

Dec. 8, 1942.

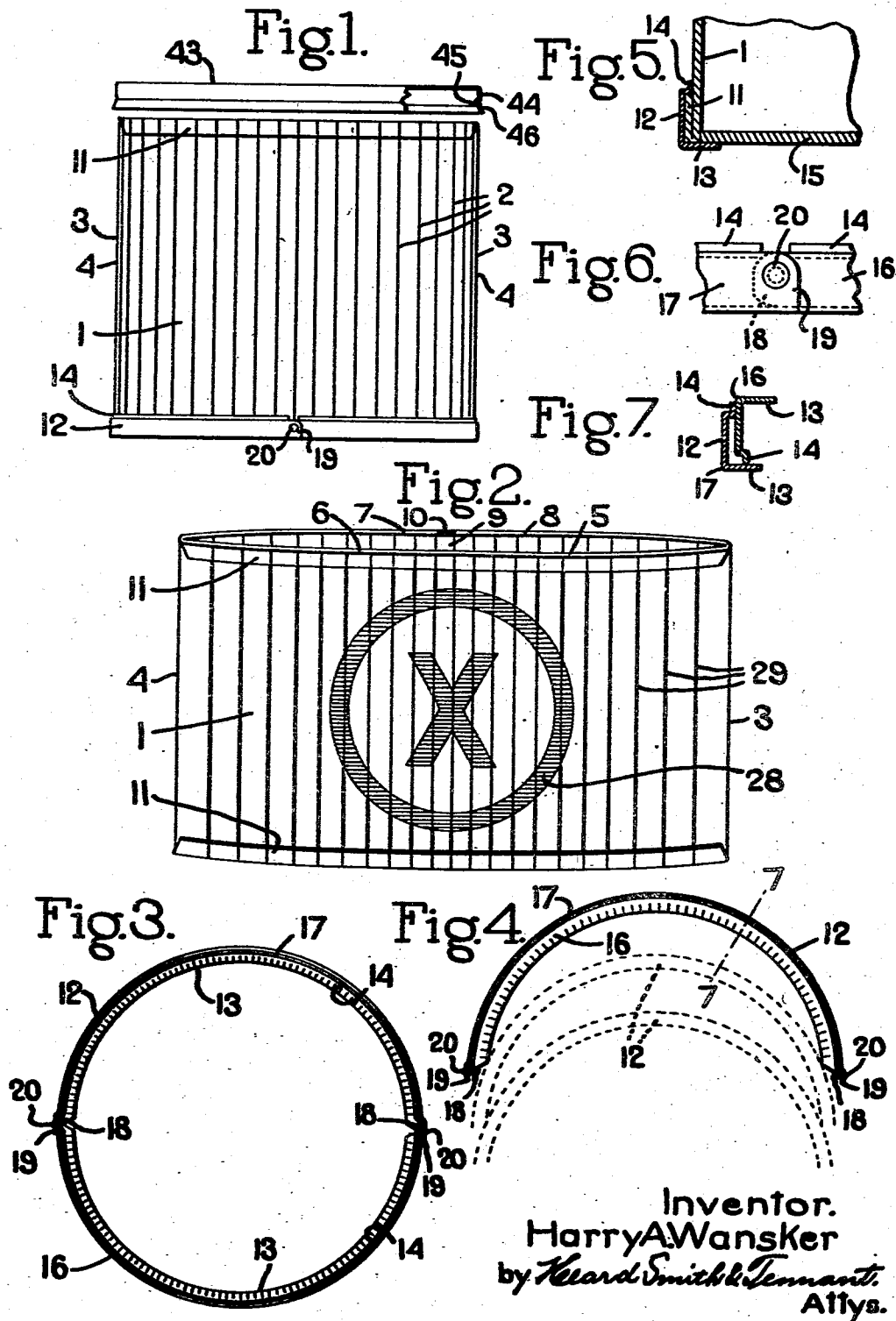
H. A. WANSKER

2,304,615

TUBULAR KNOCKDOWN CONTAINER

Filed Jan. 21, 1941

2 Sheets-Sheet 1



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H. A. WANSKER

2,304,615

TUBULAR KNOCKDOWN CONTAINER

Filed Jan. 21, 1941

2 Sheets-Sheet 2

Fig. 8.

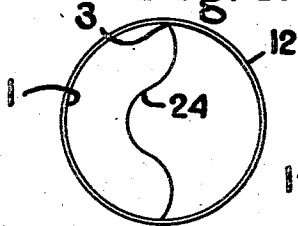


Fig. 9.

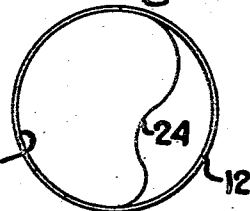


Fig. 10.

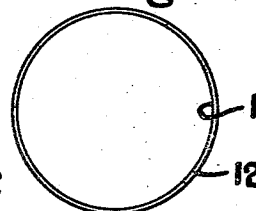


Fig. 11.

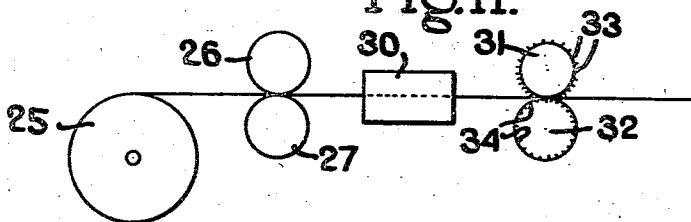


Fig. 12.

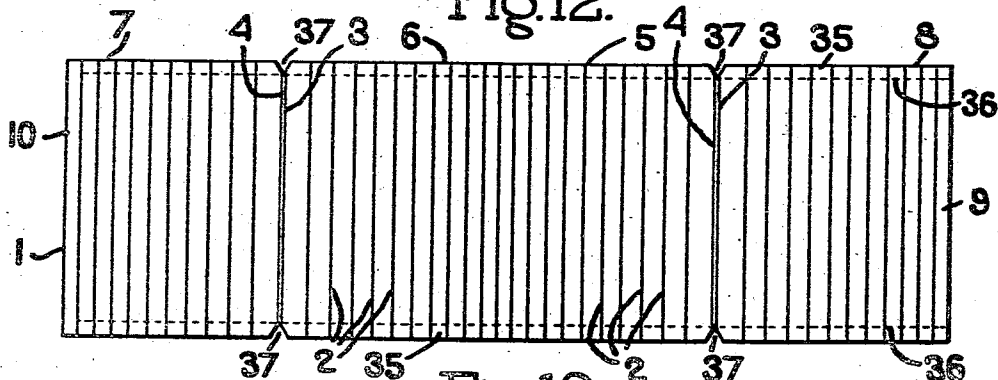


Fig. 13.



Fig. 14.

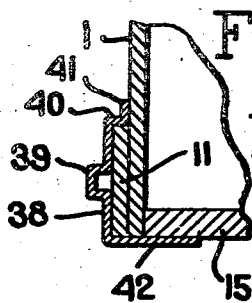


Fig. 15.

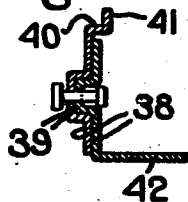
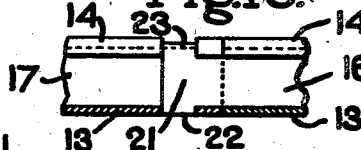


Fig. 16.



Inventor.
Harry A. Wansker
by *Heard Smith & Tennant*
Attys.

UNITED STATES PATENT OFFICE

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TUBULAR KNOCKDOWN CONTAINERS

Harry A. Wansker, Newtonville, Mass.

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11 Claims. (Cl. 229-4.5)

This invention relates to improvements in knockdown containers of the type which comprise a collapsible tubular body of fibrous material, such as paperboard, a rigid retaining and reinforcing ring fitting the end or ends of the body having a flange overlying the end and a rigid flat bottom adapted to be inserted into the tubular body within the end portion thereof which is enclosed by the retaining member.

When usual containers of this type are disassembled for storage or shipment, the bodies are collapsed, piled one upon the other, and enclosed in a carton and bound to form a convenient package, and the rings are similarly packaged in superimposed relation thereby requiring considerable space when a number of the rings are thus assembled. One of the objects of the invention is to provide a reinforcing member, for the end of the tubular body of the container, formed in complementary sections so constructed that a large number thereof may be nested in the same plane in a space of minimum length thereby greatly reducing the space required for packing usual retaining rings, and also enabling the assembled sections so to brace each other as to prevent relative slippage therebetween and to minimize the danger of injury to the rings during transportation.

Another object of the invention is to provide a longitudinally rigid circumferentially flexible tubular body for the container which will present a substantially smooth circumferential surface.

Usual bodies of paperboard, or other fibrous material, are rendered circumferentially flexible by equally spaced score lines which cut through the outer surface of the material and extend longitudinally thereof; such scoring while permitting flexibility, materially weakens the wall of the body. In other instances flexibility is produced by embossing equally spaced parallel lines into the body longitudinally thereof, but in such instances the inner and outer faces of the body present parallel grooves and complementary corrugations and also break down to a considerable extent the fibres of the wall.

By the present invention the sheet forming the body is rendered pliable by impregnation of moisture and thin lines are impressed on the sheet which extend longitudinally of the body without breaking the fibres of the body but sufficiently stretching the outer zone of the body to enable it to be bent into tubular form and to present a substantially smooth surface with only slight indentations which are hardly perceptible,

thereby avoiding the weakening of the body and enabling the retaining ring most closely to fit the surface of the end of the body throughout the circumference thereof.

In usual constructions a jig is required to hold the retaining ring while the end of the body is inserted therein particularly when said end is provided with a circumferential ridge adapted to fit within a channel-shaped ring. In assembling usual bodies in the ring a section of the end of the body is inserted in the ring, the diametrically opposite section bent inward to produce a heart-shaped contour which requires considerable force to distort it from the heart-shaped position to circular position within the ring. In the present invention diametrically opposite impressed lines are adapted to provide fold lines and the spaces between the thin impressed lines of each quadrant progressively decrease from the fold lines to the end of the quadrant, thereby providing a more flexible construction which will enable substantially one-half of the end of the body to be fitted into the retaining member, with the other half, when bent inwardly, assuming a sinuous curve which can be readily manipulated by a sweeping movement of the hand, with little force, into engagement with the remainder of the wall of the retaining member.

A further object of the invention is to provide a container body of the character described with non-obliterable means, which can be viewed from substantially any position, for identifying the contents of the container.

A further object of the invention is to provide a method of producing the invention herein set forth.

These and other objects and features of the invention will more fully appear from the following description and the accompanying drawings, and will be particularly pointed out in the claims.

Preferred embodiments of the invention and illustrations of suitable apparatus for performing the method are shown in the accompanying drawings, in which,

Fig. 1 is a side elevation of a container embodying the invention showing the cover slightly removed from the top;

Fig. 2 is a view of a collapsed container also illustrating ornamentation thereon and the means for identifying the contents of the container;

Fig. 3 is a plan view of one form of a sectional retaining member adapted to be folded into sub-

stantially concentric relation for packaging and shipment;

Fig. 4 is a plan view of the retaining member when folded to substantially concentric relation and illustrating in dotted lines the position of a plurality of rings positioned preparatory to nesting;

Fig. 5 is an enlarged detail view in section showing the manner in which one form of the retaining member embraces the bottom, the wall 10 and the peripheral rib of the container;

Fig. 6 is an enlarged detail view illustrating the pivotal connection between the complementary sections of the retaining member;

Fig. 7 is an enlarged vertical sectional view 15 illustrating the position of the sections of the retaining member when folded into substantially concentric relation;

Fig. 8 is a diagrammatic illustration of the manner in which the body is introduced into the retaining member with substantially one-half of the member fitting the retaining member, and the other half bent inwardly into sinuous form;

Fig. 9 is a similar illustration showing the internally bent portion of the body partially 25 forced outwardly by a sweeping motion of the hand;

Fig. 10 shows the body when fully expanded into the ring;

Fig. 11 is a graphic illustration of the method 30 of printing a sheet of paperboard, or other fibrous material, then subjecting the sheet progressively to an enclosing volume of steam, then impressing the thin lines into the sheet in the manner above described; longitudinally scoring the sheet from the end ribs, and trimming the sheet;

Fig. 12 is a plan view of a section of the sheet impressed with thin lines extending longitudinally of the sheet, illustrating the notches at the fold lines and the longitudinal scoring adjacent the edges of the sheet to permit the scored section to be folded upon the sheet to form the end ribs;

Fig. 13 is an enlarged horizontal sectional view of the sheet centrally broken away illustrating the scored end portions in full lines and showing in dotted lines the position of the ribs when folded against the surface of the sheet;

Fig. 14 is an enlarged detail vertical sectional view illustrating the container with the peripheral rib and a different form of retaining member;

Fig. 15 is a vertical sectional view showing the pivotal connections between the sections of a retaining and reenforcing ring having a central annular reenforcing corrugation; and,

Fig. 16 is an enlarged view, partially in vertical section, illustrating a modified construction for connecting the adjacent ends of separable complementary sections of the retaining ring.

The container embodying the invention, as illustrated in Fig. 1, comprises a tubular, preferably cylindrical, body portion 1, of paperboard or other sheet fibrous material of suitable thickness, having impressed therein parallel thin lines 2 which extend longitudinally of the body. In impressing these lines the body is sufficiently moistened to enable the lines to be impressed therein without breakage of the interlaced fibres of the body. The lines desirably are all impressed to the same depth in the body, the depth being sufficient to render the body sufficiently flexible to enable it readily to be introduced into

a suitable end reenforcing member in the manner hereinafter described.

In usual constructions of this character equally spaced parallel lines have been scored in the body by a cutter thereby breaking the fibres of the body, or relatively wide parallel corrugations have been so embossed in the body as to form complementary depressions and ridges which also break the fibres of the body.

In the present invention parallel thin lines 2 extending longitudinally of the body are impressed in the material of the body while moist, thus avoiding breakage of the fibres and practically eliminating the production of ribs upon the other side of the body.

In order to permit collapsing of the body for storage and shipment, as illustrated in Fig. 2, hinges are formed by narrowly spaced parallel lines 3 and 4 extending longitudinally of the body.

The other parallel impressed lines 2 are progressively more narrowly spaced through each quadrant 5 and 6, 7 and 8, forming progressively narrower panels, preferably varying in width by equal increments. The end panels 9 and 10 of the quadrant 7 and 8 are overlapped and suitably secured together, preferably by a strong adhesive, or may if desired be stapled together. The lower end of each body and preferably the upper end also is provided with an external rib 11 which may be formed as a continuation or lip on the body and suitably scored to permit it to be folded over and adhesively or otherwise secured to the end of the body, thereby forming an abutment adapted to be engaged by a retaining and reenforcing member or ring which tightly encircles the rib and body.

The reenforcing member desirably is in the form of a ring which preferably is circular, but may be elliptical, octagonal, or of other angular contour, and will hereinafter be inclusively referred to as a "ring." While the "ring" preferably is a metal ring it may also be made of fibrous, plastic, or other suitable material.

One of the principal features of the invention is to provide a knockdown container having a collapsible body and likewise a foldable retaining member or ring formed in sections in which a large number of the rings can be conveniently nested in horizontal position. One form of ring, which is illustrated in Figs. 1, 3, 4, 6, and 7 comprises a band or ring formed in complementary sections having a vertical wall 12 adapted to embrace tightly the peripheral end portion of the body or preferably the reenforcing rib 11 thereof, with a horizontal flange 13 adapted to underlie the end of the body and an inwardly bent upper edge portion having an upwardly extending flange 14 to fit tightly against the wall of the body, as illustrated in Fig. 5, thereby stiffening the wall of the body and forming a seal which will prevent the admission of water, which may accumulate by condensation, or otherwise, on the outer surface of the body, into the ring. The flange 13 is of sufficient width to underlie and support the usual rigid flat bottom 15 of the container. The ring is made in complementary sections 16 and 17 which have respectively overlapping end extensions 18 and 19 which are pivotally 70 connected together by a suitable rivet 20 preferably located slightly above the median plane of the center of the reenforcing member, the inwardly bent portion 13 and flange 14 being cut away sufficiently to permit the parts to be rotated 75 about the pivot. The ends 18 of the sections

16 of the ring when thus assembled lie within the ends 19 of the complementary sections 17. The section 16 preferably has a radius of slightly less length than the radius of the body of the container while the complementary section 17 of the ring has a correspondingly greater radius of curvature than that of the body of the container, so that the mean radius of the combined complementary sections of the ring is the same as that of the body of the container. When therefore the ring is applied to the end of the body of the container it will be retained in true cylindrical form.

By thus forming the sections of the ring of slightly different diameters the section 16 may be swung about its pivot, within the section 17 as illustrated in Figs. 4 and 7. By reason of this construction several of the rings can be nested, as illustrated in Fig. 4, and by reason of the resiliency of the semi-circular sections can be forced closely together, so that a large number of the retaining members may be packaged in a flat container having the overall depth of the nested rings and within a minimum length.

In packaging the knockdown container for storage or shipment a large number of the bodies may be collapsed to substantially flat positions, as illustrated in Fig. 2, and placed in a suitable carton or wrapper, or otherwise suitably bound to make a package occupying a relatively small space. The rings can be nested as above described and likewise placed in a small package occupying a minimum space. This is important as the cost of storage space or of shipping is thus greatly reduced as compared with the space required by usual containers of this type.

While the sections of the rings desirably are pivotally connected together, as above described, other means may be provided for connecting the ends of the sections together, for example, the ends of the section may be detachably connected together so that they may be dis-assembled and nested for shipment, as above described.

An illustrative means for accomplishing this purpose is shown in Fig. 16 in which the section 16 of the ring is provided with a T-shaped end 21 adapted to engage a slot 22 in the flange 13 of the complementary section 17. In this construction the lower flange 13 and the intumed upper edge and flange 14 of one of the ring sections are notched to receive the opposite extensions 23 of the T-shaped end so that the shoulders of the T-shaped end will abut against the ends of said recesses and retain the ring in an assembled position which cannot be disturbed after the end of the body has been placed within the ring and the bottom disk inserted. When however the body is collapsed and removed from the ring the sections of the ring can be disengaged and nested in the manner illustrated in Fig. 4.

It has heretofore been stated that in assembling the ends of the bodies of the containers within the ring a jig to hold the ring while the ends of the bodies are introduced therein is usually required to enable the operator to assemble them rapidly. By reason of the greater flexibility of the present construction, in which the spaces between the parallel thin lines which are impressed in the body progressively diminish in each quadrant as aforesaid, the necessity of using a jig to assemble the ends of the body in the ring is eliminated, it merely being necessary to have an abutment for the ring or to enable the

ring when supported in horizontal position to be pressed against the body of the operator.

The manner in which the body of the present invention is inserted into the ring is graphically illustrated in Figs. 8, 9, and 10. In assembling the body within the ring a half section of the body 1, as determined by the fold lines 3 and 4, is bent by the hands of the operator into semi-circular form and introduced into the half circle of the ring. By reason of the progressive variations in the spaces between adjacent quadrants, the other half of the body will then assume the sinuous form 24 illustrated in Fig. 8 and because of its greater flexibility the sinuous curve can be progressively modified to cylindrical form by a sweeping movement of the hand with light pressure, to various positions, one of which is illustrated in Fig. 9, so that the curve will follow the contour of the ring by a cycloidal-like movement until the body assumes the cylindrical form fitting within the ring as illustrated in Fig. 10. The operator is thus enabled to assemble the body within the ring with a minimum effort and without the necessity of employing a jig.

Another object of the invention is to provide a method by which the body of the container may be formed in such manner as to impress the thin lines into the body without breakage of the fibres of the body and also preferably to include means for printing the body with a suitable ornamentation and with colors indicating the contents of the body which cannot be obliterated. This is accomplished by printing narrow contents-designating lines upon the body in such manner that a portion of each line will be indented into the body by the line-impressing mechanism so that if practically all of the printing in the circumference of the body is obliterated by friction, or the like, the embedded identifying lines will still remain visible.

While the containers are used, for example, for ice cream the identifying lines for chocolate may be made in the color corresponding to chocolate, those for vanilla in buff, those for pistachio green, those for strawberry red or pink, etc., and inasmuch as the lines extend throughout the substantial length of the container and particularly to its ends the proper container can be readily selected when viewed from almost any position.

Suitable mechanism for producing successive steps in the process is conventionally illustrated in Fig. 11 which shows a roll of paper 25 rotatably mounted upon a suitable arbor with the free end of the sheet extending therefrom beneath a printing roll 26 in the complementary roll 27 by means of which any design 28 may be printed upon the sheet and also narrow lines 29 of the selected color printed upon the sheet in the same spacing as those of the lines which are thereafter to be impressed in the sheet.

After the printing is accomplished the web preferably is continuously passed through a steam chamber 30 where it is enveloped by steam for a sufficient length of time to enable the body of the sheet to absorb sufficient moisture to render it pliable. This moisture also heats the ink which has been deposited upon the surface of the sheet and causes it to penetrate more or less deeply into the surface and also to prepare it for rapid drying as soon as the printed portion progressively emerges from the steam chamber. The sheet continuously passes from the steam chamber between a pair of complementary rolls 31 and 32 which are provided with

means for impressing the thin lines into the sheet and also may be provided with cutters respectively acting to score the sheet adjacent its edges to provide rib sections adapted to be reversely folded against the outer face of the sheet and may also be provided with cutters for trimming the sheet and notching the sheet at the line of fold, as illustrated in Fig. 12.

The roller 31 for impressing thin lines into the sheet, which has been rendered pliable by moisture so that its outer surface may be stretched without breakage of the fibres, comprises a body having projecting from its edges diametrically opposite thin blades 33 for impressing fold lines and similar thin blades 33 progressively spaced more narrowly apart throughout a quadrant and then progressively spaced wider apart through the next quadrant. The complementary half of the circumference of the cylinder is provided with blades spaced in like manner. The roller 32 is provided with a series of longitudinally extending shallow grooves 34 having spacing corresponding to the spacing of the thin blades 33 to avoid such pinching as might result in the severance of the fibres of the body.

The circumference of the cylinder 31 may be such as to complete a section corresponding to a single tubular body which when bent to cylindrical form and the end sections overlapped and glued or otherwise secured together will form a complete body for the container.

It has heretofore been mentioned that desirably the body should be provided at one or both ends with an outer circumferential rib. This can be produced by the same machine by providing the roller 32 with a disk cutter adapted to sever the traveling sheet partway through so that the lip or lips 35 which extend beyond the score line 36 in the sheet may be folded over against the outer surface of the sheet and glued or otherwise secured to it, as illustrated in dotted lines in Fig. 13, thereby providing a circumferential rib at the end of the body.

It will be noted that the impressed lines extend the full width of the sheet thereby providing the lip portion with sufficient elasticity and extensibility to enable it to be folded upon the main sheet without the necessity of numerous notches as has heretofore been believed necessary.

One of the rollers 32 or 33 may also be provided with a disk cutter adapted to engage the complementary surface upon the other roller, thereby to trim the sheet. Such cutter may also be provided with reentrant blades suitably spaced to sever notches 37 in the lip 35 at the ends of the fold lines.

While the mechanism above described is one suitable for performing the process, it will be understood that other means may be provided for accomplishing the same purpose, for example, the printing may be applied to the sheet manually or in any suitable manner before the sheet is passed through the steam chamber also other suitable instrumentalities may be provided for impressing the fine lines into the sheet, and still other means may be provided for producing the score lines 36 which provide the fold lips 35.

The present method therefore comprises forming collapsible bodies for tubular knockdown containers from a sheet of paperboard, or the like, thereupon progressively passing the sheet of paperboard through an enveloping body of steam, thereby rendering it pliable by absorption of moisture, then indenting thin parallel lines into the moist sheet without breaking the fibres there-

of so as to render the sheet flexible when dry, cutting the sheet into sections of suitable length and securing together in overlapped relation the end panels of the sheet section defined by the indented lines which are nearest the respective edges.

The method also comprises the step of scoring the sheet near its edges from the opposite side to that in which the lines are impressed to a sufficient depth to enable the scored margin or lip to be folded over and secured to the face of the sheet.

The method also comprises preliminarily printing the sheet with parallel narrow lines extending transversely of the sheet (which would be longitudinal of the body thereof) at spaced intervals corresponding to the spacing of the impressed lines so that when the sheet is subsequently moistened and the lines impressed therein portions of the printed surfaces will be permanently embedded beneath the peripheral surface of the sheet, thereby being protected from obliteration. Of course any suitable ornamentation may at the same time be printed upon the sheet with the printed lines so terminating at the border of the ornamentation as not to interfere with the appearance of the design.

Other forms of reenforcing and retaining rings may be employed, such as a ring having one or more reenforcing circumferential or transverse corrugations to receive the blows produced by the impact of adjacent containers when slid one against the other, or strains otherwise imposed upon the ring. A preferred form of corrugated ring is illustrated in Fig. 14 in which the ring comprises a wall 38 adapted tightly to embrace the external rib 11 (which corresponds to the marginal rib or lip 35 of the sheet shown in Fig. 12) with a reenforcing corrugation 39 preferably midway of the width of the wall. The upper end of the wall 38 is provided with an internally bent edge portion 40 having an upwardly extending flange 41 tightly to embrace and stiffen the body 1 of the container and also to prevent the entrance of water which may condense or otherwise accumulate on the outer surface of the wall of the body.

The reenforcing ring also has an integral lower flange 42 adapted to overlies the lower end of the body and form a support for the bottom 15 of the container.

The ring construction illustrated in Fig. 14 preferably is formed in complementary sections of relatively different radii, as heretofore described, with rivets pivotally connecting the overlapped ends of the corrugation together, as illustrated in Fig. 15, the rivets being of sufficient length to permit the ring sections of smaller diameter to be rotated about the pivot in nested relation to the other section.

When the ring sections are rotated relatively to each other to extended positions and the end of the body of the container introduced therein, the overlapping corrugations will nest together so that the sections of the ring will be prevented from swinging movement relatively to each other.

Any suitable cover may be employed for the container. As illustrated in Fig. 1 the cover comprises a disk 43 of fibreboard having a peripheral flange 44 extending at right angles to the plane of the disk with an inwardly indented groove providing an internal ridge 45 of somewhat less circumference than the circumference of the rib 11 at the upper end of the container. The lower

end portion or skirt 46 of the flange 44 desirably is slightly flared outwardly to form a guide for the flange when it is applied to the body; the ridge 45 being so positioned as to engage beneath the rib 11 on the body when the cover is pressed firmly down in place, the resiliency of the flange thereby holding the cover in place, or the rib 11 may be provided with a suitable outwardly projecting corrugation adapted to be engaged by the ridge 45 of the flange to form a lock therebetween.

Alternatively the cover may be held upon the upper end of the body by an integral ring or a sectional ring of the character above described, in which case the cover disk should be of the same diameter as the external diameter of the body. After the cover is applied the ring can be forced downwardly until the inturned edge 14 thereof snaps beneath the lower edge of the rib 11 on the body.

It may be noted that where the sheet of paperboard from which the bodies are to be made are wound in the form of a roll the sheet is ordinarily wound to roll form as the sheet leaves the calender which forms the smooth outer surface of the sheet. In so winding the roll while still hot the sheet is bent to cylindrical form and when cooled retains the tendency to maintain the cylindrical curvature. When the sheet is thereafter moistened and the thin parallel lines impressed upon it, as above described, the same tendency to resume cylindrical form is maintained by the sheet, so that when the cylindrical bodies of the sheet are formed and collapsed for shipment there still remains a tendency of the opposite halves of the sheet to spring away from each other which aids the operator in opening the body to cylindrical form for the insertion of the end thereof in the retaining and reinforcing ring. This enables the person who is assembling the body upon the ring more readily to grasp and open the sheets for introduction into the ring in the manner above described.

By reason of the absorption of moisture by the sheet in advance of forming impressed lines therein also prevents the breakage of the fibres of the body upon the inner wall of the container and thereby eliminates the possibility of broken or frayed fibres from attaching themselves to the product, such as ice cream, when packed within the container and scooped therefrom.

It will be apparent from the above disclosure that a knockdown container above described, which is adapted to be produced by the method herein set forth, comprises a collapsible body portion which is more flexible and more easily assembled upon the retaining and reinforcing ring than in usual constructions heretofore produced and which can be readily packaged for storage and shipment in a minimum space. The reinforcing ring thus made in sections when removed from the body can be very compactly nested thereby saving very considerable space over previous ring constructions.

In the assembling of the container the ring section can be readily extended to substantially circular form and by reason of the greater flexibility of the body the assembling of the body within the reinforcing rings can be much more easily and speedily accomplished and without the use of jigs which are usually required. The contents-designating lines which are impressed within the body can be observed from almost any position so that the proper container for the contents to be introduced may be easily selected

and when a number of filled containers are stored the one containing the desired contents may be easily identified.

It will be understood that the particular embodiment of the invention in tubular containers of the character described is illustrative and that various modifications can be made within the spirit and scope of the claims.

It will also be understood that while suitable apparatus is illustrated for performing the method herein described, the method may be performed manually or by other types of apparatus within the spirit and scope of the claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A knockdown container comprising a collapsible tubular body of longitudinally rigid circumferentially flexible thin fibrous material having at its end a removable inextensible retaining member formed of two complementary semi-circular sections having a wall peripherally surrounding the end portion of said body and a flange overlying said end, means connecting the adjacent ends of the sections of said remaining member, adapting said sections to be nested into substantial concentric relation, when removed from the end of said body and thereupon to be assembled with similarly nested sections to form a flat package, for shipment or storage, and a rigid flat closure member tightly fitting within the encircled end portion of said body thereby forming a rigid structure when assembled.

2. A knockdown container comprising a collapsible body of longitudinally rigid circumferentially flexible thin fibrous material, a removable inextensible retaining member fitting one end of the body, formed of complementary sections of slightly different radii pivotally connected together at their adjacent ends to fold in substantially concentric relation when removed from the end of the body and having a wall tightly enclosing the end portion of said body, and a flat closure member tightly fitting within the encircled end portion of said body thereby forming a rigid structure when assembled.

3. A knockdown container comprising a collapsible cylindrical body of longitudinally rigid circumferentially flexible thin fibrous material having a closure member of stiff material tightly fitting within the end thereof, a removable inextensible retaining band formed of circular complementary sections of slightly different radii pivotally connected together to provide a wall peripherally surrounding and tightly fitting the closure-containing end of said body, each section having a flange overlying said end and operable when applied to said body to clamp it firmly upon the periphery of said closure member, said complementary sections having overlapped ends and the pivot located in said overlapped ends whereby the sections of the retaining member may be folded into substantially nested relation when the container is in a knocked down condition.

4. A knockdown container comprising a collapsible cylindrical body of longitudinally rigid, circumferentially flexible, paperboard having at one end an external reinforcing rib, a removable inextensible retaining ring having a wall enclosing an end portion of said body and the reinforcing rib thereon and a flange overlying said end and a circular rigid disk of paperboard

tightly fitting within said encircled end, said retaining ring being formed of complementary semi-circular sections having radii respectively slightly less and slightly greater than the radius of the circumference of said body, and means pivotally connecting together the adjacent ends of said sections to permit them, when removed from said body, to be folded together substantially concentrically for storage or shipment.

5. A knockdown container comprising a collapsible cylindrical body of longitudinally rigid, circumferentially flexible, paperboard, a removable inextensible metallic retaining ring having a wall enclosing an end portion of said body and a flange overlying said end and a circular rigid disk of paperboard tightly fitting within said encircled end, said retaining ring being formed of complementary semi-circular sections having radii respectively slightly less and slightly greater than the radius of the circumference of said body, with the ends of said body-enclosing walls overlapping and pivots connecting said overlapping walls adapted to permit said sections when removed from said body to be folded together substantially concentrically for storage or shipment.

6. A knockdown container comprising a base ring having an inextensible body-embracing wall, and a flange to engage the end of the body, a collapsible tubular body of paperboard having an end portion to fit within said ring and having thin longitudinal lines impressed therein without breakage of the fibres of said body providing diametrically opposite fold lines, with the spacing of the lines of each quadrant from the respective fold lines progressively decreasing in width, whereby said body may be collapsed on said fold lines to substantially flat position and when opened will permit substantially one-half section of the end of said body to be fitted within and to conform approximately to one-half of the inner circumference of the wall of said ring, with the other half section bent inwardly in a sinuous curve adapted to be progressively expanded by a sweeping outward pressure to circular form fitting tightly within said ring, and a flat rigid disk tightly fitting within the encircled end of said body thereby forming a rigid structure when assembled.

7. A body for a knockdown container having one end fitted in a reinforcing ring comprising a cylindrical wall of paperboard having thin longitudinal lines impressed therein to substantially equal depth, without breakage of the fibre of said wall, diametrically opposite lines being adapted to form fold lines to permit collapsing of the cylindrical wall to substantially flat form and the spaces between the lines of each quadrant from the respective fold lines progressively decreasing in width operable when one-half of the cylindrical wall is expanded to fit within the reinforcing ring to enable the other half thereof to be progressively and easily expanded within the other half of said reinforcing ring by a cycloidal-like movement.

8. A knockdown container comprising a cylindrical body of paperboard having series of parallel thin longitudinal lines impressed therein without breakage of the fibres of the body providing diametrically opposite fold lines with the spacing between the impressed lines of each quadrant from the respective fold lines progressively varying in width, a removable retaining and reinforcing ring for the end portion of

the tubular body of a knockdown container comprising a band of stiff inextensible material having a wall tightly to enclose the end portion of the tubular body of the container, and a flange to overlie the end of said body, said reinforcing ring being formed in complementary sections of slightly different radii of curvature and having overlapped ends so pivotally connected together as to permit said sections to be folded into substantially contiguous concentric positions whereby a large number of said rings may be nested in a space of minimum length.

9. A knockdown container comprising a cylindrical body of paperboard having at one end a circumferential reinforcing rib and having series of parallel thin longitudinal lines impressed in said body and rib without breakage of the fibres thereof and providing diametrically opposite fold lines with the space between the impressed lines of each quadrant from the respective fold lines progressively decreasing in width, a removable retaining band of stiff inextensible material having a wall tightly to enclose the end portion of the tubular body of the container and a flange to overlie the end of said body, and an intumed upper edge portion to overlie the circumferential rib of said body terminating short of the ends of said sections, said reinforcing ring being formed in complementary sections of slightly different radii of curvature and provided with overlapping extended ends, and means pivotally connecting together said overlapping ends adapted to permit said sections to be folded into substantially contiguous concentric positions whereby a large number of rings may be nested into a space of minimum length.

10. A knockdown container comprising a cylindrical body of paperboard having at one end a circumferential reinforcing rib and having series of parallel thin longitudinal lines impressed in said body and rib without breakage of the fibres thereof and providing diametrically opposite fold lines with the space between the impressed lines of each quadrant from the respective fold lines progressively decreasing in width, a removable retaining band of stiff inextensible material having a wall tightly to enclose the end portion of said tubular body, a flange to overlie the end of said body, an intumed upper edge to overlie the circumferential rib of the body, and a longitudinal reinforcing corrugation intermediate of said flange and said intumed edge portion, said reinforcing ring being formed in complementary sections having radii of curvature respectively less than and greater than the radii of curvature of said body and having at their ends relatively offset portions so pivotally connected together as to permit said sections to be folded into substantially contiguous concentric positions, whereby a large number of rings may be nested in a space of minimum length.

11. A knockdown container comprising a cylindrical body of paperboard having at one end a circumferential reinforcing rib and having series of parallel thin longitudinal lines impressed in said body and rib without breakage of the fibres thereof and providing diametrically opposite fold lines with the space between the impressed lines of each quadrant from the respective fold lines progressively decreasing in width, a removable retaining band of stiff inextensible material having a wall tightly to enclose the end portion of the tubular body of the container and a flange to overlie the end of said body, and an

inturned upper edge portion to overlie the circumferential rib of said body terminating short of the ends of said sections, with a flange extending upwardly from said inturned edge tightly fitting the wall of the body to stiffen the body of the container and to prevent the entrance within the retaining band of water which may condense or otherwise accumulate on the outer surface of the wall of the body, said reenforcing

ring being formed in complementary sections of slightly different radii of curvature and provided with overlapping extended ends, and means pivotally connecting together said overlapping ends adapted to permit said sections to be folded into substantially contiguous concentric positions whereby a large number of rings may be nested into a space of minimum length.

HARRY A. WANSKER.