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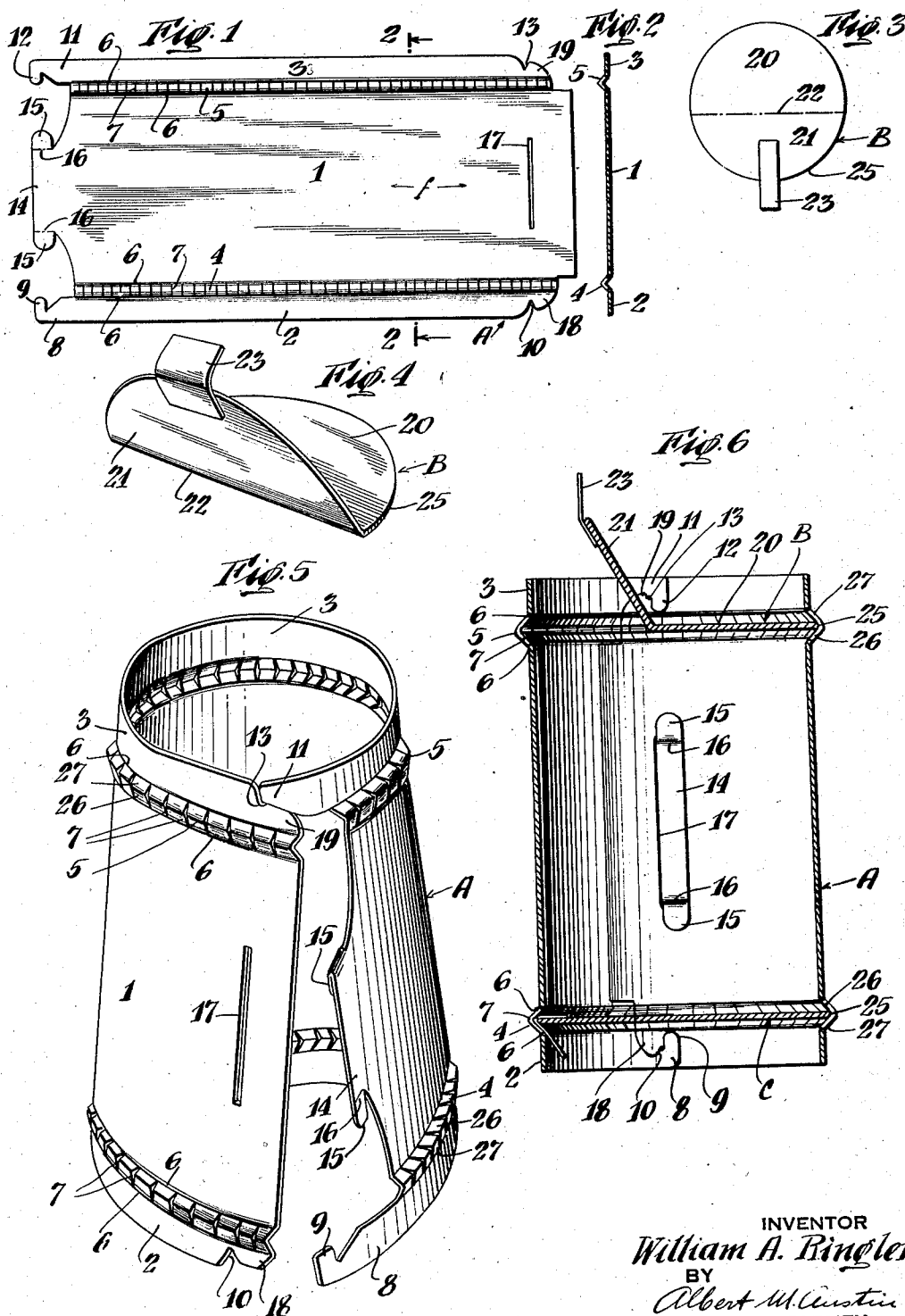
W. A. RINGLER

2,220,913

CONTAINER

Filed Oct. 11, 1937

4 Sheets-Sheet 1



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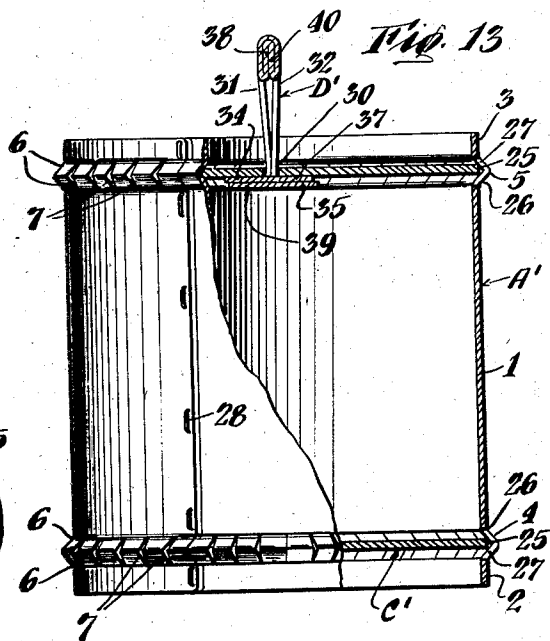
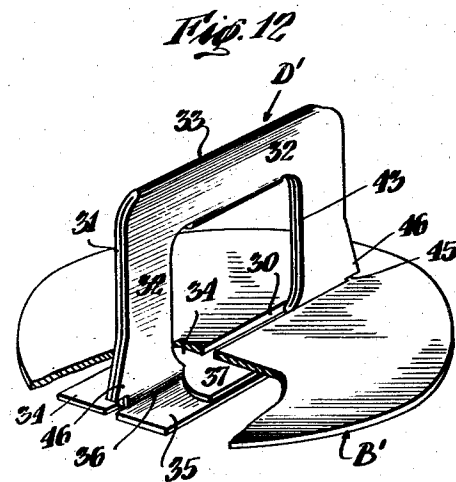
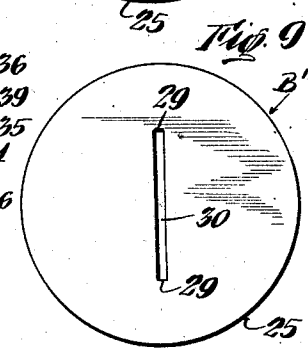
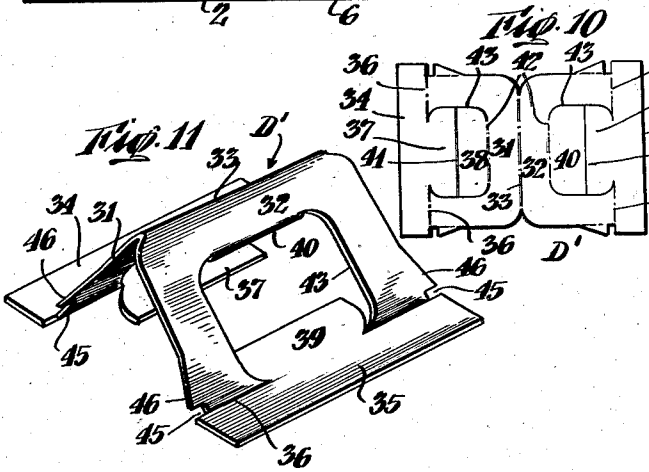
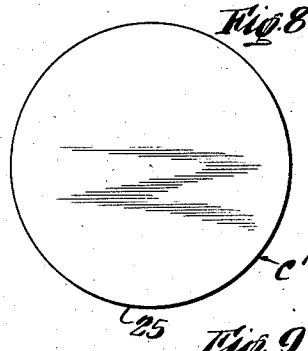
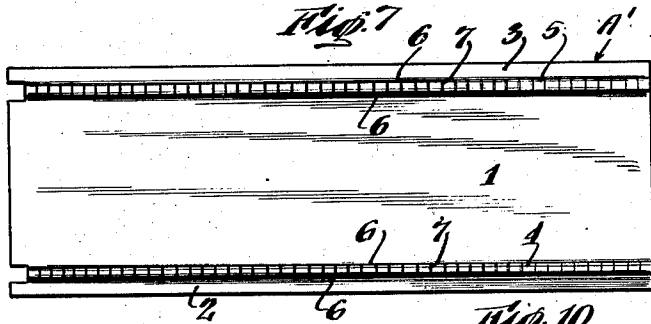
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4 Sheets-Sheet 2



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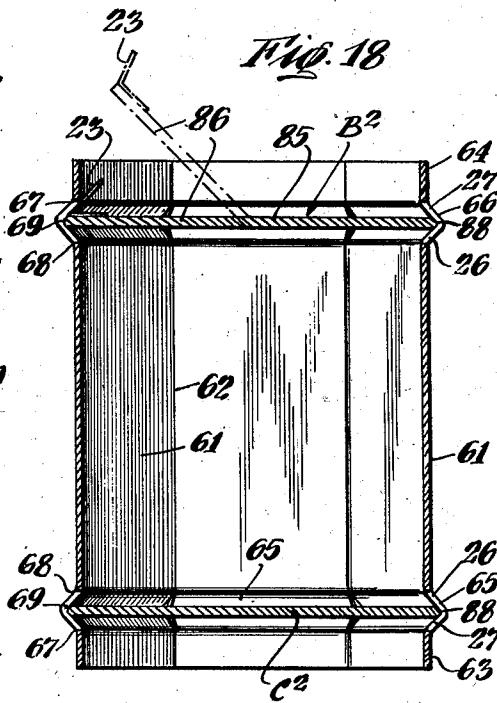
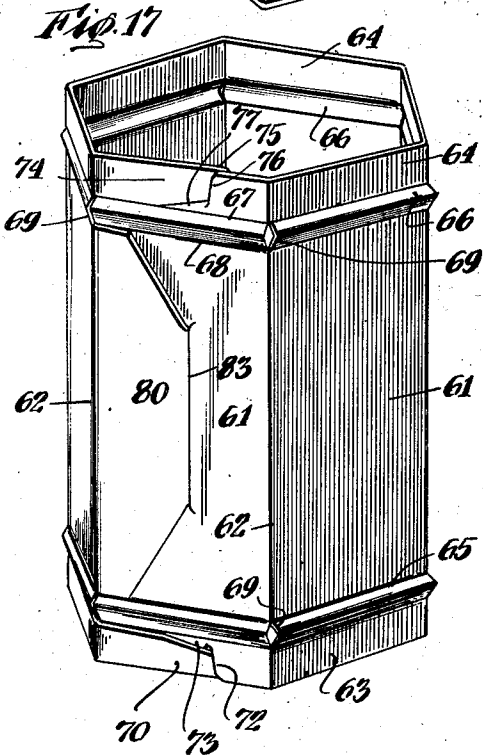
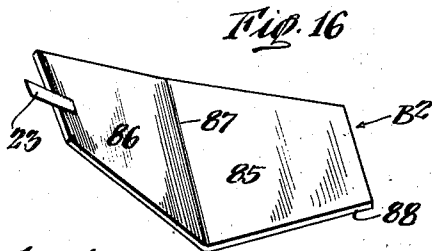
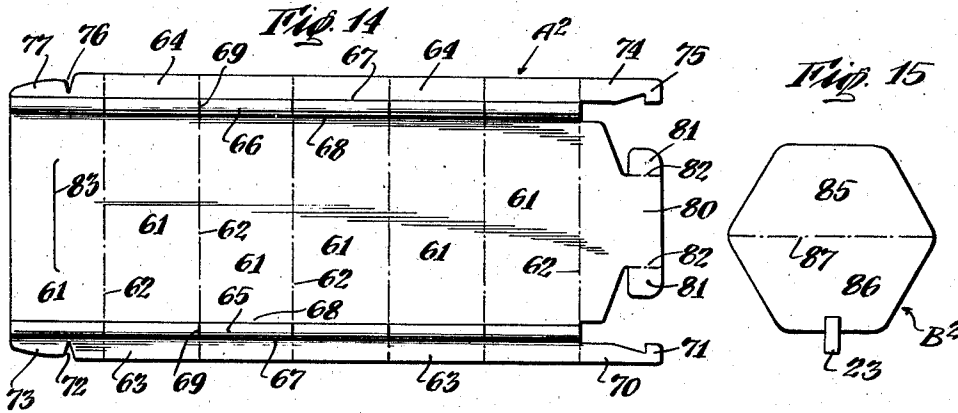
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4 Sheets-Sheet 3



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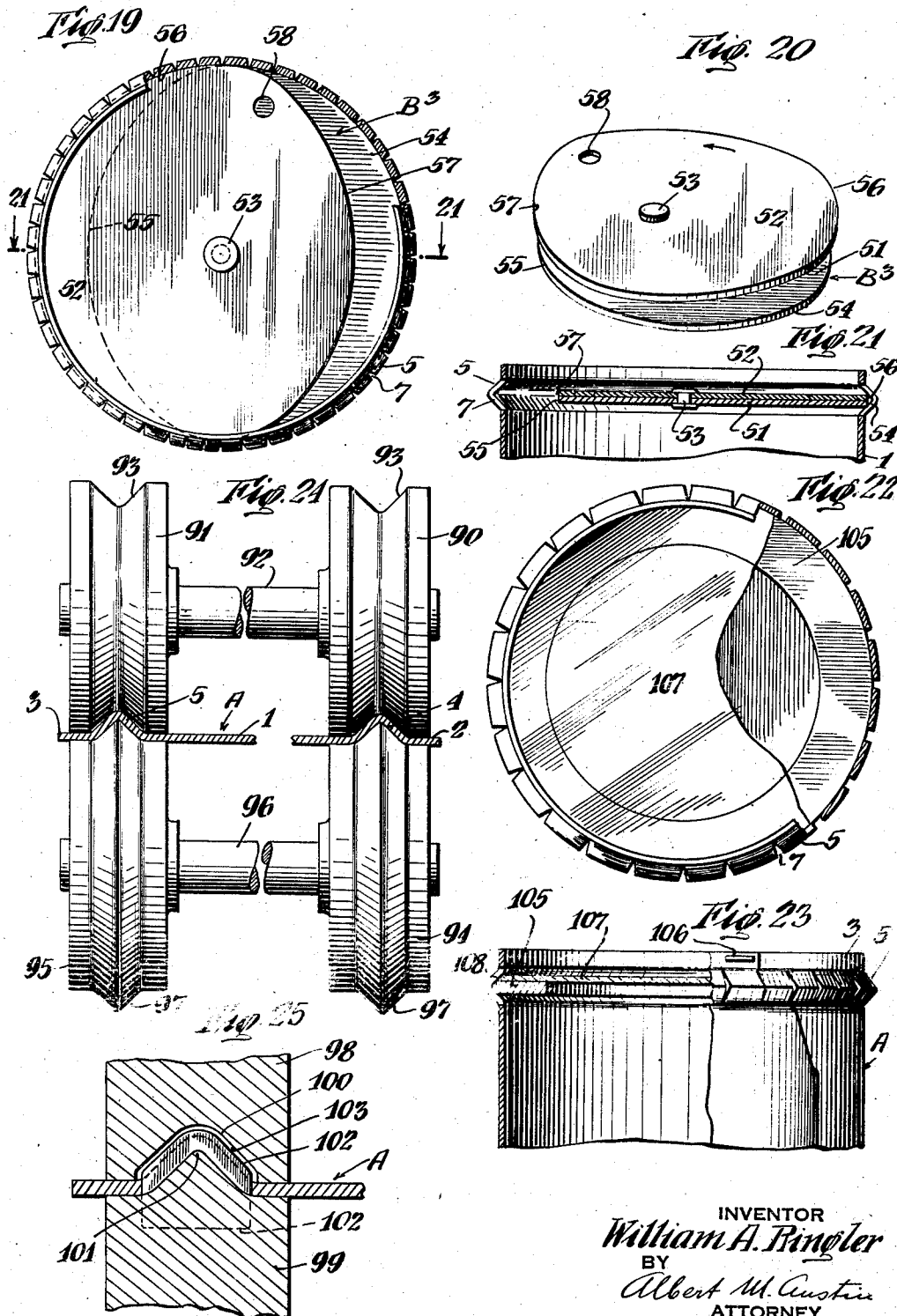
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,220,913

CONTAINER

William A. Ringler, Wayne, Pa., assignor to National Folding Box Company, New Haven, Conn., a corporation of New Jersey

Application October 11, 1937, Serial No. 168,369

3 Claims. (Cl. 229-5.5)

This invention relates to containers, and more particularly to an economical and easily assembled container formed from paperboard material, adapted for the packaging of numerous materials, articles and merchandise.

In accordance with my invention, a container having substantial strength and rigidity can be economically made substantially entirely by automatic machinery at low cost, the container being constructed from a single body-forming blank and a pair of disc-shaped end wall members. When the body-forming blank is secured together in tubular form, the end members are supported in outwardly bulging grooves extending circumferentially around and adjacent each end of the tubular body member. These grooves may be rolled into the paperboard blank by means of male and female die rollers at a high rate of speed. In the preferred form of my invention, spaced cuts traverse the circumferentially extending grooves, which serve an important and useful purpose. By the provision of these spaced cuts the grooves formed in the substantially flat blank will not flatten out or disappear when the blank is bent into tubular form, but in fact will be accentuated so as to provide a sturdy and rigid seat for the end closure member. The transversely cut grooves also provide a laterally extending rim portion which serves to cushion any shocks delivered to the packed container, since the outwardly bulging grooves of adjacent containers only can contact one another, leaving the body portion of the container between the grooves free and out of contact. The grooves also serve to cushion the vertically stacked packed containers by imparting a resiliency thereto which further protects the contents from damage as the result of external shock. Numerous materials and articles of merchandise can be packed in the container, and the container is particularly adapted for relatively bulky products.

My invention further provides a novel end closure for the container, comprising a pair of pivotally connected disc members which can be relatively rotated so as to lock the end closure in the groove within which it seats. This end closure can also be quickly removed to permit access to the contents by a simple relative rotative movement of the pivotally connected disc members to effect withdrawal of a portion of the rim portion of said closure from its seated position in said groove so that the closure can be easily withdrawn. A novel handle member formed from a single blank of paperboard material is

also provided, which is strong and sturdy in construction and economical to manufacture and assemble.

The body member can be shipped to the user in the form of flat blanks, thus occupying a minimum space during shipment and storage. The free side edges of the blank may be connected by the user to provide a rigid tubular body member, as by applying staples, stitching, adhesive or other securing means to the free side edges of the body-forming blank. If desired, the flat body-forming blank may be provided with cooperating interlocking slots and tab portions and interlocking hook and abutment portions which can be conveniently engaged by the user to retain the body member in rigid tubular form.

An object of this invention is to provide a paperboard container requiring a minimum of paperboard material for its construction and which can be formed substantially entirely by automatic machinery at low cost.

Another object of this invention is to provide a container which can be shipped to the user in flat, knockdown condition and which can be easily and quickly assembled by the user as needed.

Another object of my invention is to provide an improved body and end wall assembly for containers whereby the end member is securely and rigidly locked to the tubular body member which the weight of the contents or shocks delivered to the container will not remove.

Another object of my invention is to provide an improved container provided with cushioning means which protects the contents from damage as a result of shocks delivered to the exterior of the container.

Another object of this invention is to provide a method of assembling a tubular container by the user from substantially flat blanks of paperboard material, which assembly operation can be quickly and economically performed.

Still another object of my invention is to provide an improved method of grooving the body-forming blanks preparatory to assembly thereof.

Other objects of this invention will become apparent as the disclosure proceeds.

Various other features and advantages of the invention will be apparent from the following particular description and from an inspection of the accompanying drawings.

Although the novel features which are believed to be characteristic of this invention will be particularly pointed out in the claims ap-

pended hereto, the invention itself, as to its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part thereof, in which:

Fig. 1 is a face view of the body-forming blank of my improved container;

Fig. 2 is a cross-sectional view through the body wall, this view being taken on line 2—2 of Fig. 1;

Fig. 3 is a face view of a prepared blank which may form an end wall for the container;

Fig. 4 is a perspective view of the end wall-forming member in position to be inserted into the assembled tubular body member;

Fig. 5 is a perspective view of the body-forming blank shown in Fig. 1, partially assembled in tubular form;

Fig. 6 is a transverse cross-sectional view through the assembled container, this view showing the end wall member which forms the cover for the container in the process of being inserted into container-closing position;

Fig. 7 is a face view of a blank from which a tubular container of slightly modified construction may be formed;

Fig. 8 is a face view of a prepared blank which may form the end or bottom wall of the container;

Fig. 9 is a face view of a prepared blank which may form the other end wall or cover for the container;

Fig. 10 is a face view of a prepared blank which may be assembled to form a convenient handle for the container;

Fig. 11 is a perspective view of the handle-forming blank shown in Fig. 10 in the process of being assembled into a handle member;

Fig. 12 is a perspective view of the handle member shown in Fig. 11 as it appears when fully assembled to a container cover as shown in Fig. 9, certain parts being broken away to illustrate certain features of the construction;

Fig. 13 is a side elevational view of a completed container assembled from the body-forming blank shown in Fig. 7, the end wall-forming blanks shown in Figs. 8 and 9, and the handle-forming blank shown in Fig. 10, certain parts being broken away to illustrate certain features of the construction;

Fig. 14 is a face view of a body-forming blank from which a body member of further modified form may be assembled;

Fig. 15 is a face view of a paperboard blank cut to form an end wall or cover member for the container;

Fig. 16 is a perspective view of the cover member ready to be inserted into the tubular body member assembled from the blank shown in Fig. 14;

Fig. 17 is a perspective view of the body member assembled from the blank shown in Fig. 14;

Fig. 18 is a transverse cross-sectional view through the completed container;

Fig. 19 is a top plan view of my improved container having a generally cylindrical body, this view showing particularly a cover member of further modified form associated with the cylindrical body member;

Fig. 20 is a perspective view of the cover member associated with the container shown in Fig. 19;

Fig. 21 is a fragmentary cross-sectional view through the container and cover member shown

in Fig. 19, this view being taken along line 21—21 of Fig. 19;

Fig. 22 is a top plan view of my improved container having a cover supporting ring member positioned within the container to support the cover-forming end wall disc;

Fig. 23 is a fragmentary elevational view of the body and cover assembly shown in Fig. 22, certain parts being broken away to more clearly illustrate the construction;

Fig. 24 is a front elevational view of mechanism which may be employed to form the end member-receiving channels in the body member of the container; and

Fig. 25 is a fragmentary cross-sectional view through cutting rolls which may be provided to form the spaced transverse cut in the outwardly bulged channel portions of the body member;

Similar reference characters refer to similar parts throughout the several views of the drawings and the specification.

The container shown in Fig. 6 comprises a tubular body member A assembled from a collapsed flat blank as shown in Fig. 1, the tubular body member having an outwardly bulging channel-shaped groove 4 extending circumferentially around the lower end of the tubular body and providing a seat for the end wall or bottom member C, and an outwardly bulging channel-shaped groove 5 extending circumferentially around the upper end of the tubular body member to provide a seat for the end wall or cover member B. The tubular body member A may be cut from a sheet of suitable relatively tough paperboard material and, if desired, can be shipped and stored in the flat collapsed condition shown in Fig. 1 and thereafter set up by the user as needed.

The body-forming blank comprises a body portion 1 and rim portions 2 and 3 extending laterally therefrom. The rim portion 2 is defined from the body portion 1 by an outwardly bulging circumferentially extending channel or groove 4 defined by the circumferentially extending score lines 6. To permit bending of the flat blank into tubular form so as to provide the desired tubular body member, the channel portion 4 is dissected into segments by a series of cuts 7 extending transversely through the channel portion 4, which permits the channel portion 4 to retain its outwardly bulged form when the blank is assembled in tubular shape. The upper rim portion 3 is likewise defined from the body portion 1 by a circumferentially extending outwardly bulging channel or groove 5 defined by the circumferentially extending score lines 6, the channel or groove 5 being also dissected into segments by transversely extending cuts 7 extending between the score lines 6.

Suitable means may be provided for retaining the body-forming blank in tubular form. As shown in Figs. 1, 5 and 6, an arm portion 8 extends from one end of the rim portion 2, the arm portion being provided with a hook 9 adapted to be inserted through a notch 10 provided at the other end of the rim portion 2, the notch 10 defining an abutment portion 12 engaged by the hook portion 9, as shown more particularly in Fig. 6. The body portion 1 of the tubular body member may also be connected together by suitable means, such as a tab 14 which extends from one end of the body portion 1 and which is adapted to be inserted into a suitable slot 17 provided at the other end of the body portion. The tab 14 may be provided with wing portions 15 hinged thereto along the score lines 16, which

wing portions may be doubled over the tab 14 to permit insertion of the tab portion through the slot 17. When the wing portions 15 are released, the wing portions will extend over the extremities of the slot 17, as shown in Fig. 6, and prevent withdrawal of the tab 14 from its locked position within the slot 17. The upper rim portion 3 of the container may also be provided with means at the ends thereof for rigidly holding the rim portion in fixed tubular form, which means may be similar to the means heretofore described as holding the ends of the rim portion 2 in fixed tubular form. More particularly, an arm portion 11 extending from one end of the rim portion 3 is provided with a hook 12 adapted to be inserted into a notch 13 provided in the opposite end of the rim portion 3, and when thus inserted will engage an abutment portion 19 to prevent withdrawal thereof.

The end members of my tubular container may comprise suitably shaped plates or discs which may be made of relatively stiff paperboard material, having the peripheral edges 25 thereof seated within the circumferentially extending groove provided in the tubular body member. Referring more particularly to Fig. 6, the bottom-forming end wall member C is of larger diameter than the diameter of the body portion 1 of the tubular member A, and more particularly its diameter being such that the peripheral edge 25 thereof will snugly seat within the outwardly bulging channel portion 4 and is thus locked and securely held in seating position within the channel by the overlying walls 26 and 27 of the channel portion 4. The end member B forming the top closure for the container is likewise of larger diameter than the diameter of the body portion 1 and particularly of such diameter that its peripheral edge 25 will snugly fit within the outwardly bulged channel portion 5 encircling the upper portion of the tubular body member. Thus the outwardly bulging side walls 26 and 27 of the channel portion 5 will overhang and abut the marginal edge 25 of the end member B, thus securely holding the end member in position. To facilitate insertion and withdrawal of the end member B, a score line 22 may be provided therein dividing the end member into hinged sections 20 and 21. A strong pull-up tab 23 secured to the section 21 may be provided to facilitate removal of the end member.

In assembling and packing the container, the ends of the tubular body-forming blank A shown in Fig. 1 may be first connected together by inserting the tab 14 through the slot 17 in the manner heretofore described. The end member C forming the bottom of the container may then be inserted in this partially assembled tubular body member, care being taken to position the peripheral edge 25 thereof in the outwardly bulging circumferential groove 4 provided in the body member. The ends of the rim portion 2 may then be connected together by inserting the hook 9 into the notch 10 in such a manner that the hook 9 will engage an abutment portion 18. The rim portion 2 thus fixedly connected into tubular form serves to lock the end member C in fixed contents-supporting position within the tubular body member. The contents may then be inserted through the open end of the tubular body member. The body member may be filled up to the channel portion 5. The end wall closure member B may then be inserted so that the peripheral edge 25 thereof snugly seats within channel portion 5. The hook 12 may then be in-

serted into the notch 13 so as to engage the abutment portion 19, thus firmly locking the rim portion 3 in fixed tubular position.

The outwardly bulging channels or grooves 4 and 5 should be made of sufficient depth to support the end wall members B and C and the contents, the groove depth required being to some extent determined by the size and weight of the contents to be inserted in the container. It will be noted, however, that the outward pressure of the contents on the end members B and C serve to further collapse the bulb portions 4 and 5 outwardly, causing the side walls 26 and 27 of the groove portions to clamp and rigidly hold the end members in fixed position within the grooves. Access to the contents may be had by lifting the hook 12 out of engagement with the abutment portion 19 so as to permit expansion of the rim portion 3 and withdrawal of the closure disc 5. Where the groove portion 5 is of not too great a depth the closure disc B can be removed by an upward pull on a tab portion 23 attached thereto, which removal is further facilitated by the score line 22 which permits upward bending of the half portion 21.

A sturdy, strong and serviceable container is provided adapted to be used for the packaging of numerous and sundry articles of merchandise as will be evident to those skilled in the art. The packed containers are adapted to be stacked one upon the other during storage, shipment and display and can be assembled from the flat blanks by the user as needed. The rim portions 4 and 5 of adjacent containers prevent contact of the body portions 1 thereof, the channel portions 4 and 5 thus providing a resilient medium which protects the delicate contents from breakage or damage during shipment of the packed containers. The end wall members are firmly locked in position and will support contents of substantial weight whether the container is supported in upright position as shown in Fig. 6 or in inverted position. The relatively stiff end wall members B and C maintain the container in the desired shape and prevent deformation thereof.

A somewhat modified form of container is illustrated in Fig. 13, which container may be assembled from a body-forming blank A', as shown in Fig. 7, having a circumferentially extending outwardly bulged groove 4 which supports the bottom-forming end wall member C', and a circumferentially extending outwardly bulged groove 5 which supports the closure-forming end wall member B'. The blank A' may be held together in tubular cylindrical form by any suitable securing means, a series of staples 28 being shown in Fig. 13 for purposes of illustration. It will be understood that stitching, adhesive or other securing means may also be used.

In assembling this container, the body-forming blank A' is bent into tubular form and the side edges thereof secured together by staples 28, stitches, adhesive, or other securing means. The body-forming member C' is then inserted into the tubular container through the flange portion 2, by first seating a sector of the periphery 25 of the disc within the outwardly bulged groove 4 and then forcing by pressure the remaining sector of the disc into seating position within the groove 4. The bottom-forming member C' is thus held in fixed contents-supporting position by the overhanging side wall portions 26 and 27 of the groove 4 which extend over the outer rim portion 25 of the end wall member. After the container has been filled with contents, the cover-forming end

wall member B' may be similarly inserted into rim portion 3 of the outer tubular member and so that the side wall portions 26 and 27 of the groove 5 overhang the rim portion 25 of the end wall member B', thus securely locking the same in fixed position.

If desired, a suitable handle member D' formed from a paperboard blank shown in Fig. 1 may be provided for association with the closed member B', which handle member is inserted through a suitable slot 30 provided in the end member B'. The handle member may be formed from a single blank of paperboard comprising handle sections 31 and 32 hinged together along a score line 33. A foot portion 35 extending laterally from the handle section 32 and hinged thereto along the score lines 36 is arranged to seat against the inside face of the cover member B'. A similar foot portion 34 hinged to the handle section 31 along the score line 36 also extends laterally against the inside face of the closure member B', the whole presenting the generally inverted T-shaped member as shown in Fig. 13. The foot portion 35 is provided with an extension 39 integrally formed therewith, which extension is cut out from the handle-forming blank along the cut lines 41 and 43 so that when the handle is assembled the extension 39 will underlie and brace the foot portion 34. A similar extension 37 extends from the foot portion 34 and is defined by the cut lines 41 and 43, extension 37 being arranged to overlie the foot portion 35. To provide the handle with a comfortable hand grip, a flap 40 hinged to the handle section 32 along the score line 42 and otherwise freed from the handle section 32 by the cut lines 41 and 43, is adapted to be folded inwardly and upwardly, as shown in Fig. 13. Similarly, a flap portion 38 hinged to the handle section 31 along the score line 42 and otherwise freed from the handle section 31 by the cut lines 41 and 43 is also adapted to be turned inwardly and upwardly, as shown in Fig. 13. Thus, the grip portion of the handle comprises four layers of paperboard, which produces a comfortably rounded hand grip for the handle member and further strengthens the construction.

The handle member thus assembled is inserted through the slot 30 of the closure member B' so that the foot portions 34 and 35 extend laterally from the handle sections 31 and 32 and thus provide a relatively flat support for the closure member B'. The stiffening effect of the extensions 37 and 39 prevent collapse of the handle from its generally T-shaped form so that it is impossible to pull the handle through the slot 30 in the closure member B'. To prevent the handle member from dropping inwardly through the slot 30, a pair of tapered shoulders 46 may be provided to extend laterally from each of the handle sections 31 and 32. The shoulders 46 are wedge-shaped on one side so that the handle sections 31 and 32 can be drawn through the slot 30, but when the shoulders 46 have been drawn through the slot, the wedge-shaped shoulders will expand due to the natural resiliency of the paperboard so as to overhang the ends of the slot 30, as shown more particularly in Fig. 12. Notches 45 are provided immediately below the shoulder portions 46 to receive the end portions 29 of the closure member 25 adjacent the ends of the slot 30.

The container shown in Fig. 13 can be inexpensively constructed from paperboard or fibre-

board material and the body-forming member and end wall-forming member shipped to the user in flat blanks, effecting substantial economies in shipping and storage. The handle member D' as shown in Fig. 10 can also be shipped to the user in flat extended blanks. When a container is needed the user can quickly assemble the body-forming blank A' into tubular form upon a suitable mandrel, the ends of the blank being secured together by staples, stitches, adhesive, or other securing means. The end wall member C' forming the bottom of the container can be quickly telescoped into position in the rim portion 2 of the body member, the container then filled with contents, and the cover-forming member B' then inserted into seating position within the channel portion 5 by telescoping the same into the rim portion 3. The containers may be vertically stacked one upon the other and if the handle member has been applied, the handle sections 31 and 32 of the handle member can be bent over out of the way. A sturdy and convenient transportation container, admirably adapted for the packaging of bulky products is thus provided.

The principles of my invention may also be applied to a polygonal-shaped container, as shown in Fig. 18, formed from a tubular body-forming blank A² adapted to be shaped into tubular form, having the ends thereof closed by a bottom-forming end wall member C² and a cover-forming end wall member B². The body-forming blank A² comprises a plurality of side wall panels 61 hinged together by spaced parallel extending score lines 62, bottom-forming rim sections 63 each connected to the corresponding panel section 61 by an outwardly bulging channel portion 65. Similarly, rim sections 64 at the top of the container are each connected to corresponding side wall sections 61 by outwardly bulged channel portion 66. The channel portions 65 are hinged to the bottom rim sections 63 and to the adjacent side wall section 61 by spaced circumferentially extending score lines 67 and 68, and similarly the channel portion 66 is hinged to the rim sections 64 at the top of the container and to the adjacent side wall sections 61 by spaced circumferentially extending score lines 67 and 68, as shown more particularly in Fig. 14. To permit assembly of the flat blank shown in Fig. 14 into tubular polygonal form, transversely extending cuts 69 traversing the channel portions 65 and 66 are provided, the cuts 69 extending between the spaced score lines 67 and 68 and in line with the scores 62 which define the panel sections 61. The score lines 62 also extend through the top and bottom rim portions of the container to define the bottom rim sections 63 and the top rim sections 64.

Any suitable means may be provided for retaining the body-forming blank in set-up tubular form, such as hook flaps, staples, stitching, adhesive, or other securing means. For purposes of illustration, containers formed from blank shown in Fig. 14 may be provided with suitable securing tabs as shown in connection with the container assembled from the blank shown in Fig. 1.

In assembling the container shown in Fig. 18, a tab 80 which is hinged to one of the end side wall sections 61 along the score line 62, is inserted through a slot or cut 83 provided in the side wall section 61 at the opposite end of the blank. This insertion can be effected by bending the wing

portions 81 hinged to the tab 80 along the score lines 82 over the tab 80 until full insertion has been accomplished. When the wing portions 81 are then released the tab 80 will be locked in fixed position to the side wall section 81 provided with the slot 82 through which the tab 80 extends. The bottom-forming end wall member C² may then be telescoped or inserted through the bottom rim portion formed by the sections 83 and this bottom rim portion may then be contracted and held in fixed tubular position so as to lock the end member C² in fixed position by inserting a hook 71 provided on an arm 70 extending from one end of the rim portion through a notch 72 so that the hook 71 engages the abutment portion 73, all provided on the lower rim portion of the container. The container is filled with contents and the closure-forming end member B² then inserted so as to seat within the outwardly bulging channel portion 56. The end member B² may be provided with a diagonally extending score line 87 so as to permit bending of the sections 85 and 86 forming the end member. Suitable tab means 23 attached to one edge of the end member B² may be provided to facilitate grasping of the end member to effect removal thereof. The container here shown can be shipped to the user in the form of flat blanks, can be quickly assembled without necessitating special machinery and with a minimum of time, and provides an attractive merchandise and display container for numerous products. The containers can be stacked one upon the other in superimposed relationship during shipment, storage or display. It will be appreciated that pulverized or granular material can be packed in the containers shown in Figs. 6, 13 and 18 by providing a suitable liner within the container.

I have shown in Figs. 19, 20 and 21 a modified form of end closure B² for a container of substantially cylindrical contour, such as illustrated in Figs. 6 and 13. This end closure is formed from two separate discs which are pivoted together by a suitable rivet 53 located at the true diametrical center of the cylindrical container. Each of the discs 51 and 52 is provided with a truly circular rim portion 54 and 55 respectively, which extend a distance of at least 180° or more around each disc. The remaining rim portions 56 and 57 of the discs 51 and 52 respectively are somewhat flattened so that they do not extend in a true circle. It will be noted, however, that when the discs 51 and 52 are rotated so that the circular rim portions 54 of the disc 51 is positioned opposite the circular rim portion 55 of the disc 52, a truly circular end closure member is provided.

When inserting the end closure B² into a tubular container, such as shown in Fig. 6 or Fig. 13, the disc members 51 and 52 are so arranged that the circular edge portions 54 and 55 are in superimposed relationship. The end member B² can then readily be inserted in the container so that the superimposed circular rim portions 54 and 55 both seat within the adjacent outwardly bulged channel portion 5. It will be noted that an aperture 58 is provided in the upper disc member 52 into which a suitable instrument may be inserted to facilitate rotation of the upper disc 52 a distance of approximately 180° so as to position the circular rim portion 56 thereof into position opposite the circular rim portion 54 of the disc member 51. During this rotative movement the circular rim portion 56 will move into the outwardly bulged channel portion 5 and when the upper disc

member 52 has been rotated a full 180° the combined disc members 51 and 52 completely enclose the container end with the peripheral edge portions 54 and 55 of the end members securely locked within the outwardly bulging groove portion 5.

Access to the contents of the container may be had by inserting an instrument through the opening 58 in the upper disc member 52 and rotating the upper disc member 52 to a position wherein the circular edge portion 56 thereof is positioned directly above the circular edge portion 54 of the disc member 51. The finger or other instrument may then be inserted between the relatively flat edge portions 55 and 57 of the disc members 51 and 52 respectively and the adjacent outer tubular rim portion 3 of the container, and the closure member then pulled upwardly out of its seating position within the groove portion 5. It will also be noted that the end closure member B² as shown in Figs. 19 and 20 may form either the bottom end or cover end of the container, or both, as desired.

There is shown in Figs. 22 and 23 a ring member 105 cut out from relatively stiff, strong cardboard material seated within the channel 5 of the body member A. The ring member 105 may be seated within the channel portion 5 of the container body before the rim portion 3 of the body has been connected, and after insertion of the ring member a staple 106 or other securing means may be provided to lock the ring member securely in position. The ring member 105 provides a strong and sturdy seat for a disc-shaped cover member 107 which may also be made of paperboard material. The cover member 107 extends partially into the channel 5 of the container body and is held in place by the close seating abutment of the peripheral edge portion 108 thereof with the inside face of the container body. The cover member 107 may be telescoped into the open end of the tubular body member and be forced into seating position upon the ring member 105, and it may be removed from the container body by an upward pull thereon. The cover member 107 may be provided with a pull up tab 109 if desired, such as the pull up tab 23 applied to the cover member shown in Figs. 15, 16 and 18.

In manufacturing the body-forming blanks as shown in Figs. 1, 7 and 14, large sheets or rolls of relatively strong, tough paperboard or fibreboard material are provided, which sheets or rolls are cut into blanks of suitable size and shape to form the tubular body member. The body-forming blanks are then passed through a suitable grooving machine which forms the grooves or channel portions along the top and bottom edges of the blank. This grooving mechanism, as shown more particularly in Figs. 24 and 25, may comprise a pair of spaced female die rolls 90 and 91 arranged in staggered relationship and each mounted on a separate shaft 92. A pair of spaced male rolls 94 and 95 positioned below and cooperating with the female rolls 90 and 91 respectively are also mounted upon separate shafts 96. The body-forming blank A is passed between the male and female rolls by either drawing the blank therethrough, or if desired the male and female rolls may be rotated by suitable driving means so as to roll them over opposite sides of the blank as the blank is passed therebetween. The female rolls 90 are each provided with a suitable peripheral groove 93 which receives the extended rim portion 97 of the corresponding male rolls 94 so as to form the channels 4 and 5 in

the blank A. It will be noted that a slight lateral contraction of the blank A results due to the material required to make the grooves 4 and 5. To prevent tearing of the blank it is preferable to stagger the cooperating male and female rolls 94 and 90 with respect to the cooperating male and female rolls 95 and 91 respectively so that this necessary lateral contraction of the blank can take place at spaced points, overcoming the necessity of placing unnecessary stretching or tearing stresses on the blank.

It will be appreciated that when the grooves are formed in substantially flat blank A they would iron or flatten out when the blank is bent into tubular form if means were not provided to prevent such flattening or ironing out. By again referring to Fig. 1 of the drawings, it will be noted that each of the outwardly bulging grooves 4 and 5 is provided with transverse cuts 7, and these cuts 7 permit the intermediate groove segments to freely buckle outwardly when the blank is assembled in tubular form. The cuts 7 may be provided in the blank A by means of suitable cooperating male and female rolls, the male roll having knives properly spaced around the periphery thereof which cooperate with suitable die cavities provided in the periphery of the female roll. Such cuts may be provided in the blank either before or after the grooves 4 and 5 have been formed therein by the apparatus shown in Fig. 24.

There is shown in Fig. 25 a fragmentary portion of a female roll 98 having a groove 100 extending around the circumference thereof which cooperates with a rim portion 101 extending circumferentially around a male roll 99. The male roll is provided with circumferentially spaced transversely positioned cutting knives 102 having a cutting edge adapted to seat within a corresponding transverse die recess 103 extending transversely across the circumferential groove 100 of the female roll 98. When the female and male rolls 98 and 99 respectively traverse the blank, transverse cuts 7 are formed in the groove in the blank. It will be understood that a pair of male and female cutting rolls is provided for each groove to be formed in the blank. It will also be understood that the grooving of the blank and the transverse cutting of the blank may also be preformed simultaneously by male and female grooving rolls also provided with transverse cutting knives. By means of the mechanism above described the grooving of the blank can be rapidly and economically performed. It will also be understood that blanks of the type as shown in Fig. 14 as well as blanks as shown in Figs. 1 and 7 may be grooved and cut with the mechanism heretofore described.

It is now seen that I have provided an improved container formed from three blanks of paperboard material which, if desired, can be shipped in collapsed blank form and set up by the user as needed. The container-forming blank may be cut from large sheets or rolls of paperboard material substantially without waste, with a minimum of board required for each container. The container may be made in cylindrical or polygonal form to best suit the needs of the user. The body-forming blank is so constructed as to be adapted for quick assembly by the user without the aid of special assembly machines. The assembled container is sturdy and strong in construction and is admirably adapted for the packaging of numerous articles of merchandise, either dry or semi-dry in nature, as well

as granular materials or relatively large objects. If desired, a handle can be provided for the container whereby the packed container may be conveniently carried or transported by the customer, the handle being so made as not to interfere with the normal stacking of the packed container.

While certain novel features of the invention have been disclosed and are pointed out in the annexed claims, it will be understood that various omissions, substitutions and changes may be made by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A container including, a tubular body member formed from a single blank of paperboard material, and end member of relatively stiff paperboard material positioned within said tubular body member to form a bottom for the container, said body member having an outwardly bulging circumferentially extending groove formed in the side wall thereof adjacent the bottom end providing a seat for the peripheral edge of said end member and defining a body portion and a rim portion, said groove having spaced cuts extending transversely across said groove to permit outward collapse of said groove when load pressure is applied upon said end member, said cuts having a length not substantially greater than the width of said groove, said groove having side portions which overhang the peripheral edge of said end member, said body portion having a hook-forming tab integral with one end thereof cooperating with a slot adjacent the other end thereof for retaining the body portion in fixed tubular position, and said rim portion having at one end thereof an integral hook-forming tab cooperating with a notch adjacent the other end thereof for retaining the rim portion in fixed tubular position and to lock said end member in fixed, suspended position within the body member upon insertion thereof.

2. A container including, a body-forming blank of paperboard material having a body portion, top and bottom rim portions, and an outwardly bulging groove connecting each of said rim portions to said body portion, said body portion having an integral section extending from one end of the blank beyond the adjacent ends of said grooves to provide means for attaching the ends of the body portion together in fixed tubular form, each of said rim portions having an integral tab extending from one end of the blank beyond the adjacent ends of said grooves to provide means for attaching the ends of said rim portions together in fixed tubular form whereby the ends of said grooves are substantially in abutting position when said body portion and said rim portions are attached in fixed tubular form, and a relatively stiff end closure member positioned within each end of said tubular body and seating within the adjacent groove, said grooves each having spaced cuts extending transversely across the grooves to permit outward collapse of said grooves when load pressure is applied upon said closure member, said cuts having a length not substantially greater than the width of the grooves through which they extend.

3. A container including, a tubular body member of polygonal cross-section formed from a single blank of paperboard material comprising a body portion and rim portions, said body portion having fold lines defining connected side wall panels, each of said rim portions being connected to the body portion by an outwardly bulging groove, said grooves having transversely extend-

- ing slits in line with the fold lines defining the adjacent side wall panels, said cuts having a length not substantially greater than the width of the grooves whereof they intersect, and a closure disc of paperboard material at each end of said body member, each of said end members having the peripheral edge thereof extending into the adjacent groove, interlocking means for securing the free ends of said body portion together in fixed tubular form, comprising an integral tab extending from one end of the body portion cooperating with means at the other end of the body portion, and separate interlocking means associated with each of said rim portions for securing the free ends of said rim portions together in fixed tubular form upon insertion of the corresponding closure disc therethrough, comprising a tab extending from the end of each rim portion and cooperating with means at the other end of the corresponding rim portion.
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