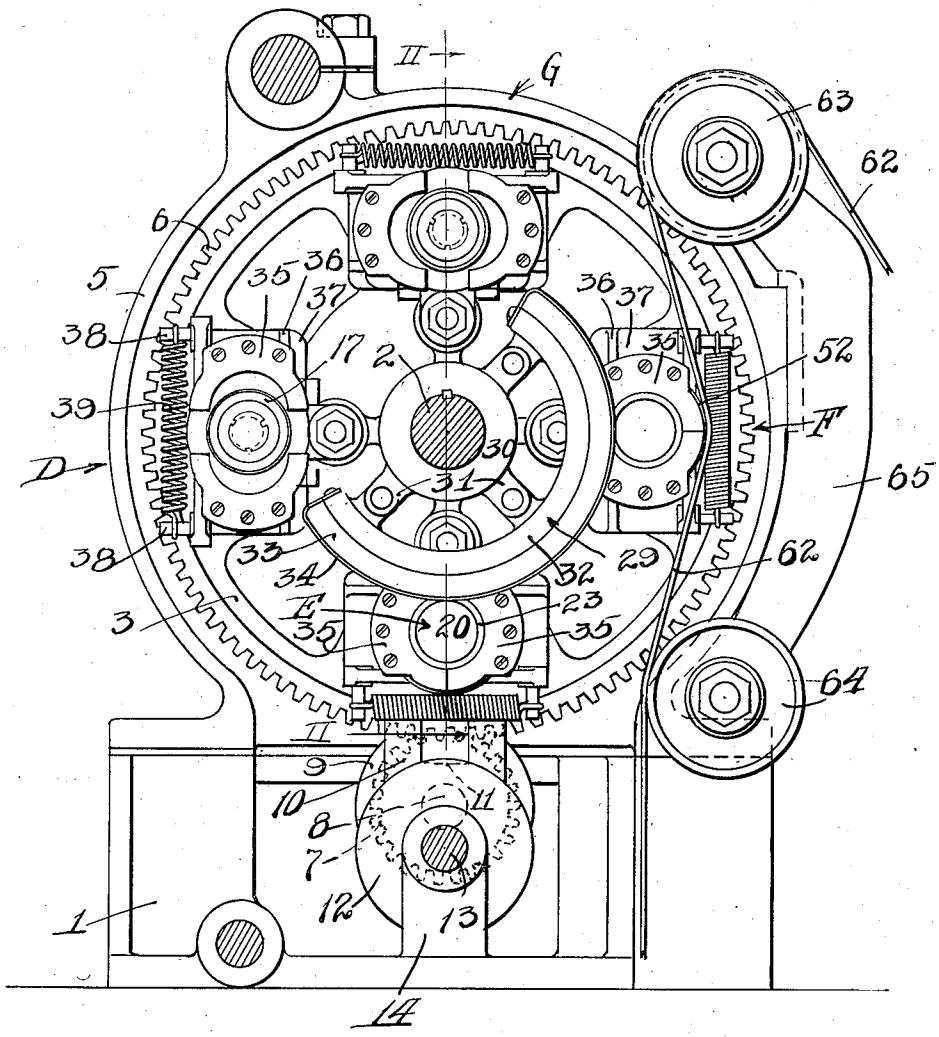
Aug. 4, 1936. C. BARBIERI 2,049,419

PROCESS OF MAKING CONTAINERS

Filed April 26, 1934 3 Sheets-Sheet 1

Fig. 1



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Aug. 4, 1936. C. BARBIERI 2,049,419

PROCESS OF MAKING CONTAINERS

Filed April 26, 1934 3 Sheets-Sheet 2

Fig. 2

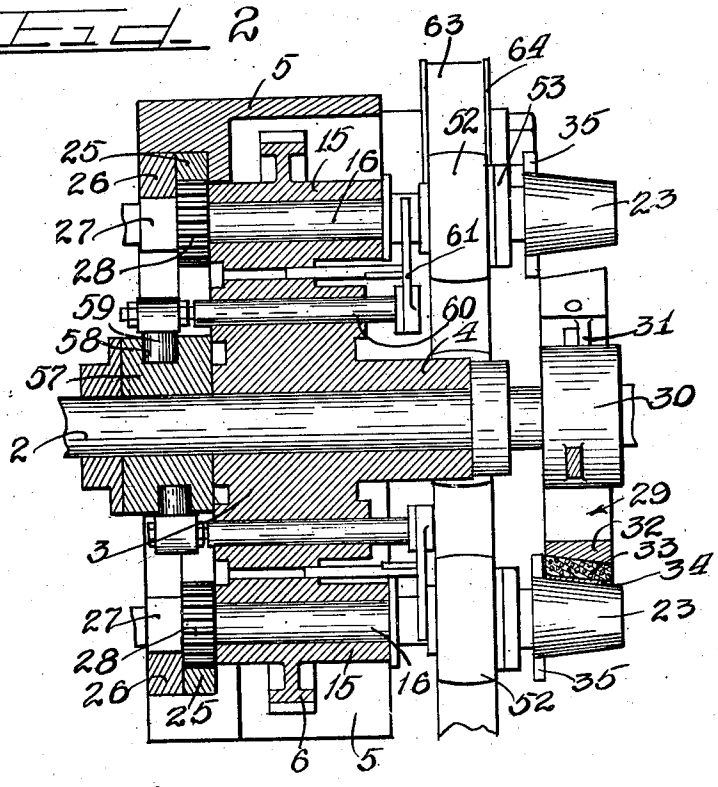
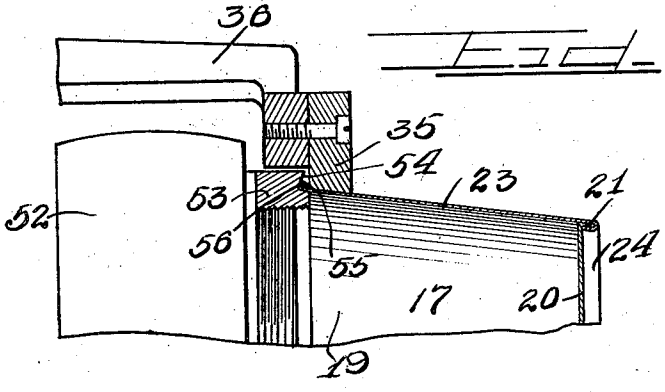


Fig. 6



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PROCESS OF MAKING CONTAINERS

Filed April 26, 1934 3 Sheets-Sheet 3

Fig. 3

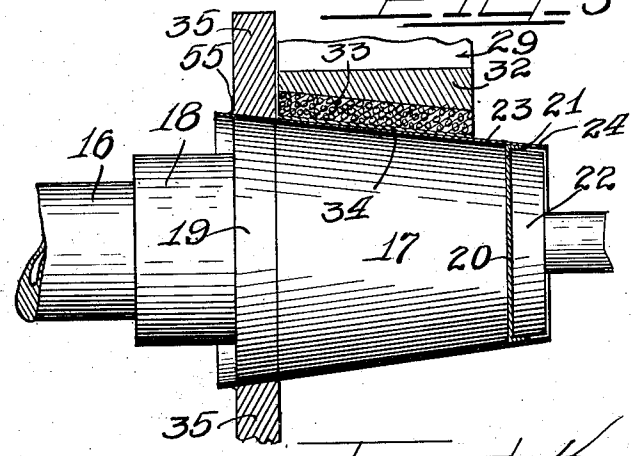


Fig. 4

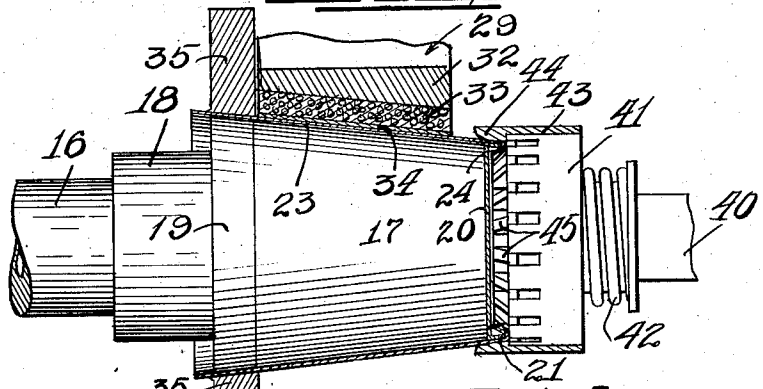
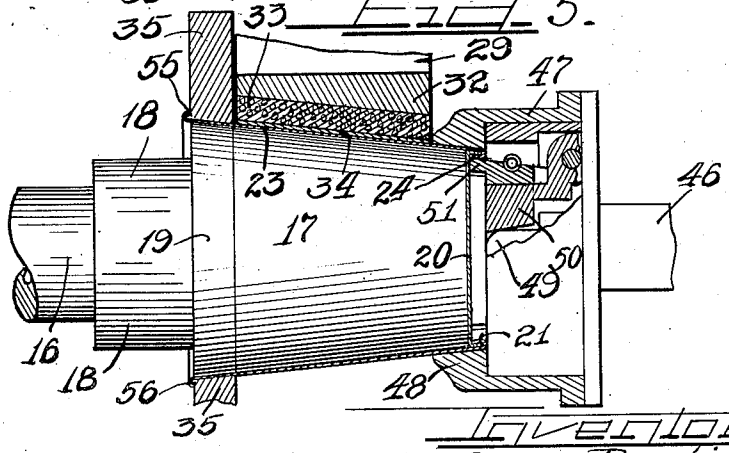


Fig. 5.



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Patented Aug. 4, 1936 2,049,419

UNITED STATES PATENT OFFICE

2,049,419

PROCESS OF MAKING CONTAINERS

Cesare Barbieri, New York, N. Y., assignor to Vortex Cup Company, Chicago, Ill., a corporation of Delaware

Application April 26, 1934, Serial No. 722,442

25 Claims. (Cl. 93—39)

This invention relates to improvements in a process of making containers, the invention being highly desirable for use in the making of paper containers of the character of drinking cups, ice cream cups and articles of similar nature, although the invention may be employed in the making of other and various articles, as will be apparent to one skilled in the art.

Heretofore, many and various methods have been employed in the making of containers, and certain of these methods have been used in making containers, such, for example, as paper drinking cups of the so-called flat bottom type which will stand alone either when empty or filled. Usually, in such cups two pieces of material are used, namely, a body portion and a bottom portion, the body portion usually having a beaded drinking edge upon the end thereof opposite the bottom. Overlapped margins of the body portion are glued together and the bottom is also commonly held in place by a suitable adhesive.

While formerly known methods of making such cups resulted in many cases in saleable articles, yet the method was not as economical as is desired, production not as rapid as is desired, and the resultant cups of necessity had a rather limited usage because of their lack of rigidity and durability.

One of the aims of the present invention is to provide a method of making a paper cup or similar container very rapidly and extremely economically with the resultant cup or container being considerably stronger and much more rigid and durable than like articles of similar material made as heretofore.

Many of the steps embodied in the present method contribute to the aforesaid results. One of the most important of these steps is that of maintaining the stock of the body portion of the container under tension while the adhesive is setting and while several other operations directed towards the completion of the container are performed. The stock of the body portion is maintained in rigid position under tension while the adhesive uniting overlapped portions is setting, and this stock is not afforded opportunity for relaxation until the cup is nearly completed, at which time relaxation cannot take effect, except to a very slight degree. Consequently, the body portion of the finished container possesses considerably more strength than if the stock of this body portion had not been kept under tension until the adhesive had set. Further strength is imparted to the cup by the folding of an end margin in the body portion about a bottom member, adhesively securing these parts, and to subsequent ironing of the parts into a rigid base portion. The beaded drinking rim at the opposite end of the body portion also adds to the durability of the container. The completed container will, therefore, have a wide variety of usages, and will maintain its non-fatiguing, non-leaking and substantially stable characteristics even after containing a purely liquid substance for relatively great lengths of time.

Accordingly, it is an object of this invention to provide a method of making a container including the forming of the body portion of the container and the maintaining of the stock of the body portion under tension while another operation towards the making of the container is completed.

At this point, it might be well to mention that where the term "tension" is used herein and in the appended claims, this term is used in the sense of applied tension as distinguished from the mere inherent pull on the outer fibers of a sheet of material formed into cylindrical or other shape out of the flat.

Another object of the invention is the provision of a method of making a container including the maintaining of the body portion and the stock of the body portion of the container under tension while the remaining operations on the container are completed.

It is also an object of this invention to provide a method of making a container consisting of forming the body portion of the container and securing the overlapping portions thereof together with a suitable adhesive, and holding the body portion under tension until after the adhesive has set.

Still another object of this invention is the provision of a method of making a container in which the first step consists of the forming of a body portion of the container and adhesively securing together overlapping portions thereof, and subsequently applying pressure directly over the adhesived surfaces to securely unite these surfaces, and in such a manner that tension is exerted upon the stock of the body portion while the adhesive is setting.

A further object of this invention is the provision of a method of making a container including the folding of an end margin of the body portion of the container about a bottom member, ironing the folds, and all the while maintaining the stock of the body portion under tension.

Another object of the invention is the provision of a method of making a container in which the

body portion of the container is first formed, and while the stock of this body portion is kept under tension, a bead is formed upon an end of the body portion.

The present method also contemplates the ironing of the body portion of the container while the adhesive which unites overlapping portions thereof is setting.

The method further contemplates the contemporaneous forming and ironing of the bottom fold with the ironing of the body portion of the container.

Still another contemplation of this method is the forming of the body portion of a container, the folding of a margin thereof about a bottom member contemporaneously with spinning a bead at the opposite end of the body portion, and the maintaining of the body portion under tension during the other operations.

In accordance with the general principles of the method herein set forth, insofar as the method pertains to the making of that type of paper cups mentioned above, a blank of suitable size for the body portion of the container is first formed, and this blank is then striped with adhesive in a plurality of directions. The blank is next held by an end edge thereof and formed into the body portion of the container, about a previously placed flanged bottom member. One stripe of the adhesive joins overlapping portions of the body or blank itself, and another stripe of adhesive joins the blank to the bottom member. The body portion of the container is next clamped and pressure applied thereto, preferably directly over the glued surfaces in such a manner as to maintain the stock of the body portion, or the stock of the blank, under tension. This tension is preferably not released until the adhesive has set and until the other operations in the making of the container have been completed.

When the blank is wrapped around the bottom member, an end margin of the body portion formed of the blank extends beyond the flange on the bottom member. This end margin is next folded about the flange of the bottom member and then the resulting fold is ironed under pressure. Of course, a stripe of adhesive unites the relative parts of this fold to each other to afford a very rigid base for the container to rest upon, although adhesive at this point is not absolutely essential. Contemporaneously with the ironing of the base fold, a drinking bead is formed on the opposite end of the cup body to complete the container.

Of course, it will be obvious that certain steps in this method may have their order changed and need not be taken up in the exact sequence outlined just above, and such variations in the order of performing the operation of this method is not without the scope of the invention.

Other objects, features, principles and steps of the method embodied in this invention will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate in general one way in which the method may be performed, and in which:

Figure 1 is a fragmentary vertical sectional view through a mechanism capable of performing the method embodied in the present invention, showing the mandrel carrying turret wheel and actuating mechanism therefor with the mechanism operable upon the container bottom construction removed.

Figure 2 is a fragmentary vertical sectional view, with parts shown in elevation, taken substantially as indicated by the line II—II of Figure 1.

Figure 3 is an enlarged fragmentary transverse sectional view, with parts shown in elevation, indicating the manner in which the body portion of the container is formed around the mandrel and the positioning of the bottom member.

Figure 4 is a view similar to Figure 3 indicating a further step in the making of the container, namely, the crimping of an end margin of the formed body portion about the flange of the bottom member.

Figure 5 is a view similar to Figures 3 and 4, illustrating a further operation in the making of the container, namely, the ironing of the bottom fold.

Figure 6 is a view similar to Figures 3, 4, and 5, indicating the manner in which the drinking bead is formed on an end of the body portion.

As shown on the drawings:

The mechanism disclosed, described and claimed in my co-pending application entitled "Cup machine", filed May 25, 1932, Serial No. 613,373, affords an example of one mechanism or apparatus capable of performing the method embodied in the present invention. Inasmuch as the present invention deals with the method of making a container, the drawings hereto appended are indicative of the various steps or operations in the method and disclose sufficient apparatus to be so indicative without disclosing all detailed drive mechanisms and the like. The mechanism is shown only in a fragmentary state illustrating sufficient of the apparatus to clearly indicate the performance of the method. Since the apparatus disclosed is very similar to that shown in my aforesaid co-pending application, reference is made to the aforesaid co-pending application for specific details of construction and operation of the apparatus or machine itself.

While the mechanism illustrated and the method involved in this invention will be disclosed and described for the making of a flat bottom paper cup having the general shape of a truncated cone, open at one end, it will, of course, be understood that the invention contemplates a method of making containers of various other shapes and sizes. The material used in making the container may be of any kind and character consistent with the purposes intended. The particular container selected to set forth the features of the invention is a drinking cup suitable for substantially any beverages or frozen confections, and this container is made preferably of that particular quality of paper well-known in the cup-making industry.

In general, the mechanism illustrated includes a mandrel-carrying turret wheel rotatable about a fixed central shaft. The turret wheel in this instance carries 4 mandrels each of which is adapted to have a cup formed thereupon. Each of the mandrels carries cup-gripping as well as cup-holding means and the cup or container is completely formed from two blanks of paper during a three-quarter revolution of the turret wheel. At various stages during this three-quarter revolution, other mechanism is brought into play, namely, by cam means, for a sufficient length of time to perform the particular operation for which each successive mechanism is designed. The various portions of the apparatus for forming the bottom part of the cup are extraneous to the turret wheel and are moved into operative position adjacent one of the mandrels until each

particular operation is performed, when that particular mechanism is retracted and again advanced as the next succeeding mandrel comes into position.

The mechanism forming the bead at the open end of the cup is carried around by the turret wheel, there being one such mechanism for each mandrel, and by cam means is advanced into operative position at a predetermined time during the three-quarter revolution necessary to form a cup.

The apparatus includes a frame 1 which supports a pedestal bracket not shown in the drawings, the pedestal bracket forming a suitable anchor for a fixed central shaft 2. Rotatable on the fixed shaft 2 is a turret wheel 3 provided with a central elongated hub 4 embracing the shaft. The turret wheel is encased within a turret wheel housing 5 mounted upon the frame 1.

Rotation of the turret wheel is had by means of a peripheral gear 6 which is preferably integral with the turret wheel. This gear 6 at the bottom thereof meshes with and is driven by a driving gear 7 (Figure 1) mounted upon a driving shaft 8 journaled in a suitable manner on the top of the frame 5. The shaft 8 is in turn driven by a mechanism including a disc 9 mounted upon the shaft and carrying a pair of spaced guide members 10 arranged to provide a slot therebetween. Seated within this slot is a follower 11 eccentrically mounted on one side of a disc 12 carried by a shaft 13 journalled in a suitable bearing bracket 14 on the frame 5, the shaft 13 being driven by suitable mechanism not shown in the drawings.

The turret wheel 3 has four bearing sleeves 15 preferably formed integral with the turret wheel and spaced substantially 90 degrees apart. Rotatably supported in each of these bearing sleeves is a tubular shaft 16 to the outer end of which is rigidly secured a chambered cup-forming mandrel 17. As seen best in Figures 3 to 5, inclusive, the mandrel 17 is completed on its inner end by a collar 18 seated in a suitable groove in the tubular shaft 16 and carrying a head 19 shaped in conformity with the mandrel body 17.

With reference now to Figure 3, it will be seen that initially a cup bottom 20 having an outwardly extending flange 21 thereon is placed in position snugly against the outer end of the mandrel 17 by means of a plunger head 22. For the purpose of clarity, the various positions a mandrel will assume in a revolution of the turret wheel 3 are designated as D, E, F, and G in Figure 1, and the placing of the bottom 20 against the nose of the mandrel 17 occurs substantially at position D, the turret wheel turning counter-clockwise as viewed in Figure 1.

Each of the mandrels 17 contains an internal gripping mechanism (not shown) for holding an end margin of a blank 23 of suitable shape to form, when rolled about the mandrel, the body portion of the cup or container. This blank has been previously striped with adhesive in such a position that the overlapping margins of the blank will be adhesively secured together to form a tubular body portion, and a stripe of adhesive will circumscribe the flange 21 on the bottom 20 to unite the bottom and body portions. Of course, the blank is fed into a mandrel when the mandrel is in position D and the mandrel is rotated until position E, the next one, is reached, thus winding the blank about the mandrel into container form, the blank having an end marginal portion 24 thereof extending outwardly beyond the flange 21 of the bottom. This rolling action will glue the overlapping marginal portions of the body together and will cause the body to be adhesively secured to the flange of the bottom, the adhesive stripe adjacent the bottom flange being sufficiently wide to project beyond this flange for engagement with the inside of the flange when the margin 24 is crimped and ironed about the flange, as will be more fully explained later herein.

To effect rotation of a mandrel upon its own axis while travelling from position D to position E, the turret wheel housing 5 (Figure 2) in the rear portion thereof contains a mutilated internal gear 25. The teeth upon this gear are so located as to cause the mandrel to turn upon its own axis substantially from position G to position E. Extending substantially half way around the housing and opposite to the teeth of the gear 25 is a control cam member 26. Keyed on each of the hollow spindles 16 is a cam block or follower 27 which is brought into engagement with the control cam 26 and rides thereover to hold the spindle 16 together with the mandrel 17 against rotation during substantially a half revolution of the turret wheel from substantially position E through position G. During the rotation of the turret wheel from substantially position G to position E, the control cam 26 permits the meshing of a gear 28 also keyed on the spindle 16 with the mutilated gear 25 to cause a rotation of the spindle and its associated mandrel. This rotation causes a mandrel leaving position G to be properly disposed at position D to receive a body blank 23 from the left hand side as the structure is seen in Figure 1. The two gears 25 and 28 are so arranged that after the mandrel has gripped an edge of the body blank, the mandrel will rotate a desired number of revolutions plus one-half a revolution between position D and position E to bring the glued overlapped margins of the rolled body blank directly beneath a presser or ironing member generally indicated by numeral 29.

The presser unit 29 includes a hub 30 keyed to the fixed shaft 2 and having radially projecting spokes 31 projecting outwardly therefrom. Bolted or otherwise secured to the spokes is a substantially half wheel rim 32, the outer peripheral surface of which is preferably inclined to correspond with the taper of the mandrels 17. This rim 32 is faced with a soft pad 33 made of sponge rubber or other suitable material, the pad being in turn faced with a thin layer of sheet metal 34 to thereby form a resilient pressure shoe. During a revolution of the turret wheel 3, a cup body blank upon its respective mandrel contacts the presser unit 29 shortly after leaving position D and continues in contact with the presser unit until shortly before position G is reached.

When the presser unit is initially contacted and until position E is reached, a mandrel and cup body are rotating beneath the presser unit, the sheet metal facing 34 riding upon the cup body portion. From position E until the mandrel passes beyond the presser unit, the mandrel does not rotate on its own axis. However, in each instance it will be noted that the presser unit exerts a pressure somewhat tangentially on the body blank as the body blank passes therearound. From position E on this pressure is exerted preferably directly over the glued overlapping margins of the body blank, and the pressure is always exerted in a direction away from the edge of the

body blank gripped by the mandrel. It is apparent, therefore, that the stock of the body blank is kept under tension from the time the body blank is wound upon its mandrel until the finished cup is very nearly in position to be discharged from the mandrel at position G.

Immediately after the body blank is rolled upon its mandrel a pair of clamping shoes 35 are closed about the body blank to hold the same upon the mandrel and help to maintain the tension in the stock of the body portion. Each of the clamping shoes is carried on the end of an arm 36, the inner end of which is integrally formed into a bracket 37 pivoted to the turret wheel 3 adjacent one of the sleeves 15. The clamping members are preferably cam actuated so that they may be opened and closed automatically at the proper time during a revolution of the turret wheel. As seen in Figure 1, a pair of clamping shoes are opened in position G to permit the discharge of a finished cup or container, and the same shoes are opened when position D is reached to permit the entrance therebetween of a body blank, and after the blank has been rolled upon the mandrel the shoes are closed and remain closed until position G is nearly reached. Preferably integral with each of the brackets 37 is a laterally projecting lug 38, and the lugs 38 of a pair of clamping shoes associated with one of the mandrels 17 are connected by means of a spring 39 to urge the clamping shoes together around the body portion of a cup on the mandrel. The clamping shoes are preferably so actuated that they grip the body portion of the container consecutively rather than simultaneously, thereby insuring a proper gripping and holding of the stock of the body portion.

When a mandrel has reached a position approximating that of E in Figure 1, crimping mechanism is brought into play for folding the margin 24 of the body portion 23 of the container about the flange 21 of the bottom. With reference to Figure 4, it will be seen that this crimping mechanism includes a shaft 40 carrying a crimping head 41 resiliently urged into contact with the container by a spring 42. Around the crimping head 41 is a sleeve 43 having a beveled or inclined deflecting rim 44 for deflecting the margin 24 inwardly as the crimping mechanism moves into position. Further deflecting means, not shown, are brought into play immediately after the rim 44, and the crimping is culminated by means of a plurality of crimping teeth 45 carried by the member 41.

After the crimping of the margin 24 around the flange 21, the crimping mechanism is retracted and ironing mechanism brought into play to iron the narrow inwardly turned margin 24 tightly against the flange 21 and establish a rigid bottom construction for the cup. The ironing mechanism includes a shaft 46 carrying a housing 47 which terminates in an ironing rim 48 embracing the outer portion of the body blank 23 and tapered in conformity therewith. Within the housing 47 the shaft 46 terminates in a control nose or finger 49 which abuts the inner inclined surfaces of a plurality of pivoted control pawls 50, urging these pawls outwardly to force segmental ironing members 51 against the inwardly turned margin 24 in opposition to the ironing rim 48. Suitable mechanism, not shown, is provided to give the shaft 46 together with the ironing mechanism a whirling action relatively to the container being formed, resulting in a very rigid base portion for the container.

Substantially contemporaneously with the ironing operation, a drinking bead is formed upon the opposite end of the container body. The mechanism performing this bead is best illustrated in Figures 1, 2, and 6. On each of the hollow spindles 16 a pulley 52 is freely mounted and rotatable relatively to its respective spindle. Threadedly engaged with a portion of the pulley 52 is a rim curling die 53 having a bead forming groove or annular notch 54 therein (Figure 6). As will be seen better in Figures 3 and 4, a portion of the container body 23 projects inwardly beyond the part 19 of the mandrel 17 in position to be contacted by the forming die 53 when the latter is moved outwardly at the proper time. Each of the clamping shoes 35 is provided on the inner edge thereof with a die portion 55 terminating in a relatively sharp edge and co-acting with the groove 54 for rapidly and tightly forming a rolled drinking rim or bead 56 upon the open end of the container.

Each of the pulleys 52 together with the forming die 53 is slidable upon the spindle 16 into and out of operative position. The movement of all four of the pulleys 52 is controlled by a single stationary cam 57 mounted upon the fixed shaft 2 and having a cam groove 58 therein (Figure 2). Tracking in the cam groove 58 for each of the pulleys 52 is a roller 59 suitably supported on the inner end of a control rod 60 slidably positioned in a suitable opening in the turret wheel 3. At the forward end of the rod 60 and rigidly secured thereto is a forked shifting arm 61, the forked portion of which is disposed immediately behind the respective pulleys 52, the fork being suitably engaged to a portion of the pulley so as to move the pulley backward and forward upon the spindle 16. As the turret wheel rotates carrying the control rod 60 therewith, the beading mechanisms are successively run into and out of operative position consistent with the rollers 59 tracking in the cam groove 58. The respective parts are so arranged that a beading mechanism is brought into play shortly before a cup in the making reaches position F (Figure 1) and is retracted shortly after the cup passes position F.

Each of the pulleys together with its die 53 is spinning when it reaches the edge of the cup. With reference to Figure 1, it will be seen that as the pulley approaches position F it contacts a belt 62 trained over an upper pulley 63 and a lower pulley 64, both pulleys being pivotally supported upon a bracket 65 attached to the framework of the machine. Suitable driving means, not shown in the drawings, drive the belt 62 preferably at a high rate of speed. A pulley 52 contacts the belt and begins spinning before the die 53 is in operative position, so that when the die 53 reaches the edge of the cup it is already spinning at a high rate of speed, while the cup or container is relatively stationary. Due to this spinning of the die together with its inward movement against the edge of the cup body the bead 56 is tightly rolled, and this bead is of somewhat a spiral nature so that, if for any reason, it would be desired to unroll the bead without destroying the same, it is only possible to do this by starting at the point where the margins of the cup are overlapped and then working from the outside end of the bead around the cup.

From the foregoing, the details of the method involved in the present invention, together with one way of performing each step of the method, is believed to be sufficiently apparent. In brief summary, therefore, the method consists of first

cutting a blank of the proper shape and size to form the container body portion, applying adhesive to this blank and delivering it to the forming mechanism. A bottom unit for the container is also held in proper position and the blank is rolled into container shape about the bottom member. Immediately upon the rolling operation, the blank is adhesively secured to the bottom member and also overlapping margins of the blank are secured to each other. The rolling is done in such a manner and the blank is subsequently held in such a manner as to impart a tension to the stock of the body portion. This tension is maintained by ironing or pressing the blank during the subsequent operations in forming the container. While tension is maintained upon the stock of the body portion, an end margin of the body portion is folded about the bottom member, crimped into position and the whole subsequently ironed to provide a rigid base structure for the container. Contemporaneously with the ironing of the base portion of the container, a drinking rim or bead is spun upon the opposite end of the container. Tension is maintained upon the stock of the body portion of the container during the spinning of the bead which completes the formation of the container in this instance. The above method results in the formation of a container comparatively rigid, strong and durable, and the method may be performed in a very expeditious and economical manner.

I am aware that numerous details of the method may be varied through a wide range, and in many instances the various steps of the method may be taken up in different order than they are described herein without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. The process of making a flat-bottom paper container out of a plurality of pieces of material, including forming the body portion of the container and maintaining the stock of said body portion under tension while uniting the different pieces of material.

2. The process of making a paper container, including forming the body portion of the container, beading an end of the body portion, and maintaining the stock of said body portion under tension during the forming and beading operations.

3. The process of making a paper container, including forming a sheet of stock into the body portion of said container and gluing overlapping marginal portions of said sheet, beading an end of the formed body portion, and maintaining the stock of said body portion under tension while the glue is setting and during the beading operation.

4. The process of making a paper container, including forming the body portion of said container, folding an end margin of the body portion about a bottom member, ironing said fold in position, and maintaining the stock of said body portion under tension during said forming and said ironing operations.

5. The process of making a container, including forming the body portion of said container, folding an end margin of the body portion about a bottom member, and maintaining the stock of said body portion under tension during the forming and the folding operations.

6. The process of making a container out of sheet material, including forming a sheet of material into the body portion of said container, folding an end margin of the formed body portion about a bottom member and gluing these parts together, and maintaining the stock of said body portion under tension during the folding and gluing operations.

7. The process of making a container out of sheet material, including forming a sheet of material into the body portion of said container, folding an end margin of the formed body portion about a bottom member and gluing these parts together, ironing the fold in position, and maintaining the stock of said body portion under tension during the folding and gluing and ironing operations.

8. The process of making a container out of sheet material, including forming a sheet of material into the body portion of a container and uniting overlapping portions with adhesive, folding an end margin of the formed body portion about a bottom member, and ironing both the stock of said body portion and said folded end margin while said adhesive is setting.

9. The process of making a container out of sheet material, including forming a sheet of material into the body portion of said container and uniting overlapping portions of said sheet with an adhesive, folding an end margin of the formed body portion about a bottom member and uniting these parts with adhesive, and ironing both the stock of said body portion and the folded end margin while the adhesive is setting.

10. The process of making a container, including forming the body portion of the container and securing overlapping portions thereof with an adhesive, and applying pressure on the formed body portion tangentially thereto and directly over substantially all of said adhesive to maintain the stock of said body portion under tension while said adhesive is setting.

11. The process of making a container, including forming the body portion of the container, folding an end margin of the formed body portion about a bottom member, ironing the fold thus formed, contemporaneously spinning a bead on the opposite end of said body portion, and holding the body portion and bottom member stationary relative to the axis of the container during the folding, ironing and spinning operations.

12. The process of making a container, including forming the body portion of the container, folding an end margin of the formed body portion about a bottom member, ironing the fold thus formed, contemporaneously beading the opposite end of said body portion, and maintaining the stock of said body portion under tension during the other said operations.

13. The method of making a paper container, including applying an adhesive to a margin of a blank, shaping the blank into form for use in the container with said adhesived margin overlying another portion of the blank, and ironing the adhesively joined parts with relatively sliding movement over substantially all the joined area while the adhesive is setting.

14. The method of making a paper container, including applying adhesive to a blank, forming said blank with overlapping parts held by said adhesive, ironing the blank over the overlapping parts, spinning a drinking bead on one end of the formed blank, and holding the formed blank against rotation about its axis during the ironing and spinning operations.

15. The method of making a flat-bottomed cup from a plurality of pieces of stock, including applying an adhesive to a blank, forming the blank

with overlapping parts held by said adhesive, joining said blank with another blank, ironing the jointure between the blanks, forming a bead on one of said blanks, maintaining the cup and its parts in continuous motion while being made, and holding the cup against rotation about its own axis during the joining and bead forming operations.

16. The method of making a paper container having a rolled rim around the mouth thereof, including forming a body portion for the container and maintaining the body portion continuously in motion while holding the same against movement relative to its own axis while forming the rolled rim around the mouth of the container.

17. The method of making a flat-bottomed paper container, including forming a body portion for the container around a bottom member and maintaining the body portion continuously in motion and holding the stock thereof under tension while completing the engagement between the body portion and bottom member.

18. The method of making a flat-bottomed paper container, including forming a body portion for the container, maintaining the stock of the body portion under tension and maintaining the body portion in continuous motion while holding the same against movement relative to its own axis during the completion of the remaining operations of making the container.

19. The method of making a paper container having a roll-like bead around the mouth thereof, including forming an initially flat blank of material into a body portion for the container and maintaining the stock of the body portion under tension while forming the bead on an end of the body portion.

20. The method of making a paper cup having a formed bead around the mouth thereof, including forming a body portion for the cup, forming a bead on an end of the body portion, and maintaining the body portion in continuous motion and holding the stock thereof under tension during the bead forming operation.

21. The method of making a container out of a plurality of pieces of material, including forming a body portion for the container, joining the body portion adjacent an end thereof with a bottom member, forming a bead around the opposite end of the body portion, and maintaining the stock of the body portion under tension during the other said operations.

22. The method of making a container out of sheet material, including forming a sheet of material into container shape, and ironing said sheet to apply tension thereto during the forming operation.

23. The method of making a container out of sheet material, including forming a sheet of material into container shape, applying pressure to said sheet during the forming operation, securing overlapped margins of the sheet with adhesive, and ironing said formed sheet while the adhesive is setting.

24. The method of making a container out of separate parts, including a bottom member and body member, including forming the body portion of the container around the bottom member, and applying and maintaining tension in the stock of the body portion while completing the union between the body portion with said bottom member.

25. The method of making a paper container out of separate parts, including forming the body portion of the container around a bottom member and maintaining the body portion and bottom member in continuous motion while holding the same against movement relatively to the container axis during the completion of the jointure between the body portion and bottom member.

CESARE BARBIERI.