Aug. 6, 1968 T. C. BAKER 3,395,623

LIQUID-TIGHT CONTAINER AND METHOD OF FORMING SAME

Filed Dec. 8, 1964 2 Sheets-Sheet 1

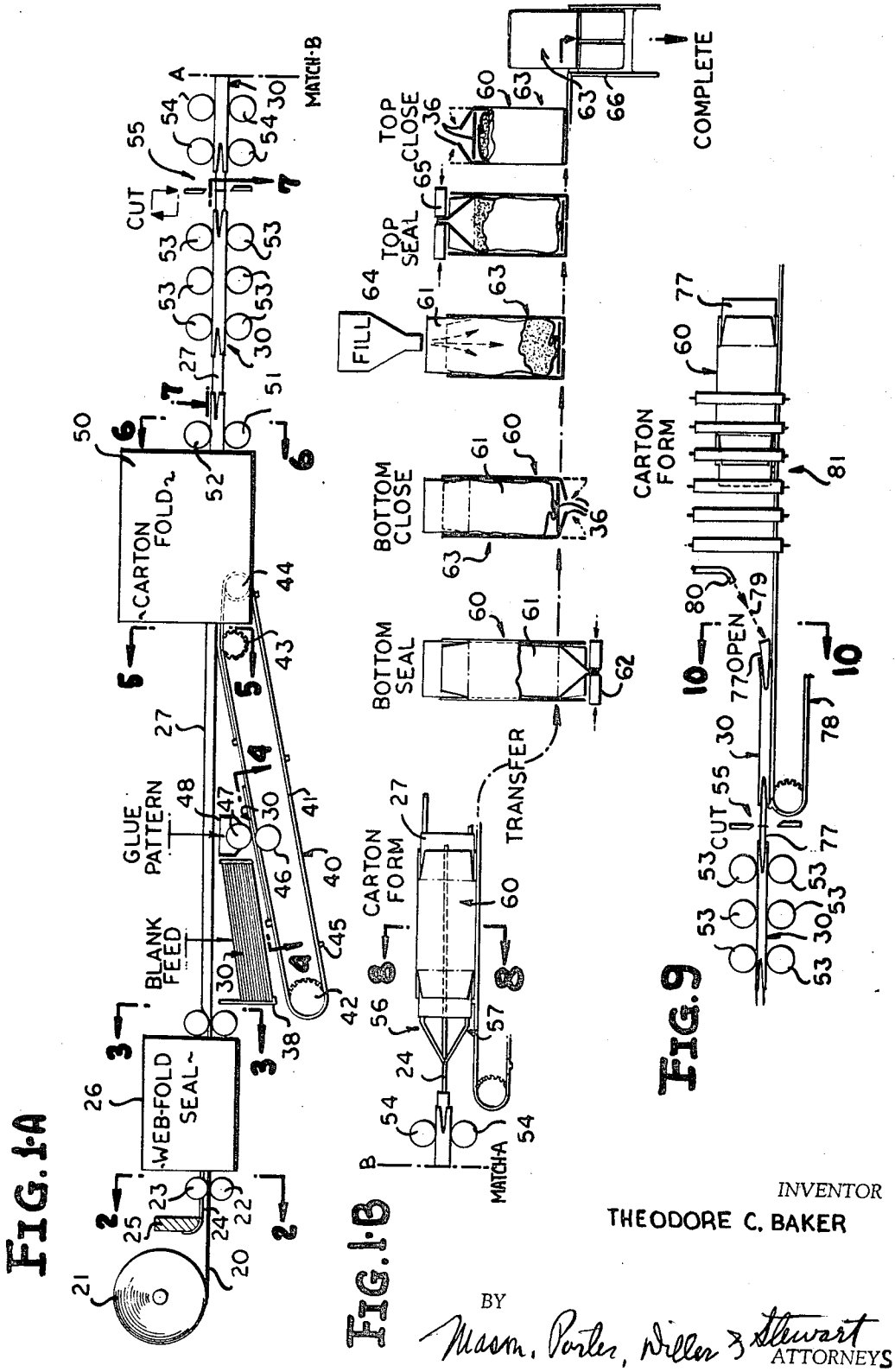


FIG. 1A

FIG. 1B

FIG. 9

INVENTOR
THEODORE C. BAKER

BY Mason, Porter, Diller & Stewart
ATTORNEYS

Aug. 6, 1968 T. C. BAKER 3,395,623

LIQUID-TIGHT CONTAINER AND METHOD OF FORMING SAME

Filed Dec. 8, 1964 2 Sheets-Sheet 2

FIG. 2

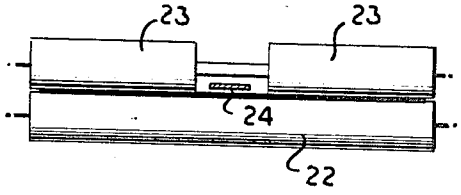


FIG. 3

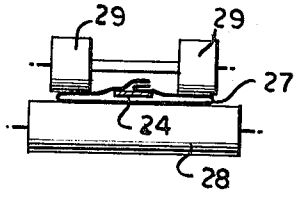


FIG. 4

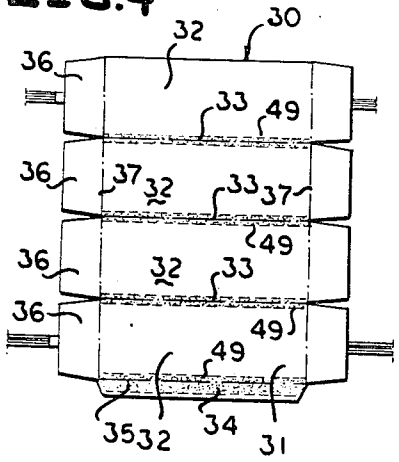


FIG. 5

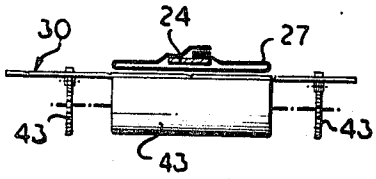


FIG. 7

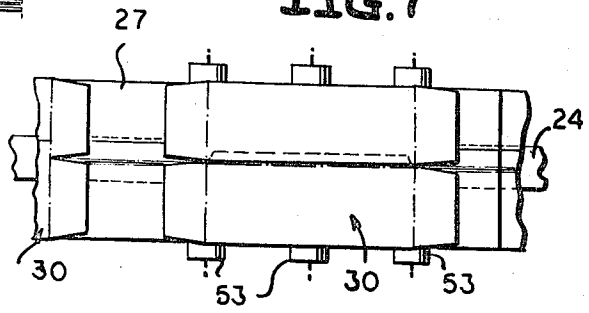


FIG. 6

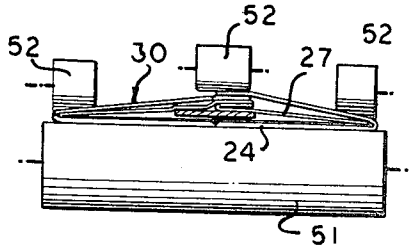


FIG. 8

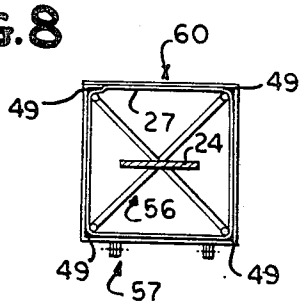
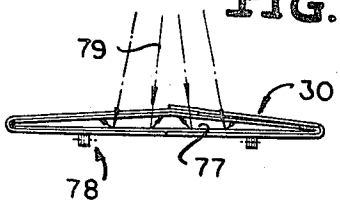


FIG. 10



INVENTOR
THEODORE C. BAKER

BY
Mason, Porter, Miller & Stewart
ATTORNEYS

United States Patent Office 3,395,623 Patented Aug. 6, 1968

3,395,623

LIQUID-TIGHT CONTAINER AND METHOD OF FORMING SAME

Theodore C. Baker, New Canaan, Conn., assignor to Continental Can Company, Inc., New York, N.Y., a corporation of New York

Filed Dec. 8, 1964, Ser. No. 416,797
12 Claims. (Cl. 93—36.01)

This invention relates in general to new and useful improvements in container construction and more particularly to a novel liquid tight container.

At the present time there are available liquid tight containers which are formed of a conventional type of paperboard box in which there is positioned a suitable liquid tight bag. These containers are formed by setting up a paperboard box in the usual manner to the extent that the bottom of the paperboard box is closed. Then the desired liquid tight bag is positioned within the box. The bag may be filled either prior to the positioning thereof within the box or after it has been placed in the box. It will be readily apparent that this type of operation requires both the setting up of the paperboard box and the opening and positioning of the liquid tight bag within the box.

In accordance with this invention, it is proposed to provide a novel liquid tight container which includes a paperboard box and a liquid tight bag which are formed as a unit and which are simultaneously opened in the setting up of the container.

Another object of this invention is to provide a novel liquid tight container blank which includes a length of tubing which is liquid proof and a paperboard box blank which is wrapped around the length of tubing. It will be readily apparent that such a container blank construction is one that it may be readily set up in a single series of operations as opposed to separate series of operations which are required when the box and the bag are separately formed.

Another object of this invention is to provide a novel method of forming blanks for liquid tight containers, the method including the steps of feeding tubing, placing box blanks on the tubing at spaced intervals, wrapping the box blanks around the tubing, and then cutting off the tubing intermediate the box blanks.

Still another object of this invention is to provide a novel method of forming blanks for liquid tight containers in accordance with the foregoing wherein as the box blanks are wrapped around the tubing, they are adhesively secured thereto whereby each container blank may be opened in a single operation with the length of tubing being automatically opened as the box blank is opened.

A further object of this invention is to provide a novel method of forming a liquid tight container blank from individual sheet components, the method including the step of feeding a strip of liquid proof material, progressively folding the liquid proof material and sealing the remote edges thereof to define flattened tubing, supplying box blanks, applying the box blanks to the tubing at spaced intervals, folding the box blanks around the tubing and both adhering together the remote edges of the box blank and adhesively securing the box blank to the tubing, and then severing the tubing intermediate the box blanks.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings.

In the drawings:

FIGURES 1A and 1B are schematic side elevational views showing a method of forming a liquid tight carton in accordance with this invention, setting up the carton, filling the carton and closing the carton.

FIGURE 2 is a transverse vertical sectional view taken along the line **2—2** of FIGURE 1A and shows the manner in which the web of material is supported and fed and also shows the relationship of the web to a support for an opening shoe.

FIGURE 3 is an enlarged vertical sectional view taken along the line **3—3** of FIGURE 1A and shows the web after it has been folded and adhesively bonded along the edges thereof to define flattened tubing.

FIGURE 4 is a fragmentary plan view taken along the line **4—4** of FIGURE 1A and shows the specific details of a box blank which is being fed for association with the flattened tubing.

FIGURE 5 is an enlarged transverse vertical sectional view taken along the line **5—5** of FIGURE 1A and shows the initial relationship of the box blank with respect to the flattened tubing.

FIGURE 6 is an enlarged fragmentary transverse vertical sectional view taken along the line **6—6** of FIGURE 1A and shows the box blank wrapped around and bonded to the flattened tubing.

FIGURE 7 is an enlarged fragmentary horizontal sectional view taken along the line **7—7** of FIGURE 1A and shows the specific relationship of the box blanks with respect to the flattened tubing.

FIGURE 8 is an enlarged fragmentary transverse vertical sectional view taken along the line **8—8** of FIGURE 1B and shows the manner in which the opening shoe opens simultaneously the flattened tubing and the box blank.

FIGURE 9 is a fragmentary schematic side elevational view showing the manner in which the carton blanks may be formed and opened when the flattened tubing is initially formed as tubing and supplied as such.

FIGURE 10 is an enlarged fragmentary transverse vertical sectional view taken along the line **10—10** of FIGURE 9 and shows schematically how the tubing and the box blank are initially opened by means of air pressure.

In accordance with this invention, it is proposed to form container blanks for liquid tight containers by feeding flattened tubing and wrapping therearound and bonding thereto at spaced intervals box blanks. The tubing may either be supplied as flattened tubing, or may be formed from a strip of suitable liquid proof material. While the container blank forming operations are somewhat similar in the methods of forming the carton blanks from the two different types of tubing, when the tubing is supplied as flattened tubing, no support is available for an opening shoe and therefore, the two methods of forming cartons differ in the manner in which the carton blank may be opened.

The method of forming liquid tight cartons from liquid proof material supplied in web form will be first described. Referring now to the drawings, it will be seen in FIGURE 1A that the web of liquid proof material, which is referred to by the numeral **20**, is supplied in the form of a reel **21**. The web **20** is fed from the reel **21** by suitable feed rollers **22** and **23** which are disposed below and above the web **20**. It is to be noted that the upper feed roll **23** is split so as to provide clearance for a horizontal support **24** which is carried by a transverse support **25**. The purpose of the support **24** will be set forth in detail hereinafter.

The web **20** passes through a web folding and sealing mechanism which functions to fold inwardly the remote edges of the web **20** into face-to-face engagement and effect the sealing thereof, after which the sealed portions of the web are reversely folded so that the web has the appearance shown in FIGURE 3. It is to be understood that the specific folding and sealing means of the web folding and sealing mechanism, which is referred to by

the numeral 26, are not specific parts of this invention, and therefore, the details thereof have not been shown here.

After the web 20 has been folded and the edges thereof sealed together, the liquid proof material is now in the form of flattened tubing which is identified by the numeral 27. The tubing 27 surrounds the horizontal support 24 and is fed from the web folding and sealing mechanism 26 by means of a lower feed roll 28 and connected spaced apart upper feed rolls 29.

In accordance with this invention, box blanks, which are generally referred to by the numeral 30, are applied to the flattened tubing 27 at regularly spaced intervals. As is best illustrated in FIGURE 4, each box or carton blank 30 has a body portion 31 which is divided into a plurality of wall panels 32 by longitudinal fold lines 33. In addition, the body portion 31 includes a flap 34 which is connected to an outer one of the body panels 32 along a fold line 35. At each end of each of the body panels 32 there is a closure flap 36, the closure flaps 36 being connected to the body panels 32 along transverse fold lines 37.

The box blanks 30 are fed from a hopper 38 in any desired manner and for illustrative purposes, it is to be noted that the box blanks 30 are delivered to an endless conveyor which is generally referred to by the numeral 40. The endless conveyor 40 includes a pair of spaced apart chains 41 which pass around suitable sprockets 42, 43 and 44 which may be driven in any desired manner. The conveyor chains 41 are provided with suitable lugs 45 for the purpose of advancing the box blanks 30.

In accordance with this invention, glue is applied to each of the box blanks 30 in a linear pattern. This is accomplished by means of a back-up roll 46 and a glue pattern roll 47 which is suitably carried by a glue box 48. As is shown in FIGURE 4, the glue or adhesive is applied to the body portion 31 of the box blank 30 in the form of stripes 49 along each of the fold lines 33. In addition, the glue or adhesive is applied to the flap 34.

The box blanks 30 are fed to the flattened tubing 27 from beneath the same. However, it is to be understood that it is also within the concept of this invention to apply the box blanks from above the flattened tubing 27.

After the box blanks 30 are brought into contact with the flattened tubing 27, the tubing 27 and the carton blanks 30 pass into a folding mechanism which is generally referred to by the numeral 50. The folding mechanism 50 automatically folds over the outermost wall panels 32 along their respective fold lines 33. This results in the flap 34 overlying the remote one of the wall panels 32 and being adhesively bonded thereto. Also, when the carton blank 30 is folded around the flattened tubing 27, the adhesive carried by the box blank 30 serves to adhesively secure the body portion 31 thereof to the flattened tubing 27. This is clearly shown in FIGURE 6.

As the tubing 27 and the carton blanks 30 pass out of the carton folding mechanism 50, they are advanced by means of suitable feed rolls which include a lower feed roll 51 and upper feed rolls 52. It is to be noted that the relationship of the upper feed rolls 52 is exaggerated in view of the necessity of showing the various thicknesses of the tubing 27 and the box blank 30. It is to be noted also that the support 24 is now encircled by the box blanks 30.

The tubing 27 with the box blanks wrapped thereabout and adhered thereto are advanced by a series of feed rolls 53. At this time, it is pointed out that similar feed rolls may be provided for advancing the tubing 27 between the web folding and sealing mechanism 26 and the carton folding mechanism 50. However, such feed rolls have not been illustrated because of lack of space for illustrative purposes.

A further set of feed rolls 54 are spaced longitudinally from the feed rolls 53. Intermediate the feed rolls 53 and 54 there is a flying shear type of cutter which is

generally referred to by the numeral 55. The operation of the flying shear cutter 55 is timed so as to sever the tubing 27 intermediate the carton blanks 30. After the tubing 27 has been severed, the short length of tubing and each individual carton blank 30 are fed by the feed rolls 54. The lengths of tubing and the associated carton blanks are fed along the support 24 to the opening shoe which is generally referred to by the numeral 56. In order to assure the movement of the lengths of tubing and the carton blanks over the opening shoe 56, there is associated with the opening shoe 56 a feed conveyor 57. It is to be noted that the opening shoe 56 is supported by the support 24 and serves to fully open both the lengths of tubing and the carton blanks 30. This is clearly shown in FIGURE 8. In view of the fact that the tubing 27 is adhesively secured to the carton, which is identified by the numeral 60, by the stripes of adhesive 49, it will be seen that the tubing 27 within the body of the carton 60 maintains substantially the same cross section as the carton body.

After the carton and the associated length of the liner has been opened, the opened carton is then transferred to a suitable conveyor mechanism which has not been illustrated, but which could feasibly be in the form of a turret. During the transfer, the carton 60 is rotated from a horizontal position to an upright position. The projecting lower end of the length of tubing is then closed by means of a suitable sealer 62 so that the length of tubing now becomes a bag 61. The lower portion of the bag 61 is then folded up into the bottom part of the carton 60, after which the bottom of the carton 60 is closed by upwardly and inwardly folding the flaps 36. The carton 60 now combines with the bag 61 to define a container which is of a liquid type construction and which is generally referred to by the number 63. The container 63 is now ready for filling and the desired product, including liquids, is placed within the container 63 by means of a suitable filler 64. After the container 63 has been filled, the upper end of the bag 61 is sealed by means of a suitable sealer 65. Then the carton 60 of the container 63 has the upper end thereof closed by the downwardly and inwardly folding of the upper flaps 36. The resultant package is then delivered to a suitable discharge conveyor 66.

In FIGURES 9 and 10 there is illustrated another method of forming the container 63. In lieu of providing the liquid proof material in the form of the web 20, inasmuch as the liquid proof material may preferably be in the form of a suitable plastic, such as polyethylene, polyvinyl chloride, or laminates thereof, etc., and since these products are frequently formed as tubes, the liquid proof material may be supplied in the form of a flattened tube in lieu of the tube being made in the manner illustrated in FIGURE 1A. This tube is seamless and is referred to by the numeral 77. The tubing 77 is fed in the same general manner as that illustrated in FIGURE 1A and box or carton blanks 30 are applied thereto in the identical manner shown in FIGURE 1A. The box or carton blanks 30 are then folded around and secured to the tubing 77 utilizing the same type of carton folding mechanism 50. The tubing 77 with the carton blanks applied thereto then pass through the feed rolls 53 and the tubing is cut intermediate the adjacent carton blanks 30 by means of the flying shear 55.

The short lengths of tubing 77 with the carton blanks 30 applied thereto are then delivered to a suitable positive drive conveyor which is generally referred to by the numeral 78. The conveyor 78 first passes the forward end of the tubing 77 towards the path of air 79 from an air jet 80 so that the tubing 77 and the carton blank 30 are initially partially opened, then the carton blank and the length of tubing are passed through a plurality of carton forming rolls which are generally referred to by the numeral 81 and pressure is applied against the remote corners of the carton 30 so as to effect the opening thereof. The resultant carton is the same as the carton

60 and is so identified. The opened carton 60 is then transferred in the manner shown in FIGURE 1B and described above and the container is formed therefrom and filled.

It is believed that the advantages of the invention are obvious. It will be readily apparent that the containers may be formed on a continuous basis and that the tubing or bags of the containers may automatically be opened during the opening of the cartons. It will also be readily apparent that it is feasible to form the tubing with the cartons attached thereto and then to wind the units into a reel, and that the tubing cutting and carton opening operations may be carried on in a consumer's plant.

Although only two specific embodiments of the invention have been illustrated and described herein, it is to be understood that minor variations may be made in the container construction and the method of forming the same without departing from the spirit and scope of the invention, as defined by the appended claims.

I claim:

1. A method of forming liquid tight containers comprising the steps of providing a length of flattened liquid proof tubing, applying flat box blanks to said tubing at regularly spaced intervals, folding the flat box blanks around said tubing and connecting together remote edges thereof and connecting said box blanks to said tubing, severing the tubing intermediate the box blanks, opening each box blank and the associated length of tubing, sealing one end of the tubing length, folding the sealed end of the tubing into the adjacent end of the box body, and closing the adjacent end of the box body with the flaps at the adjacent end.

2. A method of forming container members comprising the step of providing a length of flattened liquid proof tubing, applying flat box blanks to said tubing at regularly spaced intervals, folding the flat box blanks around said tubing and connecting together remote edges thereof and connecting said box blanks to said tubing, severing the tubing intermediate the box blanks and mechanically opening the box blank and the tubing.

3. The method of claim 2 wherein all of said steps being part of a continuous operation.

4. The method of claim 2 wherein all of said steps being part of a continuous straight line operation.

5. A method of forming container members comprising the step of providing a length of flattened liquid proof tubing, applying flat box blanks to said tubing at regularly spaced intervals, folding the flat box blanks around said tubing and connecting together remote edges thereof and connecting said box blanks to said tubing, severing the tubing intermediate the box blanks and mechanically opening the box blanks automatically by applying a force to said blanks.

6. The method of claim 5 in which the force is applied to the blank from within the tubing.

7. A method of forming container members comprising the step of providing a length of flattened liquid proof tubing circumferentially of an elongated support, applying flat box blanks to said tubing at regularly spaced intervals, folding the flat box blanks around said tubing and connecting together remote edges thereof, connecting said box blanks to said tubing, severing the tubing intermediate the box blanks, mechanically opening the box blanks and the tubing by applying a force to said blanks which mechanically opens said blank and tubing simultaneously by the force of a shoe from within said tubing.

8. A method of forming container members comprising the step of providing a length of flattened liquid proof tubing circumferentially of an elongated support, applying flat box blanks to said tubing at regularly spaced intervals, folding the flat box blanks around said tubing and connecting together remote edges thereof, connecting said box blanks to said tubing, serving the tubing intermediate the box blanks, mechanically opening the box blanks and the tubing by applying a force to said blank which mechanically opens said blank and tubing simultaneously by the force of a shoe affixed to said elongated support, said force acting upon said blank from within said tubing.

9. A method of forming container members comprising the step of providing a length of flattened liquid proof tubing, applying flat box blanks to said tubing at regularly spaced intervals, folding the flat box blanks around said tubing and connecting together remote edges thereof, connecting said box blanks to said tubing, severing the tubing intermediate the box blanks and mechanically opening the box blanks and the tubing by applying a force to said blank in the form of a combined force of a jet of air applied internally of said block cooperating with an external force.

10. A method of forming container members comprising the step of providing a length of flattened liquid proof tubing, applying flat box blanks to said tubing at regularly spaced intervals, folding the flat box blanks around said tubing and connecting together remote edges thereof, connecting said box blanks to said tubing, severing the tubing intermediate the box blanks, mechanically initiating the opening of the box blanks and tubing by a jet of air applied internally of said blank, and further opening said box blank by the application of an external force to said blank.

11. The method of claim 9 wherein said external force being applied along the opposite separated longitudinal edges of said blank.

12. The method of claim 2 together with the added steps of rotating said open box and tubing to an upstanding position, sealing one end of said tubing with said box in an upstanding position, folding the sealed tubing end inwardly of said box, closing the box and flaps adjacent said sealed tube end, filling the tubing from the other end, sealing said other end of said tubing, folding said other end of said tubing inwardly of said box and closing the other box end, all of said steps being part of a continuous operation.

References Cited

UNITED STATES PATENTS

2,758,520	8/1956	Hepworth	93—36.01
2,200,818	5/1940	Bergstein	229—14
2,493,337	1/1950	Buttery	229—14
2,879,933	3/1959	Bergstein et al.	229—14
2,799,211	7/1957	Zerlin et al.	93—36.01
3,104,596	9/1963	Bergstein et al.	93—36.01
3,130,649	4/1964	Stripin	93—36.01

FOREIGN PATENTS

833,296	4/1960	Great Britain.

BERNARD STICKNEY, *Primary Examiner.*