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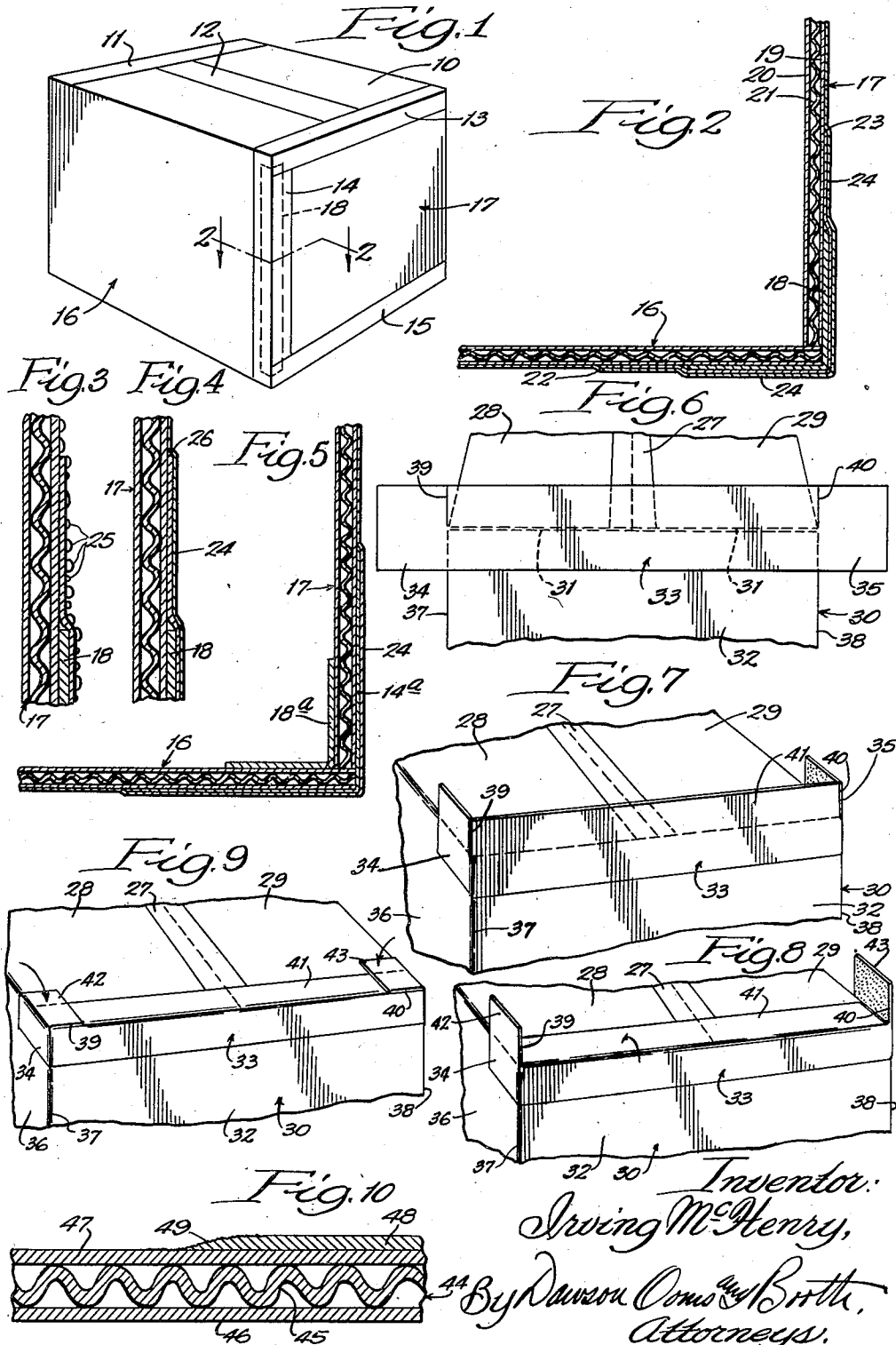
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2,391,791

METHOD OF PREPARING WATER-RESISTANT CONTAINERS

Filed March 20, 1942

2 Sheets-Sheet 1



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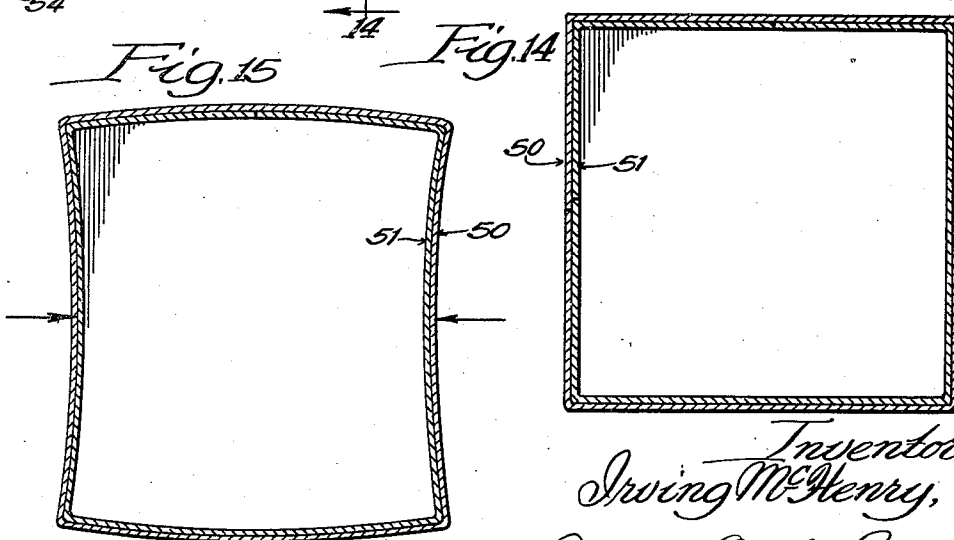
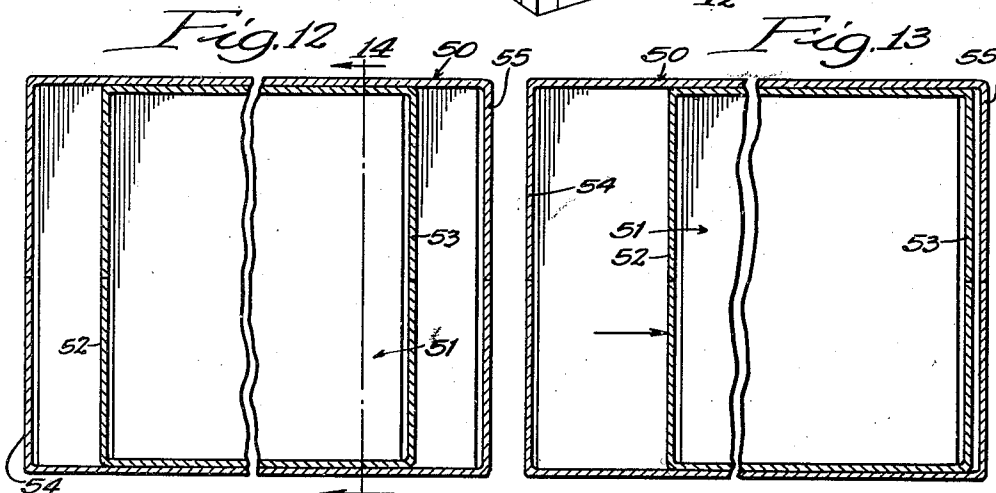
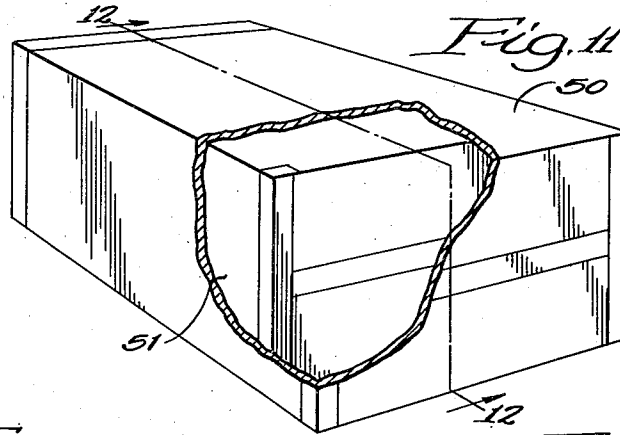
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METHOD OF PREPARING WATER-RESISTANT CONTAINERS

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2 Sheets-Sheet 2



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METHOD OF PREPARING WATER-RESISTANT CONTAINERS

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6 Claims. (Cl. 93—2)

This invention relates to a water-resistant container and to a method of forming the same, and particularly to the forming of a smooth, thin, continuous water-resistant coating on the outer surface of the container, and the providing of closure means for the container which permits easy application of such a coating.

An object of the invention is to provide a container such as a cardboard box or carton which is substantially resistant to moisture. Another object is to provide for the closing of the open joints of a box or carton in such a manner as to permit the application of a thin coating of a water-resistant material to the entire outer surface of the box or carton. Still another object is to apply a sheet of material over the open joints of the container with the sheet material disposed in overlapping relation with respect to the walls of the container adjacent the joints. Yet another object is to provide a junction between the overlapping sheet material and the walls of the container which is extremely thin and is adapted to receive a thin coating of a water-resistant material which will extend over the junction.

Another object is to seal a container such as a box or carton with gummed tape, the gummed tape being disposed over the open joints of the box or carton and extending over the walls of the container adjacent the open joints in overlapping relation with the walls. Another object is to provide strips of gummed tape sealing the open joints of the container, with the entire periphery of each of the strips being in sealing relation with the walls of the container.

A further object is to provide a double container structure in which one container is disposed within the other and wherein each of the containers is substantially water-resistant. Such a structure may be subjected to pressure and to distortion without appreciably affecting the water-resistant qualities of the same. In this structure the inner container may be movable in a single direction within the outer container.

Other features and advantages of the invention will appear from the following specification and drawings in which:

Fig. 1 is a perspective view of a cardboard box showing the strips of gummed tape applied thereto; Fig. 2 is a fragmentary transverse sectional view taken along the line 2—2 of Fig. 1; Fig. 3 is a fragmentary detail sectional view of a portion of the container wall shown in Fig. 2 with the water-resistant particles applied to the outer surface thereof; Fig. 4 is a fragmentary detail

sectional view corresponding to Fig. 3 and showing the water-resistant coating on the outer surface of the wall of the box; Fig. 5 is a fragmentary sectional view corresponding to the view of Fig. 2 and showing a modification of the invention; Fig. 6 is a fragmentary perspective view showing the application of a strip of gummed tape in accordance with a modification of the invention; Fig. 7 is a fragmentary perspective view of the same modification showing one step in the application of the strip of gummed tape; Fig. 8 is a fragmentary perspective view of the same modification showing a second step in the application of the gummed tape; Fig. 9 is a fragmentary perspective view of the modification shown in Figs. 6, 7 and 8 illustrating the box after the application of the tape; Fig. 10 is a fragmentary detail sectional view of a wall of the box showing a strip of tape applied thereto with the edge of the tape being tapered; Fig. 11 is a perspective view partially broken away showing a modification of the invention wherein one box is disposed within another; Fig. 12 is a longitudinal sectional view partly broken away taken along the line 12—12 of Fig. 11; Fig. 13 is a longitudinal sectional view similar to that of Fig. 12 showing the inner box in shifted position; Fig. 14 is a transverse sectional view taken along the line 14—14 of Fig. 12; and Fig. 15 is a transverse sectional view corresponding to the view of Fig. 14 showing the double container when the side walls are subjected to pressure.

The invention contemplates the forming of a container from cardboard, paperboard or the like which will be substantially resistant, not only to atmospheric humidity, but also to the direct application of water to the container. In providing such a container the entire outer surface of the container may be treated with a substantially water-resistant material to waterproof the container.

In the treatment of a container of cardboard or the like with a water-resistant material, the forming of a continuous coating over the entire outer surface of the container presents certain problems, particularly with respect to the closing of the joints of the container. In accordance with the present invention the closure of such joints is carried out by the application of a sheet material such as gummed tape which extends over the open joint and is sealed to the walls of the container adjacent the edges of the same in overlapping relation with the wall. The junction which is formed between the gummed tape and the wall of the container is preferably

as thin as possible in order to permit the application of a coating of the water-resistant material to this junction.

In the embodiment of the invention described herein, and referring particularly to Figs. 1 to 4, a cardboard box 10 of rectangular shape is provided with strips 11, 12, 13, 14 and 15 of gummed tape which seal the open joints of the container. The side wall 16 and end wall 17 of the container are joined by a strip of reinforcing tape 18 which is of relatively heavy material and provides the necessary strength for securing these walls to each other. In the usual construction of cardboard boxes or cartons a single joint of this character serves to provide for the assembly of the box.

As seen particularly in Fig. 2, the end wall 17 of the box may consist of an inner wall 19, an outer wall 20, and a corrugated section 21 therebetween. In the usual box construction as illustrated, all of the walls of the box may be of this same construction.

In assembling the box the strip 18 of heavy reinforcing tape, which may be of sisal tape or other suitable material, is applied across the open joint formed by the walls 16 and 17 and is secured to the walls adjacent the edges of the joint. Over the strip 18 of sisal tape is placed the strip of gummed tape 14, the strip 14 being larger than the strip 18 so that the edges of the gummed tape extend beyond the edges of the sisal tape and the gummed tape about its periphery is secured directly to the walls of the box rather than to the sisal tape. As seen particularly in Fig. 2, this construction provides junctions 22 and 23 at the edge of the gummed tape which are extremely thin and which are adapted to receive a thin continuous coating 24 of a water-resistant material such as wax or the like.

When the sisal tape 18 and gummed tape 14 have been placed in position on the corners of the box the water-resistant material, which may consist of paraffin wax or the like, may be applied to the outer surface of the box in the form of extremely small particles 25. Preferably these particles are formed on the outer surface of the box by spraying the wax particles thereon. The wax may be in liquid form as it passes through the spray and the particles which are sprayed will solidify by the time that they engage the surface of the box and will thus form small solid particles on the surface of the box. When the particles are brought into engagement with the surface of the box they should be sufficiently tacky to adhere to this surface. As seen in Fig. 3 the particles adhering to the surface of the box normally will be flat on the side which engages the surface of the box, but in other respects will be globular in character.

The box carrying the particles of wax (Fig. 3) may be subjected to heat to melt the particles and cause them to flow together forming a substantially continuous coating 24 extending over the outer surface of the box and over the surface of the strips of gummed tape applied thereto (Fig. 4). By reason of the use of the thin strips of gummed tape on the surface of the box the junction formed by the overlapping of the gummed tape on the walls of the box will be so thin that the layer 24 will extend in continuous form over this junction, as seen at 26.

Preferably the wax which is sprayed on the surface of the box contains a small quantity of a material which tends to prevent crystallization of the wax or other water-resistant material, for

example, approximately 5% by weight of diethylene glycol abietate resin.

The wax is preferably sprayed with an air spray in which the air used possesses a relative humidity of between 50 and 100%. Air having a relative humidity of 50% has been found to be particularly suitable for this purpose.

As seen particularly in Fig. 5, the walls 16 and 17 may be joined by applying the heavy strip 18 of reinforcing tape to the inner surface of the box. In this manner the strip 18 is applied to the inner surface of the walls 16 and 17 and is adhesively secured to these walls to join the walls together. A strip of gummed tape 14 may then be applied to the outer surface of the walls 16 and 17 and will extend across the open joint formed by these walls. The strip of tape 14 is adhesively secured to the walls 16 and 17 adjacent the open joint and is adapted to receive the coating 24 of wax or other water-resistant material.

In the embodiment of the invention shown in Figs. 6, 7, 8 and 9, a strip of gummed tape 27 is applied to the closure flaps 28 and 29 of a box 30. The closure flaps are placed in adjacent relation so that the edges are adjoining and form an open joint across which the tape 27 is placed.

The open joint formed along the line 31 between the closure flaps 28 and 29 and the side wall 32 of the container is sealed by the use of a strip 33 of gummed tape. The strip 33 of gummed tape is applied to the side wall 32 of the box with one longitudinal portion of the tape being adhesively secured to the side wall 32 and another longitudinal portion extending upwardly above the top of the box. The strip of gummed tape 33 is longer than the side wall 32 of the box and so provides end portions 34 and 35 which may be folded rearwardly upon the end walls 36 of the container. The longitudinal portion of the strip 33 which extends upwardly above the box is then cut transversely along a pair of lines which are in alignment with the corners 37 and 38 of the box to form the slits 39 and 40. The longitudinal portion 41 extending upwardly above the top of the box is then folded over the open joint 31 and adhesively secured to the upper surface of the closure flaps 28 and 29, as seen in Fig. 8. The end portions 42 and 43 adjacent the upper longitudinal portion 41 are then folded downwardly and adhesively secured to the upper surface of the portion 41 and the closure flaps 28 and 29 (Fig. 9).

With the arrangement of the strip of gummed tape as shown in Figs. 6, 7, 8 and 9, all of the peripheral edges of the tape are adhesively secured to the surface of the box or to another surface of the gummed tape. The junction formed by the overlapping edges of the tape is in each case extremely thin and is adapted to receive a continuous coating of a water-resistant material which may extend over the junction.

Referring particularly to Fig. 10, the wall 44 of the box, consisting of the corrugated section 45 and the inner and outer walls 46 and 47 may receive a strip 48 of gummed tape. In order to minimize the difficulty of covering the overlapping junction of the gummed tape with the wall 44 the edge of the strip of gummed tape may be subjected to a sanding operation which produces a taper 49 at the edge of the tape and simplifies the forming of a continuous water-resistant coating over the wall of the box, the tape, and the junction between the two. If desired, the edge of the strip of gummed tape may be subjected

to a buffing operation with sand paper or the like, and for the purpose of simplicity, any frictional treatment of the edge of the strip of gummed tape will be referred to herein as a buffing operation.

In the modification of the invention shown in Figs. 11 to 15 the container includes a pair of boxes 50 and 51 with the box 51 disposed within the box 50. Preferably, as shown, the internal cross-sectional dimensions of the box 50 are substantially the same as the external cross-sectional dimensions of the box 51, thus producing (Fig. 14) a tight fit between the surfaces of the two boxes. At the same time the box 50 is preferably longer than the box 51 so that the end walls 52 and 53 of the box 51 are spaced from the end walls 54 and 55 respectively of the box 50. This construction provides for movement of the box 51 within the box 50 in a longitudinal direction and when one of the ends of the outer box 50 is subjected to pressure the inner box 51 may move freely to the position shown in Fig. 13 wherein the end wall 53 is brought into adjacent relation with the end wall 55. If the other end of the box 50 were subjected to pressure the box 51 could shift in the opposite direction so that the end wall 52 would be in adjacent relation to the end wall 54.

If the outer box is subjected to pressure on its sides or at any of the corners of the same, the box 51, although it cannot move laterally within the box 50, will nevertheless be permitted to expand longitudinally under this lateral pressure and any danger of breaking the box 51 is substantially avoided.

Both the box 50 and the box 51 may be treated with a water-resistant material which forms a coating about the entire outer surface of each of the boxes. The outer box 50 will then prevent access of water to the material within the inner box unless the box 50 or the coating thereon is broken or destroyed. In this event the box 51 will provide the protection for the material contained within it and the arrangement of the box 50 about the box 51, as shown, will tend to prevent any breaking of the box 51 or the water-resistant coating formed on the surface of the same.

The boxes 50 and 51 may be of conventional cardboard construction of the type shown and described in Figs. 1 to 10, inclusive. Similarly, in applying the water-resistant material to each of the boxes, the method heretofore described may be used.

In assembling the unit the box 51 is filled with the desired material and then closed. All of the open joints of the box are sealed with gummed tape in accordance with the steps described in connection with the embodiment of the invention shown in Figs. 1 to 10. The outer surface of the box 51 is then coated with a thin layer of a water-resistant material.

When the box 51 has been treated to provide water-resistance it may then be placed within the box 50 and the box 50 may be closed in the conventional manner and all the open joints of this box sealed with gummed tape in accordance with the method of this invention. A suitable water-resistant material such as wax may then be applied to the entire outer surface of the box 50 to effectively seal the same against moisture.

The double box unit is not only resistant to moisture but is also resistant to blows and is very difficult to injure or destroy. If the coat-

ing of the outer box or the box itself is torn, bent or broken, the inner box will still serve to provide moisture resistance. Moreover, the outer box has a cushioning effect which serves to protect the inner box and the coating thereon from damage.

Although the invention has been described in connection with particular constructions and embodiments of the same, it will be understood that many changes and modifications may be made without departing from the spirit and scope of the invention.

I claim:

1. A method of treating a container to render the same water-resistant, said container having an open joint formed by the walls thereof, with the edges of the walls disposed in adjacent relation, comprising adhesively securing a sheet of gummed tape over said joint, with the sheet extending across said joint and being adhesively secured to the surface of the walls adjacent said edges, the entire periphery of said sheet being secured to the walls in overlapping relation, applying to the outer surface of the container and the sheet of gummed tape thereon a plurality of small particles of a water-resistant material, said particles being slightly tacky whereby they adhere to said surface, and heating the particles to melt the same and cause them to flow together, forming a substantially continuous water-resistant coating.

2. A method of treating a container to render the same water-resistant, said container having an open joint formed by the walls thereof, with the edges of the walls disposed in adjacent relation, comprising applying a sheet of reinforcing tape to said joint, said sheet extending across said adjacent edges of the walls and being secured to the walls, adhesively securing a thin sheet of material over said reinforcing tape, said thin sheet being larger than the sheet of reinforcing tape and extending beyond all of the edges of the reinforcing tape, the thin sheet being secured to the walls of the container in overlapping relation therewith, applying to the outer surface of the container and the thin sheet a plurality of small particles of a water-resistant material, said particles being slightly tacky whereby they adhere to said surface, and heating the particles to melt the same and cause them to flow together forming a substantially continuous water-resistant coating over the said surface including the junction of said thin sheet with the walls of the container.

3. A method of treating a container to render the same water-resistant, said container having an open joint formed by the walls thereof, with the edges of the walls disposed in adjacent relation, comprising securing a sheet of reinforcing material across said joint on the inner side of said container, adhesively securing a thin sheet of material over said joint on the outer surface of the container, with the sheet extending across said joint and being adhesively secured to the surface of the walls adjacent said edges, the entire periphery of said sheet being secured to the walls in overlapping relation, applying to the other surface of the container and the thin sheet of material thereon a plurality of small particles of a water-resistant material, said particles being slightly tacky whereby they adhere to said surface, and heating the particles to melt the same and cause them to flow together to form a substantially continuous water-resistant coating.

4. A method as set forth in claim 1 wherein the edges of the gummed tape are buffed to reduce the thickness of the same along the junction of the sheet of tape with the walls of the container before the water-resistant material is applied to the container.

5. In a method of treating a container to render the same substantially water-resistant, said container having an open joint formed by the walls thereof, with the edges of the walls disposed in adjacent relation, the steps of adhesively securing a sheet of reinforcing tape to said joint, said sheet extending across said adjacent edges of the walls and being secured to the walls, adhesively securing a thin sheet of material over said sheet of reinforcing tape, said thin sheet being larger than the sheet of reinforcing tape and extending beyond all of the edges of the reinforcing tape, the edges of the thin sheet being secured to the walls of the container in overlapping relation therewith, buffing the edges of the thin sheet of material to reduce the thickness thereof at the junction of the same with the walls of the container, and applying a thin, substantially continuous coat-

ing of a water-resistant material to the outer surface of the container and the thin sheet of material including the junction of the latter with said walls.

5 6. In a method of treating a container to render the same substantially water-resistant, said container having an open joint formed by the walls thereof, with the edges of the walls disposed in adjacent relation, the steps of adhesively securing a sheet of heavy reinforcing tape to said joint, said sheet extending across said adjacent edges of the walls and being secured to the walls, adhesively securing a thin sheet of gummed tape over said sheet of reinforcing tape, said thin sheet being larger than the sheet of reinforcing tape and extending beyond each of the edges of the reinforcing tape, the edges of the thin sheet being secured to the walls of the container in overlapping relation therewith, and buffing the edges of the thin sheet of gummed tape to reduce the thickness thereof at the junction of the same with the walls of the container.

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