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(54) **Method of forming metal cans.**

(57) This relates to a method of forming metal cans wherein two generally cup-shaped halves have their open ends united to form such cans. This particularly relates to the forming of can components at a central facility where the can components are formed in great numbers and are then shipped to a place of use. This particularly relates to the forming of tapered can components which are readily nested for stacking, wrapped, and then shipped to a satellite facility where the tapered can components are reshaped to have cylindrical bodies and domed ends and wherein the domed cup-shaped can halves are then assembled by way of a pressure tight seam between the can halves.

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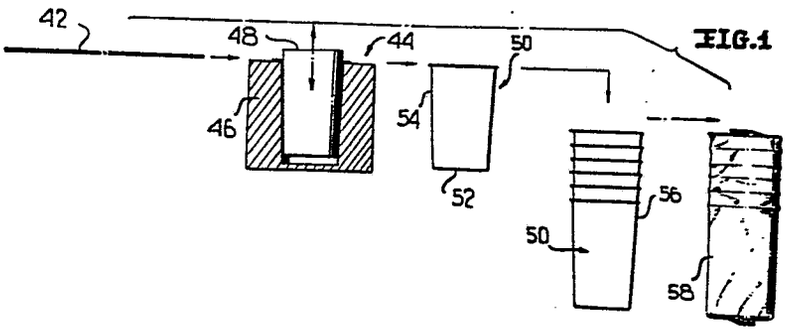


FIG.1

METHOD OF FORMING METAL CANS

This invention relates in general to new and useful improvements in the manufacture of metal cans, and more particularly to metal cans which are formed by joining open ends of two cup-shaped halves.

It will be appreciated that when one ships empty cans, one is shipping large quantities of air and thus the cost of shipping cans is quite high as compared to the cost of shipping other products when one considers the weight of the product.

Many years ago, cylindrical can bodies were made in the United States, flattened, shipped to Cuba, and then opened to save shipping space. However, this invention relates to can components which have integral bottoms, and therefore are not readily collapsible by flattening.

Accordingly, the object of the present invention is to provide a method of forming metal cans which overcomes the foregoing problems.

The present invention provides a method of forming metal cans, said method comprising the steps of producing at a first facility tapered cup-like can components, nesting the can components to provide high density packing, shipping the nested can components to a second facility, separating the can components and reforming the can components to form upper and lower can halves each having a generally cylindrical body and an integral end, and then joining the can halves in sealed relation.

An embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a schematic view showing the manner in which sheet metal is shaped into tapered cup can components, nested, and then wrapped into a high density package for efficient shipping.

Figure 2 is a perspective view of wrapped, nested, tapered cup can components.

Figure 3 is a perspective view showing wrapped can components packaged in a container for ease of handling during shipment.

Figure 4 is a schematic view showing the forming of tapered cup can components into upper and lower can halves, and the assembling thereof to form cans.

Figure 5 is a top perspective view of a typical can formed in accordance with this invention, the can having been filled and closed.

Figure 6 is an enlarged fragmentary sectional view taken generally along the line 6-6 of Figure 5, and shows the easy opening details of the can.

Reference is first made to Figure 5 wherein there is illustrated a typical can which may be formed in accordance with this invention, the can being generally identified by the numeral 10. The can 10 includes a lower half 12 and an upper half 14 which are joined together in sealed relation.

The lower half 12 includes a cylindrical body 16 having an integral domed bottom 18 which is generally hemispherical in configuration. In order that there may be provided a stable platform for the lower half 12, the domed bottom 18 has projecting downwardly therefrom a plurality of bulges or projections 20 in the form of feet. The projections 20 are generally circumferentially spaced about the bottom 18 and project downwardly therebelow sufficiently to compensate for any bowing or further doming of the bottom 18 due to internal pressures within the can.

The upper can half 14 includes a domed top 22 which may also be generally of hemispherical shape if so desired. The domed top 22, as is best shown in Figure 6, is provided with a central opening 24, the opening 24 being a filling opening.

The two halves 12, 14 are joined together at their open ends, preferably by internesting and bonding as will be described hereinafter, and thus the resultant can 10 has no opening therein except for the filling opening 24. The filling opening 24, as is best shown in Figure 6, is closed by a filler plug 26. Depending upon other features of the top 22, the filler plug may be permanently installed or may be removable for dispensing the contents of the can 10. For example, the filler plug could be in the form of a threaded fitment having a closure cap and the can could be inverted and used with a dispenser. On the other hand, the can top 22 may be of the easy opening type.

As is shown in Figures 5 and 6, the illustrated can top 22 is of the easy opening type and is provided with a dispensing opening 28 and a vent opening 30 which are closed by molded plastic plugs 32 and 34, respectively. The plugs 32 and 34 are bonded to the underside of a tape 36 which, in turn, for a large portion of its length is peelably bonded to the can top 22. A terminal portion 38 of the tape 36 will be permanently bonded to the can top 22 so that after the can has been opened by peeling back the tape 36, the tap 36 and the plastic plugs 32 and 34 remain adhered to the can.

The tape 36 has a reversely folded portion 40 in the form of a pull ring to facilitate the peeling the tape from the can top 22. The filler plug 26 may either be utilized to hold the tape 36 adhered to the can top 22, the tape 36 may have an opening (not shown) of a sufficient size to permit the tape 36 to be drawn over the filler plug in the opening process.

The above-described can 10 is only one of many can configurations which can be formed in accordance with this invention, and it is not intended that the invention be so limited.

Referring now to Figure 1, it will be seen that sheet metal body blanks 42, preferably aluminum blanks, are fed to a forming apparatus 44 which is schematically illustrated as including a female die 46 and a cooperating punch 48 which serves to draw the metal blank 42 into the form of a cup-shaped component generally identified by the numeral 50. The cup-shaped component includes a flat bottom 52 and an upwardly flared tapered body 54.

The can components 50, after they have been formed, are automatically stacked by machinery (not shown) in a nested relation to form a stack 56. Although only six can components 50 have been illustrated as being stacked, it is to be understood that a large number of can components 50 will be stacked in a single stack, the number being on the order of fifty can components.

The stacked can components 50 are then encircled within a sleeve-type wrapper 58 which may be of any construction but generally is in the form of a bag having a closable end 60.

The wrapped stacks 56 of can components 50 are then placed in a suitable container for shipment. In Figure 3, the wrapped stacks 56 are illustrated as having been placed in a conventional paperboard container or box 62 which is then closed in the normal manner and is ready for shipment. Since the stacks 56 are of a high density, it is to be understood that the shipping cost per can body component 50 will be relatively low.

Referring now to Figure 4, it will be seen that, at a satellite facility, the can components 50 are converted into upper and lower can halves. In accordance with this invention, it is feasible that the same can components 50 be utilized in the formation of both lower can halves 12 and upper can halves 14. On the other hand, due to the very

large quantities involved, it is also to be understood that the tapered can components 50 may be of different sizes, one size forming the lower can half 12 and another size for forming the upper can half 14. However, for purposes of illustration the same can component 50 is used in the forming of both can halves.

A tapered can component 50 is placed in a suitable reforming die 52 and is reformed by means of a suitable punch 54 so as to have the configuration of the previously described can lower half 12. In a like manner, another of the tapered can components 50 is placed in a female die 56 and is reshaped therein by means of a punch 58. The reshaped can component 50 becomes the upper can half 14. For purposes of illustration only, it will be seen that the upper can half 14 has a free end portion 60 of a reduced diameter for telescoping in the upper end of the lower can half 12. The internested portions of the can halves 12 and 14 are then sealed by a high strength bond to form a seam 62 which will withstand high internal pressures within the can 10 so that it may be utilized for the packaging of carbonated beverages and other products presenting high internal pressures within the can 10.

Merely for purposes of illustration, there is also illustrated the application of the filler plug 26 and the tape 36.

At this time it is pointed out that while single forming operations have been illustrated with respect to the initial forming of the blank 42 into tapered can components 50 and the reshaping of the tapered can components 50 to define the can halves 12 and 14, it is to be understood that progressive die assemblies may be utilized in such forming operations.

It is also pointed out here that the completed cans 10 may also be provided with a suitable label for identifying the product, or suitable indicia may be applied to the bodies either after forming of the can halves or after the assembling thereof to form cans.

CLAIMS

1. A method of forming metal cans, said method being characterized by the steps of producing at a first facility tapered cup-like can components, nesting the can components to provide high density packing, shipping the nested can components to a second facility, separating the can components and reforming the can components to form upper and lower can halves each having a generally cylindrical body and an integral end, and then joining the can halves in sealed relation.

2. A method according to claim 1, characterized in that subsequent to nesting of said can components, said nested components are wrapped in a sleeve-like wrapper.

3. A method according to claim 2, characterized in that subsequent to wrapping in said sleeve-like wrapper the nested wrapped components are then placed in a box-like container.

4. A method according to claim 1, 2 or 3, characterized in that each can component is drawn from sheet metal.

5. A method according to any of claims 1 to 4, characterized in that each can component is initially formed with a flat end and each can component is converted into a can lower half by downwardly doming said flat end to form a domed bottom, and forming said domed bottom with stabilized base forming projections.

6. A method according to any of claims 1 to 4, characterized in that each can component is initially formed with a flat end and each can component is converted into a can upper half by upwardly doming said flat end to form a domed top, and forming said domed top with combined filling and dispensing means.

7. A method according to claim 6, characterized in that said filling means includes forming a central filling opening in said domed top, and providing a filler plug.

FIG.1

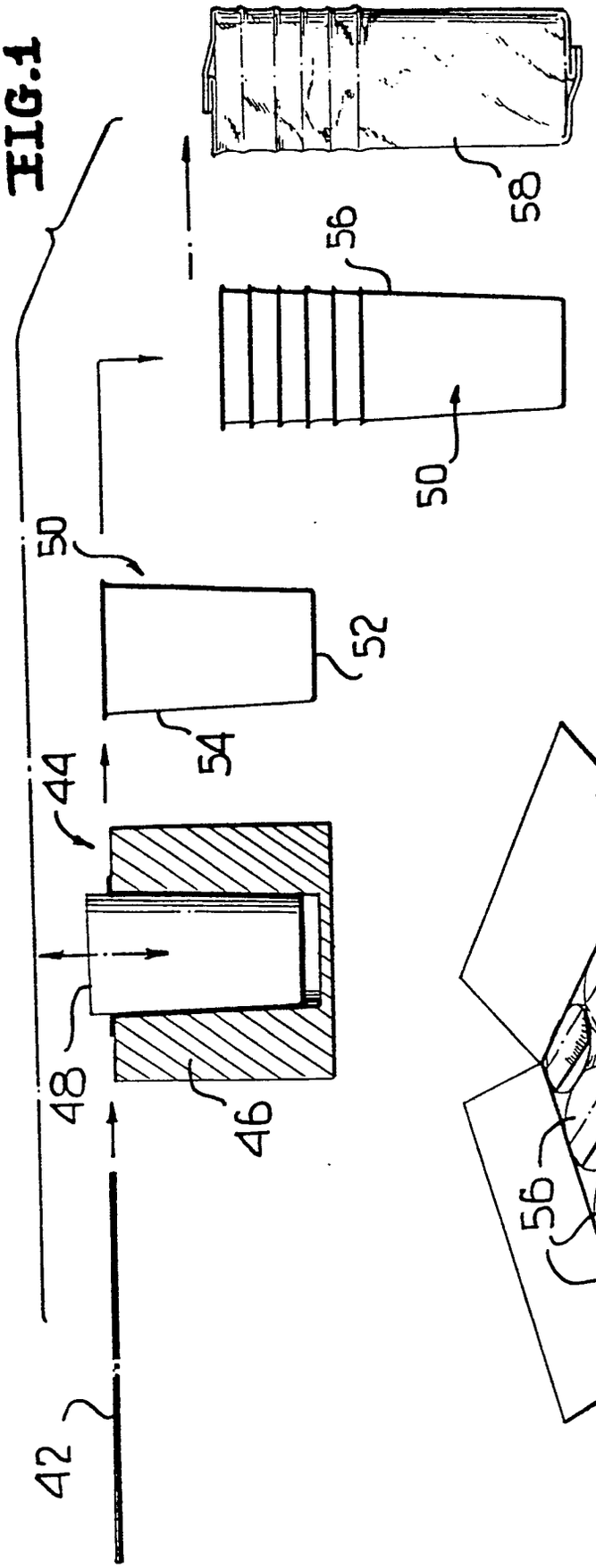


FIG.2

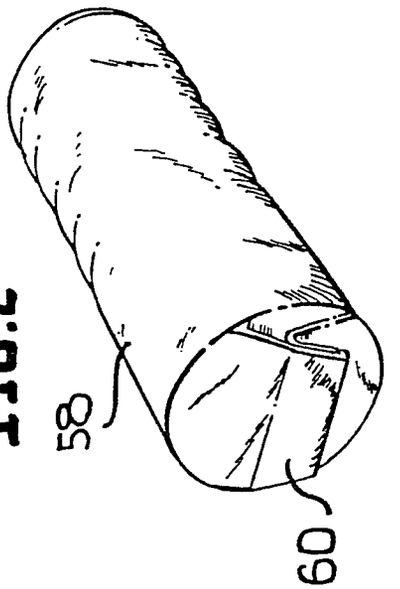


FIG.3

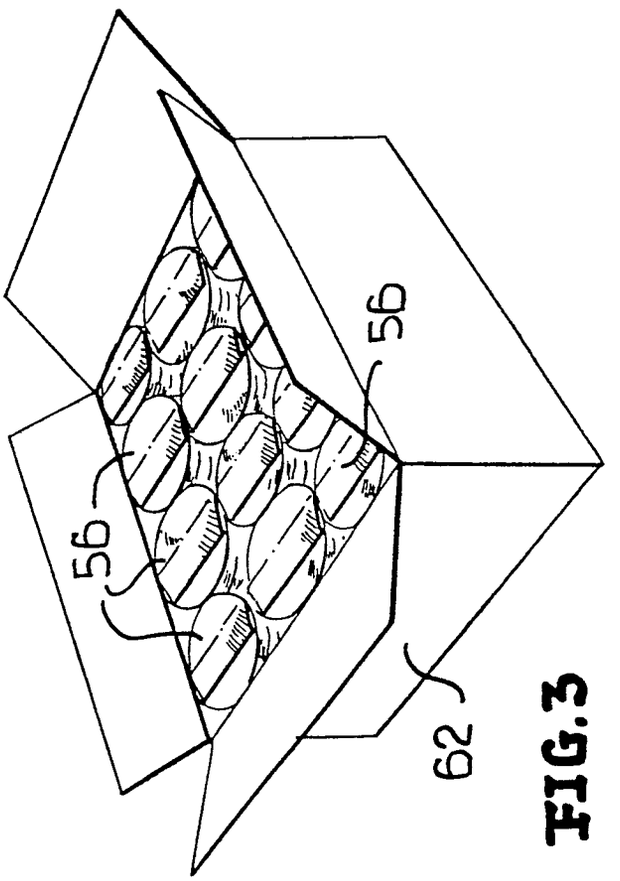
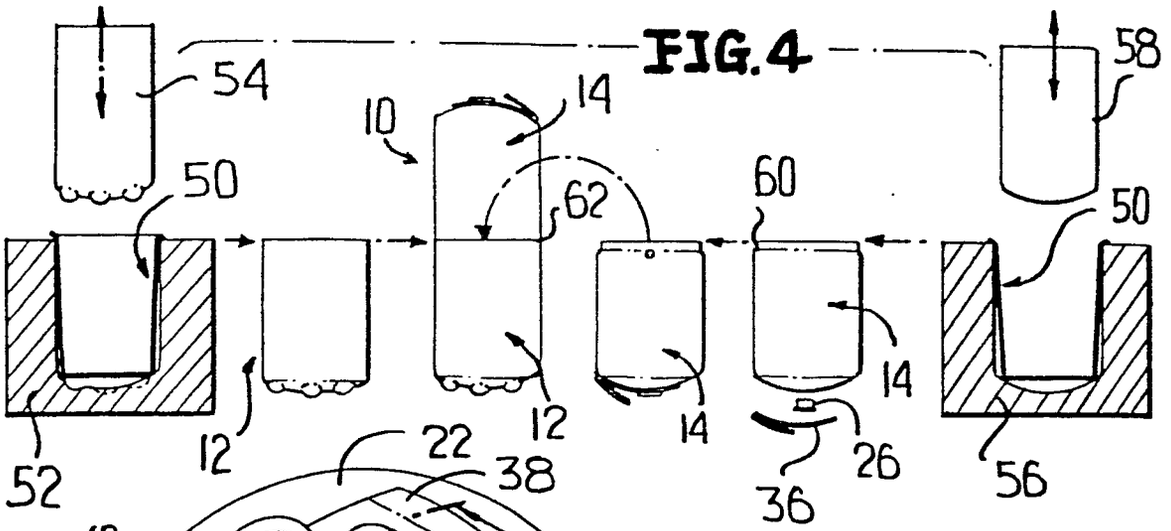


FIG.4



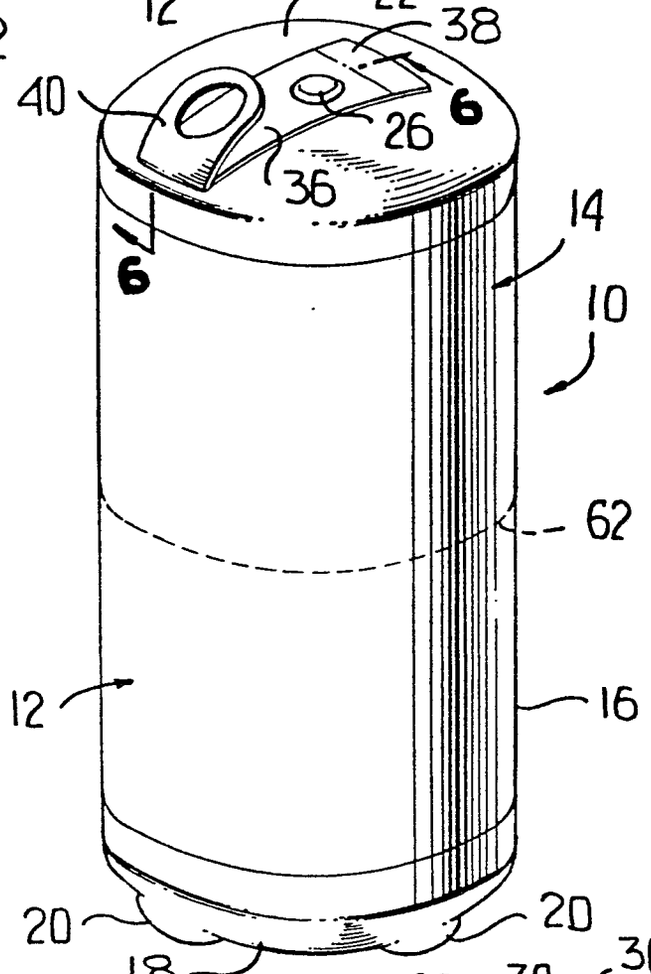


FIG.5

FIG.6