Sept. 15, 1959 I. L. WILCOX 2,904,239

COLLAPSIBLE RECTANGULAR CONTAINER

Filed March 30, 1953 2 Sheets-Sheet 1

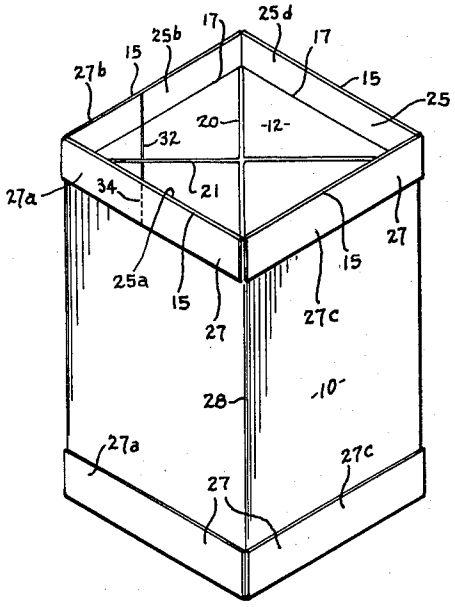

Fig. 1

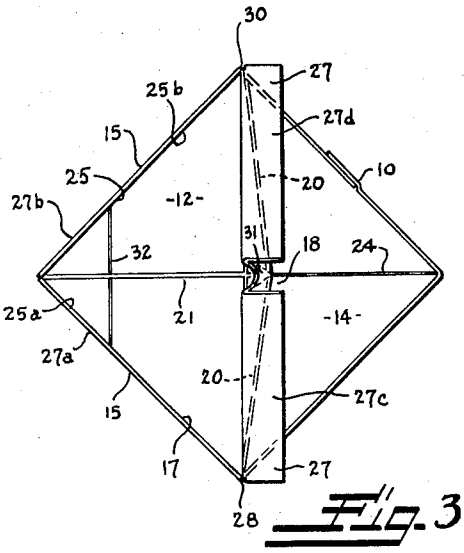

Fig. 3

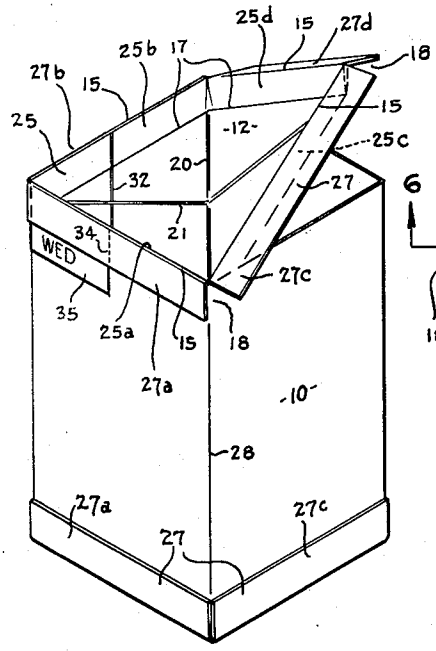

Fig. 2

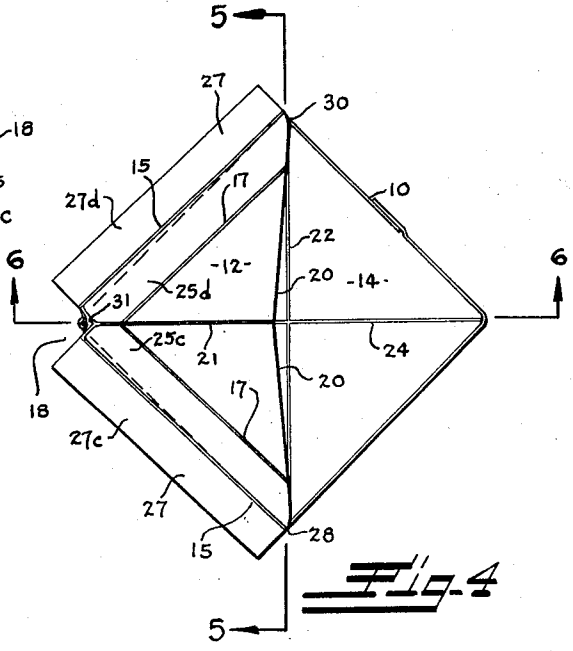

Fig. 4

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COLLAPSIBLE RECTANGULAR CONTAINER

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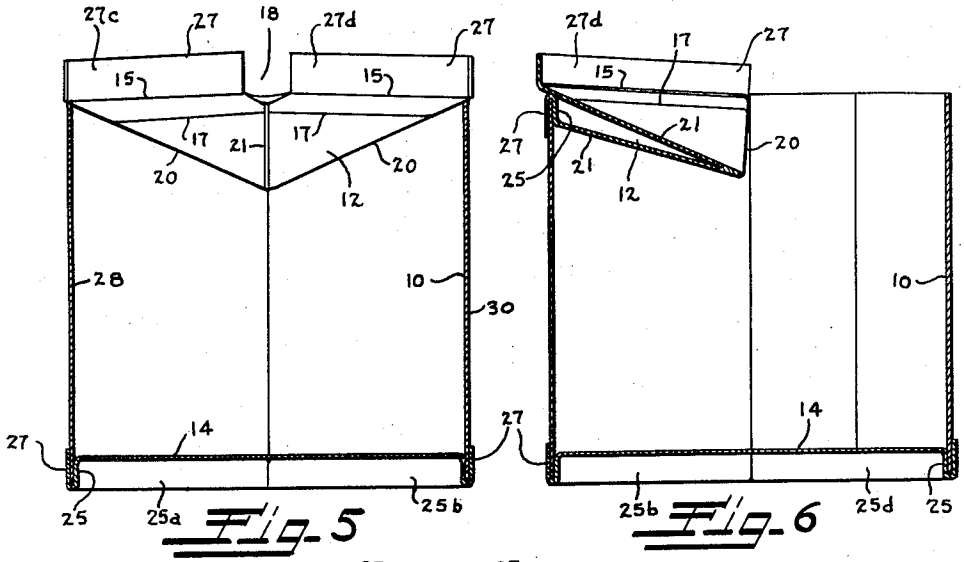

Fig-5

Fig-6

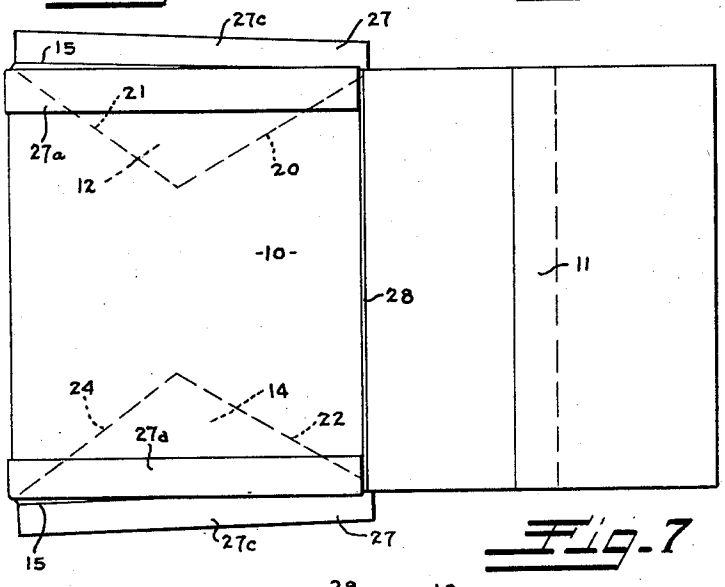

Fig-7

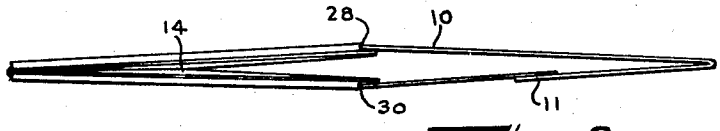

Fig-8

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COLLAPSIBLE RECTANGULAR CONTAINER

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3 Claims. (Cl. 229—41)

This invention relates to containers formed of fibrous sheet material, such as paperboard, and has particular reference to a sheet material container having novel means which permit it to be collapsed into substantially flat form for shipment and storage.

The primary object of the invention is to provide a container having a tubular body member and scored end closure members partially secured to the body member, the parts of the container being arranged so that it can be conveniently collapsed to save space during shipment and storage and yet can be quickly and easily readied for filling when needed for use.

A further important object of the invention is to provide a container, particularly adapted for liquids, which is simple and economical to form, and at the same time is strong and leak proof.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is a perspective view of a collapsible container embodying the invention.

Figure 2 is a perspective view similar to Figure 1 showing the upper end closure member of the container in partially open position.

Figure 3 is a plan view of the container of Figure 1 showing the upper end closure member thereof folded along a diagonal score line so that one-half of the member extends from the container in a vertical plane.

Figure 4 is a plan view of the container of Figure 1 showing the upper end closure member thereof folded back upon itself along a diagonal score line.

Figure 5 is a vertical section through the container taken along line 5—5 of Figure 4.

Figure 6 is a vertical section through the container taken along line 6—6 of Figure 4.

Figure 7 is a side elevation of the container when collapsed into substantially flat form.

Figure 8 is a bottom view of the container when collapsed into substantially flat form.

Having reference now to the drawings, the body **10** of the container is of tubular formation, square in cross section, and may be formed of a single blank which is scored in the usual manner and folded so that the marginal portions adjacent its shorter edges overlap as indicated at **11**. The engaging surfaces of these overlapping portions may be coated with impervious adhesive material which is preferably of the heat sealing type, such as Vinylite, so that the portions can be sealed together upon the application of heat and pressure to form a strong liquid-tight joint. It will be apparent that the tubular body **10**, thus formed, can be collapsed or folded into flat form along a diagonal plane as indicated in Figure 8.

Body **10** is provided with upper and lower end closure members **12** and **14**, respectively, each end closure being

formed from square blanks. These blanks are provided with outer marginal score lines **15** on the under sides thereof and inner marginal score lines **17** on the upper sides thereof, the distance between lines **15** and **17** being equal to the distance between lines **15** and the peripheral edges of the blanks. At each corner of the blanks a substantially square portion thereof is cut away as indicated at **18**, the inner corners of the cut away portions being located at points approximately equidistant from the score lines **15, 17**. In addition, the upper end closure member **12** is provided with diagonal score lines **20, 21**, while lower end closure member **14** is provided with diagonal score lines **22, 24**. In each end closure the area defined by the inner marginal score lines **17** is substantially equal to the cross sectional area of tubular body **10**.

In ordinary practice, the container will be substantially fully formed at the container manufacturing plant by forming up the tubular bodies **10** as described hereinabove and then assembling the bodies and end closures in the following manner: An end closure is inserted into each end of the body so that the portions of the closures bounded by inner marginal score lines **17** are perpendicular to the longitudinal axis of the body and spaced from the ends a distance equal to the distance between the inner and outer score lines **17, 15**. This causes the portions between the marginal score lines of each end closure to be formed into a rim or flange **25** engaging the interior surfaces of body **10** adjacent one end thereof, and permits the flaps **27**, formed by cut away portion **18** and outer marginal score lines **15**, to be folded over the end edges of the body into engagement with the exterior surfaces thereof. It will be understood, of course, that in the assembling operation the body **10** can be carried by a mandrel adapted to be indexed to stations where suitable machinery positions the scored end closure blanks in the body in the described manner.

The engaging surfaces of the end closures and body **10** are coated with impervious adhesive material which is preferably of the heat sealing type such as Vinylite or, if desired the members may be so coated in their entirety. Having positioned the end closures in the body as described hereinabove, two adjacent sides of each end closure are sealed to the body **10** by the application of heat and pressure to two adjacent sides of the flanges **25** and to their corresponding flaps **27**. Thus, in the illustrated example, flange sides **25***a*, **25***b* and corresponding flaps **27***a*, **27***b* of each end closure are sealed to the body **10**.

Since the flange sides **25***c*, **25***d* and corresponding flaps **27***c*, **27***d* of each end closure are not sealed to the container body, it will be seen that the triangular half of the end closure including these sides and flaps can be folded back about a diagonal score line into a position overlying the secured triangular half of the end closure. Thus, as may be seen in Figure 2, the free half of upper end closure **12** can be folded back on its diagonal score line **20** into a position overlying its secured half as indicated in Figures 4, 5 and 6. Similarly, the free half of lower end closure **14** can be folded back on its diagonal score line **22** in the same manner. Having thus folded the upper and lower end closures, they may each be folded again on diagonal score lines **21, 24**, respectively, causing opposite edges **28, 30** of the body **10** to be drawn together so that when the end closures are completely folded as described, the body will be collapsed into substantially flat form as shown in Figures 7 and 8. The containers are shipped in this collapsed form from the manufacturer to the filling plant, and since the volume of the containers is at a minimum it will be apparent that a considerable saving in transportation costs is made possible. In addition, after the containers have been received by

the filling plant, a large number of containers may be stored in a relatively small space which is of particular advantage when the filling plant is a dairy because of the great quantities of containers needed for daily milk consumption.

When the dairy, in the case of milk containers, is ready to use the containers, the bodies **10** thereof are opened out and placed on a mandrel or some other suitable equipment which moves them to a station where the lower end closures **14** are unfolded and the flange sides **25***c*, **25***d* and corresponding flaps **27***c*, **27***d* thereof are sealed by the application of heat and pressure to the body. The container, having a liquid-tight lower end closure, is then turned over and filled through the top where the upper end closure **12** is still folded or partially folded along its diagonal score line **20**. The container is shown at this stage of formation in Figures 3–6, inclusive. After each container has been filled, its upper end closure **12** is unfolded and the flange sides **25***c*, **25***d* and flaps **27***c*, **27***d* thereof are sealed to the container body. The milk, or other content, is then sealed in a liquid-tight manner in the container ready for delivery to the ultimate consumer. The liquid-tight condition of the container is enabled not only by the impervious adhesive sealing, mentioned hereinabove, but also by the extra flap or surplus of material **31** in the corner of each cut away portion **18** of the end closures, this surplus being compressed into the corners of the container when fully formed and sealed to insure liquid-tight joints. The upper end closure **12**, Figures 1, 2 and 3 is further scored as at **32** and flaps **27***a*, **27***b* are perforated as at **34** to permit the consumer to lift the corner of the closure and pour out the contents. The lifting of the flaps may, if desired, be aided by the provision of a suitable gripper tab **35**.

What I claim is:

1. A collapsible container carton comprising a tubular body member rectangular in cross section and having side walls free from scores, said body member being adapted to be folded at diagonally opposite corners to substantially flat form, an end closure member of complemental rectangular form positioned at each end of the body, each of said end closures being formed with a pair of score lines extending diagonally from the corners of the closures, two contiguous side edges of each of said end closures being fixedly secured to like contiguous side walls at the ends of the tubular body member and the other two contiguous side edges being unsecured to the tubular body member, the unsecured portion of each end closure being foldable along one of said diagonal score lines over the secured portion, and both of the portions of said end closures being foldable inwardly of the body about said other diagonal score line when the container is in substantially flat form.

2. A collapsible container carton as defined in claim 1 wherein each of said end closures is provided with an inverted peripheral channel portion adapted to receive the end portions of the tubular body member.

3. A collapsible container carton comprising a tubular body member rectangular in cross section, said body being adapted to be folded at its diagonally opposite corners to substantially flat form, an end closure member of complemental rectangular form positioned at each end of the body, each of said end closures being formed with an inverted peripheral channel portion adapted to receive the end edge portions of the side walls of said tubular body member, each of said closures being also formed with a pair of score lines extending diagonally from the corners of the closures, the engaging surfaces of said tubular body and end closure members being coated with heat sealable adhesive material, two contiguous side edges of each of said end closures being fixedly sealed to like contiguous side walls at the ends of the tubular body member and the other two contiguous side edges being unsecured to the tubular body member, the unsecured portion of each end closure being foldable over the secured portion thereof along the score line extending diagonally from the corners between the secured and unsecured portions of the closure, and both of the portions of each closure being foldable inwardly of the body about said other diagonal score line when the container is in substantially flat form.

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