Jan. 17, 1956 G. A. MOORE 2,731,189

NESTING TYPE CONTAINER

Filed May 3, 1952

FIG. 2

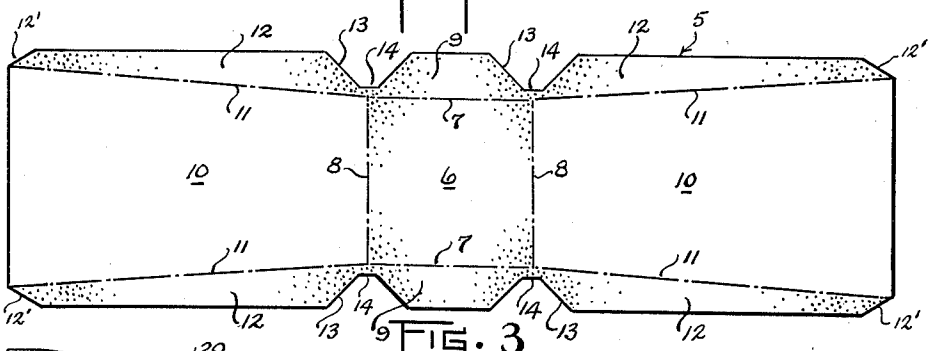



FIG. 3

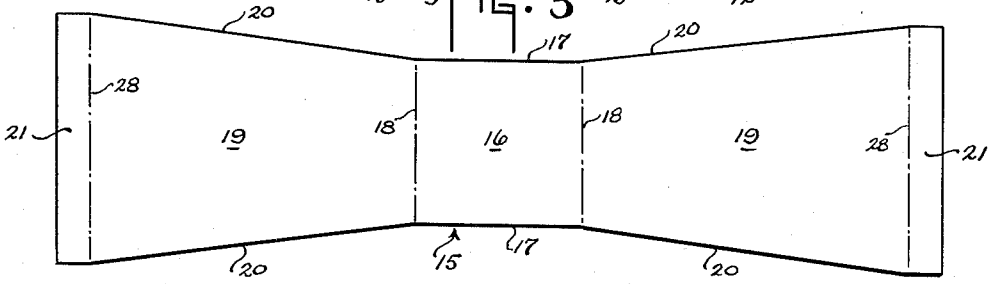



FIG. 1

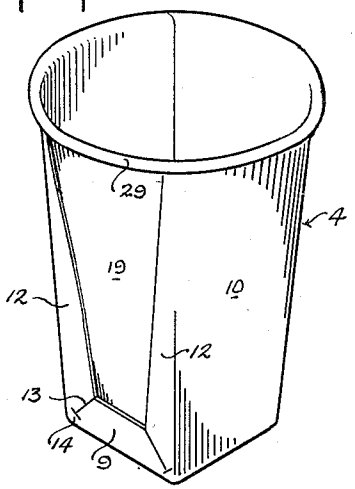



FIG. 4

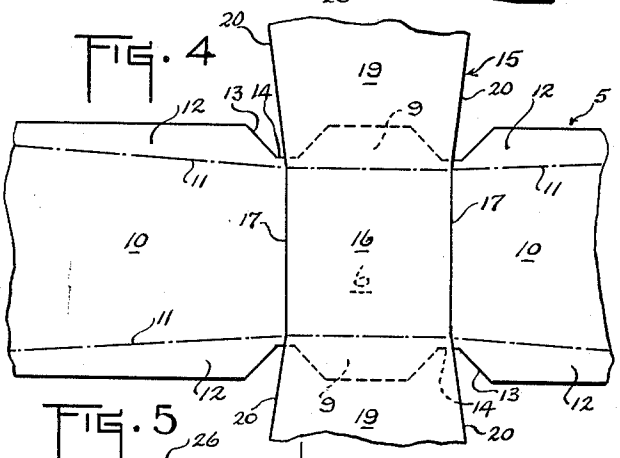



FIG. 5

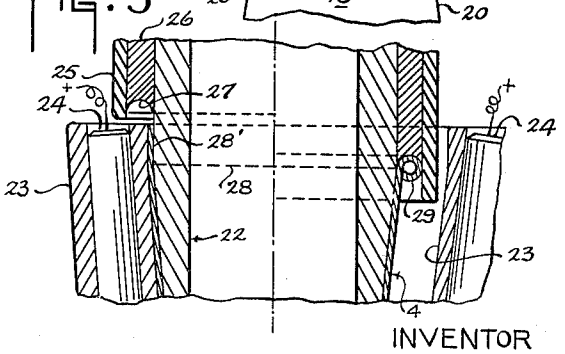
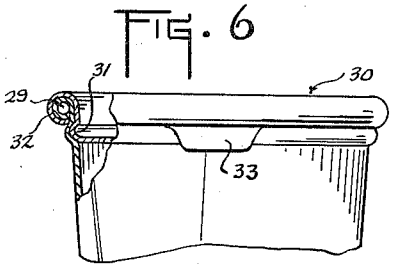



FIG. 6




INVENTOR

GEORGE ARLINGTON MOORE

George Arlington Moore

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# NESTING TYPE CONTAINER

George Arlington Moore, New York, N. Y.

Application May 3, 1952, Serial No. 285,873

7 Claims. (Cl. 229—23)

This invention relates to improvements in containers made of sheet materials such as paper or aluminum and constructed of a pair of blanks cut therefrom which are assembled together in such manner that the bottom of the container is reinforced with two-ply material and formed integrally with tapering side walls, the shape of the bottom being substantially rectangular, the side walls being marginally reinforced and blends from a rectangular shape to a round shape at the mouth of the container, the said mouth being reinforced with a marginally rolled rim portion of the said side walls, the area across the mouth of the container being greater than across the bottom thereof.

Conventional conical shaped containers are constructed from sector shaped body blanks and circular shaped bottom discs cut from sheet material, the body blanks being usually convolutely wound two-ply for strength and the bottom disc drawn in a flanging operation, the flanged bottom part being inserted into the wound body whereby a bottom marginal portion of the body is turned inwardly and upwardly over the flange of the circular bottom the material being compressed by being acted upon with rotating tool parts, the mouth of the container being rolled with rotating tools. Usually, rotating dies are employed to hold the container bodies during the assembly of the container. The nominal waste of sheet material in cutting the sector shaped body blanks may be up to eighteen percent and the cutting of circular discs twenty-three percent. The said conventional containers are fabricated in machinery operational stages consisting of body rolling, bottom flange drawing and final assembly of the said parts, the bottom being inserted into the body and attached thereto by rotary action of tools.

A principal object of the present invention is to provide containers which will eliminate the high percentage of waste material heretofore described and provide structural reinforcements whereby further economy in use of materials may be employed by utilizing lighter weight sheet with which to construct the container, the structure being formed and completed in one operational machine.

Another object of the invention is to provide containers of comparable net capacity that will occupy less space than those of conventional types, the bottom of the container being reinforced and constructed integrally with the side walls, the said bottom being flat and of substantially rectangular shape, the side walls being blended from the said shape to round shape at the mouth of the container.

A further object of this invention is to provide a method of constructing containers without a rotating motion of either the material thereof or the fabricating dies and tools which form the container, thereby improving the efficiency and economy in making containers.

A still further object of the invention is to provide containers so constructed that they are produced economically by a simple method of fabrication, the containers being adapted to be utilized for dispensing hot and cold liquid drinks of various kinds and serve many other general purposes.

These and other objects of the invention will be apparent upon reading the following descriptive disclosure read in conjunction with the illustrative accompanying drawings, wherein;



Fig. 1 is a perspective view of the container,

Fig. 2 is a plan view of a first blank used in constructing the container,

Fig. 3 is a plan view of a second blank used in the construction of the container,

Fig. 4 is a fragmentary view of the blanks in partial assembly relationship.

Fig. 5 is a fragmentary view in cross-section of fabricating tools used in making the container showing to the left of the vertical center line, the dies and tools in position before curling of the rim and to the right of the center line the dies in position after curling of the rim,

Fig. 6 is a fragmentary view in perspective of a closure adapted to the container, a portion of the wall and closure structure broken away.

Referring to Figs. 1, 2, 3 and 4 of the drawings, the container 4 (Fig. 1) is formed of a pair of blanks (Figs. 2 and 3) which are assembled together cross-wise (Fig. 4) the central portion of each blank being superimposed and secured together to form the bottom of the container, the extended wall portions of the assembled blanks being folded in side wall relationship, the said walls having marginal portions overlapping each other and secured together, the walls being blended in shape from flat surfaces adjacent the bottom to curved surfaces adjacent to and at the top of the container. The side walls terminate at the top of the container in an outwardly rolled rim which merges the assembled blank edges together in a substantially uniform and reinforced border around the mouth of the container, the bevelled ends of said marginal overlapping portions co-operating in merging said edges smoothly.

Referring more particularly to Fig. 2 there is illustrated a substantially rectangular shaped blank **5** having a central area **6** and a pair of horizontal parallel junction lines **7** and a pair of transverse junction lines **8**, the said central area being connected with side flanges **9** extending outwardly of lines **7** and lateral extensions **10** projecting outwardly of each of the junction lines **8**. The lateral extensions **10** include a pair of lateral side flanges **12** which merge with the flanges **9** of the central area by triangular shape notches **13** having blunt apexes **14** at each of the adjacent corners of the central area of the blank. The flanges **12** terminate with angular cut ends. The blank **5** may be provided with thermoplastic adhesive which may be printed or otherwise applied to selected surfaces of the blank that constitute the seam area zones or, the entire surface of the blank may be provided with thermoplastic film such as polyethylene.

The blank **15** (Fig. 3) is provided with a central wall portion **16** having parallel side edges **17** and transversely disposed parallel folding lines **18** beyond which extend lateral wall projections **19** having inwardly tapering side edges **20** terminating in the rectangular shaped marginal portions **21**.

The assembling of the container consists of feeding the pre-cut blank **15** (Fig. 3) to position upon the end of a mandrel **22** (Fig. 5) having an end surface matching the central area of the blank, said mandrel may be arranged in multiples in one machine, the mandrel having the form of the container. The pre-cut companion blank **5** is then fed upon the previously positioned blank in the manner shown in Fig. 4 in which position the central wall portions of each blank are secured together by the thermoplastic adhesive being activated by the application of heat and pressure thereupon. The lateral extensions **10** and **19** are folded over the exterior surface of the mandrel with the flanges **9** and **12** overlapping portions of the adjacent walls. A chuck assembly **23**

adapted to expand and contract and equipped with electrical heating elements 24 compresses the overlapping portion of the walls thereby transferring to the said walls the shape of the said mandrel. The overlapping flanges are sealed with heat and pressure which activates the film of thermoplastic adhesive on the flanges which upon solidification produces a container having a bottom integral with the side walls.

After the pre-cut blanks are molded and adhesively seamed to one another to form the shape of the container, a rim is formed. The segments of the chuck assembly 23 expand to move away from the surface of the formed wall of the container thereby providing clearance for the operation of curling the top of the container to form the rim. The curling assembly comprises a cylindrical shaped sleeve 25 in which a curling die 26 is disposed said die having a semi-circular cavity 27 therein. The mandrel 22 has a cylindrical shape upwardly of the shoulder line 28 to support the curling die and to provide a straight walled marginal portion 28' to the top of the container wall. The curling die 26 has a straight downward movement which turns or curves the top edge of the container side wall and rolls over a portion thereof to form a reinforcing rim 29 around the mouth of the container. The sleeve 25 surrounding the curling die moves downwardly faster in advance of the curling die 26 to confine and control the curling and to prevent uncontrolled spreading of the worked material.

When the blanks are assembled and folded, the side walls of the notches 13 abut each other the blunt apexes 14 providing excess material, which material is compressed under heat and pressure to tighten securely and reinforce the corner portions of the bottom of the container, therefore the bottom is strongly reinforced with two layers of integrally secured material, the side walls being strongly reinforced with overlapping flanges secured to portions of the walls. The ends of the walls are formed into a reinforced rim around the mouth of the container. The container so constructed is produced economically and by a simple method of fabrication, the containers being adapted to be utilized for dispensing hot and cold liquid drinks of various kinds and serve many other general purposes.

The container may be adapted with a cover 30 (Fig. 6) preferably made of aluminum sheet material the thickness of which may be 0.004 inches thickness or thicker if desired. A flanged circular shaped disc fitted inside the mouth of the container, capping tools are provided to form an inner groove 31 inside the top of the container wall. Curling of the remaining portion of the cover over the rim 29 of the container forms a further reinforcement 32 to the mouth of the closed container. The ductility and workability of aluminum provides a tight closure which may be thermoplastically sealed to the wall of the container using heat and pressure and expandable grooving tools. The curling operation may be accomplished in the same manner as described for the function of the curling die illustrated in Fig. 5. A tab 33 may be provided with which to remove the cover.

Rolls of suitable paper sheet material which may be printed and of the character and grade used in fabricating conventional containers, are fed through a blanking operation thereby providing pre-cut blanks for a series of container forming mandrels equipped with tools (Fig. 5) which shape and construct the complete container in one operation, the said operation consisting of the forming of the bottom and integrally related body walls, securing the related parts together in seam forming relationship and forming a reinforcing rim around the mouth of the container after which the completed container is ejected from the mandrel into a nesting formation of previously ejected containers. The waste of material in making the said containers being negligible in comparison with conventional taper shaped containers.

Aluminum sheet material about 0.004 inch thickness may be employed economically with which to fabricate the improved containers, the fabricating method as described being adaptable to work such material.

I claim:

1. The herein described method of forming a cup-like container having a rectangular bottom and four side walls gradually merging upwardly into a circular mouth which comprises, placing two generally rectangular elongated blanks one across the other in cruciform relation to provide a two ply rectangular bottom wall and four wall extensions, folding the extensions upwardly to provide four flat side walls having marginal edge portions overlapping from opposite directions while confining said extensions between inner and outer surfaces causing the flat side walls gradually to merge into an open circular mouth, curling the mouth edge outwardly, and adhesively bonding the superposed bottom plies and the overlapping marginal edges to complete and retain the shape of the container.

2. The method defined in claim 1 including the step of forming a cylindrical portion defining the circular mouth extremity of the container, and shaping this cylindrical portion into the outward curl.

3. The method defined in claim 1 including the steps of proportioning the underlying or outer blank so that it will provide marginal edge portions disposed to overlap not only upstanding wall portions of the companion blank but also wall portions of the companion blank above and along the juncture thereof with the bottom wall of said companion blank, and forming notches in said outer blank margins at portions disposed to lie at the corners of the container bottom, said notches having blunt apices so as to present imperforate corners and being defined by edges converging at such angular relation as to be disposed in flush edge abutting relation when the marginal edge portions are overlapped and adhesively bonded.

4. The method defined in claim 1 including the steps of pre-conditioning one of the said blanks with activatable adhesive prior to forming the container so that the portions intended to overlap including the bottom walls and corner junctions thereof, may be bonded together in liquid tight seam forming relationship by the application of heat and pressure.

5. The method of forming a container of heat sealable sheet material having a rectangular bottom and four side wall forming portions to provide a body portion gradually merging upwardly into a circular mouth which comprises, placing two generally rectangular elongated pre-cut strips of said sheet material one across the other in cruciform relation to provide a two-ply flat rectangular bottom wall and four extensions, pressing said bottom wall portion with heat to seal the engaging surfaces of said two plies together, folding said extensions upwardly to provide four flat side wall portions having marginal edge portions overlapping from opposite directions while confining said extensions between inner and outer surfaces causing the flat side wall forming portions gradually to merge into an open circular mouth, heat sealing said marginal edge portions of the extensions to permanently secure the shape of the walls of said extensions and thereby provide said body portion, curling the related mouth edges thereof outwardly in uniformly blended relation to provide reinforcement to said mouth and augment the permanency of said circular shape thereof including the shape of said container.

6. A cup-like container of sheet material comprising an assembly of two pre-cut strips of said material, each of said strips being of generally elongated rectangular shape and crossed centrally one across the other in cruciform relation which provides a uniformly flat reinforced two-ply bottom wall of rectangular shape of said container, each said bottom wall layer being adhesively united together, the inner wall layer of said bottom wall having two opposed integral side wall portions being folded upwardly from two substantially parallel corner edges of

said bottom wall, the outer wall layer of said bottom wall having two opposed integral side wall portions being folded upwardly from two substantially parallel transverse corner edges of said bottom wall, the edges of the outer bottom wall layer and its two opposed integral side wall portions being provided with lateral flanges, the flanges of the side portions being joined to the corresponding flange of the bottom layer by a portion which makes these flanges continuous, the said continuous opposed lateral flanges being in overlapping relation to the corresponding marginal surfaces of the first mentioned folded side wall portions which are integral with the inner bottom wall layer, all of which portions form the whole body side wall of the container, said overlapped margins thereof being adhesively united together in seam forming relationship, the alternate pairs of said side wall forming portions being shaped in contour defined as being of rectangular shape in horizontal cross section upwardly adjacent the corner edges of said bottom wall and being transitorily blended into circular shape adjacent the top periphery edges of said body side wall of the container, said periphery being formed into an outwardly disposed marginally curled helicoidal rim, said rim providing means which reinforces said body side wall to maintain substantially concentric circular shape around the open mouth thereof.



7. A cup-like container according to claim 6 wherein the top corner edges of said marginally overlapped seamed side wall portions being encompassed within said curled rim and thereby provide a uniformly level top horizontal plane of the corner edge of the container body side wall and which said encompassed edges within said rim augmenting the stability of said contour shape thereof.

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