Nov. 20, 1951 E. F. CADMUS 2,575,580

METHOD OF PACKAGING

Filed Feb. 14, 1949 2 SHEETS—SHEET 1

FIG. 1.

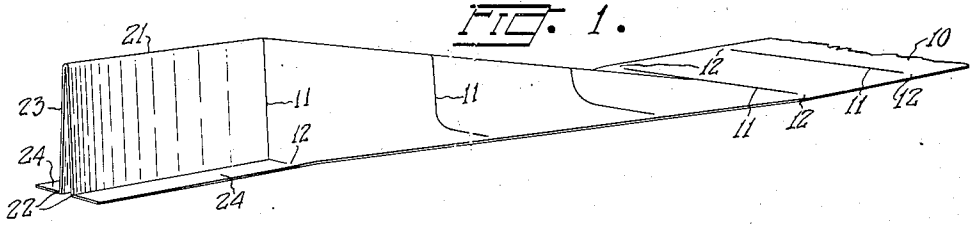


FIG. 3.

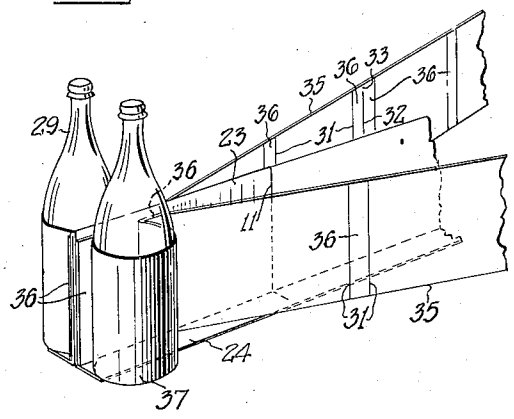


FIG. 2.

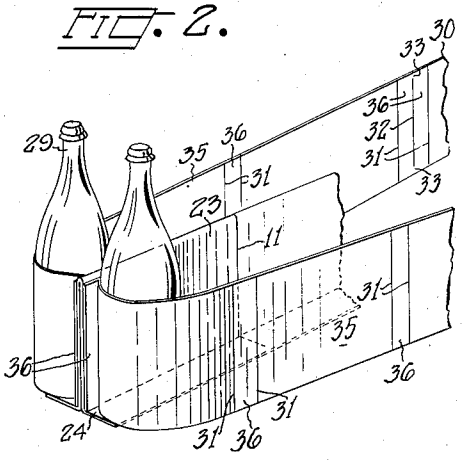


FIG. 5.

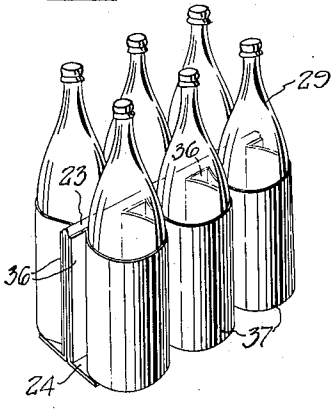
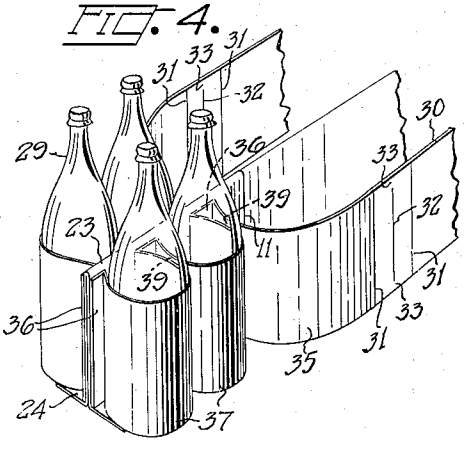


FIG. 4.



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FIG. 9.

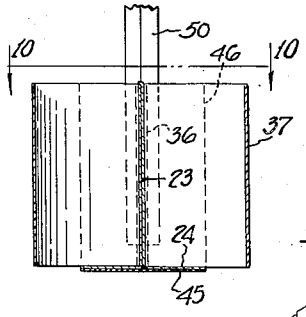


FIG. 6.

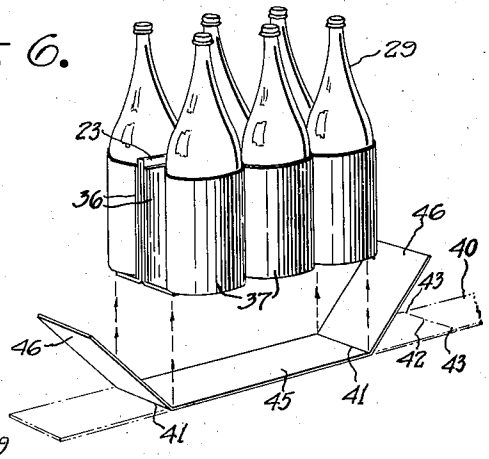


FIG. 11.

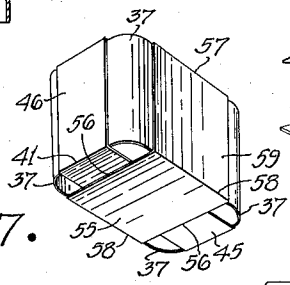


FIG. 7.

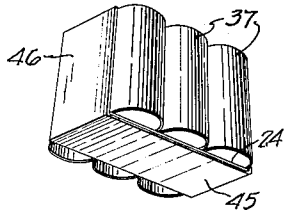


FIG. 8.

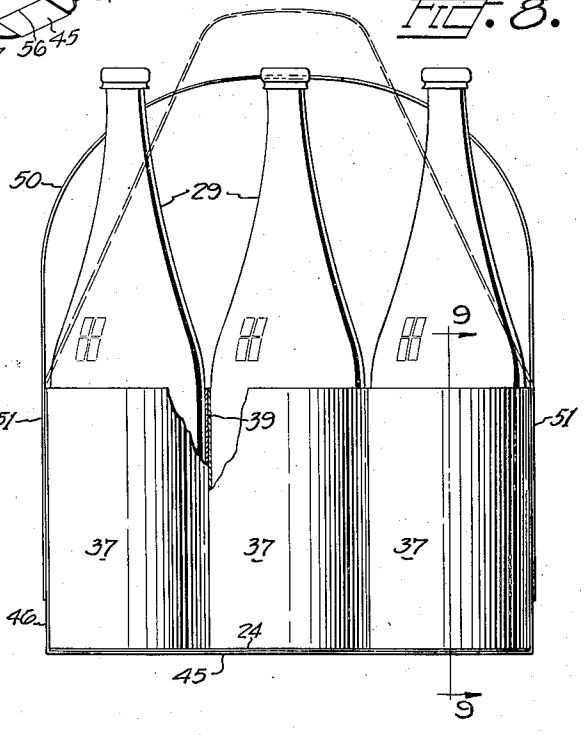
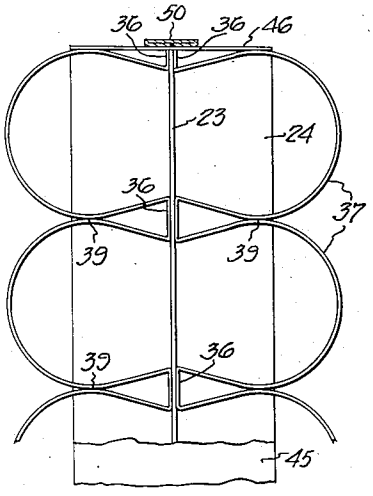


FIG. 10.



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METHOD OF PACKAGING

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Application February 14, 1949, Serial No. 76,300

14 Claims. (Cl. 93—3)

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This invention relates to an improved method of wrapping articles to form a carton or container about a plurality of the articles.

The common procedure in packaging articles is usually to provide first an adequate supply of prefabricated cartons and then fill the cartons with the articles. This method of packaging is inefficient because it usually requires a separate plant and machinery to make the cartons and space to store a reserve supply of empty cartons. Considerable handling is entailed in moving the empty cartons from their point of manufacture to a temporary storage space, in again moving them from the storage space to the place where they are to be filled, and finally in filling the cartons. In order to improve upon this method of packaging, it has heretofore been proposed to perform the final assembly and filling of the carton simultaneously to avoid the storing and handling of bulky empty cartons. The methods thus far developed to improve the efficiency, however, require the prefabrication and handling of different parts of cartons, and in most cases there is one major part which comprises most of the finished carton and involves about as great a problem in production and handling as though the carton were completely prefabricated before filling. There is relatively small advantage in merely completing the carton at the time of filling when the prefabricated parts must first be made and handled separately prior to the final operation.

The general object of the present invention is, therefore, to provide an improved method of wrapping articles wherein the carton or container is entirely formed directly on the articles it is to contain, and in substantially one continuous operation so that when the container is completed it will be already filled and ready for disposal.

Other objects are to provide an improved method of wrapping to avoid the handling of prefabricated or partially prefabricated empty cartons, to provide a method which is essentially a continuous process suitable for application to articles such as bottles or cans moving by conveyor as they are being discharged from a bottling or canning machine, and to provide a process which may be carried out entirely by mechanical apparatus coordinated with the delivery rate of such machine.

Still other objects are to provide a method of wrapping to form a reasonably strong package, carton or container from relatively inexpensive flat sheet material such as paper, to provide a novel form of construction for such container whereby it may be formed progressively around the articles to be wrapped as they are received, to provide a form of construction which is adapted to utilize either opaque or transparent heat sealing plastic sheet materials, or plastic coated paper, to form a strong and fairly rigid container by the novel forming and bonding together of a plurality of sheets of such material as they are drawn in long strips from supply rolls, and to provide an improved form of paper carton construction which may be equipped with a handle and used as a bottle carrier and the like.

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The method of the invention involves the complete fabrication of the carton or container at one time and place with the different parts of the wrapping being applied directly and progressively to the articles as they are delivered to be wrapped. The wrapping comprises a number of sheets of tough paper-like material which are drawn from rolls or other suitable sources of supply as the wrapping material is used to form the carton. The different sheets of the wrapping material are scored for folding and cutting as they leave their respective sources of supply in continuous strip form, and are bonded together in a number of heat sealed joints which are formed successively as the wrapping is applied to additional articles which are to be included in the same package. As the wrapping and bonding operations are being completed on one package, the sheets are severed from their sources of supply at the proper times to make the strips available for starting a new package when the next articles are received for wrapping. In the wrapping process separate pockets are formed for the articles whereby the pockets may be left open at their tops to provide a container from which the articles may be removed individually without destroying the container, so that it may be used repeatedly as a carrying container.

Other objects and advantages of the invention will be apparent from the detailed description in the following specification with reference to the accompanying drawings illustrating a preferred embodiment of the invention.

In the drawings:

Figure 1 shows a horizontal strip of sheet material progressing from a source of supply through certain folding operations required to form the vertical central member of the container in performing the initial step of the method;

Figure 2 shows two articles placed in position with respect to the central member, and a pair

of vertical strips forming side members attached to the central member to start the wrapping of the articles;

Figure 3 illustrates a bonding step subsequent to Figure 2 wherein the wrapping of the first pair of articles is completed;

Figure 4 shows a step subsequent to Figure 3 wherein the second pair of articles are wrapped and the strips are bonded together in a third joint;

Figure 5 shows the container with the side members bonded in place to wrap six articles in the container and form an open top carton;

Figure 6 shows the assembly of Figure 5 in position to receive a bottom and end reinforcing member;

Figure 7 is a perspective view showing the bottom of the completed container with the bottles removed;

Figure 8 is a side elevation view of the container showing a handle applied to utilize the container as a bottle carrier;

Figure 9 is a cross sectional view taken on the line 9—9 of Figure 8;

Figure 10 is a plan view taken on the line 10—10 of Figure 9; and

Figure 11 shows a further step involving the addition of another member to strengthen the container for certain purposes.

Figures 1 to 6 illustrates successive steps in the wrapping process to form a carrying container for six bottles, or the like, without reference to equipment or machine elements which would be used in performing the various operations. In Figure 1, the numeral 10 designates a source of supply of a continuous horizontal strip of material such as tough paper which may be drawn as needed from a roll, not shown. After leaving the source of supply, this strip is cut scored at intervals as indicated at 11. The spacing of the scores 11 determines the length of the finished container, and the scores are preferably interrupted in certain portions as indicated at 12 to provide sufficient tensile strength in the strip so that the paper will not pull apart prematurely at the score line as it is being drawn from the source of supply.

The strip is scored and reversely folded longitudinally as indicated at 21 and 22 to form a central member 23 for the container. The member 23 forms the central rib or backbone for the container having a vertical partition wall or web of double thickness with the fold 21 forming the top edge thereof and the folds 22 defining a pair of flaps or flanges forming horizontal bottom walls 24 on opposite sides of the central wall. The width of each bottom wall 24 is preferably equal to about half the diameter of the article to be wrapped when the articles are cylindrical. It is preferred to have adhesive material on both sides of this strip of stock for heat sealing purposes, and so if the strip is of a material such as paper which does not possess inherent heat sealing properties it should be plastic coated on both sides.

The articles to be wrapped are then introduced in pairs with one article on each side of the central member 23 and resting on a bottom wall 24, as indicated by the two bottles 29 in Figure 2. While the first two bottles are being brought into position, a pair of spaced, vertical strips of plastic or plastic coated material are drawn from sources of supply 30 on opposite sides of the central member 23 to wrap around the bottles in the manner shown. As these strips 30 progress from their sources of supply, they are vertically fold scored and cut scored at intervals. The numerals 31 designate fold scores, and the numerals 32 designate cut scores which do not extend entirely across the sheet but leave portions 33 of sufficient strength to prevent premature severance from the source of supply. These two vertical strips thereby form side sheets or members 35 for the container. The vertical fold score lines 31 define the lengths of article containing loops or pockets 37 in the side members 35 and interposed bonding areas 36 for attachment of the side members to the central member 23 between the bottles.

The side members 35 are first attached at the portions 36 at their foremost ends by applying heat to these portions in a manner well understood in the art of heat sealing materials while the portions are held against opposite sides of the member 23. Then the first two bottles 29 are moved into position, if they are not already there, and the side members 35 are wrapped around these two bottles to form the first pair of pockets 37 and place the next portions 36 simultaneously against opposite sides of the central member 23 for the next heat sealing operation, upon the completion of which the container appears as shown in Figure 3.

A container may be made which is satisfactory for some purposes without any additional direct connection between the pockets 37, but the structure may be considerably strengthened and stiffened by bonding the adjacent pockets together at points in the vertical line of contact designated at 39 in Figures 8 and 10. The shape of the article being wrapped and the type of bonding material employed will determine the nature of the bond or joint on this line, as there are various ways of forming this connection. If a heat sealed bond is employed, a heat pressure element may be applied behind each side member 35 when it is disposed in approximately the position shown in Figure 3 to obtain adhesion between the pockets 37 at spaced points such as the top and bottom thereof or in substantially complete line contact extending the whole height of the pockets. Conventional heat sealing materials are in common usage which are well suited for this purpose as they stick immediately when heated and merely brought into contact so that a good bond may be obtained even when it is formed by pressing the parts together against the side of a cold bottle. It is also possible to apply a wet glue wipe to the contacting surfaces and supply the necessary contact pressure to unite the surfaces by crowding the second pair of bottles against the first pair. Even though this bond on the vertical line 39 is effective only at the top and bottom edges of the pocket, or in other spots, it has a marked stiffening influence on the container by preventing relative movement of the adjacent pockets.

After the second pair of bottles are moved into position and crowded against the first pair, the side members 35 are wrapped about these bottles in the same manner as the wrapping of the first pair of bottles, and the third sealing portions 36 are bonded to opposite sides of the central member 23. Then, with the parts in the approximate positions shown in Figure 4, heated members are applied behind the side members 35 to press momentarily against the second pair of bottles and form the inter-pocket connections in the vertical lines 39 between the second and third pockets on each side of the container. When a wet glue wipe is used for these connections the press-

ing of the joint is accomplished by the crowding of the third pair of bottles.

When the third pair of bottles are in place, the final end portions 36 are bonded to opposite sides of the central member 23 and the three members are severed from their strips of stock at the cut scores 11 and 32. This operation leaves the container with its six bottles in the partially completed condition shown in Figure 5, each bottle being wrapped in an individual pocket.

In packaging certain kinds of materials it may be desirable to include more than one individual article in each pocket and this may easily be accomplished by wrapping each pocket or loop of the side members 35 about any convenient number of articles in a group before bonding each sealing portion 36 to the central member. It will also be apparent that the container may be formed with only two or four pockets, or with as many as eight, ten or twelve pockets, as desired.

After the members 23 and 35 have been severed from their supply strips 10 and 30, the latter are available to start wrapping another group of articles and the foregoing steps may be repeated to start the next package while the present one is being completed. The next package may be started even before the severance of members 23 and 35 and then at the proper time the assembly of Figure 5 may be moved ahead or to one side of the zone of operations just described so as not to interfere with the forming of the following package.

The container of Figure 5 is then ready for application of the combined bottom and end piece which is likewise formed from cut lengths of material from a single strip drawn from a source of supply or strip of stock 40, as shown in Figure 6. The strip 40 is transversely fold scored at intervals as indicated at 41 and cut scored on the lines 42, leaving portions 43 solidly attached to the supply strip for tension purposes to feed the stock. An individual bottom piece cut from this strip is designated generally by the numeral 45 and has ends 46 which may be folded up on the score lines 41. The main bottom portion of the member 45 is then introduced to the bottom of the assembly shown in Figure 5 where it is heat sealed or otherwise suitably attached to the bottom parts 24 of the central member 23, the member 45 in the present instance having a width equal to the combined width of the two bottom walls 24. The arrows in Figure 6 are intended merely to indicate the position in which the member 45 is applied to the bottom of the container and not to the precise manner of manipulation to bring these elements together. The member 45 may be introduced to the bottom of the container in various ways in an automatic wrapping machine depending upon the type of mechanism employed to move the bottles at this stage of the process. The member 45 may be introduced under the moving bottles to move along therewith in either sidewise movement or continued forward movement, or in any other suitable manner.

At about the same time that the bottom member 45 is bonded to the flaps 24, the ends 46 are folded up and bonded to the outside of the end pockets and the quadruple edge thickness of material comprising the ends of members 23 and 35. When this is accomplished, the container is completed and appears as shown in Figure 7. It may be used in this form for some purposes, but to serve as a bottle carrier a handle 50 is attached as shown in Figures 8, 9 and 10.

The handle may be formed of a folded strip of the same material used for the other members of the container, or it may be formed of cord or any other suitable material. The handle 50 in the present embodiment is formed from longitudinally folded plasticized paper which is heat sealed to the end portions 46 of the bottom member. It is preferred to limit the upper end of this bond at a point 51 a half inch or so below the top edge of the container so that the carrying stresses on the handle will not tend to tear the top edges of the end walls 46. When the container is to be used as a bottle carrier, the handle should be of such length that it will normally bow out to repose in approximately the position shown in full lines in Figure 8 so as not to extend above the tops of the bottles to become caught when the carriers or cases of the carriers are stacked. The handle should have sufficient length, however, to assume approximately the position shown in broken lines when the carrier is lifted, to allow space for a person's hand between the handle and the tops of the bottles.

If the container is made of paper, only the center member 23 and the handle need be plastic coated on both sides. For heat sealing purposes in bonding, the side members 35 need be coated only on the outside, and the combined bottom and end member 45 need not be coated at all. However, to obtain the maximum benefit of the water-proofing properties of the plastic material, all the strips of stock material may be plastic coated on both sides. The effect of such treatment is to give the paper a very smooth and rather hard surface which very materially increases both the dry and wet strengths of the paper so that a lighter grade of paper may be used. The water-proofing effects imparted by the plastic coating also enable articles to be refrigerated in paper containers without disintegration of the paper from condensation when it is removed from the refrigerator. The plastic coating is very desirable for bonding purposes because a strong joint may be formed almost instantly upon the application of heat by merely bringing the two surfaces together without applying any particular pressure. The joints do not have to be held in position to set slowly as with most other types of glue. For bonding purposes, either one or both of the contacting surfaces may be plastic coated, but the bond is just as strong if only one of the surfaces is coated.

If desired, the container may be still further strengthened and stiffened for use with heavy articles by applying a second bottom member having flaps to fold up on opposite sides of the container. Figure 11 shows an additional step in the process to form such a container, this step preferably, though not necessarily, following immediately after completion of the container to the condition shown in Figure 7, before the handle is applied, if the container is to have a handle. The second bottom member, 55, may be drawn out as a continuous horizontal strip from roll stock in substantially the same manner as the strip of stock 40. The two edges 56 represent severed cut scores transverse of the strip, and the opposite edges 57, only one of which is visible in Figure 11, constitute the side edges of the original strip before folding. The corners 58 are formed by longitudinal fold scores in the strip to provide two side flaps 59. The central

or bottom portion of the member 55 is bonded to the first bottom member 45 and the side flaps 59 are bonded to the three pockets 37 on each side of the container.

The additional bottom member 55 thereby provides a triple thickness of material under most of the base area of the container and serves also to reinforce and stiffen the pockets 37 to impart greater rigidity to the container as a whole. One or the other of the two bottom members 45, 55, should be coated to establish a bond between these members, or the member 55, like the other members, may be plastic coated on both sides for waterproofing purposes.

It will be apparent to persons skilled in the art that either one or both of the bottom members 45, 55 may be formed from strip stock drawn out transversely to the longitudinal direction of the first three strips 10, 30, 30, if desired, without departing from the spirit of the invention. In an automatic packaging machine certain steps of the method may be carried out while the articles are in motion, and other operations may be performed while the articles, or certain ones of them, are temporarily at rest. Conflict may be avoided between successive packages in different stages of completion by accelerating the motion of the articles at times and by changing the direction of movement, making it desirable in some cases to feed certain of the strips from different directions.

It will thus be apparent that the method of the invention is well adapted to the packaging of articles of various kinds as they are delivered or conveyed from a processing machine. Each package, or container, is formed complete, directly on the articles, from flat stock material which may be supplied from rolls whereby there are no prefabricated parts to be handled. The forming and bonding manipulations are of a type which may easily be performed by automatic apparatus coordinated with the article delivery mechanism. The containers made by this process are in the nature of open cartons, or carriers, permitting the articles to be removed freely without impairing the future utility of the carriers. The carriers are sufficiently durable for re-use and are considerably less expensive to make than the conventional cardboard or metal types.

Having now described my invention and in what manner the same may be used, what I claim as new and desire to protect by Letters Patent is:

1. The method of wrapping a plurality of articles in a single package comprising drawing a central strip and two outside strips of flexible sheet material into wrapping position from sources of supply, folding said central strip longitudinally to form a vertical partition with oppositely directed horizontal bottom wall portions, introducing said articles two at a time on said bottom wall portions on opposite sides of said partition and between said outer strips, looping said outer strips about said articles and uniting them on opposite sides of said partition after each pair of articles is introduced to form individual pockets progressively as additional articles are introduced, by drawing said strips from their sources of supply, then severing said strips from their sources of supply.

2. The method of packaging articles comprising forming a vertical central member with integral horizontal bottom wall portions, introducing said articles on said bottom wall portions and on both sides of said central member, looping outer strips of sheet material about said articles to form pockets, and attaching said outer strips to said central member between said pockets.

3. The method of packaging articles comprising folding a strip of sheet material to form a vertical member of double thickness having oppositely directed horizontal bottom wall portions, introducing said articles on said bottom wall portions and on both sides of said vertical member, looping strips of sheet material about said articles to form pockets on opposite sides of said vertical member, and attaching said looped strips to said vertical member between said pockets.

4. The method of making a relatively stiff article package from flexible sheet material comprising reversely folding a strip of said material to form a double thickness vertical wall member having oppositely directed horizontal bottom wall portions, looping strips of sheet material to form pockets on opposite sides of said wall member, and attaching said looped strips to said wall member between said pockets.

5. The method of making a relatively stiff article carrier from flexible sheet material comprising longitudinally folding one strip of said material to form a double thickness vertical partition having oppositely directed single thickness bottom wall portions, introducing said articles on said bottom wall portions on both sides of said vertical partition, looping strips of sheet material about said articles to form pockets, and attaching said looped strips to said vertical partition between said pockets.

6. The method of packaging articles comprising disposing three strips of sheet material in spaced relation to receive said articles therebetween, folding the central one of the three strips longitudinally to form a vertical wall member with oppositely directed horizontal bottom wall portions, introducing said articles two at a time on said bottom wall portions on opposite sides of said vertical wall member looping the outer strips about the articles of each pair as they are introduced, and uniting said outer strips to said vertical wall member after the introduction of each pair of articles to form individual pockets for the articles on opposite sides of said vertical wall member.

7. The method of packaging articles comprising disposing three strips of sheet material in spaced relation to receive said articles therebetween, introducing said articles two at a time on opposite sides of the central strip, looping the outer strips about the articles of each pair as they are introduced, uniting said outer strips to said central strip after the introduction of each pair of articles to form individual pockets for the articles on opposite sides of the central strip, and uniting a combined bottom and end member with said vertical members.

8. The method of packaging articles comprising forming a vertical, central member with outwardly directed horizontal base portions, assembling said articles on opposite sides of said central member, wrapping side members around said articles and attaching said side members to said central member on both sides of each article, and then attaching a combined bottom and end member to the bottom portions of said central member and to end portions of said side members.

9. The method of packaging a plurality of articles comprising forming a vertical, central member with oppositely directed horizontal bottom portions, introducing the articles two at a time on opposite sides of said central member and on

top of said bottom portions, wrapping side members about said articles as they are introduced to said central member and then attaching said side members to said central member after each such wrapping operation to define individual pockets for said articles, and attaching a combined bottom and end member to said previously mentioned members.

10. The method of packaging a plurality of articles comprising forming a vertical, central member having outwardly directed horizontal bottom portions, assembling the articles two at a time on opposite sides of said central member and resting on said bottom portions, wrapping side members around said articles and attaching said side members to said central member between the articles to form a pocket for each article, attaching adjacent pockets together at their points of contact, forming a bottom member with integral upstanding end portions, attaching said bottom member to the bottom portions of said central member, and attaching said end portions to the end pockets formed by said side members.

11. The method of packaging articles comprising folding a flat sheet of material to form vertical web and horizontal flange portions, positioning said articles on said flange portion and against said web portion, looping a flat strip of material about said articles and securing said strip to said web portion between said articles to form a predetermined number of pockets for said articles, folding a flat sheet of material to form a bottom member with upturned end portions, securing said bottom member to said flange portion, and securing said upturned end portions to the end pockets of said looped strip.

12. The method of making a relatively stiff article holder from flexible sheet material comprising folding a strip of said material longitudinally to form a vertical wall member with oppositely directed horizontal bottom wall portions, looping strips of said material to form pockets on opposite sides of said wall member attaching said side strips to said wall member between said pockets, folding a sheet of material to form a bottom member with integral upstanding end portions, and attaching said end portions to the end pockets of the holder.

13. The method of making a relatively stiff article container from flexible sheet material comprising folding a strip of said material to form a vertical wall member with oppositely directed horizontal bottom wall portions, looping side strips to form pockets on opposite sides of said partition, attaching said side strips to said partition between said pockets, folding a strip to form a bottom member with integral upstanding end walls, securing said bottom member to said bottom wall portions, securing said end walls to the end pockets of the container, and securing the ends of a handle to said end walls.

14. The method of making a relatively stiff article carrier from flexible sheet material comprising longitudinally folding a strip of said material to form a double thickness vertical partition having oppositely directed horizontal bottom wall portions, looping strips of said sheet material to form pockets on opposite sides of said partition, attaching said looped strips to said partition between said pockets, folding a strip of said material to form a bottom member with upstanding end walls, securing said end walls to the end pockets of the container, and attaching a handle to the carrier at the ends of said vertical partition.

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