Nov. 30, 1954 P. L. WAHL 2,695,728

BOX CONSTRUCTION

Filed Nov. 8, 1951

FIG. 1

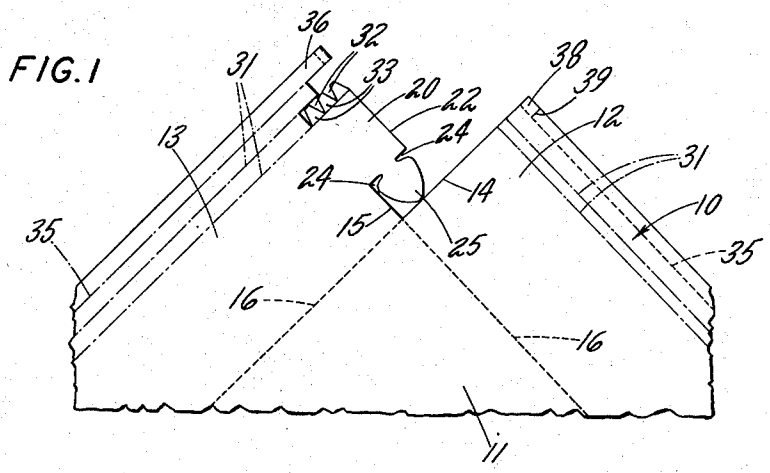


FIG. 2

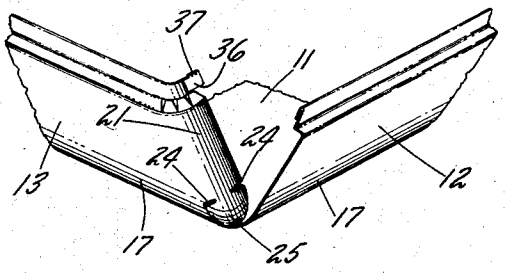


FIG. 3

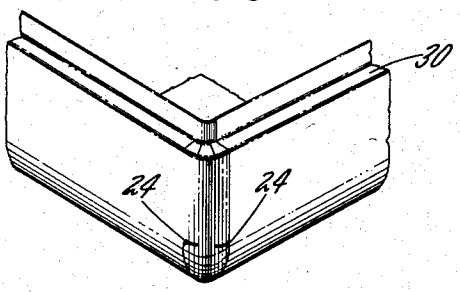
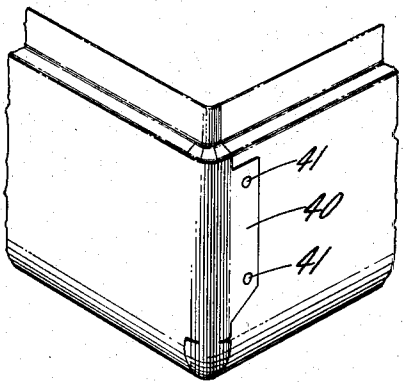


FIG. 4



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BOX CONSTRUCTION

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2 Claims. (Cl. 220—62)

This invention relates to the construction of boxes and receptacles and more particularly to a generally rectilinear box construction formed from a sheet blank so as to have curvilinear corners at each intersection of the walls thereof.

In the manufacture of boxes of the type described it has been common practice to form the box by a drawing process wherein the box is fabricated from a sheet blank by placing the blank in a press and performing one or more drawing operations thereon. Although the box thus formed may have the desired rounded corners at the juncture of the walls thereof, the process of manufacture is subject to certain disadvantages. For example, the dies utilized in forming the box can be used in forming a box of only one size, that is, the same dies cannot be used when it is desired to vary the overall dimensions of the box. In addition, the cost of the dies is relatively high and a great deal of time is involved in changing one set of dies for another within a press in order to condition the press for production of boxes of a different size. The cost of the box manufactured by such process is also increased in that a relatively heavy sheet blank must be used in order to withstand the drawing process and in addition only certain types of relatively high quality metals can be utilized in a drawing process.

It is an object of the present invention to provide an improved process for forming a box from a sheet blank, said process to involve stamping or cutting the blanks so that the same may be formed into a box having rounded corners without involving the use of drawing presses whereby the box may be most economically formed from lightweight and inexpensive sheet material.

A further object of the present invention is to provide means for forming a box of the type described from a sheet blank wherein only relatively inexpensive tools need be utilized and wherein said tools can be used in the fabrication of the corners of boxes of different sizes.

Other objects will be in part obvious and in part pointed out more in detail hereinafter.

The invention accordingly consists in the features of construction, combination of elements and arrangement of parts which will be exemplified in the construction hereafter set forth and the scope of the application of which will be indicated in the appended claims.

In the drawings:

Fig. 1 is a fragmentary view of a blank utilized in constructing a box according to the present invention and showing particularly the configuration of a section of the blank utilized to form a rounded corner joining adjacent side walls;

Fig. 2 illustrates the details of the corner construction and an intermediate step in the formation of the box;

Fig. 3 is a view similar to Fig. 2 which shows the completed corner referred to above; and

Fig. 4 is a view similar to Fig. 3 showing a modified corner construction.

The box of the present invention is to be formed from a blank of sheet material as, for example, a thin sheet metal blank **10**. In Fig. 1 one corner portion of the blank is shown, and in the construction of a polygonal box, the number of such corner sections corresponds to the number of sides. For example, in the construction of a four-sided box, the blank will be provided with four corner sections similar to the sections shown in Fig. 1.

The blank per se comprises a bottom portion **11** having integrally formed thereon peripheral portions **12** and **13** which in the process of forming the box will comprise

adjacent side walls thereof. One side wall portion **12** has one end edge **14** which is substantially normal to the edge **15** on the adjacent end of the side wall portion **13**.

If the box were to be formed with sharp corners, the side wall portions **12** and **13** could be bent relative to the bottom portion **11** along the dash lines **16** to a substantially normal position relative to the bottom **11** whereby the side walls would join in a sharp corner along the edges **14** and **15**, said corner also being normal to the bottom **11**. However, in accordance with the present invention the blank is to be formed into a box having rounded corners and the side walls **12** and **13** are curved as at **17** adjacent the dash lines **16**. The body portion of the side walls in the present construction are substantially normal to the bottom **11** and due to the curvature **17** the edges **14** and **15** will be in spaced relation to each other when the side walls assume the aforementioned normal position.

The space between the adjacent edges **14** and **15** is closed in the present construction by providing the side wall **13** with an extension adjacent the edge **15**. The extension **20** is arranged to be convexly outwardly curved as indicated at **21** along an axis parallel to the edge **15** whereby the leading edge **22** on the extension will abut against the edge **14** on the side **12** to provide a rounded vertical corner as shown in Fig. 3.

In order to join the rounded vertical corners between adjacent side walls with the rounded corners between the side walls and the bottom of the box, the extension **20** is notched as at **24** to define a generally triangular downwardly depending tongue **25** which is formed into a convexly outwardly curved shell, the peripheral edges of which join the side wall edges **14** and **15** to provide a parti-spherical surface at the juncture of the horizontal corners **17** and vertical corner **21**. In forming the tongue **25** into a parti-spherical shell, the notches **24** are substantially closed to provide a substantially imperforate curvilinear corner construction joining adjacent side walls and the bottom wall of the box. The abutting edges of the elements comprising the aforedescribed corner construction are to be secured together as by soldering, welding, or the like.

It should be understood that the aforedescribed corner construction is to be utilized in forming each of the corners of the box and it should also be understood that the blank **10** can be cut and formed in the aforedescribed manner by an operator utilizing the most simple of hand tools. However, to expedite the process, the corner portions of the blank can be stamped in a conventional punch press into the form shown in Fig. 1, by placing only the corner portions of the blank into the press. Thereafter conventional metal forming machinery and tools can be used to form the rounded corners in the stamped blank. Obviously, the stamping press and the tools utilized in forming the box in the manner described can be utilized in the construction of the boxes of varying sizes, thereby making it unnecessary to change dies when it is desired to change from the manufacture of one size box to a box of another size.

The above described means and method for forming a box relates to straight-sided open-topped boxes, but in addition, the box can be provided with an internally directed ledge or shoulder **30** to accommodate a cover which may be formed similarly to the box. In suiting the blank **10** for the construction of boxes having such a ledge the side walls **12** and **13** are offset by bending the same along the dash and dot lines **31** to the configuration shown in Figs. 2 and 3. In such constructions the side wall extensions **20** are notched as at **32** adjacent their upper edges to define a plurality (three shown) of tooth-like ears **33** which join each other in edge-abutting relationship when the extension **20** is rounded or curved as at **21**. Thus, the ledge **30** is also provided with rounded corners symmetrical to the vertical corners of the box.

The upper edge of the box may be provided with a reinforced rim by folding the peripheral margin of the side walls inwardly and downwardly along dash lines **35** to the position shown in Fig. 2. The folded upper edges of the adjacent side walls may be conveniently joined by providing one of the side walls with an extension **36** ad-

jacent its upper edge which in the rolled condition of the edge, as shown in Fig. 2, may be folded upon itself as indicated by reference numeral **37** to provide a hook for receiving an ear **38** defined in the upper corner of the adjacent side wall as by cutting the same at **39**. The ear **38** may be disposed between the extension **36** and the folded section **37** thereof to secure the adjacent side walls in edge-abutting relationship. The provision of the aforedescribed securing means facilitates assembly of the box from the blank by holding the side walls in said edge-abutting relation until the solder or other securing and sealing means is applied to the corner.

In Fig. 4 there is illustrated a modification of the construction of the corners for the aforedescribed box wherein the extension **20** is provided with an extending leaf **40** adapted to overlie the outer surface of the adjacent side wall when the corner is formed in the aforedescribed manner. The leaf **40** is then secured to said adjacent side wall by spot welding or the like as indicated at **41**. In such modified construction, however, the seams formed by the abutting edges of the adjacent side walls are filled with solder or otherwise sealed as, for example, by a butt welding process.

If desired, the corner construction shown in Figs. 1 to 3 may be reinforced by various means as for example a curved plate (not shown) affixed either internally or externally to the adjacent side walls as by spot welding or the like. However, the aforedescribed corner construction is remarkably strong and in most cases reinforcing means will be unnecessary.

It will be seen that boxes can be formed according to the present invention from very thin sheet blanks since there is no drawing process involved such as will change the cross-sectional structure of the blank utilized. It will also be seen that the box may be formed by following the simple steps of the aforedescribed method and without the use of expensive machinery or apparatus.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the language used in the following claims is intended to cover all of the generic

and specific features of the invention herein described and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

I claim as my invention:

1. A blank for forming an open top box comprising a polygonal sheet having a body portion and extending side portions adapted to be folded upwardly with respect to said body portion to define rounded horizontal edges therealong, each of said side portions having a lateral extension for forming a rounded vertical edge between said side portion and an adjacent side portion and for defining a parti-spherical corner between said vertical edge and the adjacent horizontal edges, said extension comprising a generally rectangular portion adapted to be formed as the rounded vertical edge and a generally triangular tongue depending from the rectangular portion and defined by aligned notches extending toward each other from opposite sides of said extension between said rectangular portion and said triangular tongue whereby the said tongue may be formed in parti-spherical shape so that the apex thereof will engage the body portion of the blank and so that the side edges thereof will engage the adjacent rounded horizontal edges.

2. A corner structure for an open top box having rounded horizontal and vertical edges comprising a lateral extension in one wall of the box having a rectangular portion formed to define a rounded vertical edge engaging the adjacent wall of the box, and said extension also having a generally triangular tongue depending from said rectangular portion and defined by aligned notches extending toward each other from opposite sides of said extension between said rectangular portion and said triangular tongue, said tongue being formed in parti-spherical shape with its apex engaging the bottom of the box and with its side edges engaging the adjacent rounded horizontal edges.

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