G. J. BOHLMAN.

APPARATUS FOR MAKING PAPER CUPS WITH ROLLED EDGES.

APPLICATION FILED NOV. 2, 1914.

1,155,787.

Patented Oct. 5, 1915.

2 SHEETS—SHEET 1.

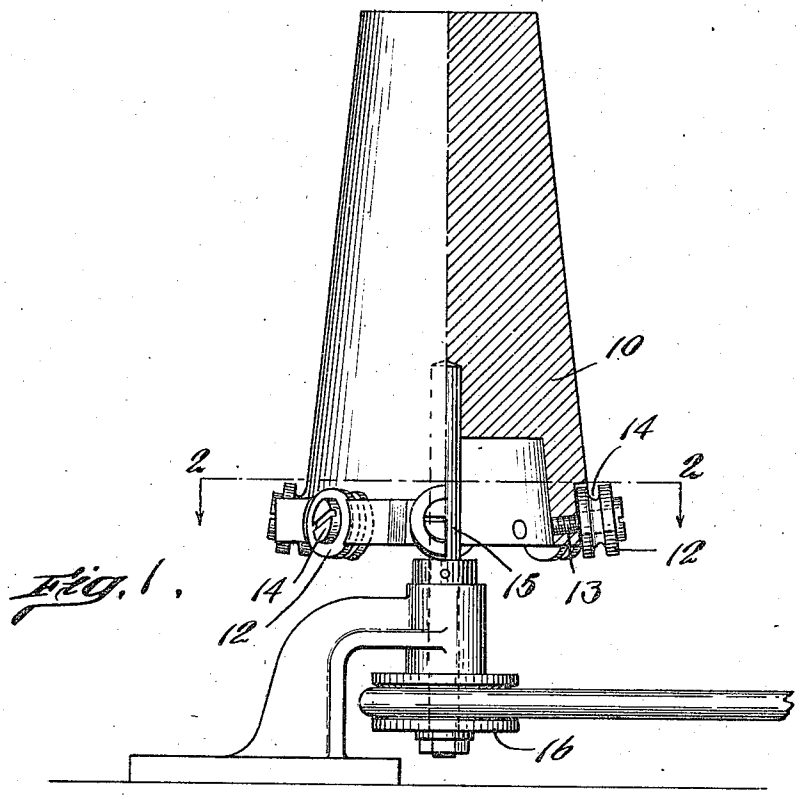


Fig. 1.

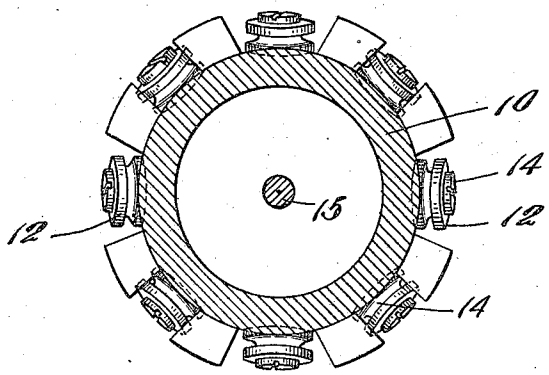


Fig. 2.

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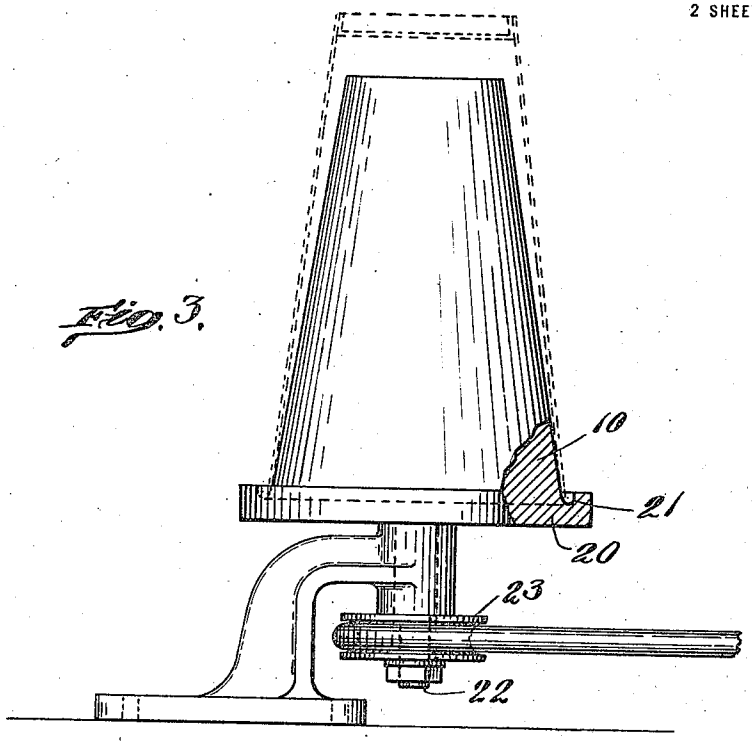
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Fig. 3.



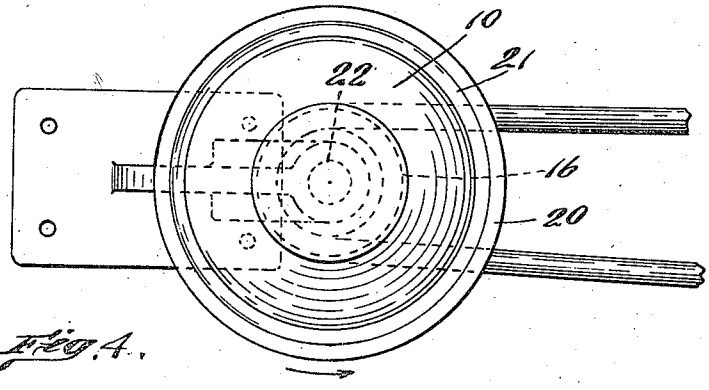


Fig. 4.

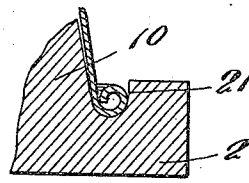


Fig. 5.

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UNITED STATES PATENT OFFICE.

GEORGE J. BOHLMAN, OF MEDFORD, MASSACHUSETTS, ASSIGNOR TO AMERICAN WATER SUPPLY COMPANY OF NEW ENGLAND, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

APPARATUS FOR MAKING PAPER CUPS WITH ROLLED EDGES.

1,155,787. Specification of Letters Patent. Patented Oct. 5, 1915.

Application filed November 2, 1914. Serial No. 869,764.

To all whom it may concern:

Be it known that I, GEORGE J. BOHLMAN, a citizen of the United States, residing at Medford, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Apparatus for Making Paper Cups With Rolled Edges, of which the following is a specification.

This invention relates to an apparatus for rolling the edges of paper cup-bodies and other receptacles by which a roll of small diameter and preferably of circular form may be produced. A paper cup of this description having a rolled edge produced by the method involved in the apparatus here shown, forms the subject matter of my application for Letters Patent #869,762, filed Nov. 2, 1914.

The invention has for its object the construction of a bending-device by which the edge of the cup-body is heated and bent to form a roll, said device having supporting-means for the cup-body associated with it, and means to rotate the device at a speed to cause the end-portion of the cup-body which is in engagement therewith and which it is designed and intended shall be bent, to be heated by friction to a high temperature, so that said end-portion may be bent while thus heated. Upon removal of the cup-body from the device, it will be allowed to cool and the bent end-portion, which forms the roll, will become permanently set.

Figure 1 is a side elevation and partial vertical section of an apparatus embodying this invention by which the end-portion of a paper cup-body may be bent to form a roll. Fig. 2 is a horizontal sectional view of the same on the line 2—2, Fig. 1. Fig. 3 is a side elevation and partial vertical section of a modified form of device embodying my invention. Fig. 4 is a plan view of the device shown in Fig. 3. Fig. 5 is an enlarged detail of a portion of the device, illustrating the formation of the roll.

10 represents a form of frusto-conical or other shape which serves as the means to support the cup-body while its end-portion is being bent to form a roll. Said form is of a shape corresponding to the shape of the cup-body, but is of lesser dimensions than the interior of the cup-body except at the base, so that said body will loosely fit the form, yet said form will serve to steady the cup-body sufficiently to serve as a supporting-means therefor and also as a guide to assist in directing it while applying pressure to it in a downward direction. At the lower end or base of the form 10, a plurality of rolls 12 are arranged, which are separately supported and free to revolve on studs 13, which project radially from the form and in a direction at right angles to the inclined faces thereof or thereabout, and said rollers are equidistantly spaced apart and arranged in recesses in a flange on the form. These rollers each have a peripheral groove 14, the faces of which are curved, and the inner of said grooves are arranged in continuation of the inclined face of the form or thereabout, so that when the cup-body is placed on the form, its lower end-portion will enter the grooves in the rollers, engaging said inner sides thereof preparatory to being bent outwardly by following the curved faces of the grooves. As here shown, the rollers are arranged in two sets, one set being arranged at a slightly lower elevation than those of the other set, so that those which are arranged at the higher elevation will be first engaged by the end of the cup-body. By arranging the rollers in this manner the bending operation is much better performed. The form 10 bearing the rollers is surmounted on top of a vertical spindle 15, having suitable bearings, and a belt-pulley 16 is secured to said spindle over which a belt passes for rotating the form. In lieu thereof other means may be provided for rotating the spindle and form carried by it. The form may be rotated at a high rate of speed, so that the end-portion of the cup-body will become heated more or less which facilitates the bending of the paper, particularly when a slight stretching of the paper is also required. I have discovered that by bending the paper while heated, when it is allowed to cool it will become permanently set in the form in which it is bent. The cup-body having been placed on the rapidly rotating form, which may be done by hand, is pressed downward, and during such downward movement its end-portion is bent outwardly by following the curved faces of the grooves in the rollers, and such downward movement may be continued until a complete circular roll has been formed on said end-portion, although it will be un-

derstood that a lesser downward movement produces a roll of less circumference, which may be sufficient. The grooves in the rolls have wide open mouths, so that the rolled edge on the cup-body may be withdrawn without obstruction.

Referring to Figs. 3 and 4, wherein a modified form of device is shown, the form 10 is substantially the same as the form heretofore described, but in lieu of providing a plurality of grooved rollers at the base of the form, a flange 20 is provided at the base of the form having a groove 21 in its upper side, the wall of said groove being arranged in continuation of the inclined face or wall of the form, so that the inner diameter of the groove 21 will be approximately the same as the diameter of the end-portion of the cup-body. Said form 10 is surmounted on top of the vertical spindle 22, having suitable bearings, and a belt-pulley 23 is secured to said spindle over which a belt passes for rotating the device rapidly. The paper cup-body is placed on the form with its lower edge engaging the flange, and entering the groove 21 thereof, and then a slight pressure is applied to said cup-body in a downward direction, as for instance, the pressure of the hand will be sufficient, by which its lower edge is caused to frictionally engage said flange, and by the friction, due to the rapid rotation, said edge-portion will be heated to a high temperature, and while heated to a high temperature and said pressure is continued, its edge-portion is caused to follow the curved wall of the groove 21, thus bending outwardly, upwardly, and inwardly, and forming a roll, which, it will be seen, will be circular. The extent of downward movement will determine whether or not the roll, which is formed, will be a complete circle, and it is obvious that it may be moved downward more or less, as desired.

The form shown in Fig. 3 is better adapted for heating the paper in case heating is desired, on account of the increased friction produced, as compared with the form shown in Fig. 1.

I claim:—

1. An apparatus for rolling the edges of paper cup-bodies, consisting of a form arranged to receive upon it and guide the cup-body, enabling said body to be grasped and held against rotation, and a plurality of grooved rollers arranged radially on said form at the base thereof, the grooves of which are arranged to receive the end-portion of the cup-body, and to deflect the same, and means to rotate said form and thereby revolve said rollers about the axis of the form, said rollers being free to rotate about their own axes, substantially as described.

2. An apparatus for rolling the edges of paper cup-bodies, consisting of a form arranged to receive upon it the cup body and having an outwardly extended flange at its lower end with spaced apart recesses, and freely rotatable grooved rollers arranged in said recesses, the grooves of which are arranged to receive the end-portion of the cup-body and to deflect the same, and means to rotate said form, substantially as described.

3. An apparatus for rolling the edges of paper cup-bodies, consisting of a form arranged to support and guide the cup-body, and a plurality of grooved rollers arranged radially on said form at the base thereof, the grooves of which are arranged to receive the end-portion of the cup-body and to deflect the same, some of said rollers being arranged at a lower elevation than the others, and means to rotate said form, and thereby revolve said rollers about the axis of the form, said rollers being freely rotatable about their own axis, substantially as described.

4. An apparatus for rolling the edges of paper cup-bodies, consisting of a form and a grooved-element associated with it, the groove of which is adapted to receive the end-portion of the cup-body, and means to rapidly revolve said grooved-element, to deflect the end-portion of said body while said body is held firmly in engagement with it and against rotation and is being pressed downward, one wall of said groove being arranged in continuation of the wall of the form, substantially as described.

5. An apparatus for rolling the edges of paper cup-bodies, consisting of a form and a grooved-element associated with it, the groove of which is adapted to receive the end-portion of the cup-body, and means to rapidly revolve said grooved-element to deflect the end-portion of said body while said body is held firmly in engagement with it and is being pressed downward, the inner wall of said groove being arranged in continuation of the wall of the form, substantially as described.

6. An apparatus for rolling the edges of cup-bodies, consisting of a form and a grooved-element associated with it, the groove of which is adapted to receive the end-portion of the cup-body, and means to rapidly revolve said form and grooved-element thereby to deflect the end-portion of said body while said body is held firmly in engagement with it, and against rotation, and is being pressed downward, the diameter of one wall of the groove of said element corresponding with the diameter of the end-portion of the cup-body, substantially as described.

7. An apparatus for rolling the edges of cup-bodies, consisting of a form and a grooved-element associated with it, the groove of which is adapted to receive the end-portion of the cup-body, and means to rapidly revolve said form and grooved-ele-

ment thereby to deflect the end-portion of said body, while said body is held firmly in engagement with it, and against rotation, and is being pressed downward, the diameter of the inner wall of the groove of said element corresponding with the diameter of the end-portion of the cup-body, substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE J. BOHLMAN.

Witnesses:
ELIZABETH M. HANSON,
AMOS L. TAYLOR.