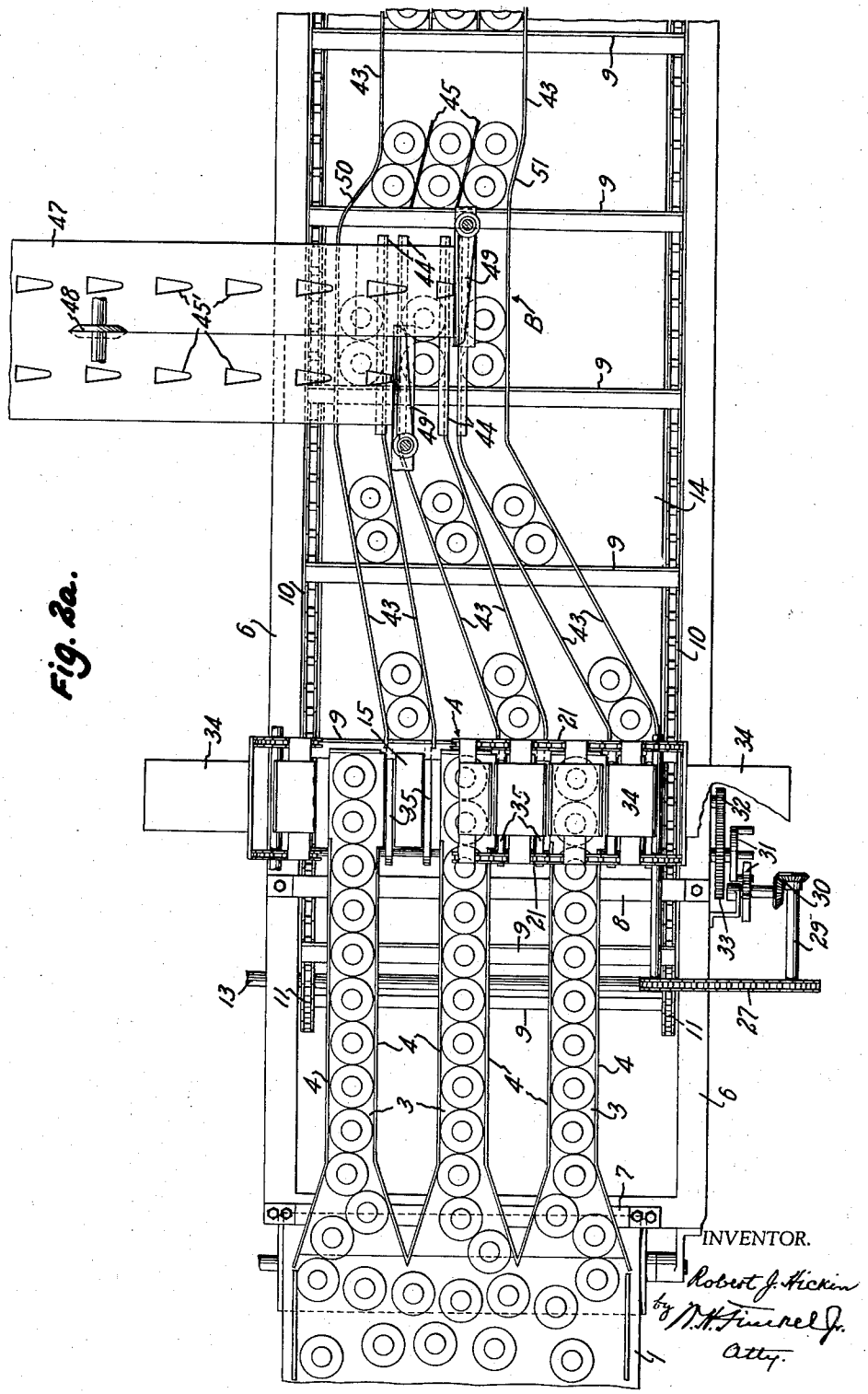

Fig. 2a.

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PACKAGING METHOD AND APPARATUS

Filed Dec. 10, 1958

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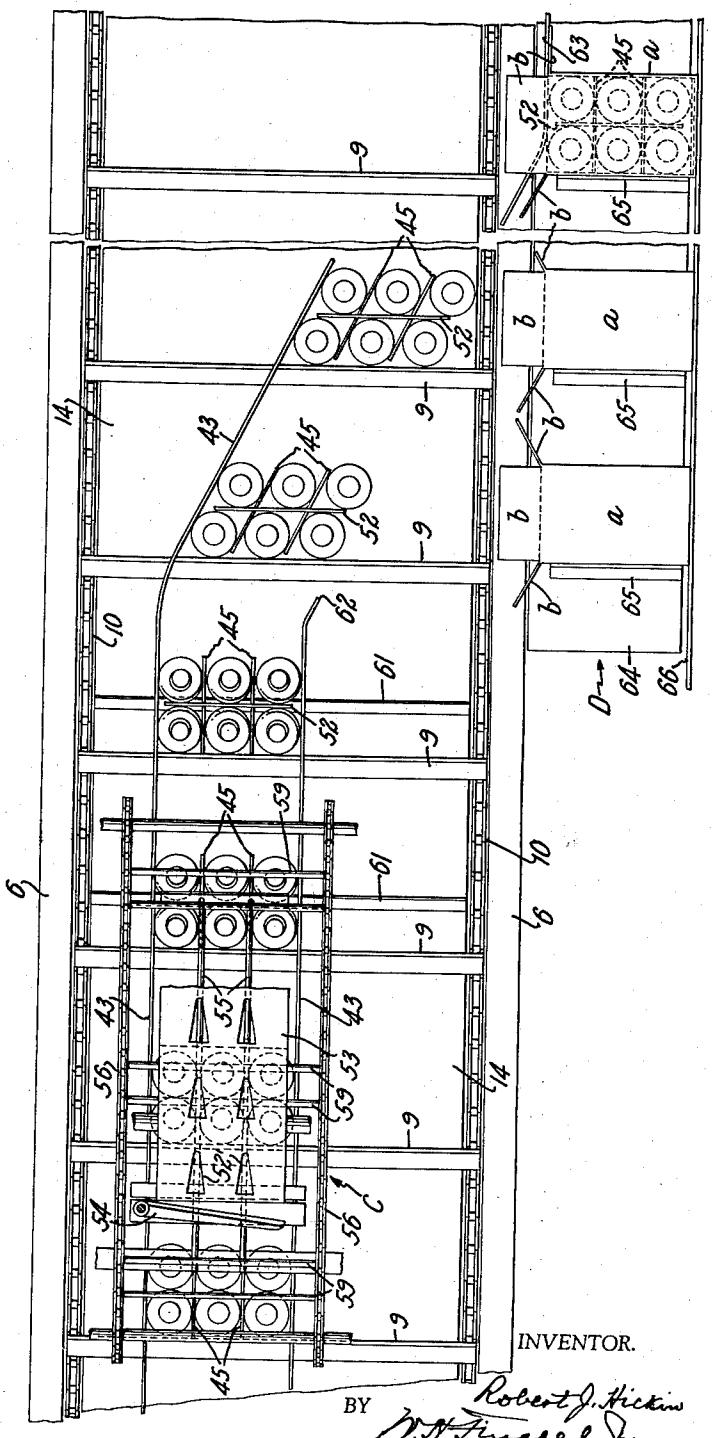
Fig. 2B.



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Jan. 24, 1961 R. J. HICKIN 2,968,898

PACKAGING METHOD AND APPARATUS

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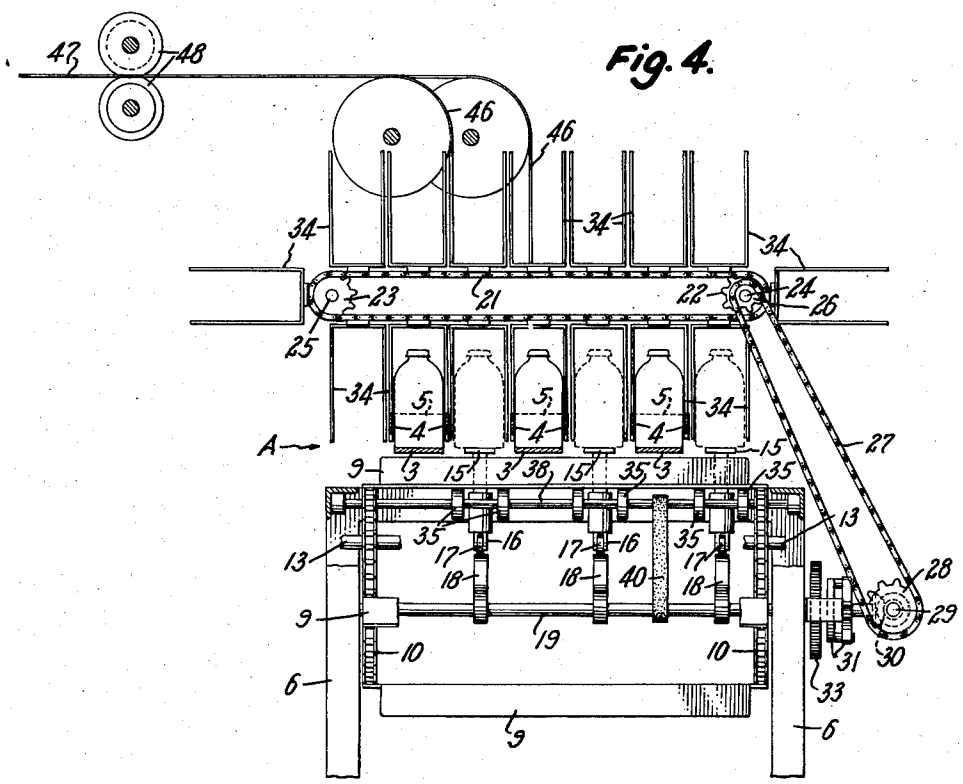
Fig. 4.



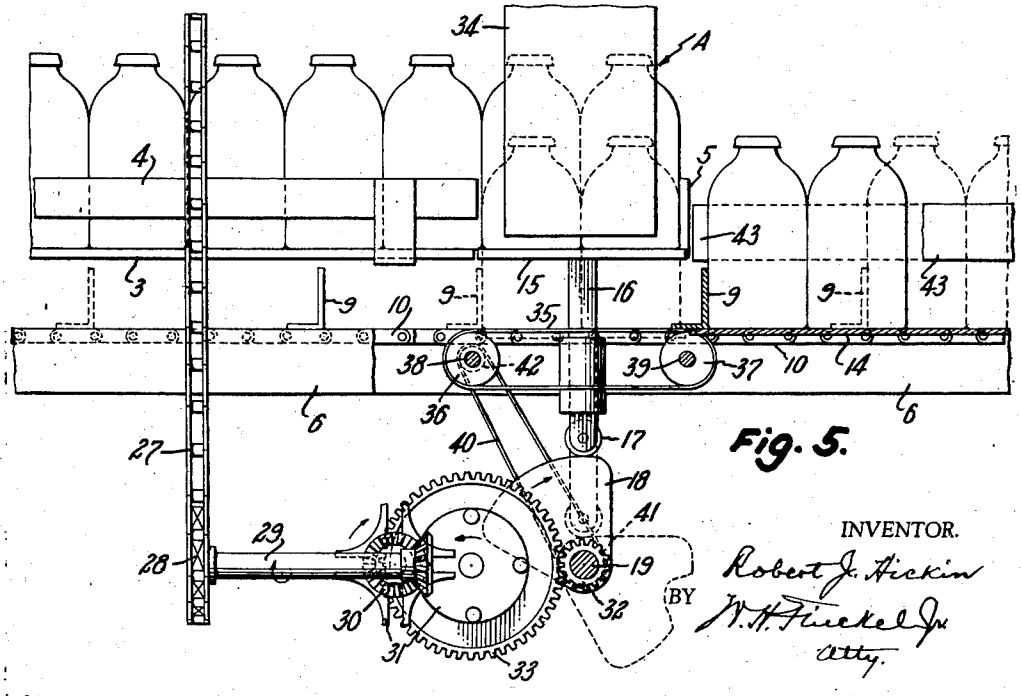


Fig. 5.

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PACKAGING METHOD AND APPARATUS

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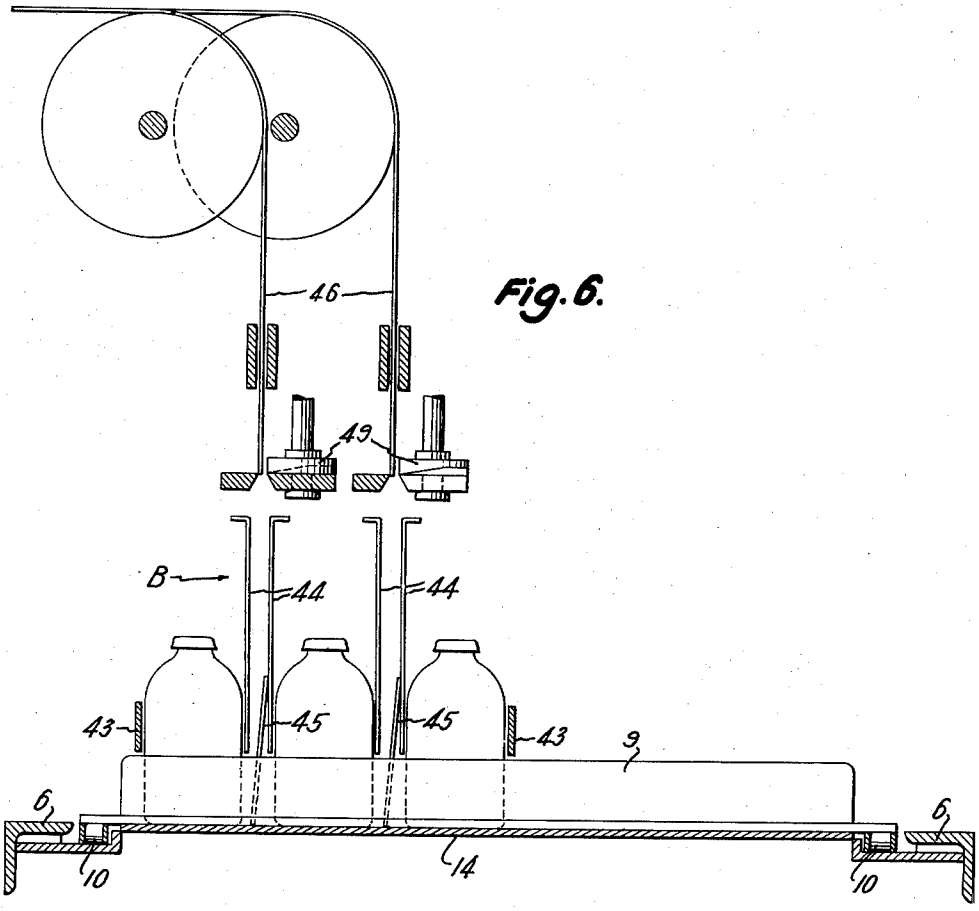

Fig. 6.

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PACKAGING METHOD AND APPARATUS

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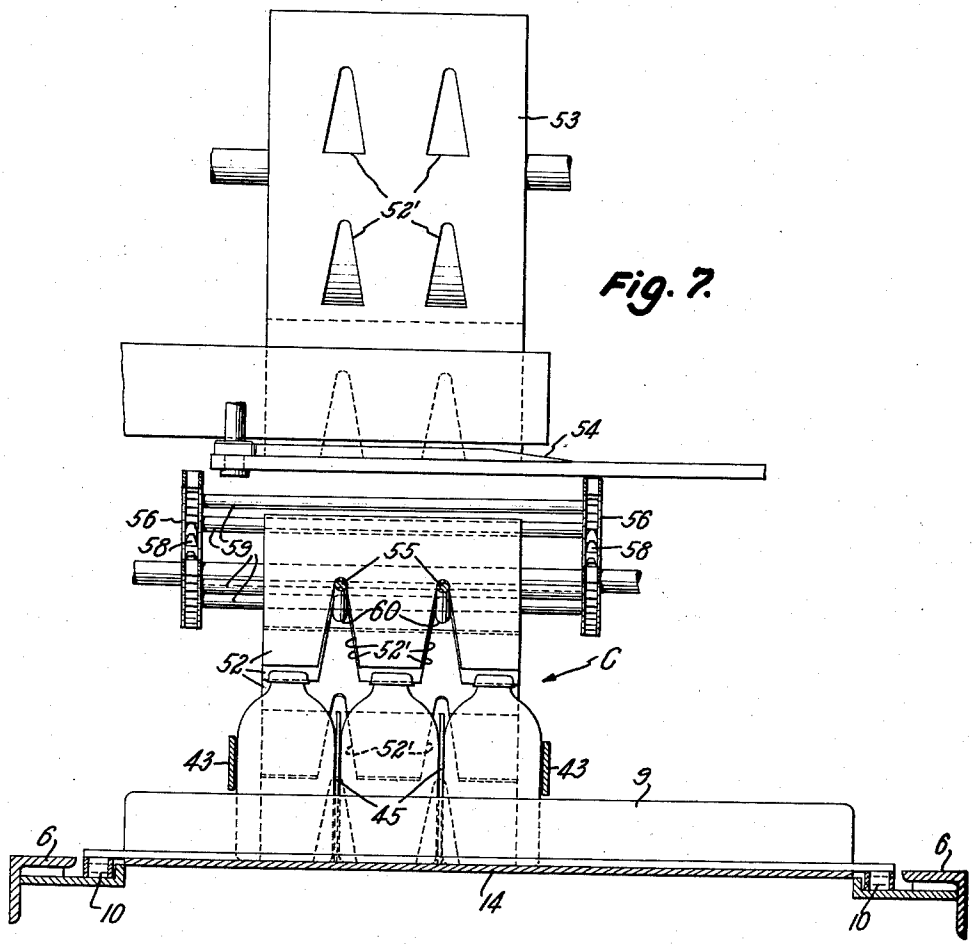

Fig. 7.

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United States Patent Office 2,968,898 Patented Jan. 24, 1961

2,968,898

PACKAGING METHOD AND APPARATUS

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Filed Dec. 10, 1958, Ser. No. 779,483

13 Claims. (Cl. 53—26)

This invention relates primarily to the handling of articles for packaging, and particularly to such handling of the articles as to arrange them in package groups of predetermined multiples and in chosen relative arrangement.

Although the method of the invention, and suitable apparatus for its practice, may be employed in the handling and packaging of a variety of articles a particular utility for its employment is in the handling and packaging of bottles and bottled goods, and in the following disclosure this utility will be described as representative.

In the packaging of bottled goods, such for example as bottled beverages, it has become a broadly accepted practice to form packages containing a predetermined multiple of bottles arranged in rows with the number of rows and the number of bottles in each row dictated by the salable size of the package, as exemplified by the now conventional "six-pack" of bottled beer which contains three rows of two bottles each or, conversely, two rows of three bottles each.

In order to economically produce such packages the bottles must be handled rapidly by mechanical means as they come from the bottling machine or other bulk source, but they must, nevertheless, be handled gently in order to prevent breakage and, where they bear labels, to avoid destruction or defacement of such labels.

Furthermore, when the groups of bottles are packaged in conventional closed cases it is desirable, and customary to furnish in the groups separator members or partition strips which are interposed substantially in mating longitudinal and transverse arrangement or assembly between the rows of bottles and between the bottles of such rows, and in the procedure of making up the groups it has been found expedient to assemble the separator members or partition strips with the bottles as the formation of the groups progresses. An example of this procedure is disclosed in applicant's patent for Packaging Method and Means, No. 2,615,289, granted October 28, 1952.

As a specific bottle packaging example the following disclosure is directed to the packaging of groups of six bottles, with proper assemblies of separator members or partition strips, in closed cartons, and in accordance with the method of the invention, and the representative apparatus for its practice, the bottles are fed in haphazard arrangement, but all standing upon their bottoms, from a conveyor, and crowded in single file into three raceways from which they are transferred two-by-two to a table surface over which they are advanced and guided in groups of three rows of two bottles each through two separator member depositing stations where longitudinal and transverse separator members are properly associated with them and mated with each other, and thereafter the individual groups, with their assembled separator members, are guided toward and inserted into proper cartons which are successively presented for reception of the successive groups through their opened ends. This may be considered as a broad statement of the successive steps of the method of the invention, but certain of the steps involve

novel features which will be particularly pointed out, and the invention comprises not only these concepts of the method but also features of the novel apparatus whereby the method steps are performed, all as will be more especially described hereinafter and finally claimed.

In the accompanying drawings the apparatus shown somewhat schematically is representative of such as is adapted properly to perform the method of the invention, although some of the mechanisms, and the assemblies embodying same, are considered to be novel in concept in adaptation to the method steps as will hereinafter become apparent. In these drawings, in the several figures of which like parts are similarly designated,

Figs. 1*a* and 1*b* present a longitudinal side elevation of the apparatus of the invention with certain parts omitted, and other parts broken away and in section,

Figs. 2*a* and 2*b* present a longitudinal top plan view of the apparatus with parts broken away to reveal underlying elements,

Fig. 3 is a greatly enlarged view of a portion of the conveyor means, and adjacent mechanism for one type of separator member, as shown at the upper left-hand end of Fig. 1*b*, with parts in section,

Fig. 4 is a transverse sectional elevation taken on the line 4—4 of Fig. 1*a*,

Fig. 5 is an enlarged fragmentary sectional side elevation of the intermittent motion imparting means for the transfer conveyor, with details of the elevator operating mechanism,

Fig. 6 is an enlarged transverse sectional elevation of mechanism at the grouping station taken on the line 6—6 of Fig. 1*a*, and

Fig. 7 is an enlarged transverse sectional elevation of mechanism at the group finishing station taken on line 7—7 of Fig. 1*b*.

As has been stated hereinbefore, the drawings are somewhat schematic, and it will be noted that parts, such as power sources and their drives, framing members and mechanism bearings and supports, have been omitted. It is thought, however, that the schematic nature of the drawings, and the omission of parts therefrom, will not preclude a full understanding of the apparatus and its functions.

Having reference particularly to the side elevational and top plan views furnished by combinations of Figs. 1*a*, 1*b* and Figs. 2*a*, 2*b*, respectively, it will be seen that the bottles are fed by a conveyor belt 1, shown travelling over a platform 2, in irregular or haphazard arrangement although upright upon their bottoms, to the entrance ends of three similar raceways, having bottoms 3 and side guides 4, into which they are crowded to the right in single file arrangement by the feed of the belt 1 until they are arrested by end stops 5 upstanding from the bottoms 3 (see also Figs. 4 and 5) at a transfer station A.

A table frame **6** is provided with brackets **7** and **8** which support the raceways in a sufficiently elevated position to permit the passage beneath their bottoms 3 of the flight bars **9** carried in uniform longitudinally spaced arrangement by conveyor chains **10** meshing with sprockets **11** and **12** and driven by a shaft **13**. These chains **10** flank a table surface **14** over which the flight bars extend transversely and are advanced longitudinally by the conveyor chains **10**. Inasmuch as the table surface **14** is at a level below that of the bottoms of the raceways, and in view of the fact that the bottles are advanced upon this table surface after they leave the transfer station A (Figs. 1*a*–1*b*, 4 and 5), the transfer station means must be provided not only for effecting transfer of the bottles from the stop or discharge ends of the raceways transversely but also downwardly therefrom to the level of the table surface **14** in order to effect their desired ultimate grouping.

In order that two of the bottles may thus be transferred transversely from each of the raceways and lowered to the level of the table surface 14, an elevator member 15 flanks each of the raceways at its discharge end and similar vertical reciprocation is imparted to all of these elevator members in unison through their standards 16 and cam-follower rollers 17 by cams 18 rotatable with a cross shaft 19 which is rotated in timed relation to the travel of the flight bars 9 by suitable drive means such as sprockets 20 (Fig. 1*a*) meshing with the conveyor chains 10. These sprockets 20 serve also to so direct travel of the return passes of the chains 10 that the flight bars 9 will clear the cams 18.

In order to accomplish intermittent transverse shifting of two of the bottles from the discharge end of each of the raceways 3—4 to its adjacent elevator member 15 in timed relation to the vertical reciprocation of such elevator members, and when such elevator members have their upper surfaces in a plane coincident with that of the bottoms 3 of the raceways, there is provided above the discharge ends of the raceways, and of their adjacent elevator members (see Figs. 1*a*, 2*a*, 4 and 5), a transversely travelling conveyor comprising a pair of spaced chains 21 meshing with sprockets 22 and 23 mounted for rotation in pairs with shafts 24 and 25 the former of which, shaft 24, carries a driven sprocket 26 in mesh with a drive chain 27 to which intermittent, or step-by-step, motion is imparted by a drive sprocket 28 connected through its drive shaft 29 and suitable gearing 30 with an intermittent motion drive means 31 of any appropriate type which is actuated in timed relation to the rotation of the cams 18 and hence to the vertical reciprocation of the elevator members 15 by a driving pinion 32 carried by the cross shaft 19 and meshing with a driven gear 33 which serves to rotate one element of the intermittent motion means 31.

Spanning the transverse conveyor chains 21 is a plurality of U-shaped flight members 34 spaced on the chains 21 on longitudinal axes or centers conforming to the equal spacing of the longitudinal axes or centers of the raceways 3—4 and elevator members 15 and having their respective offstanding legs relatively separated a distance substantially conforming to the separation of the side guides 4 of the raceways and hence suitable for laterally embracing the bottles at the discharge ends of the raceways, and of longitudinal extent adequate to contact the two leading bottles on the raceway, and of vertical length sufficient to operatively embrace such two bottles whether the bottles are supported by either the raceways or the elevator members at the level of the raceway bottoms or at the level of the elevator members when depressed to the level of the table surface 14 (see particularly Figs. 1*a*, 4 and 5).

In order to reduce the force of impact of the flight bars 9 upon the bottles when they are engaged by such bars at the level of the table surface 14 and advanced thereonto from the depressed elevator members 15, initial feed belts 35 (Figs. 1*a*, 4 and 5) carried by pulleys 36 and 37 mounted on cross shafts 38 and 39 are provided in flanking relation to the elevator members 15, and one of these shafts, the shaft 38 as shown, is driven by a belt and pulley arrangement 40, 41, 42 from the cross shaft 19 of the cams 18 which actuate the elevator members 15. The upper passes of the belts 35 are preferably located at a level slightly above that of the bottle-carrying surfaces of the elevator members, and the drive of these belts is such that their linear speed is somewhat less than the speed of advance of the flight bars 9. Having reference to Fig. 2*a*, in the broken-away portion of the transfer station A, it will be seen that the combined transverse dimension of an elevator member 15 and its two flanking belts 35 is substantially the same as the diameter of the bottles being handled and, therefore, when the elevator members lower their complements of bottles to the level where the bottoms of the bottles engage the belts 35, the bottles will be relatively slowly advanced from the elevator members and hence will be in such motion as will reduce the force of impact of an advancing flight bar as it overtakes them.

Having the foregoing in mind, it will be apparent, in the operation of the mechanisms at the transfer station A, that when a flight bar 9 has about reached the position, as shown in section in Fig. 5, slightly advanced past the discharge or delivery ends of the raceways 3—4, and with the elevator members 15 at their upper level, one intermittent motion of the flight members 34 of the transverse conveyor means will laterally or transversely shift the two leading bottles of each raceway, which have been arrested by the stops 5, from the raceways onto the elevator members, as shown by the full line and broken line showing of the bottles in Fig. 4. Now, due to the timing of the mechanisms, the elevator members will quickly descend to their lower level (the level of the table surface 14) and the bottoms of the bottles carried by them will rest upon the flanking belts 35 which, due to their travel, will impart a slow advance to the bottles. Obviously, as soon as the discharge ends of the raceways 3—4 are cleared the crowding feed of bottles in the raceways will cause others to take their places against the stops 5.

While the elevator members are at their depressed level a flight bar 9 will pass over them, catch up with the slowly advancing bottles, and more rapidly advance the bottles onto and along the table surface. Immediately upon passage of the flight bar past the right-hand ends of the elevator members these members will be restored to their upper level, the transversely movable flight members 34 of the conveyor chains 21 will be given another step to the right (Fig. 4), and the next complements of bottles will be similarly handled, and this operation will continue as long as the machine is in operation with an adequate supply of bottles.

This transfer step of the method of the invention, and the mechanisms by which it is performed are particularly important especially in the handling of bottles and other relatively fragile articles in that although the articles are handled rapidly they are, at the same time, handled gently, thus guarding against breakage and defacement.

After their advance from the transfer station A the bottles, with their bottoms resting upon the table surface 14, are preferably continuously advanced in three rows of two each by the flight bars 9 through three converging paths formed by pairs of guide rails 43 (Figs. 1*a* and 2*a*) to and through the grouping station B at which the central row is separated from the rows flanking it by pairs of relatively spaced parallel guide panels 44 (Figs. 2*a* and 6) which provide between them, and hence between the three rows of bottles, vertical channels for the reception and substantially vertical support (Fig. 6) of separator members or partition strips 45 which, as shown, may be formed from two continuous strips 46 fed from the roll (not shown) of an integral web 47 which is longitudinally divided by slitter means 48 (Figs. 2*a* and 4). The individual separator members are severed from the strips 46 by shear means 49 (Figs. 2*a* and 6) which cut across the webs at the bases of the triangular-shaped pre-punched openings 45′ therein (Figs. 1*a* and 2*a*) to produce an upwardly opening slot or notch (see righthand broken line showing in Fig. 1*a*) in each separator member 45. These shear means 49 are intermittently actuated in timed relation to the advance of the flight bars 9 and hence of the rows of bottles, as is also the feed of the webs 46, so that, as the rows of bottles advance through the passages provided by the pairs of guide panels 44 and the outside guide rails 43, the separator members 45 deposited in the channels between the guide panels 44 will be picked up by the flight bars and advanced thereby with the advancing rows of bottles and properly positioned between and associated with the bottles of such rows.

The provision of the separator members as formed by shearing from continuous strips slit from the integral web of a roll is intended merely as illustrative of one way in which such members may be furnished. Alternatively, they may be in the form of precut, individual separator members individually and intermittently fed into the channels formed by the guide panels **44**. However, no matter what form the separator members themselves, and the manner of their feed, may take, it is to be noted that the provision and function of the guide panels **44** in forming relatively spacious channels makes possible easy, exact and rapid supply of the separator members between the rows of bottles during the continuous advance of the bottles under the feed of the flight bars **9**.

Where the groups of bottles emerge from the grouping station B the outside guide rails **43** are so shaped at **50** and **51** as to crowd the three rows together but still in rows as determined by the interposed separator members **45** which are now held erect by contact of the bottles with them (see Fig. 2*a*).

From this crowding point the outside guide rails **43** preferably extend in parallelism with each other, and with the longitudinal edges of the table surface, at a spaced-apart distance substantially equal to the sum of the diameters of three bottles plus the sum of the thicknesses of two separator members **45** in order that orderly advance of the thus far formed groups of bottles may continuously proceed to and through the group finishing station C (Figs. 1*b*, 2*b*, 3 and 7) where means are provided for supplying and assembling with the groups of bottles other separator members or partition strips **52** which are complemental to and arranged transversely of the separator members **45** already in place, and mate with such members **45** between the bottles of the individual rows to thus complete, or finish, the complements of bottles and separator members in the several, successively advanced, package groups.

In the apparatus shown, the separator members **52** may be formed from the continuous web **53** of a roll (not shown), and divided from such web by shear means **54** (Figs. 1*b*, 2*b* and 7) which cut across the web in line with the bases of the triangular-shaped pre-punched openings **52'** therein to produce two downwardly opening slots in each separator member (see Fig. 7). These shear means **54** are actuated in timed relation to the advance of the flight bars **9** and of similarly timed separator depositing means which will now be described.

As the separator members **52** are successively severed from the web **53** by the shear means **54** they drop upon spaced parallel longitudinally extending rails **55** with one of said pre-punched slots or notches **52'** straddling each of said rails. It should be noted, here, that the apexes of the slots **52'** are preferably curved to provide a proper sliding fit upon the rails **55**, and are nearer to the upper edges of the separator members **52** than to their lower edges thereby serving to cause the separator members to hang vertically upon the rails.

Flanking the rails **55**, and operatively remote from the side edges of the separator members carried thereby, are similar conveyor chains **56** meshing with pairs of sprockets **57** and **58**, one pair of which is driven to cause the lower passes of the chains **56** to advance in the same direction and at the same linear speed as the conveyor chains **10**. These chains carry a number of traveller members or rods **59** extending transversely between them and travelling over the upper surfaces of the rails **55**, and they are spaced longitudinally of the chains at distances equal to the spacing of the flight bars **9** but so offset forwardly thereof as to overlie the points of peripheral contact of the pairs of bottles in the several rows of the advancing groups. Thus, due to the consonant travel of the conveyor chains **10** and **56**, it will be apparent that when a separator member **52** is sheared from the web **53** at an interval intermediate the space between two of the traveller members **59** as they advance, this separator

member will be suspended upon the rails **55** in position to be advanced by a traveller member **59** on the lower pass of the chains **56** and in position above the said contact points of the bottles of an underlying advancing group.

The rails **55** are at an elevation above the groups of bottles sufficient that at the point where the sheared separator members drop upon them the lower edges of such separator members will clear the tops of the bottles, but that these rails slant downwardly in the direction of travel of the bottles to such a degree that as advance of the groups of bottles and their separator members, properly allocated by the traveller members **59**, progresses, the separator members will be lowered into contact with the bottles and when they reach the termini **60** (Figs. 1*b* and 7) of the rails they will be deposited in proper position between, and supported by, adjacent bottles of these groups (see Fig. 1*b*).

As the groups of bottles, with the separator members **52** deposited upon them, leave the group finishing station C they pass over joggling means in the form of strips **61** carried by and extending above the table surface **14** and in spaced arrangement in the direction of advance of the groups of bottles (see Figs. 1*b* and 2*b*). These strips serve to tilt and joggle the bottles during their advance and to thus momentarily separate them longitudinally of the table surface sufficiently to permit the separator members **52** to drop between them into mating relation with the separator members **45**, and with their bottom edges resting against the table surface **14**.

Adjacent to the point of completion of this group finishing operation one of the outside guide rails **43** is terminated, as indicated at **62**, Figs. 1*b* and 2*b*, and the opposite, other outside guide rail **43** is given a bend so as to extend angularly transversely of the table surface **14** thereby to guide the finished groups of bottles transversely of the table surface to the packaging station D at which cartons *a*, with their end flaps *b* open, are fed in synchronism with, and appropriately juxtaposed to, the flight bars **9** and the groups of bottles advanced thereby so that such groups will be pushed by the outside guide rail **43**, and particularly by its straight extension **63**, into the cartons *a* through their open ends, as shown at the right-hand end of Fig. 1*b*. From this station the thus-filled cartons will be transferred to a conventional carton-closing apparatus.

Merely for purposes of schematic illustration, the cartons are shown as advanced in synchronism with the advance of the flight bars **9** by a conveyor belt **64** having flight bars **65** and the upper pass of which moves in consonance with the travel of the conveyor chains **10** which carry the flight bars **9**, and the cartons are held against movement transversely of this belt **64** by an abutment rail **66** so that they are restrained against such movement during insertion of their respective groups of bottles. Obviously, other carton furnishing and presenting means may be employed.

It will readily be appreciated that, in accordance with the method of the invention, and the apparatus schematically disclosed, the bottles may be handled rapidly and gently throughout their feeding and advance to and through the various stations of operation, and that they advance continuously to and through all of such stations with the exception of the transfer station at which their advance is momentarily arrested in order to effect their desired lateral transfer from the raceways to the elevator members, and by the elevator members from one level to another to thus allocate them into appropriate groups of predetermined multiples.

It will be understood, furthermore, that other types of separator members or partition strips may be substituted for those of the complementally notched type shown while still retaining the continuous feed of the bottles which is one of the features of their rapid handling.

Various changes and modifications are considered to

be within the principle of the invention and the scope of the following claims.

What I claim is:

1. The method of handling a supply of similar articles for packaging in complements of predetermined multiples, which comprises the steps of feeding a plurality of the articles in an arrangement with their respective ends similarly oriented, collecting and guiding the thus fed articles in at least two files while supported at a predetermined level to a transfer station, at said transfer station transferring a selected number of said articles from each of the individual files laterally of the direction of feed in such files and to a different level, advancing the transferred articles at said last-named level and causing them to form a group, and following such grouping advancing the articles in groups to a packaging station.

2. The method of handling a supply of similar articles for packaging in complements of predetermined multiples, which comprises the steps of feeding a plurality of the articles in an arrangement with their respective ends similarly oriented, collecting and guiding the thus fed articles in at least two files to a transfer station, at said transfer station transferring a selected number of the individual articles from each of said files laterally of the direction of feed in such files, advancing the articles thus transferred from the respective files in relatively spaced arrangement through a grouping station and at such grouping station interposing between the articles transferred from the respective files separator members by depositing such separator members in the spaces therebetween, further advancing the formed groups of articles with the thus deposited separator members through a group finishing station and at such finishing station depositing between the articles other separator members transversely of and mating with those already deposited at the grouping station, and thereafter advancing the groups of articles with the several interposed and relatively mating separator members to a packaging station, said articles being fed continuously in all of the defined steps with the exception of that at the transfer station, at which station the files of articles are intermittently arrested and substantially simultaneously with such arresting the said lateral transfer of the selected numbers of articles from each file thereof is intermittently effected.

3. The method as claimed in claim 2, in which the files of advancing articles are supported at a predetermined level, and substantially simultaneously with the lateral transfer step are displaced to a lower level at which lower level they are supported and advanced through all of the subsequent steps.

4. The method of handling bottles for packaging in multiples in a plurality of rows with each row comprising a predetermined complement of at least two bottles, which comprises the steps of feeding a plurality of the bottles standing upright upon their bottoms, collecting and guiding bottles of such fed plurality in files equal in number to said plurality of rows, and at a predetermined level, to a transfer station, at such transfer station transferring from each of the individual files laterally of the direction of feed in such files, and to a lower level, the predetermined complements of bottles for the several rows, advancing said transferred bottles while supported at said lower level and during such advancing guiding their said rows in relatively spaced relation for presentation at a grouping station, at such grouping station depositing in the spaces between said rows of bottles separator members, further advancing said rows of bottles and the deposited separator members simultaneously in groups from said grouping station through a group finishing station and during such advance through such finishing station depositing between the bottles of the multiple of rows in the groups other separator members disposed transversely of and mating with the previously deposited separator members, and thereafter successively advancing the groups of bottles and the separator members associated therewith to a packaging station.

5. The method as claimed in claim 4, in which said bottles are constantly advanced in all of the steps except that at the transfer station, at which station advance of the bottles in the several files is intermittently arrested and substantially simultaneously with such arresting the lateral and downward transfer of bottles from the several files is effected.

6. Apparatus for handling bottles and other end-orientable articles for packaging in predetermined multiples in a plurality of rows with each row comprising a predetermined complement of at least two such articles, said apparatus comprising means providing a plurality of raceways having bottoms for supporting and sides for guiding said articles in similar end orientation in a plurality of single files at least equal to said plurality of rows and at a predetermined level, means for feeding said articles properly oriented to and along said raceways, said raceways having discharge ends for exit of articles therefrom, means providing a table surface adjacent to the discharge ends of said raceways and at a level below that of the bottoms of said raceways, travelling conveyor means having transverse flight bars which travel over said table surface and beneath the bottoms of said raceways in the direction of the feed of said articles toward the discharge ends of the raceways, and means providing a transfer station for successively and intermittently transferring row complements of articles from the discharge ends of the individual raceways to said table surface, the means providing said transfer station including an elevator member displaced laterally of and in substantial parallelism with each of said raceways adjacent to its discharge end and vertically reciprocable from the level of the raceway bottoms to the level of the table surface, and conveyor means disposed above said raceways and arranged for travel laterally of the discharge ends thereof and provided with a plurality of flight members spaced to laterally embrace articles in said raceways and on said elevator members, means for imparting continuous travel to said first named conveyor, means for imparting vertical reciprocation to said elevator members in unison, and means for imparting intermittent travel to said last named conveyor, said vertical reciprocation and intermittent travel imparting means being operable in timed relation to the travel of said first named conveyor means, whereby the flight bars of said first named conveyor means may serve during the interval of lowered position of said elevator members to feed the articles from said elevator members to and along said table surface.

7. Apparatus as claimed in claim 6, in which driven belt means are provided in position to flank said elevator members when in their lowered position, said belt means serving to contact with and impart to the articles carried by the elevator members preliminary advancing motion prior to feeding contact therewith of the flight bars of said first named conveyor means to thereby relieve the force of impact of said flight bars with the articles.

8. Apparatus as claimed in claim 6, and including means providing an article grouping station spaced from said transfer station in the direction of feed of said articles along the table surface, guide means for directing the fed articles from the elevator members to said grouping station in individual row arrangement and for causing said rows to converge into parallelism at said grouping station, the means providing the grouping station comprising guide panels arranged in parallel pairs between adjacent rows of articles and means for intermittently depositing a separator member between each of said pairs of panels and resting edgewise upon said table surface in timed relation to the feed of said articles by said flight bars, whereby said separator members will be advanced by said flight bars between and along with said rows of articles.

9. Apparatus as claimed in claim 8, and including

means providing a group finishing station spaced from said grouping station in the direction of feed of said articles along the table surface, said finishing station having means for depositing separator members transversely of those deposited at said grouping station and between the articles comprising the rows thereof.

10. Apparatus as claimed in claim 9, in which means are provided for actuating the depositing means at said finishing station to deposit the separator members in timed relation to the advance of said flight bars and into position resting upon and supported by and between the articles of the rows, and said table surface is provided with offstanding means in an arrangement transverse to the travel of the articles for tilting the articles during their advance to thereby cause their separation longitudinally of the table surface sufficiently to permit said last deposited separator members to drop between them and into cooperation with said first deposited separator members.

11. Apparatus as claimed in claim 10, including guide means extending angularly transversely with relation to said table surface and serving to guide the groups of articles with their complements of separator members towards a longitudinal edge of said table surface as said groups are individually advanced longitudinally of said surface by said flight bars, and means for supporting and feeding packaging cartons adjacent to and at the level of said table surface edge concurrently with said groups of articles and with their open ends in register with said groups, whereby when the groups are guided to said edge they will be individually inserted into said cartons by said guide means.

12. Apparatus as claimed in claim 9, in which the separator member depositing means at said group finishing station include rail means extending longitudinally of and above said table surface and the groups of articles advanced thereover, said rail means terminating in the direction of advance of said groups, means for intermittently depositing upon said rail means said second named separator members whereby said separator members may be suspended above said groups of articles, conveyor means operatively associated with said rail means and including traveller members movable along said rail means in synchronism with the advance of said flight bars, said traveller members thereby serving to deliver separator members from the terminus of said rail means and deposit them in operative relation to successively advancing groups of articles.

13. Apparatus as claimed in claim 12, in which said rail means slant downwardly from the point of deposit thereon of said separator members to their terminus, whereby as the separator members are carried along the rail means by said traveller members in consonance with the advance of said groups of articles they will be gradually lowered between the respective articles of the several rows and will be carried along therewith when they leave the terminus of said rail means.

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