

Sept. 24, 1957

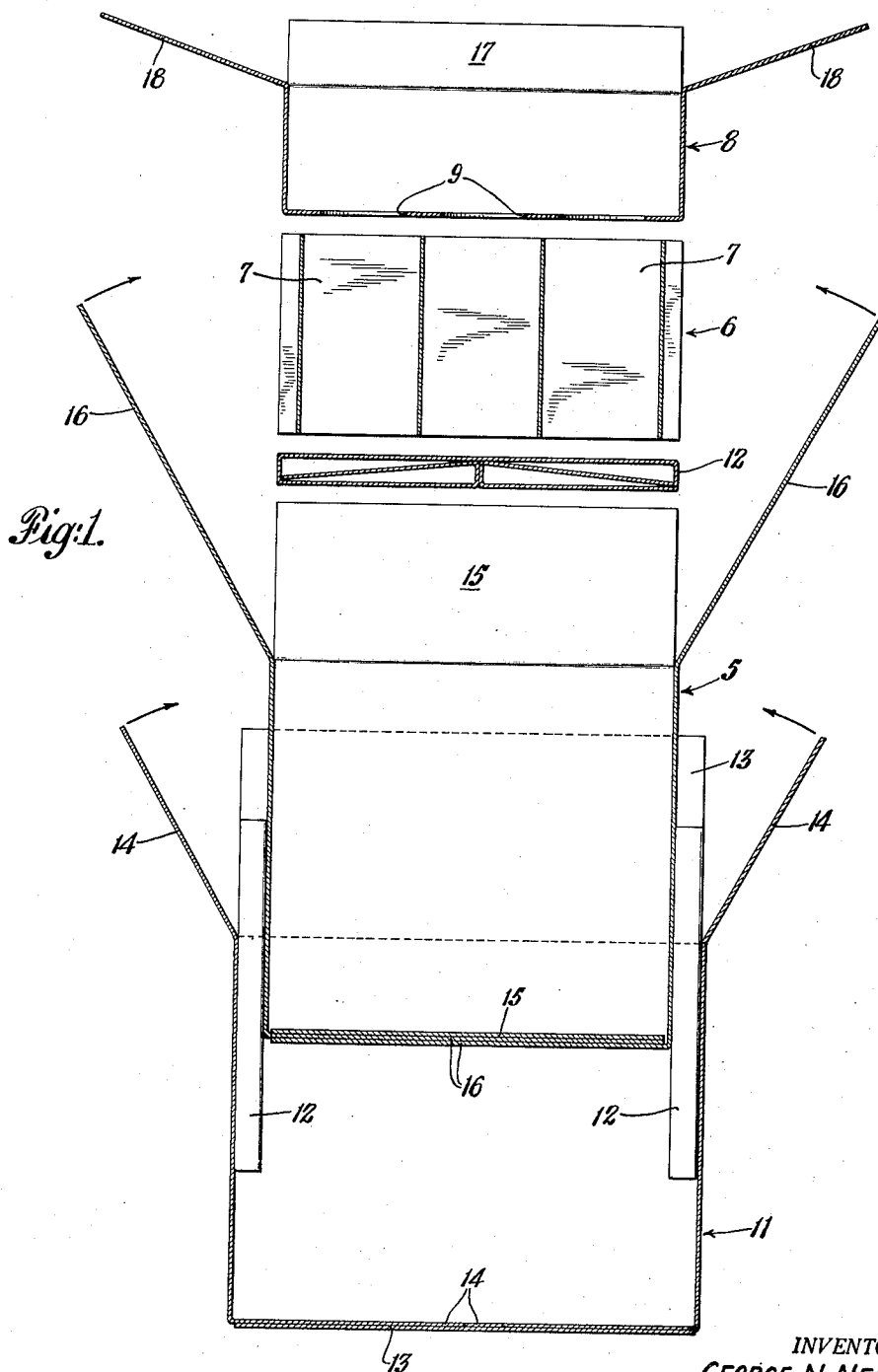
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2,807,402

PAPERBOARD SHIPPING CONTAINER

Filed Sept. 12, 1955

3 Sheets-Sheet 1



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Fig:2.

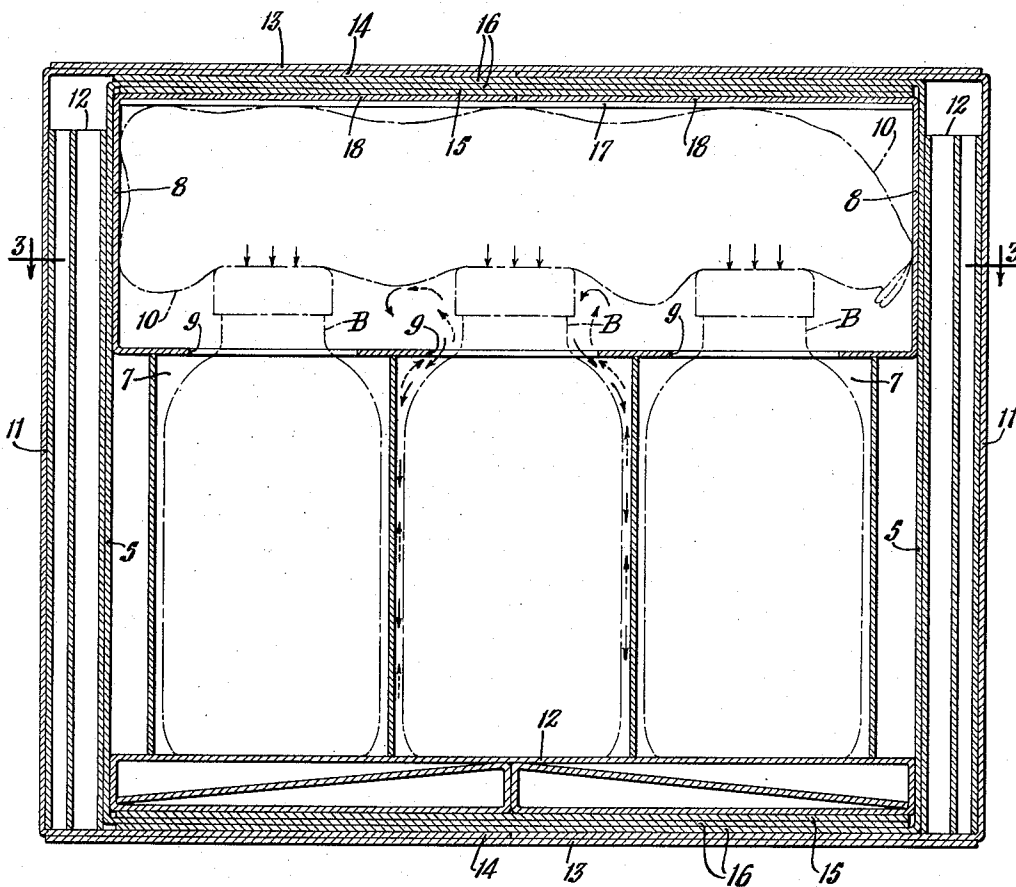
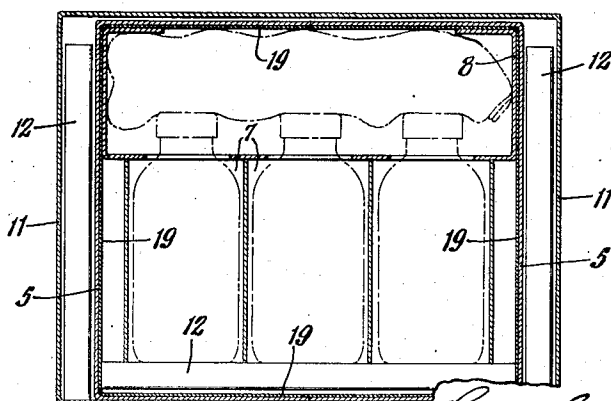


Fig:4.



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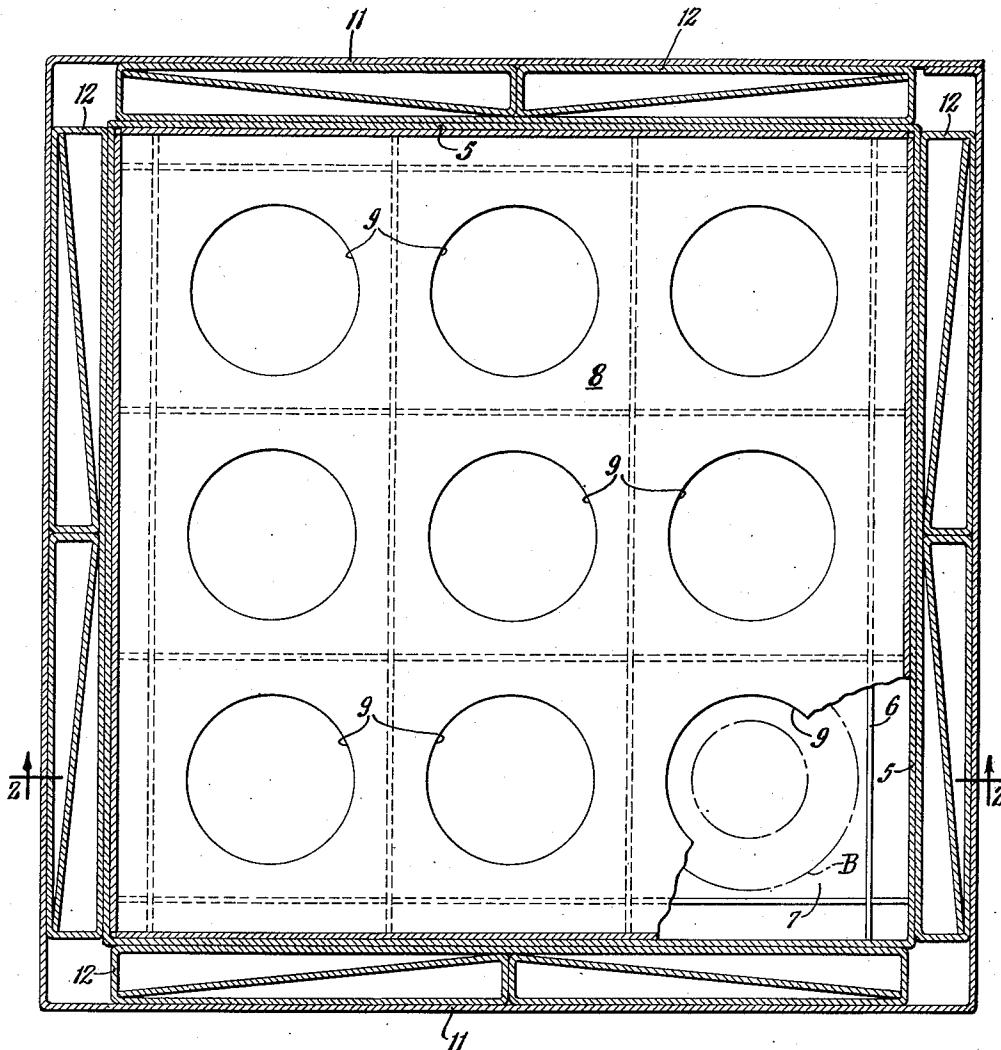
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Fig:3.



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PAPERBOARD SHIPPING CONTAINER

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3 Claims. (Cl. 62—80)

The invention relates to a shipping container for blood, plasma, serum and the like, for use primarily by the American Red Cross and other disaster, health and welfare agencies.

Summary

The container according to my invention comprises, in its general combination and arrangement, a box of corrugated paperboard, boxboard, etc., spacer means forming a plurality of cells in the lower part of the box to receive bottles and the like containing blood, plasma, serum, etc., with their upper ends projecting above the tops of the spacer means, and a tray fitting into the upper part of the box, this tray being supported by the spacer means and having openings in its bottom spaced to bring individual openings above the individual cells. Refrigerating means, such as a plastic bag filled with ice, is received within the tray and, by reason of the construction described, the upper ends of the bottles will project into the tray for direct contact with the refrigerating means. The openings in the bottom of the tray are substantially larger than the upper ends of the bottles with the result that the bottles are cooled by conduction through contact between their projecting upper ends and the refrigerating means, and also by convection of refrigerated air passing between the edges of the openings in the tray and the upper ends of the bottles and flowing over the sides of the bottles into the individual cells of the spacer means.

The box is received within an outer container, and hollow paperboard elements are disposed between the sides of the box and this outer container, and inside the bottom of the box, the box being lined with metal foil and the hollow paperboard element disposed inside the bottom of the box serving to prevent direct conduction between the bottoms of the bottles and the metal foil lining. The arrangement of the hollow paperboard elements in relation to the foil is this: The hollow paperboard elements in the spaces between the sides of the box and outer container are outside of the foil lining to provide maximum reflective insulation and buffer protection, and the hollow paperboard element fitting within the bottom of the box is inside of the foil lining to provide maximum conduction insulation and buffer protection.

Other objects and advantages of my invention will appear as the description proceeds.

Description

In the drawings wherein I have illustrated the best mode contemplated by me for carrying out my invention:

Fig. 1 is an exploded view of the container with vertical separation of its several components to illustrate its general make-up and manner of assembly.

Fig. 2 is a vertical cross-sectional view taken on the line 2—2 of Fig. 3, showing the container fully assembled and packed.

Fig. 3 is a horizontal cross-sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a diagrammatic view generally representative

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of a vertical cross-section taken at right angles to the section of Fig. 2. In this view the foil lining is shown in greatly exaggerated cross-section on the inside of the box and on the inside of the first-folded flaps thereof (but without any attempt being made to show the foil on the outer flaps). The purpose of this diagrammatic view is to reveal the general relationship between the hollow paperboard elements and the foil lining.

Referring to the drawings and more particularly to Fig. 1, my preferred construction comprises a box 5 of corrugated paperboard and the like, spacer means 6 forming a plurality of cells 7 in the lower part of the box to receive bottles with their upper ends projecting above the tops of the spacer means (Fig. 2), and a tray 8 fitting into the upper part of the box and supported by the spacer means. The tray has openings 9 in its bottom spaced to bring individual openings above the individual cells so that the upper ends of the bottles will project into the tray for direct contact with refrigerating means such as the ice bag 10 carried within the tray. The openings 9 in the bottom of the tray are substantially larger than the upper ends of the bottles B to be carried by the container, whereby the bottles are cooled by conduction through contact between their projecting upper ends and the refrigerating means 10, and also by convection of refrigerated air passing between the edges of said openings and the upper ends of the bottles and flowing over the sides of the bottles into the individual cells of the spacer means, as may be seen in Fig. 2. In this view the downward flow of the refrigerated air is indicated by the solid arrows and the upward flow of the warmer air which is displaced by the refrigerated air is shown by the dotted arrows. The box 5 is received within an outer container 11 of corrugated paperboard and the like, and hollow paperboard elements 12 are disposed between the sides of the box and outer container and inside the bottom of the box, and the box is lined with metal foil (not shown, but indicated diagrammatically in Fig. 4 at 19). The hollow paperboard element 12 which is disposed inside the bottom of the box, serves to prevent direct conduction between the bottoms of the bottles and the metal foil lining.

The box 5 and container 11 may be of conventional construction, i. e. tubular shipping containers having two pairs of end flaps at both bottom and top. For the box 5 I prefer to use the type of end closure flaps wherein the inner flaps meet at the center of the box, whereas the outer flaps each extend over the entire top of the box so as to overlie one another, this arrangement providing three layers of metal foil insulation and three layers of corrugated board for buffer protection. Thus there is provided, in combination, a tubular paperboard shipping container 11 with top and bottom closure flaps 13, 14, a second tubular paperboard shipping container 5 received within the first and likewise having top and bottom closure flaps 15, 16, the second container fitting within the first without substantial clearance top and bottom but with clearance between the respective container sides, hollow paperboard elements 12 in the spaces between the sides, and a hollow paperboard element 12 fitting within the bottom of the second or inner container, spacer means 6 forming a plurality of cells in the lower part of the inner container, and a tray 8 fitting into the upper part of the inner container and supported by the spacer means, the tray having openings 9 in its bottom spaced to bring individual openings above the individual cells. The spacer means 6 may comprise crisscross partitions arranged to form individual cells 7 of generally rectangular form, conventionally made by cutting parallel slits half way across the partition sheets so that when assembled a set of parallel partitions having the slotted edges up are crisscrossed by another set having the slotted edges down,

the aligned opposed slots being brought into engagement to interlock crisscross partitions with their respective upper and lower edges lying in common planes. This construction being well known in the art, it will not be described in greater detail here.

With reference to Fig. 4, it will be noted that the hollow paperboard element 12 in the spaces between the sides of the respective containers, is outside of the foil lining 19 to provide maximum reflective insulation and buffer protection, whereas the hollow paperboard element fitting within the bottom of the inner container is inside of the foil lining to provide maximum insulation and buffer protection.

The refrigerating means may consist of a plastic bag 10 filled with ice, and the tray 8 preferably is coated with wax to increase its wetted strength against condensed moisture. The tray preferably is provided with flaps 17 and 18 folding over the plastic bag 10. The hollow paperboard elements 12 may each be made of a single blank of corrugated board and the like, scored for folding into the form clearly shown in Fig. 3, to provide a plurality of dead air spaces for insulation and to provide buffer protection against breakage of the bottles.

Features of my container which have been found to be especially valuable in service tests as Red Cross shipping containers for human blood include the following: (1) the arrangement whereby the bottles are cooled by conduction through contact between their projecting upper ends and the refrigerating means, and also by convection of refrigerated air passing between the edges of the openings in the tray and the upper ends of the bottles and flowing over the sides of the bottles into the individual cells of the spacer means, and (2) the arrangement of the hollow paperboard elements in relation to the foil lining whereby those elements between the sides of the two containers are outside of the foil lining to provide maximum reflective insulation and buffer protection, whereas that element which fits within the bottom of the inner container is inside the foil lining to provide maximum conduction insulation and buffer protection. With regard to feature 1, it may be observed that according to my construction, the tray 8 serves the functions of a spacer element, a container for the ice bag, and of holding the ice bag in contact with the metal tops of the blood bottles for maximum cooling.

The terms and expressions which I have employed are used in a descriptive and not a limiting sense, and I have no intention of excluding such equivalents of the invention

described, or of portions thereof, as fall within the purview of the claims.

I claim:

1. In combination, a tubular paperboard shipping container with top and bottom closure flaps, a second tubular paperboard shipping container received within the first and likewise having top and bottom closure flaps, said second container fitting the first without substantial clearance top and bottom but with clearance between the respective container sides, hollow paperboard elements in the spaces between the sides, and a hollow paperboard element fitting within the bottom of said second, or inner, container, spacer means forming a plurality of cells in the lower part of the inner container, and a tray fitting into the upper part of the inner container and supported by said spacer means, said tray having openings in its bottom spaced to bring individual openings above the individual cells.

2. A combination according to claim 1, in which said openings are substantially larger than the upper ends of the bottles to be carried.

3. A combination according to claim 1, in which the inner container has a foil lining, the arrangement of the hollow paperboard elements in relation to said foil lining being thus: the hollow paperboard elements in the spaces between the sides of the respective containers being outside of the foil lining to provide maximum reflective insulation and buffer protection, and the hollow paperboard element fitting within the bottom of the inner container being inside of the foil lining to provide maximum conduction insulation and buffer protection.

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