UNITED STATES PATENT OFFICE.

BENJAMIN B. AVERY, OF NEW YORK, N. Y., AND ALEXANDER NELSON, OF NEWARK, NEW JERSEY, ASSIGNORS, BY MESSRS. ASSIGNMENTS, TO GERMPROOF CUP CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

SANITARY DRINKING-CUP AND METHOD OF MANUFACTURING SUCH CUPS.


Application filed April 4, 1918. Serial No. 296,688.

To all whom it may concern:

Be it known that we, BENJAMIN B. AVERY and ALEXANDER NELSON, both citizens of the United States, residing at New York City, county and State of New York, and Newark, Essex county, State of New Jersey, respectively, have invented certain new and useful Improvements in Sanitary Drinking-Cups and Methods of Manufacturing Such Cups, of which the following is a specification.

This invention relates to an improvement in the method of manufacturing sanitary drinking cups, the objects of the invention being to provide an improved sanitary drinking cup and method of making such cup from paper or similar thin material with the folded side edges thereof efficiently locked against separation whereby an improved drinking cup is obtained.

A further object of the invention relates to the improved method of forming such cup by the use of cup blank folding means whereby the use of feeding and pressure rollers for folding and feeding the edges of the cup blank is done away with and a much simplified as well as more efficient cup is provided, and by means of which a very much improved method of folding the side edges of the cup is obtained.

A further object of the invention is the provision of an improved method of carrying the cup blank through the former.

A further object of the invention is the provision of an improved method for locking the side edges of the cup after it has passed through the former.

In the drawings accompanying and forming a part of this specification, Figure 1 illustrates a portion of a web of paper severed to form a cup blank; Fig. 2 illustrates the cup blank with its side edges folded once; Fig. 3 illustrates the next step of folding the cup and illustrates the folded side edges again folded; Fig. 4 illustrates another step in the formation of the cup and shows the previous fold shown in Fig. 3 partially infolded; Fig. 5 illustrates the completed cup with the locking flap turned down over the folded side edges; Fig. 6 is a perspective view of one of the former members; Fig. 7 is a perspective view of another former member; Fig. 8 is a perspective view of the third former member; Fig. 9 is a perspective view of the three former members; Fig. 10 is a side view of the former members as they appear when assembled in position in the machine; Fig. 11 is a cross-sectional view taken on line 11—11 Fig. 10; Fig. 12 is a cross-sectional view taken on line 12—12 Fig. 10 and Fig. 13 is a cross-sectional view taken on line 13—13 Fig. 10.

Similar characters of reference indicate corresponding parts in the several figures of the drawings.

In carrying out this improved method of forming cups, the several cup blanks are successively severed from a web when a web is used, (which is desirable, as this obviates the handling of the cup blanks) the severing action taking place when the web is fed to the cup forming mechanism, and this web is usually carried by a roll, upon which sufficient paper is wound to supply a large number of cups.

One form of apparatus or machine, by means of which the several steps of this improved method may be carried out to produce this improved cup, is shown and described in our contemporaneously pending application, Serial No. 296,683 filed May 10, 1919.

In the present instance, we have shown a very simple mechanism for carrying out this improved method, and which mechanism can be conveniently used in a suitable coin vending machine.

In carrying out this method, a cup blank 2, having been severed from the web of blanks at a suitable point to provide the proper length of cup blank and a flap 3 is fed to the folding apparatus illustrated in Fig. 9, comprising a movable folding blade 4, suitably supported for reciprocatory movement and reciprocated by any suitable mechanism, whereupon as the blade moves downward, it folds the cup blank transversely of its length as at 5, Fig. 1, and at the same time carries the so-folded cup blank through the former into position to be engaged by the rolls hereinafter described.

The improved former comprises three members or plates 6, 7 and 8, the member 7 forming the middle plate of the series while the members 6 and 8 form the two outside plates of the former. The member 6 is provided with a curved apron formed portion 9 for directing and guiding one end of the cup blank. This apron 10...
9 extends transversely or at an angle to the former portion proper, and is preferably formed integral therewith. The member 6 comprises a flat back portion 10 having at each side thereof below the apron portion an inwardly bent side edge 11, which at a suitable point in its length is also bent backwardly as at 12. These bent side edges form the means for giving the edges of the cup blank the first fold inwardly upon the blank, and also for shaping the remaining folds of the side edges of the blank. The apron portion of the member 6 is slotted and the cut out portions are bent downward to provide a pair of downwardly extending plates 13 for the attachment of the former member in the machine. The back portion of the former 6 is cut away at the lower sides thereof as at 10°. Cooperating with this former member is a middle former member 7, which comprises a flat plate 14 having a transversely extending shelf portion 15 for attachment of the plate in position.

In the present instance this middle former member is provided with a pair of upwardly extending portions 16, which assist in the guiding of the former and the first folding of the cup blank, although these may be dispensed with if preferred. This middle former member has its side edges extending into the bent edges of the first former member, and it is between these two former members that the cup blank passes, and it is around the side edges of this middle former that the side edges of the cup blank are first folded. Suitably secured to this middle former member at the desired point is a third former member 8, and this member 8 has its side edges bent or curled as at 17, so as to taper from their upper ends to their lower ends, so that they somewhat resemble the curled petals of some well-known flowers. In other words, the curl is greater or tighter at the lower ends of the curled portions than at the upper end of this former plate 8, and when properly positioned, it being suitably secured by rivets or other fastening means to the middle former plate 7, the curled side edges of this former member 8 are in position to have the upper portions thereof overlap portions of the bent side edges of the former plate 6. In fact the edges of the curled portions of the plate 8 project between the folds of the bent portions of the plate 6 in such manner that the cup blank, as it passes through the former, will first have its side edges bent toward each other by the former member 6, giving a wide fold. As the blank passes farther through the former the curled side edges of the former 8 make a narrow fold of each free edge of the blank, folding this edge backwardly over the bent side edges of the former member 6, and as the cup blank further passes through the former the lower curled portions of the former 8 infolds as it were the narrow bent edges of the blank upon the first folded portion of the blank. In other words, as the cup passes into the machine it is first folded along the dotted line 5, Fig. 1, and by means of this fold and the folder blade, the cup blank is then passed into and through the former. As it passes into the former a wide fold a is given to the cup (see Fig. 2). As it further passes through the former a narrow fold b is given to the cup (Fig. 3) and this narrow fold is then turned, folded upon one-half of the first fold a as at c (Fig. 4), except that the fold c is considerably tighter than as shown in Fig. 4, it being left in this condition for purposes of illustration. At this time the lower end of the blank has been pushed by the folder blade 4 through the former sufficiently far for the lower end of the blank 85 to be engaged by the knurled rollers 20, a pair thereof located at each side of the former and connected by suitable shafts. These knurled rollers pull the blank from the former and compress the side folded edges of the blank and crimp it, the rollers being just wide enough to conform to the folded side edges of the cup blank (Fig. 5) of the cup.

After the cup blank has passed almost through the pair of rollers 20 a horizontally reciprocating tucker 21 operated by any suitable means engages the flap portion 3 of the cup blank, pushes it into engagement with one of the sets of rollers 20 and a corresponding set 22, whereby this flap 3 is bent over the rear of the cup in the manner shown in Fig. 5, thereby to form a lock for the side edges as well as a smooth mouth edge for the cup.

In carrying out this improved method of making sanitary drinking cups, it will thus be seen that the web of paper or other thin material either of paraffin paper or otherwise, as may be found desirable, is suitably severed transversely thereof to form the desired length of cup blank, which is then folded by the folder blade transversely of its length excluding the length of the flap portion 3, and this folder blade recovers to carry the so-folded cup blank sufficiently far into the former so that the lower end thereof will be engaged by the two sets of rollers 20—20 working along the side edges of the cup. As the cup blank is fed through the former the side edges thereof are first folded with a wide fold and then these folded side edges folded with a narrow fold, and then the narrow fold infolded upon one-half of the wide fold by the former whereupon as the cup passes from the former it is engaged by the sets of rolls 20 until the flap portion 3 is about to leave these rollers, when the tucker 21 is brought into position to engage the flap and carry the blank into position to be engaged by one set of rollers.
20, and its companion set 22, which thereupon fold the locking flap 3 backwardly upon the folded side edges of the blank, and so materially assist in locking the side edges in position.

It will also be observed from the foregoing that the folding blade 4 not only transversely folds the cup blank but also constitutes a means for pressing or pushing the blank into and practically through the former sufficiently far to enable the forward or lower end thereof to be engaged by the sets of rollers 20 by reason of the fact that the folder exerts its pressure upon the transverse fold of the cup blank and that the tucker 21 operates transversely to the direction of movement of the folder 4. In other words, as the blank 2 (see Fig. 10) is fed in the direction of its length or downward, the lower end thereof is deflected by the apron 9 upwardly, so that it can be formed into two flat sides, and when a sufficient amount of this cup blank is so deflected, the folding blade 4 engages the blank and transversely folds the same, and then exerts pressure upon such transverse fold from the inside of the two flat sides of the blank to further feed the blank in the direction of its length and through the former and into position to have the transverse folded portion engaged by the rollers 20. Simultaneously with this feeding of the blank by the blade 4 in the direction of the length of the blank, the former exerts sidewise pressure upon the opposite side edges of the blank toward the longitudinal center thereof thereby to fold such side edges in the manner hereinafore described. Owing to the manner in which the former is formed with the curls thereof tighter at the lower ends thereof, the result is that as the blank passes from the upper to the lower ends of the former, the former may be properly said to exert a constantly narrowing sidewise pressure upon the opposite side edges of the blank.

By means of the former, which gives three folds to the blank at each side thereof, the necessity of using feeding and pressure rollers for folding and feeding the edges of the cup blank is avoided while a better locking of the cup blank is also obtained.

It will be seen that the former member 8 is cut away as at 30 below the curled edges thereof to permit the operation of the rolls 20, and that as hereinafore stated, the member 6 is likewise cut away below the lower ends of the bent side edges thereof to facilitate the passage of the blank through the former, and that while the former is shown made of three pieces in the present improvement, the former members 7 and 8 are secured together so that they form practically one part.

It will also be seen that the upper ends of the bent side edges of the former member 6 gradually flare outwardly to facilitate the feeding of the cup blank through the former, and that the bent side edges of the member 6 have what may be considered an oggee or S-shaped bend, the bend nearest the plate 10 constituting the means for giving the first fold to the blank, while the top or outward bend constitutes the means around which the narrow fold 5 is made by the former member 8, while the lower curled portion of the former member 8 produces the final infolding of the blank.

It will be observed that during the operation of forming the cup, the side edges of the cup proper as well as of the flap are simultaneously folded so that when the flap is folded down it materially assists in locking the folds of the cup proper or body in place, and this more efficiently than would be the case if the side edges of the flap were not folded with those of the body. It will also be observed from the foregoing that the infold or narrow fold lies between two wide folds, which folds are formed from the main fold and that the narrow fold and one of the wide folds when the cup is completed, extend toward the longitudinal axis of the cup while the other wide fold extends away from such longitudinal axis.

It will be understood that the various details may be more or less changed without departing from the spirit or scope of the present improvement.

We claim as our invention:

1. The method of producing sanitary drinking cups, which consists in folding a blank transversely of itself, then folding the side edges toward the center thereof, then folding such folded side edges away from the center thereof, and then infolding such side edges toward the center thereof.

2. The method of producing sanitary drinking cups, which consists in folding a blank transversely of itself, to provide two flat sides one longer than the other thereby to provide a flap, then folding the side edges toward the center thereof, then folding such folded side edges away from the center thereof, then infolding such side edges toward the center thereof, and then folding the flap of the blank upon such side edges.

3. The method of producing a sanitary drinking cup which consists in first folding a blank transversely of itself to provide a pair of side portions, one of greater length than the other, then folding the side edges to produce a wide fold, then folding such folded portions to produce a narrow fold, and then infolding such narrow folds within the wide fold and then folding that side portion having the excess length to form a locking flap for the side edges.

4. The method of producing a sanitary drinking cup, which consists in first fold...
ing a blank transversely of itself to provide a pair of side portions one of greater length than the other, then folding the side edges throughout the length of the blank toward the center of the blank to produce a wide fold, then folding such folded portions away from the center thereof to produce a narrow fold, then infolding such narrow folds toward the center of the blank and within the wide folds, then folding that side portion having an excess length to form a locking flap for the side edges, and during the folding of such side edges crimping the same.

5. The method of making sanitary drinking cups, which consists in feeding a cup blank in the direction of its length, then deflecting one end of said cup blank upon itself to form two flat sides with one side longer than the other thereby to form a flap and transversely folding the blank, then exerting a constantly narrowing sidewise pressure upon the opposite side edges of the blank toward the longitudinal center of the blank thereby to fold such side edges a plurality of times, and then folding the flap over upon such folded side edges.

6. The method of making sanitary drinking cups, which consists in feeding a cup blank in the direction of its length, then deflecting one end of said cup blank upon itself to form two flat sides with one side longer than the other thereby to form a flap and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length and simultaneously with such feeding exerting sidewise pressure upon the opposite side edges of the blank toward the longitudinal center of the blank thereby to form two flat sides with one side longer than the other thereby to form a flap and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length and simultaneously with such feeding exerting sidewise pressure upon the opposite side edges of the blank toward the longitudinal center of the blank thereby to fold such side edges a plurality of times, and then folding the flap over upon such folded side edges.

7. The method of making sanitary drinking cups, which consists in feeding a cup blank in the direction of its length, then deflecting one end of said cup blank upon itself to form two flat sides with one side longer than the other thereby to form a flap and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length and simultaneously with such feeding exerting sidewise pressure upon the opposite side edges of the blank toward the longitudinal center of the blank thereby to fold such side edges a plurality of times, and then folding the flap over upon such folded side edges.

8. The method of making sanitary drinking cups, which consists in feeding a cup blank in the direction of its length, then deflecting one end of said cup blank upon itself to form two flat sides with one side longer than the other thereby to form a flap and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length and simultaneously with such feeding exerting sidewise pressure upon the opposite side edges of the blank toward the longitudinal center of the blank thereby to fold such side edges a plurality of times, and then folding the flap over upon such folded side edges.
cup and the flap a plurality of times, then crimping such folded side edges, and then folding the flap with its folded side edges down upon the back of the side carrying such flap and over the side edge folds of the cup proper.

12. The method of making sanitary drinking cups, which consists in feeding a cup blank in the direction of its length, then deflecting one end of said cup blank upon itself to form two flat sides with one side longer than the other thereby to form a flap and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length and simultaneously with such feeding exerting sidewise pressure upon the opposite sides of the blank toward the longitudinal center of the blank thereby to fold and infold such side edges, and then feeding the blank transversely of its original direction of movement and folding the flap upon the folded side edges of the cup.

13. The method of making sanitary drinking cups, which consists in feeding the cup blank in the direction of its length, then deflecting one end of said cup blank upon itself to form two flat sides with one side longer than the other thereby to form a flap and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length and simultaneously with such feeding exerting a constantly narrowing sidewise pressure upon the opposite sides of the blank toward the longitudinal center of the blank thereby to fold and infold such side edges and then feeding the blank transversely of its original direction of movement and folding the flap upon the folded side edges of the cup.

14. The method of making sanitary drinking cups, which consists in feeding a cup blank in the direction of its length, then deflecting one end of said blank upon itself to form two flat sides and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length, and then exerting sidewise pressure upon the opposite sides of the blank toward the longitudinal center of the blank thereby to fold such side edges first with a wide fold, then with a narrow fold, and then infolding such narrow fold within the wide fold.

15. The method of making sanitary drinking cups, which consists in feeding a cup blank in the direction of its length, then deflecting one end of said blank upon itself to form two flat sides and transversely folding the blank, then exerting pressure upon the transverse fold from the inside of the two flat sides to further feed the blank in the direction of its length, and then exerting sidewise pressure upon the opposite sides of the blank toward the longitudinal center of the blank thereby to fold and infold such side edges, and then crimping such folded side edges.

16. A sanitary drinking cup comprising a blank folded upon itself to form a pair of flat sides, one longer than the other thereby to form a flap, the flat sides and the flap having their side edges folded a plurality of times in opposite directions and locked by the flap folded down upon the cup.

17. A sanitary drinking cup comprising a blank folded upon itself to form a pair of flat sides with one side longer than the other thereby to form a flap, the side edges of the cup proper and the flap being folded in opposite directions by a plurality of folds of different dimensions and the flap and its side edges folded down upon the folded side edges of the cup proper.

18. A sanitary drinking cup having a pair of flat sides and a flap with the side edges folded a triple number of times to form seams, each comprising wide folds, and a narrow fold with the narrow fold infolded between the wide folds and with the flap folded over such folded side edges.

19. A sanitary drinking cup having a pair of flat sides, one longer than the other, forming a flap, said cup having the side edges thereof and of the flap folded a triple number of times to form seams, each comprising a pair of substantially equally wide folds and a narrow fold with the narrow fold infolded between the wide folds and with the flap and its side edges folded over the folds of the cup proper.

20. A sanitary drinking cup having a pair of flat sides and a flap with its side edges folded a triple number of times to form seams, each comprising wide folds and a narrow fold, a pair of such folds extending toward the longitudinal center of the cup and one of such folds extending away therefrom with the narrow fold infolded between the wide folds and with the flap folded over such folded side edges.

22. A sanitary drinking cup having a pair
of flat sides, one longer than the other forming a flap with the side edges of the cup and its flap folded to form seams, each comprising substantially equally wide folds and a narrow fold with the narrow fold infolded between the wide folds and projecting toward the longitudinal axis of the cup and with the flap and its folded side edges folded over the folded edges of the cup properly.

23. A sanitary drinking cup having a pair of flat sides, one longer than the other forming a flap with the side edges of the cup and its flap folded to form seams, each comprising substantially equally wide folds and a narrow fold with the narrow fold infolded between the wide folds and projecting toward the longitudinal axis of the cup, one of said wide folds also extending toward the longitudinal axis of the cup and the other away therefrom and the flap and its folded side edges being folded over the folded edges of the cup proper.

24. A sanitary drinking cup comprising a pair of equally wide flat sides having straight parallel side edges, one side longer than the other forming a flap, said cup having the side edges thereof and of the flap folded a triple number of times to form seams, each comprising substantially equally wide folds and a narrow infolded fold, the flap of the cup with its folded side edges being folded down over the cup proper at the back of the flat side carrying such flap, the folds of the cup and the flap being crimped thereby to assist in locking the same.

25. A sanitary drinking cup having a pair of flat sides and a flap with the side edges folded a triple number of times to form seams, each comprising a pair of folds and an infold therebetween with the flap folded over such folded side edges.

26. A sanitary drinking cup having a pair of flat sides, one longer than the other forming a flap, said cup having the side edges thereof and of the flap folded a triple number of times to form seams, each comprising a pair of folds and an infold therebetween with the flap and its folded side edges folded over the folds of the cup proper, the folded seams being crimped thereby to assist in locking the seams.

27. A sanitary drinking cup having a pair of flat sides and a flap at its mouth with the side edges folded a triple number of times to form seams, each comprising a main fold folded to form a narrow infold lying between a pair of wide folds with the flap folded over the folded side edges of the cup and with such folded side edges crimped to assist in locking the same.

28. A sanitary drinking cup having a pair of flat sides, and a flap, with the side edges folded a triple number of times, first with wide folds, then with narrow folds, and then with the narrow folds infolded, with the flap folded over such folded side edges.

29. A sanitary drinking cup having a pair of flat sides one longer than the other to form a flap, said cup having the side edges thereof and of the flap folded a triple number of times, first with a wide fold, then with a narrow fold, and then with substantially equally wide folds thereby to form a series of folds with the flap and its folded side edges folded over the folds of the cup proper.

30. A sanitary drinking cup having a pair of flat sides, and a flap with its side edges folded a triple number of times, first toward each other with wide folds, then the free edges of such folds folded away from the longitudinal center of the cup with narrow folds, and then such narrow folds infolded upon one-half of the first folds and toward the longitudinal center of the cup, with the flap folded over such folded side edges.

31. A sanitary drinking cup having a pair of flat sides one longer than the other to form a flap with the side edges of the cup and its flap folded toward each other with wide folds, the free edge of such folds being folded with narrow folds and such narrow folds then infolded upon one-half of the first fold, the flap and its folded side edges being folded over the folded edges of the cup proper.

32. A sanitary drinking cup comprising a pair of equally wide flat sides having straight parallel side edges, one side longer than the other to form a flap, said cup having the side edges thereof and of the flap folded a triple number of times, first with a wide fold, then with a narrow fold, and then with substantially equally wide folds with the folds of the cup and the flap crimped thereby to assist in locking the same, the flap of the cup with its folded side edges being folded down over the folds of the cup proper at the back of the flat side carrying such flap.

Signed at New York city, New York, this 26th day of March, 1918.

BENJAMIN B. AVERY.
ALEXANDER NELSON.