United States Patent [19]

Helms

[11] **3,751,872**

[45] **Aug. 14, 1973**

[54] **APPARATUS AND METHOD FOR ENCLOSING OF CONTAINER GROUPS**

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[73] Assignee: **Container Corporation of America,** Chicago, Ill.

[22] Filed: **Sept. 27, 1971**

[21] Appl. No.: **184,265**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 863,049, Oct. 2, 1969, which is a continuation of Ser. No. 30,916, April 22, 1970, abandoned.

[52] **U.S. Cl.** **53/32,** 53/48, 53/186, 53/209, 53/242

[51] **Int. Cl.** **B65b 11/12**

[58] **Field of Search** 53/32, 48, 49, 186, 53/209, 242

[56] **References Cited**

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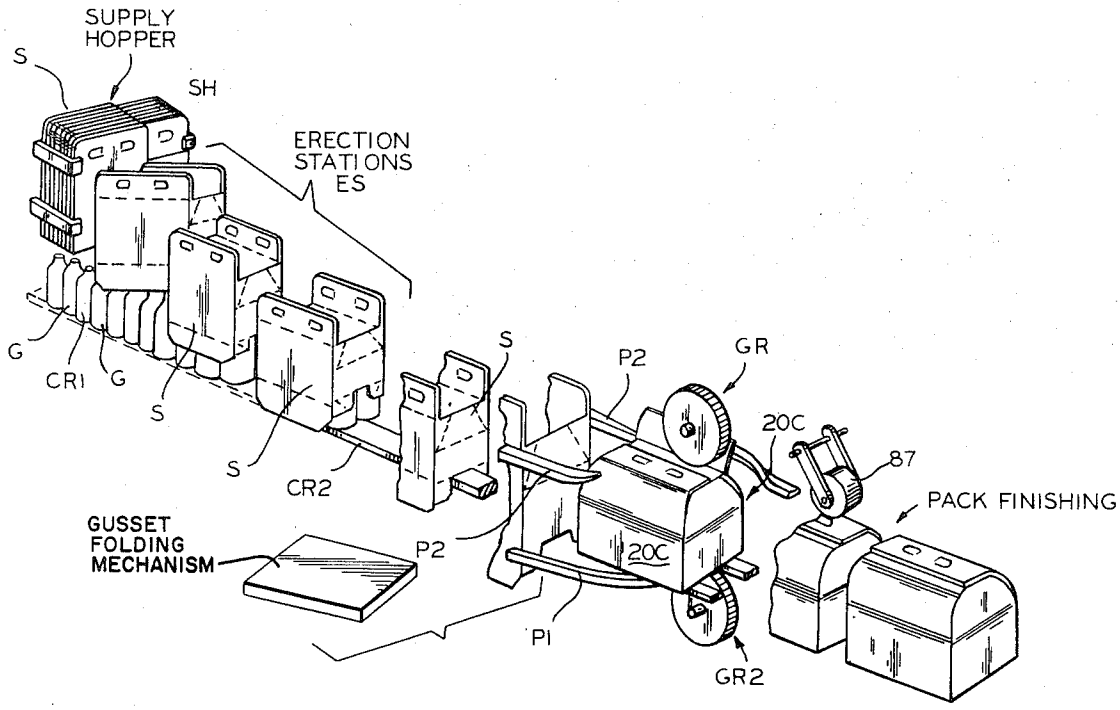
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Primary Examiner—Travis S. McGehee
Assistant Examiner—John Sipos
Attorney—Carpenter, Ostis & Lindberg

[57] **ABSTRACT**

Apparatus and method for enclosing a discrete group of articles, such as cans or bottles arranged in a double row carton sleeve, the groups moving along a first conveyor reach having a width substantially equal to the width of the double row, and then along a second conveyor reach substantially less in width than the first reach, a tubular carton being adapted to move into position around the group as it moves from the first reach to the second reach. The tubular carton has lower closure elements adapted to embrace the second reach, and structure is provided for moving the closure elements into position against the bottom of the group as the group moves from the second reach to the third reach.

11 Claims, 16 Drawing Figures



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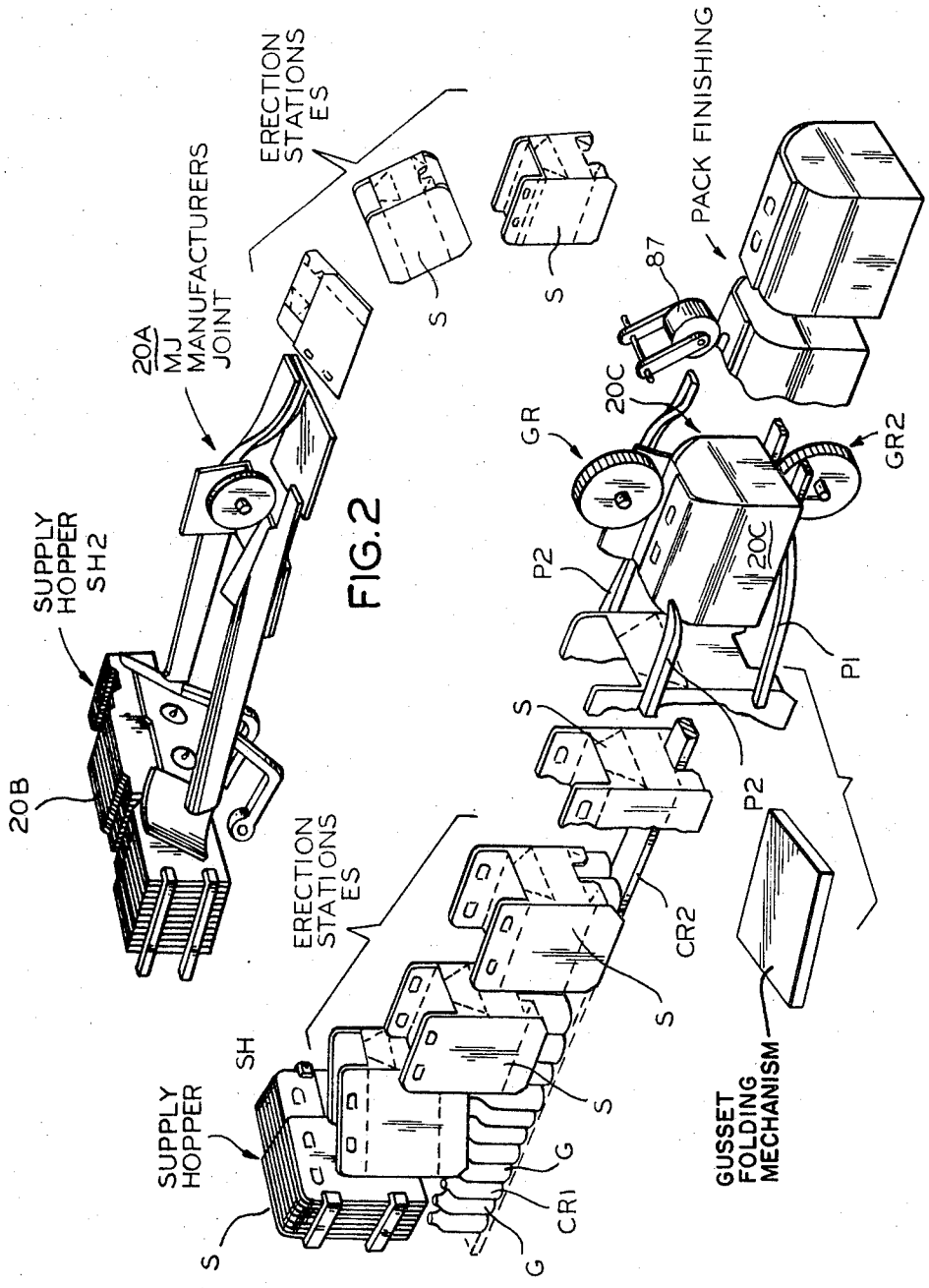


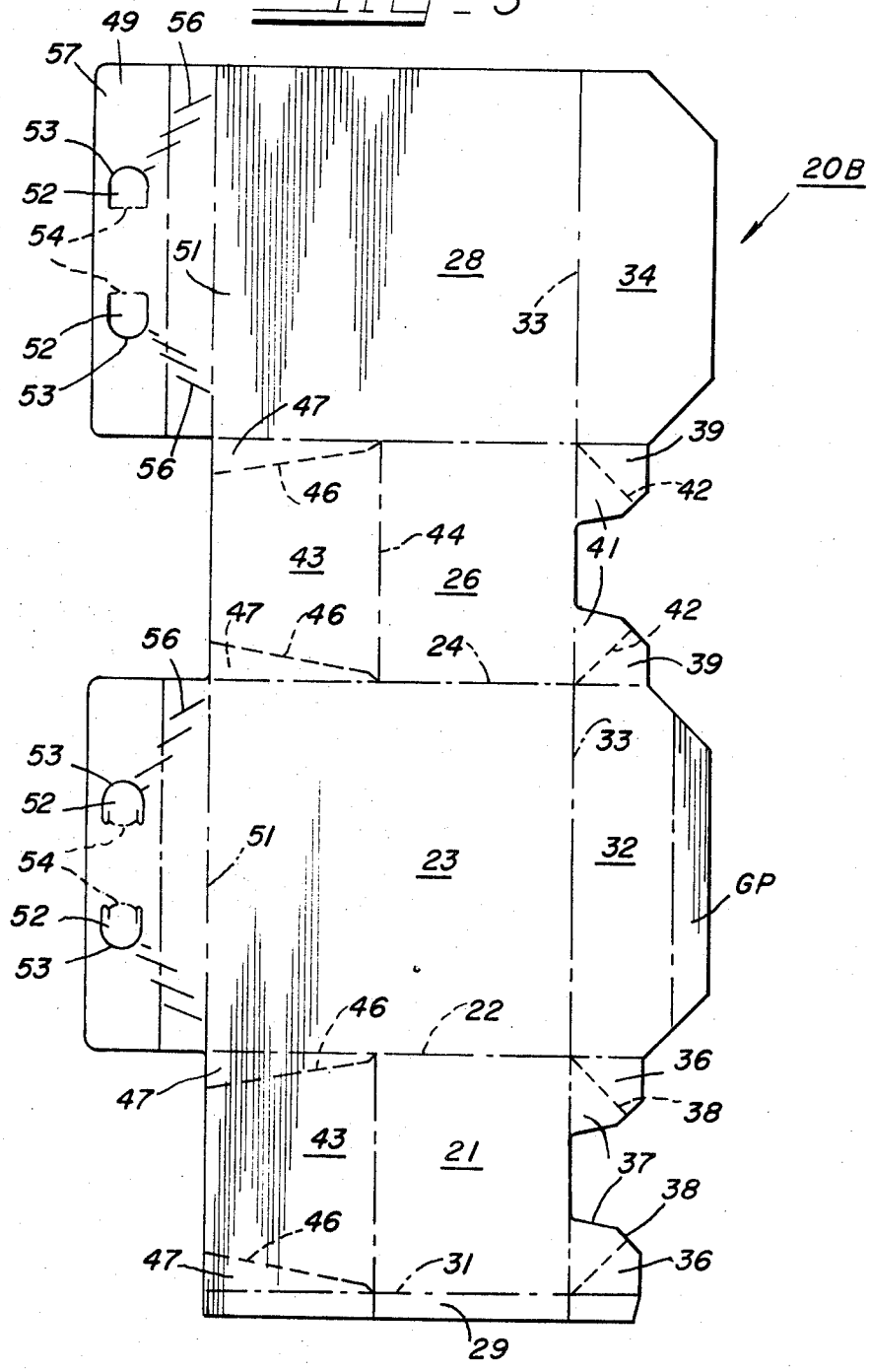
FIG. 2

FIG. 1

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FIG. 3



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Fig. 4

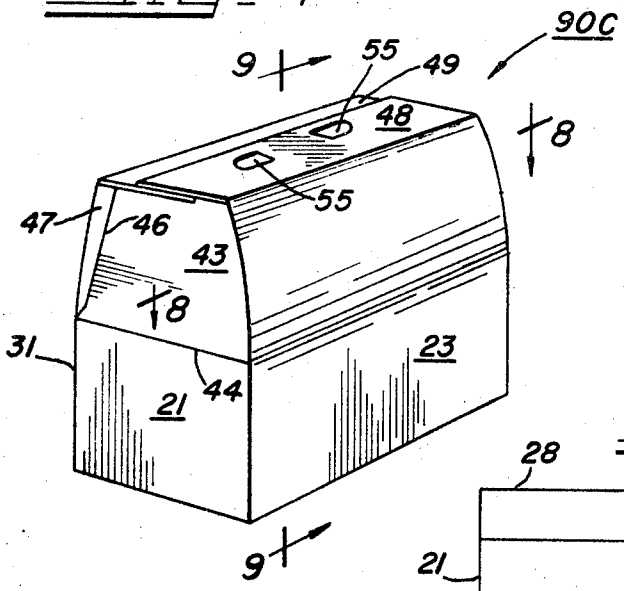


Fig. 5

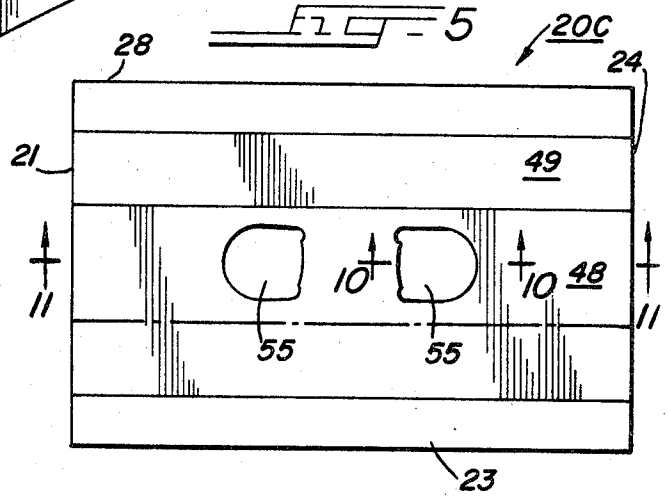


Fig. 6

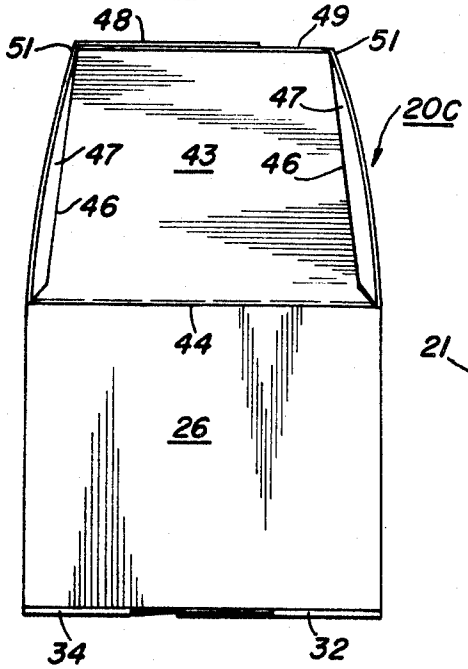
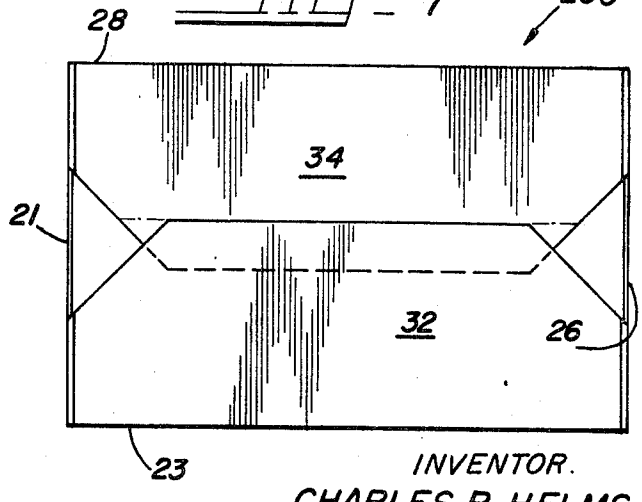


Fig. 7



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FIG - 9

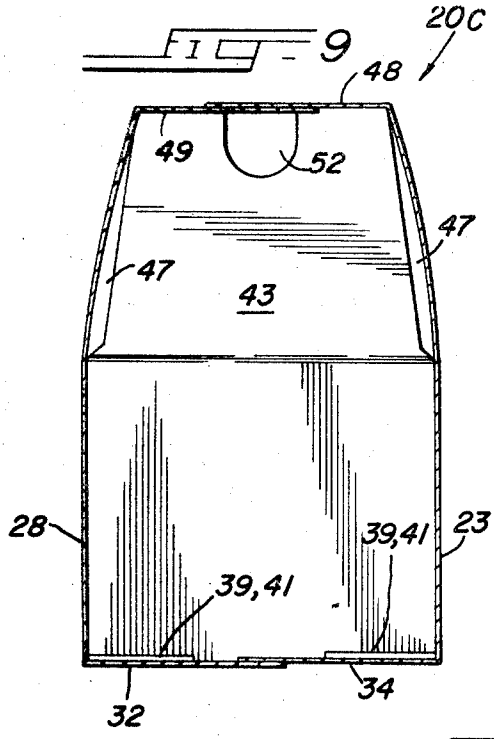


FIG - 11

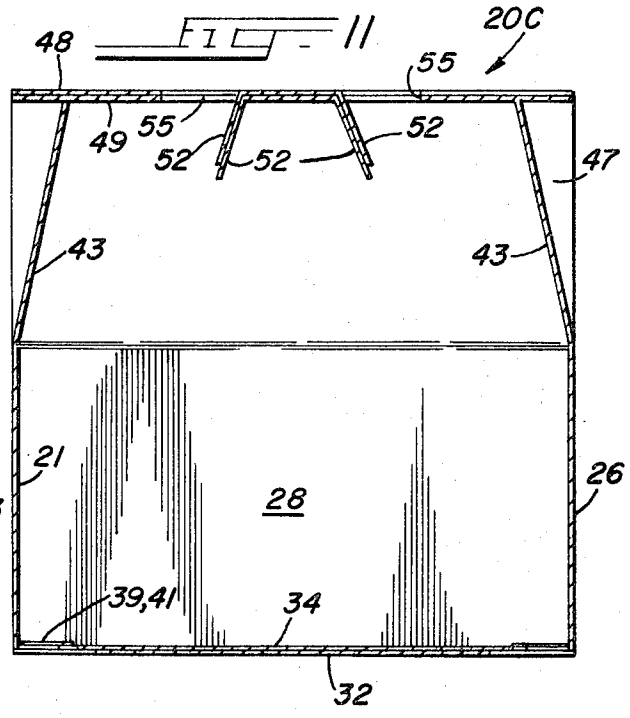


FIG - 8

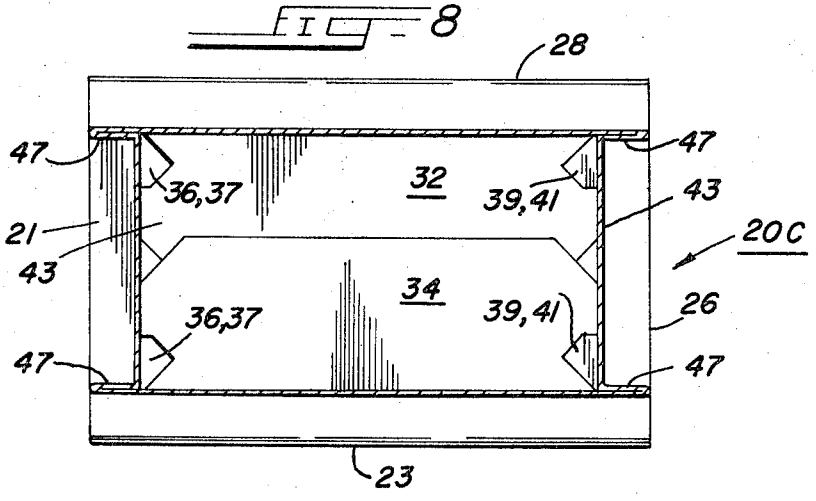
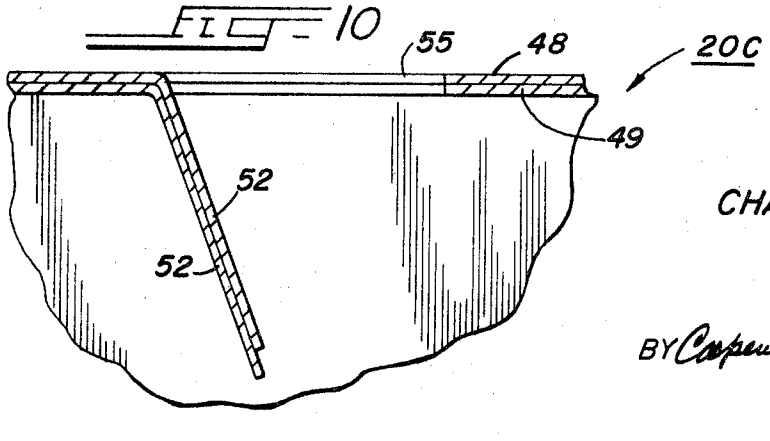


FIG - 10



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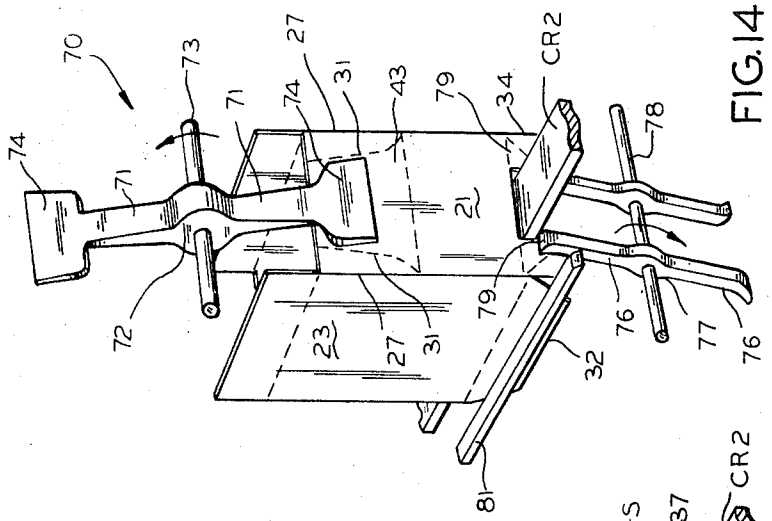


FIG.14

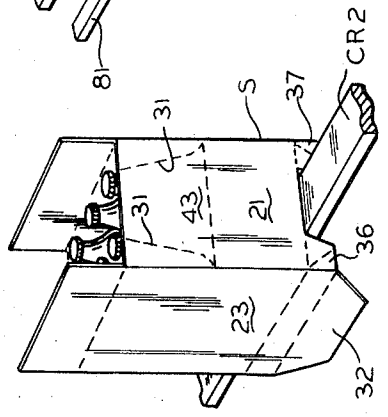


FIG.13

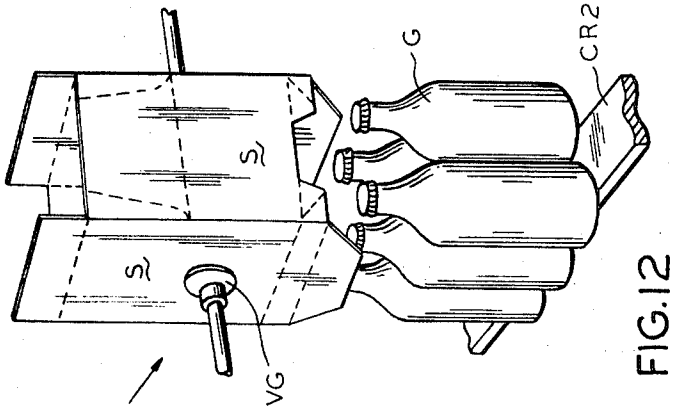


FIG.12

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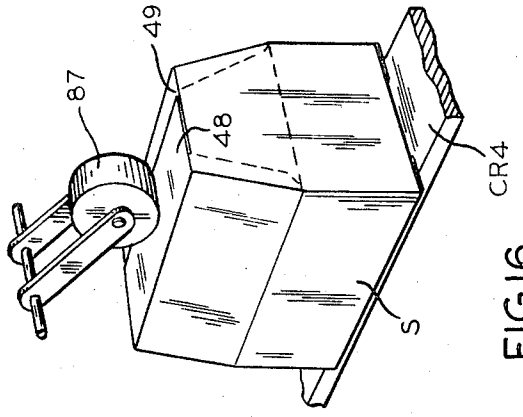


FIG.16

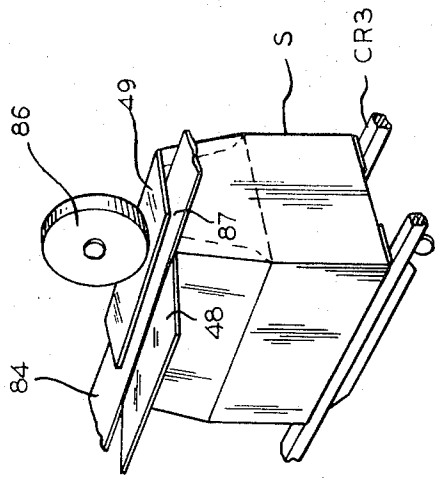


FIG.15

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APPARATUS AND METHOD FOR ENCLOSING OF CONTAINER GROUPS

This application is a continuation-in-part of my application Ser. No. 863,049, filed Oct. 2, 1969 which in turn, is a continuation of Ser. No. 30,916, filed Apr. 22, 1970, now abandoned.

It is a principal object to provide a method and apparatus for enclosing a group of containers in a carton sleeve as the group moves from a first conveyor reach of a relatively wide width to a second conveyor reach of a narrower width, and for moving lower closure elements into closing position as the group moves from the second conveyor reach to a third conveyor reach.

THE DRAWINGS

FIG. 1 is a schematic view illustrating apparatus for carrying out the method according to the present invention;

FIG. 2 is a view similar to FIG. 1 and showing a modified form of such apparatus;

FIG. 3 is a plan view of a cut and scored blank for forming a carton sleeve adapted to be used with the apparatus of FIGS. 1 and 2;

FIG. 4 is a perspective view of a completed carton formed with the apparatus of FIGS. 1 and 2;

FIG. 5 is a top view thereof;

FIG. 6 is an end view thereof;

FIG. 7 is a bottom view thereof;

FIG. 8 is a horizontal cross-section taken along the plane indicated looking in the direction of the arrows 8—8 of FIG. 4;

FIG. 9 is a vertical sectional view looking in the direction of the arrows 9—9 of FIG. 4;

FIG. 10 is an enlarged sectional view taken along the line 10—10 of FIG. 5 looking in the direction of the arrows;

FIG. 11 is a vertical sectional view taken along the line 11—11 of FIG. 9 looking in the direction of the arrows; and

FIGS. 12 to 16 inclusive are schematic views of portions of the apparatus seen in FIGS. 1 and 2 for enclosing a container group within a carton sleeve like that shown in FIG. 4.

The apparatus for carrying out the method according to the present invention is denoted by the reference numeral 20 in FIG. 1, and an alternate form of such apparatus is denoted by the reference numeral 20A in FIG. 2. The apparatus of FIGS. 1 and 2 is particularly adapted to act upon a carton sleeve S formed from a cut and scored blank 20B seen in FIG. 3 to provide a resultant carrier 20C.

Cut and scored blank 20B comprises an end panel 21 connected by a fold line 22 to a front panel 23, the latter being connected at a fold line 24 to an opposed end panel 26. A back panel 28 is connected by a fold line 27 to the opposed end panel 26 and panel 28 is connected to a glue flap 29 foldable with respect to the first end panel 21 along a fold line 31 to provide a carton sleeve S.

As seen in FIG. 1, a supply of collapsed carton sleeves S is retained in a supply hopper SH, and individual carton sleeves are withdrawn therefrom and erected at erection stations ES.

The apparatus of FIG. 1 includes a first conveyor reach CR1 for transporting groups of containers G. They are arranged in two rows of three each and may be in the form of throw-away glass containers commonly wrapped in groups of six and referred to in the trade as "6-packs." The container groups G are adapted to move on the first conveyor reach CR1 to a point thereon where an erected carton sleeve S is placed therearound. At such conjunction of the erected sleeve S and a group G of containers, the container group together with the sleeve S then moves to and along a second conveyor reach CR2. The width of this second conveyor reach is greatly less than the width of the first conveyor reach CR1 thereby causing the individual containers to become unstable. The carton sleeve thereby encloses the group of containers G in such a fashion that they cannot spill from the conveyor reach CR2 by reason of the restraint imposed by the sleeve S.

Referring back to FIG. 3, cut and scored blank 20B for forming the carton sleeve S includes a first lower closure flap 32 connected to the front panel 23 along a fold line 33. An opposing closure flap 34 is connected to the back panel 28 along a continuation of the fold line 33. Closure flap 32 has a glue flap GP thereon, so that closure flap 32 may be placed into overlapping relationship with respect to closure flap 34 to close the bottom of the carton 20C seen in FIG. 7.

First end panel of erected sleeve S has gusset flap elements 36 and 37 extending from the lower end thereof, these flap elements being capable of being folded with respect to each other along a score line 38.

Gusset flap elements 36 and 37 are defined by a continuation of the score lines 31 and 22 and a continuation of the score line 33 of the front panel 23. Likewise, the opposed end panel 26 has gusset flap elements 39 and 41 foldably connected along a score line 42. One pair of such gusset flap elements is defined by the continuation of the score line 24 and by a continuation of the score line 33, while the other pair of such gusset flap elements is defined by a continuation of the fold line 27 and a continuation of the fold line 33.

When the blank 20B seen in FIG. 3 is formed into the sleeve S, the gusset flap elements extending from the first end panel 21 and the gusset flap elements extending from the second end panel 26 are spaced at each of such panels by a distance whereby the carton sleeve S can move along the conveyor reach CR2 as seen in FIG. 1, the bottom closure flaps 32 and 34 flanking the conveyor reach CR2.

Alternately, and as seen in FIG. 2, the apparatus of FIG. 1 may include a supply hopper SH2 for a plurality of carton blanks 20B. These are removed from the supply hopper SH2 by the mechanism shown, and a manufacturer's joint may be made in each such blank 20B at a station MJ, the sleeve S being erected in the erecting station ES thereof.

It may be noted at this point that the apparatus for forming a carton sleeve and for erecting same, or apparatus including a supply hopper for a plurality of carton sleeves and erecting same are well-known in the art and they are therefore not described in detail.

Referring again to FIGS. 3 to 11 inclusive, the carton blank 20B includes a pair of inclined end panels 43 foldable with respect to the first and second end panels 21 and 26 along a fold line 44. The inclined end panels 43 converge towards each other, and each is defined by converging gusset fold lines 46 and by triangular gusset folds 47 also defined by the continuation of the score lines 22, 24, 27, and 31 as the case may be.

An overlapping top flap 48 extends from the front panel 23, and is foldable with respect thereto along a continuation of the score line 51.

Referring back to FIG. 1, as the group of containers moves along the second conveyor reach CR2, gusset folding mechanism GFM acts upon the lower extremities of the carton sleeve S to complete the gusset folding and the closing of the bottom of the container wrapper 20C.

The overlapping and underlapping top flaps 48 and 49 are glued together in a gluing operation including plows P2 and glue roller GR which places glue against the outer side of flap 49. The two flaps 48 and 49 are each provided with fold-down tabs 52 defined by an essentially semi-circular cut line 53 and a score line 54. When tabs are folded down, they are in register and define a pair of spaced finger holes 55 for the transport of the filled container 20C.

The top panels 48 and 49 may also be provided with parallel slits 56, which weaken the top panels 48 and 49 and form thereby end tear panels 57 whereby the top panels 48 and 49 may be opened as desired.

Referring back to FIG. 1, the completion of the closing of the bottom of the sleeve S by the gusset folding mechanism GFM includes lower plows P1 and lower glue rollers GR2, and takes place as the sleeve S moves on to a third conveyor reach CR3, the closing of the bottom being completed at this time at that part of the apparatus referred to as pack finishing. The container wrapper 20C is then completed in a number of operations taking place and noted as pack finishing in FIG. 1.

Referring now to FIGS. 12 to 16 of the drawings there is shown details of the mechanism for completing the gusset folding at the bottom of the container sleeve S and details of mechanism for forming the gusset fold in a carrier of the type as seen in FIGS. 3 to 11 inclusive. Referring also to FIG. 2, the carton supply hopper SH is adapted to feed individual blanks to a carton erection station ES whence individual sleeves S are moved vacuum grippers VG engaging each side of the carton sleeves and operable to deposit sleeves around a container group G as the same moves from the conveyor reach CR1 to CR2.

As has been previously described, the container group G moves along a first conveyor reach CR1 whereon the containers comprising the group are stable, and from such conveying reach CR1 to a narrow conveying reach CR2 where the individual containers of the group G are unstable. As has been previously described, at such point of transfer of the members of the group G from the wide conveyor reach CR1 to the narrow reach CR2, the carton sleeve is placed thereabout, the sleeve S acting to hold the members of the group G against unstable movement.

FIG. 13 shows a carton sleeve S moving along the narrow conveying reach CR2. Sleeve S of this type undergoes operations with the group G enclosed therein whereby the end panels 43 are depressed inwardly along the gusset fold lines 31. In addition, the folding of the gusset folds 36 and 37 is done during the folding in of the bottom closure panels 32 and 33.

As seen in FIG. 14 an upper gusset fold former is indicated generally by the reference numeral 70 and consists of a pair of paddle arms extending from a central hub made fast to a shaft 73. The distal end of each arm 71 is integral with a paddle 74, and the two arms 71 have an intermittent motion enabling one of the paddles 74 to contact the panel 43 of the leading end of a carton sleeve S to depress panel 43 along its gusset fold line 31 and along score line 27 of the sleeve S. This causes the upper portions of the side panels 23 and 28 swing inwardly, and following such action of one of the paddles 74 the arm 71 rotates with the shaft 73 in the direction indicated by the arrow, the other paddles 74 then moving into contact with the panel 43 at the trailing end of the sleeve S. After the depressing of the panel 43 by such paddle 74 it remains in stationary position to contact the panel 43 at the leading end of the next sleeve and container group moving along conveyor reach CR2.

Mechanism not shown, is provided to give intermittent motion to the shaft 73 and to the arms 71 for the purposes aforesaid.

In the same fashion the gusset panels 36 and 37 of leading end panel 21, and the gusset panels 39 and 41 of the trailing end panel 26 are folded by a gusset fold tucker mechanism indicated generally by the reference numeral 75. It includes paddle arms 76 extending from central hubs 77 fast upon an intermittently rotating shaft 78 having a motion similar to the shaft 73 of the upper gusset forming mechanism 70 previously described. Each of the arms 76 terminates in a tucker member 79 engageable with the fold lines 38 or 42, as the case may be, of lower gusset panels previously referred to.

The folding of the gusset panels aforesaid causes the lower closure panels 32 and 34 to be folded inwardly, this being accomplished by converging plow rails 81 flanking the conveyor reach CR2 and converging in the direction of movement of container group G and the sleeve S enclosing same.

Referring now to FIGS. 15 and 16, in the pack finishing referred to in FIG. 1 glue is applied to the bottom closure flaps 32 and 34 by the glue roller, the operation of the glue roller GR2 taking place as the loaded sleeves moves on to a third conveyor reach CR3. As such movement takes place on to conveyor reach CR3 the narrow reach CR2 terminates.

The finishing of the top of the sleeve S whereby the container group is properly enclosed therein is achieved by a hot melt adhesive applying roller 86 for applying a strip of hot melt adhesive to the upper side of the closure panel 49, the latter being folded against a sword 84. Thereafter, the opposite flap 48 is folded into position over flap 49, and a compression roller 87 seen in FIG. 16 is effective against the upper panels 48 and 49 to finish the carton as seen in FIG. 8. During this time the carton and the container group G therein move along a final reach CR4.

I claim:

1. Apparatus for enclosing a discrete group of articles such as cans or bottles arranged in two side-by-side rows in a tubular carton sleeve of rectangular cross section open at the top and bottom and having bottom closure elements including opposed side closure panels and spaced foldable gusset panels connecting side edges of said closure panels to end panels of said sleeve, said apparatus comprising:

a. conveying means, including first, second, and third conveying reaches adapted to move groups of said articles therealong;

b. said first reach being of substantially the same width as said two rows with said groups being stable as they move therealong;

c. said second reach being of a width whereby said articles are unstable in directions laterally thereof;

d. means for placing a carton sleeve over said group so that said carton sleeve embraces the sides of the articles of said group as said group moves from said first reach onto said second reach whereby said articles are stable within the sleeve embracing the same;

e. said second reach being of a width whereby said bottom closure elements and said spaced foldable gusset panels extend below and flank said second reach;

f. means for closing said bottom closure elements as said group moves onto said third reach.

2. The invention according to claim **1** wherein said closing means includes gusset panel folding means engaging said gusset panels as said group moves from said second reach to said third reach.

3. The invention according to claim **2** wherein said closing means includes means for folding said side closure panels into closing position with said gusset panels also in closing position.

4. In a method for enclosing a discrete group of articles arranged in two side-by-side rows in a rectangular tubular carton sleeve open at the top and bottom and having top closure elements and bottom closure elements including opposed side closure bottom panels and spaced foldable gusset panels connecting side edges of said closure panels to end panels of said sleeve, the steps of:

a. conveying said articles along a conveyer reach having a lateral dimension whereby said articles are stable in directions laterally of said reach;

b. conveying said articles along a second reach having a lateral dimension whereby said articles are unstable in directions laterally of said reach;

c. placing a carton sleeve over a group of said articles so that said carton sleeve embraces the sides of the articles of said group as said group moves from said first reach onto said second reach whereby said articles are stable within said carton sleeve;

d. resting said carton sleeve at the ends thereof in contact with said second reach with said bottom closure elements depending therebelow with said gusset panels flanking said reach at right angles thereto;

e. folding said gusset panels as said sleeve moves along said second reach;

f. completing the closing of said side closure panels as said articles move from said second reach.

5. A method according to claim **3** which includes the step of adhering side closure bottom panels of said sleeve together.

6. A method according to claim **5** which includes the step of gluing the surfaces of at least one of said lower portions prior to said closing step.

7. Apparatus for enclosing a discrete group of articles such as cans or bottles arranged in two side-by-side rows in a tubular carton sleeve of rectangular cross section open at the top and bottom and having bottom closure elements including opposed side closure panels and additional bottom closure elements foldably connected to end panels of said sleeve, said apparatus comprising:

a. conveying means, including first, second, and third conveying reaches adapted to move groups of said articles therealong;

b. said first reach being of substantially the same width as said two rows with said groups being stable as they move therealong;

c. said second reach being so configured whereby said articles are unstable in directions laterally thereof;

d. means for placing a carton sleeve over said group so that said carton sleeve embraces the sides of the articles of said group as said group moves from said first reach onto said second reach whereby said articles are stable within the sleeve embracing the same;

e. said second reach being of a width whereby said bottom closure elements and said additional bottom closure elements extend below and flank said second reach;

f. means for closing all of said bottom closure elements as said group moves onto said third reach.

8. The invention according to claim **7** wherein said closing means includes means engaging said additional bottom closure elements as said group moves from said second reach to said third reach.

9. The invention according to claim **7** wherein said closing means includes means for folding said side closure panels into closing position with said additional bottom closure elements also in closing position.

10. In a method for enclosing a discrete group of articles arranged in two side-by-siderows in a rectangular tubular carton sleeve open at the top and bottom and having top closure elements and bottom closure elements including opposed side closure bottom panels and additional bottom closure elements foldably connected to end panels of said sleeve, the steps of:

a. conveying said articles along a conveyer reach having a lateral dimension whereby said articles are stable in directions laterally of said reach;

b. conveying said articles along a second reach having a lateral dimension whereby said articles are unstable in directions laterally of said reach;

c. placing a carton sleeve over a group of said articles so that said carton sleeve embraces the sides of the articles of said group as said group moves from said first reach onto said second reach whereby said articles are stable within said carton sleeve;

d. resting said carton sleeve at the ends thereof in contact with said second reach with said bottom closure elements depending therebelow with said additional bottom closure elements flanking said reach at right angles thereto;

e. folding said additional bottom closure elements as said sleeve moves along said second reach;

f. completing the closing of said side closure panels as said articles move from said second reach to said third reach.

11. A method according to claim **10** which includes the step of adhering said closure bottom panels of said sleeve together.

* * * * *