May 21, 1929. P. R. SIMMONS 1,713,720

PAPER CUP AND PROCESS OF MAKING SAME

Filed Feb. 23, 1924 2 Sheets-Sheet 1

FIG. 4

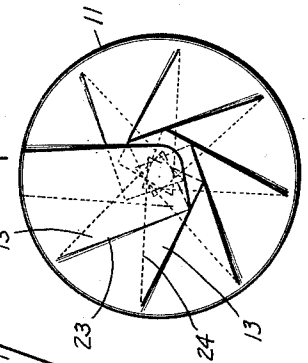


FIG. 1

INVENTOR.
PAUL R. SIMMONS.

BY Lothrop & Lothrop

ATTORNEYS.

May 21, 1929. P. R. SIMMONS 1,713,720

PAPER CUP AND PROCESS OF MAKING SAME

Filed Feb. 23, 1924 2 Sheets-Sheet 2

FIG. 3

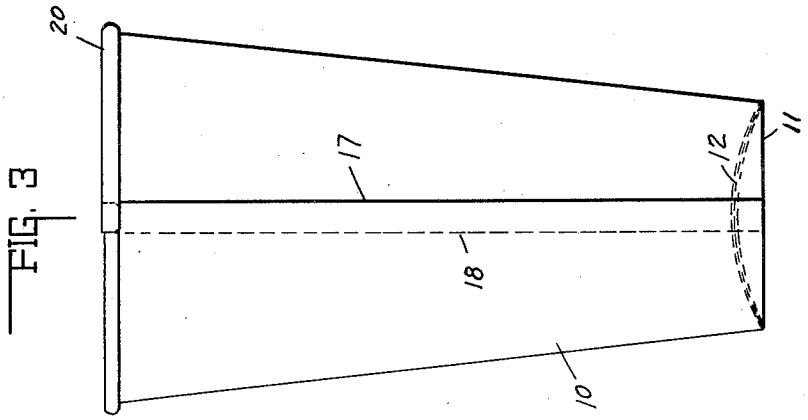
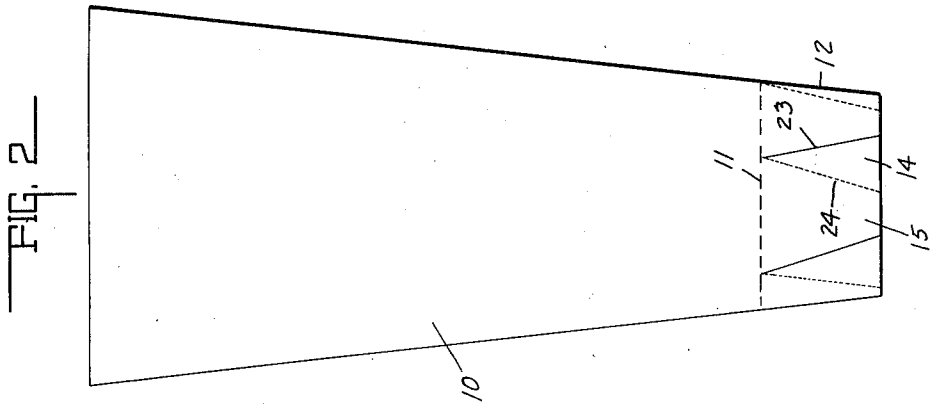


FIG. 2



INVENTOR.
PAUL R. SIMMONS.

BY Fishburn & Fishburn

ATTORNEYS.

Patented May 21, 1929. 1,713,720

UNITED STATES PATENT OFFICE.

PAUL R. SIMMONS, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO PARAMOUNT PAPER PRODUCTS COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION.

PAPER CUP AND PROCESS OF MAKING SAME.

Application filed February 23, 1924. Serial No. 694,787.

The object of this invention is to improve and also cheapen the production of cups made out of paper and the like.

The chief feature of this invention is the manufacture of the bottom of the cup by folding in the lower section of the side wall of the cup so as to provide folds which have their inner ends widened and extending beyond the center of the bottom of the cup and superimposed upon each other and secured together by an adhesive. The cup may be made of relatively strong stiff material, as it is rolled into a conical form without any folding, and the projecting portion of the lower end is folded in to form the bottom and the folds or sections glued together so that it makes a very strong bottom and for this construction the insertion of a separate piece at the bottom is unnecessary and the folding of the material to form the body of the cup is unnecessary.

Another feature of the invention is scoring the projecting portion at the lower end so as to facilitate the folding thereof to form the bottom and to make the segments of the bottom therefor substantially regular and uniform so as to improve the strength of the construction of the bottom and also the appearance thereof.

The full nature of the invention will be understood from the accompanying drawings and the following description and claim:

In the drawings, Figure 1 is a plan view of a blank for making a paper cup with glue applied thereto indicated by dotted lines. Fig. 2 is a side elevation of the cup after the blank has been rolled and the seam at the side secured together. Fig. 3 is a side elevation of the cup after the top and bottom have been formed and showing the cup in finished form. Fig. 4 is a bottom view of the bottom of the cup, slightly enlarged.

The process employed in making this cup is as follows: A blank 10 is formed as shown in Fig. 1. It has its sides inclined similarly with the lower ends approaching each other so that if extended at the lower end they would intersect. The top and bottom curve substantially concentrically with the imaginary point of intersection of the two sides as a center. The lower portion of the blank is scored at 11 above the bottom line to form the extension 12 afterwards employed to form the bottom of the cup so that the width of the extension longitudinally of the cup is greater than the radius of the bottom to be formed. The extension 12 is scored to form two sets of foldable portions 13 and 14 alternating with each other, the sections 13 being V-shaped and the sections 14 being A-shaped. This is done by making the solid score lines 23 and the dotted score lines 24 inclined from the bottom line, as shown in Fig. 1, so that they intersect each other near the top line 11. This makes a set of foldable portions 13 which lie between dotted lines on the right and full lines on the left and alternating sections 14 which lie between full lines on the right and dotted lines on the left. This construction is such that when said foldable sections are folded in to form the bottom of the cup, the dotted score lines 24 will bend first and cause the sections 14 to fold over and against the bottom surfaces of the sections 13.

The foregoing constitutes the first step in the process of making this cup. The next step is to apply glue 15 along the margins of one side and the bottom of the cup, as indicated by dotted lines in Fig. 1. Fig. 1 shows in elevation the side of the blank which becomes the inside of the cup, so that the glue 15 is on the underside or back side of the blank, as shown in Fig. 1, that is, on the side which forms the outside of the cup.

The third step in the process consists in cylindrically rolling or forming the blank 10 so as to bring the lateral edges together and cause the same to overlap, as shown by the full and dotted lines 17 and 18 in Fig. 2, and said overlapping edges are secured by the glue which had already been placed on one of said edges. This forms the body of the cup, but leaves the top and bottom unformed.

The fourth step in the process consists in forming the top and bottom of the cup although they may be done in separate steps or at different times if desired. The top is rolled, as heretofore done, to form a bead 20. The bottom extension 12 is folded in against a suitable former, not shown, inside of the cup, to the position substantially as shown in Figs. 3 and 4. The extension 12 at the bottom of the cup shown in Fig. 2, consisting of sections 13 and 14, folds in so that said sections overlap each other. The dotted score lines 24, which make the material at that point weaker than it is at the solid score lines 23, folds first so that the dotted score line edge of each section is on the inside of the

bottom of the cup, while the solid score line edge 13 is on the underside of the bottom of the cup. Since the glue had already been placed on the bottom of the blank shown in Fig. 1, as soon as the bottom sections are folded over on each other, as shown in Fig. 4, they are secured in such position by the glue.

It may be noted that the length of each section forming the bottom is slightly greater than the radius of the bottom, or, in other words, the width of the extension 12 is made wider than the radius of the bottom of the cup to be formed so that the ends of the sections will have wide ends which extend beyond the center of the bottom of the cup and overlap or are superimposed on each other at the center of the bottom sufficient to make an absolute closure when secured by the glue. The score or fold lines are so located as not to be radial, but extend to the side of the center of the bottom of the cup. The score line on one edge of each fold extends to one side of the center and the score line on the other edge of such fold extends to the other side of the center. Therefore, the inner ends of the fold extend beyond the center in every direction, thus avoiding the center hole or weakness, and since the ends of the folds are superimposed upon each other and secured together by adhesive, the center of the cup is greatly strengthened. Also it is preferable to form the bottom convex on the upperside, as shown in Fig. 3. The result of this construction of the bottom is that it is formed of the same material as the body of the cup and no insert is necessary, and the sections or folds of the bottom overlap each other to a considerable extent and especially towards the center, which, together with the glue, makes a thick body of paper stock and glue and, therefore, a very strong bottom, and this is further strengthened by giving it the convex form shown in Fig. 3. Hence, this cup may be made of relatively thick material and without more than one blank or piece of material, and without folding the sides or body of the cup, as is done in some forms of paper cups. The result is that the paper cup is smooth and solid on the side and is easily beaded at the top with a bead that remains permanent if the material is thick enough, and with bottom that is made of the same piece as the body and is very strong. Hence, the production of this cup is relatively cheap and after it is made, it is relatively strong and satisfactory in use.

The invention claimed is:

In a paper cup having an upstanding side and an integral bottom and formed from a single non-perforated blank having a substantially arcuate bottom edge, each end connected to a divergingly directed and substantially radial side edge, said side edges overlapping for cup formation, the margin portion adjacent and including the bottom and side edges having an arcuate and concentric scoring in spaced relation with said bottom edge and at a distance greater than the radius of the cup bottom when formed, said margin portion at the ends adjacent and including the radial edges forming an inner and initial portion and an outer and final portion projecting beyond the center of the cup toward the opposite side from its connection, said margin portion intermediate the end portions thereof including alternate and reverse scorings, said scorings extending from the smaller arcuate edge toward the arcuate scoring but terminating slightly short thereof, said alternate scorings being arranged in inverted V-shaped arrangement with the apex adjacent the arcuate scoring, each inverted V-shaped scoring being in spaced relation with the adjacent similar scorings and the outermost scoring at each end constituting the connection to the end portion of the marginal portion, each end portion of the margin portion having its greatest width along the arcuate scored portion and the entire scored margin including the ends being arranged in overlapped folded relation to form an integral and water-tight bottom and cup.

In witness whereof, I have hereunto affixed my signature.

PAUL R. SIMMONS.