

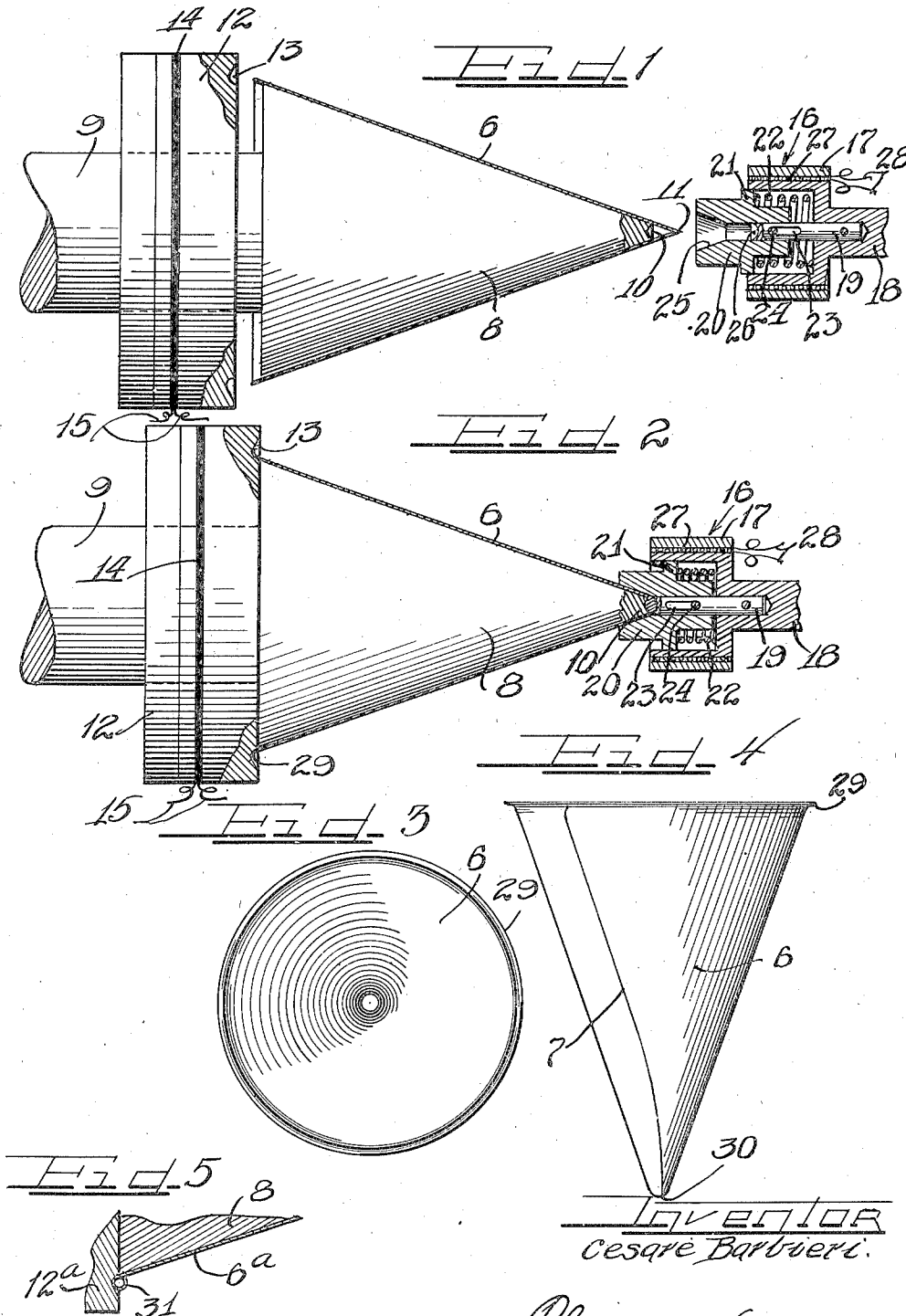
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METHOD OF AND PROCESS FOR FORMING PAPER CUPS

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METHOD OF AND PROCESS FOR FORMING
PAPER CUPSCesare Barbieri, New York, N. Y., assignor to
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This invention relates to improvements in a method of and process for forming paper cups of the type commonly used as paper drinking cups, ice cream cups, and for similar purposes, although the invention will have other uses and purposes as will be apparent to one skilled in the art.

In the manufacture of paper containers, it is desirable to produce the containers as economically as possible, without detracting from their strength and efficiency. It is also desirable to give a resultant container an attractive appearance and render the same extremely easy and natural to handle.

With the foregoing in mind, it is an object of the present invention to provide a method of and process for forming a paper container which may be in the form of a paper drinking or frozen confection cup made of a thermoplastic treated paper, the finished container having a formed mouth portion stiffened and held in shape by means of the thermoplastic with which the paper has been treated.

The invention also provides a novel method of making a paper container and forming the same into a desired shape in an economical manner.

Another object of the invention is the provision of a method or process of forming a container made of a thermoplastic treated paper, including the application and removal of heat sufficient to melt or soften the thermoplastic of the paper, the forming operation occurring during the application of heat.

Still another object of the invention is the provision of a process of forming a container made of a thermoplastic treated paper, including the steps of melting or softening the thermoplastic, shaping the paper of the container, and freezing or permitting the thermoplastic to set with the paper in its shaped form.

A further object of the invention is the provision of a method or process for blunting the apex of a paper container having substantially a truly conical shape.

A further feature of the invention is the provision of a method or process for blunting the apex of a conical paper container in which the paper used is treated with a thermoplastic, the method including the steps of softening the thermoplastic, shaping the apex, and either freezing or permitting the thermoplastic to harden with the apex in its shaped form.

This invention also contemplates contemporaneously shaping different parts of a container

made of thermoplastic treated paper by softening the thermoplastic, and relying upon the subsequent setting of the thermoplastic to hold the paper in its desired shape.

The invention in general consists in initially forming a container into general shape from one or more pieces of a paper treated with a thermoplastic. A heated shaping tool is next applied to the part of the container to be shaped, the application of the tool resulting both in a melting or softening of the thermoplastic carried by the paper and a shaping of the particular part of the container to which the tool is applied. Upon removal of the tool, the surrounding air is of sufficient coolness to almost immediately set or rigidify the thermoplastic which will then greatly aid in strengthening and maintaining the shaped part of the paper, although, if desired, the paper may be chilled sufficiently to quickly freeze or set the thermoplastic. This chilling operation could be accomplished, by way of example, by blowing a blast of cold air over the formed paper. Different parts of the container may be shaped in this manner, either simultaneously, contemporaneously or successively, as may be deemed most desirable.

As stated above, the invention contemplates the shaping of different parts of the container, such as the flaring of the rim or margin around the mouth of the container, the beading of the margin around the container, the blunting of the apex in a conical container, and similar operations. The invention is, of course, applicable to containers of both the conical and flat-bottom type, insofar as the shape of the container permits application of the invention.

While some of the more salient features, characteristics, and advantages of the present invention have been above pointed out, others will become apparent from the following disclosures, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a fragmentary part sectional, part elevational view, illustrating an initial step in the forming of the container, and somewhat diagrammatically showing apparatus used.

Figure 2 is a view of the same nature as Figure 1, but showing a more advanced step in the making of the container.

Figure 3 is a plan view of the finished container.

Figure 4 is a side elevational view of the finished container.

Figure 5 is a fragmentary sectional view, illus-

trating the forming of a different shape to a part of the container.

As shown on the drawing:

By way of example and for the purpose of clarity, I have illustrated a container generally conical in shape, and certain steps in the process of making such a container. The container is preferably made from a single blank of paper or equivalent material. The material used is initially treated with a thermoplastic, such as a suitable wax, resin or gum.

Of course, there are several ways of treating the paper or similar material with a thermoplastic. One of these ways resides in dipping the material in a melted or softened thermoplastic, either before or after forming the material into container shape, and thus coating the material with the thermoplastic.

Another satisfactory way, and the preferable way, is to impregnate the material with a thermoplastic to produce what is commonly termed a dry-wax paper, one in which the thermoplastic is not clearly evident from an examination of the outer surface of the material, and in which little or no thermoplastic will be presented as a result of scraping the material with a sharp instrument.

For the purpose of clarity, I have illustrated the present invention and will hereinafter describe the same in connection with the forming of a container of the impregnated or dry-wax paper.

A blank of paper is first cut and then formed into general container shape by means of any suitable cup-making machinery, that illustrated being a satisfactory example. In this instance, the forming of the blank provides a container of substantially true conical shape, the container illustrated having overlapped marginal portions, as indicated at 7, held together by any suitable adhesive.

In the illustrated embodiment, the container 6 is shown as having been formed on a suitable mandrel 8 carried by a shaft 9 and provided with a blunted or recessed apex 10. As seen clearly in Figure 1, the container initially extends beyond the blunted end of the mandrel 10 and terminates in a relatively sharp apex 11.

The mechanism, as seen in Figures 1 and 2, also includes a tool 12 movable longitudinally relatively to the shaft 9 and having an annular groove 13 in the front face thereof of such a shape as to outwardly flare the adjacent margin of the container when the tool is pressed thereagainst. The tool 12 is also internally provided with a heating element, preferably an electrical heating element, indicated in general by numeral 14, energized by a pair of wires 15 which may be connected to any suitable source of electrical energy. This heating element 14 is sufficient to raise the temperature of the tool 12 to such a degree that contact of the tool with the container 6 will melt the thermoplastic carried by the container paper.

The mechanism further includes a forming element for blunting the apex 11 of the container, this element being generally indicated by numeral 16. The blunting apparatus may include a cup-shaped member 17 carried by a shaft 18, the shaft being centrally drilled to accommodate a pin 19 keyed to the shaft. A hollow plunger 20 is slidable within the member 17 and the hollow therein is of a proper size to receive the pin 19. The plunger is shouldered at 21 to keep a coil spring 22 within the socket of the member 17, which coil spring constantly

urges the plunger outwardly. The pin 19 is provided with an elongated slot 23 through which a pin 24 anchored in the shank of the plunger extends to limit the in and out movement of the plunger. The plunger is provided at its forward end with an opening 25 substantially of the shape of a truncated cone to receive the apex of the cup 6, and the forward end of the pin 19 is provided with an arcuate recess 26 which, when applied, will cause a swaging and rounding of the apex 11. Of course, any desirable shaping of the apex may be provided by properly shaping the opening 25 and the forward end of the pin 19.

The cup-shaped member 17 is also provided with a heating element, preferably an electrical heating element, 27, from which a pair of conductors 28 may extend to any suitable source of electrical energy. This heating element is sufficient to raise the temperature both of the plunger 20 and the forward end of the pin 19 to a degree that will cause a softening or melting of the thermoplastic carried by the paper.

In carrying out the method of this invention, as stated above, a blank of paper is first formed into the substantially truly conical shape seen in Figure 1. It is next desired to outwardly flare the margin of the container around the mouth thereof, and to round or blunt the apex thereof. These operations may be performed simultaneously, contemporaneously or successively, as may be most desirable. The tool 12 is moved relatively to the shaft 9 until the inner portion of the groove 13 contacts the margin of the container. Further movement of the tool 12 results in a shaping of the container margin into an outward flare 29, as seen best in Figure 4. Of course, such contact of a cold shaping tool would result in a deformation of the margin of the container in the nature of a flare, but the flare so provided, especially in relation to a relatively light-weight stock, would not be permanent or rigid to the desired extent. In other words, a flare so provided might be distorted in removing a cup from a dispenser or in other ways.

However, in the present instance, the application of a heated tool results in a softening or melting of the thermoplastic carried by the paper upon application, keeping the thermoplastic in that condition during the shaping of the margin, and upon removal of the tool, the surrounding air will immediately chill the thermoplastic sufficiently to stiffen the same. Therefore, the flare will be held in a substantially permanent and rigid condition, insofar as the particular paper or material permits, by the set thermoplastic.

Preferably, the application and removal of the tool is a very rapid action, and the thermoplastic will set almost instantaneously upon removal of the tool. In such application, the tool 12 may be spinning relatively to the container 6, the container spinning relatively to the tool, or both stationary or spinning, as may be deemed most desirable.

In similar manner, the apex blunting mechanism is brought into play against the apex of the cup with sufficient pressure to move the plunger rearwardly to the position seen in Figure 2, causing the apex to be blunted, in this instance rounded, by the end of the pin 19. The heat of this mechanism also causes a melting or softening of the thermoplastic which almost instantaneously sets or hardens upon removal of the tool. As pointed out above, if so desired, a cold air blast

may be provided upon the removal of the tool, if such is deemed necessary. These operations produce a novel form of container, such as is seen in Figures 3 and 4, namely, a substantially conical container with a flared mouth 29 and a rounded apex 30.

It will be noted that the same flaring process may be used upon a container which does not have an apex, and the invention further is not limited to performing these specific operations, but certain parts of the container may be shaped as desired by the practice of this invention, the illustrated operation being sufficient for the purpose of setting forth the invention in an adequate manner.

In Figure 5, I have shown how the mouth margin of a container 6a may be provided with a bead 31. In this instance, the container is carried on the same mandrel 8, but a tool 12a is used having a substantially semi-circular groove therein of a proper shape to provide a bead 31. This tool 12a is heated in the same manner as the previously described tool 12 and functions in substantially the same way.

From the foregoing, it is apparent that I have provided a novel method and process for forming a container out of paper or similar material, the method and process being highly efficient and rapid in operation, and very economical to practice.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I, therefore, do not purpose limiting the patent granted hereon otherwise than is necessitated by the prior art.

I claim as my invention:

1. The method of forming a container of thermoplastic treated paper, including forming a blank of said paper into a container having substantially the shape of a true cone, contemporaneously applying heat to the mouth edge of the container and also to the apex thereof, shaping these parts, and removing the heat permit-

ting the thermoplastic to set and maintain the new shapes of the mouth edge and apex.

2. The method of blunting the apex of a conical container made of thermoplastic-treated material, including applying a heated shaping tool to the apex of the container and relatively quickly removing it therefrom.

3. The method of blunting the apex of a conical container made of thermoplastic-treated material, including heating the apex to soften the thermoplastic, shaping the apex, and permitting the thermoplastic to set.

4. The method of making a container, including forming a container of substantially true conical shape from a blank of material carrying a thermoplastic, and then reshaping the very point of the conical container to eliminate sharpness by simultaneously applying both heat and pressure to said point, the heat being sufficient to melt the thermoplastic carried by the material.

5. The method of making a container, including forming a container of substantially true conical shape from a blank of material carrying a thermoplastic, and then reshaping the very point of the conical container to eliminate sharpness by simultaneously applying both heat and pressure to said point, the heat being sufficient to melt the thermoplastic carried by the material, removing the heat and pressure, and applying a cooling medium to the reshaped point to chill the thermoplastic.

6. The method of making a container, including forming a container of substantially true conical shape from a blank of paper carrying a thermoplastic, reshaping the very apex of the container to eliminate sharpness, temporarily melting the thermoplastic during the reshaping of the apex, and permitting the thermoplastic to reset with the apex in its new shape.

7. The method of making a paper cup of conical formation which consists in first forming the cup with a relatively sharp tip at its apex and thereafter subjecting said tip to endwise pressure to render the same blunt, as well as ironing the blunt tip to give it a smooth set.

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