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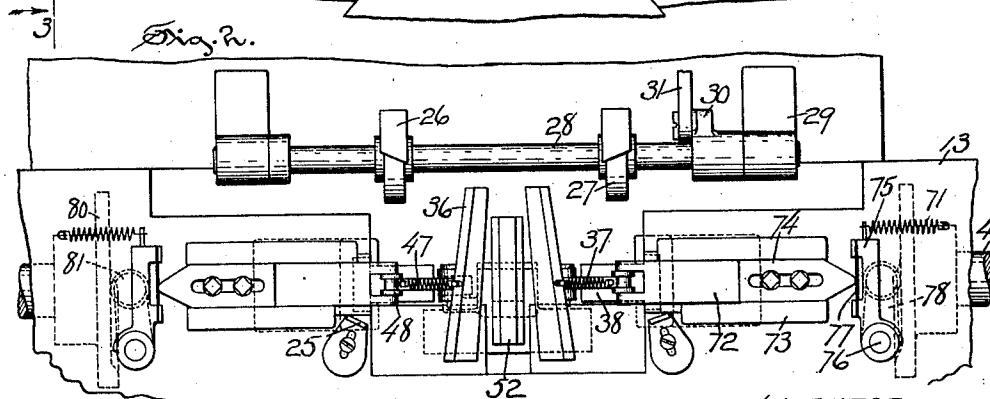
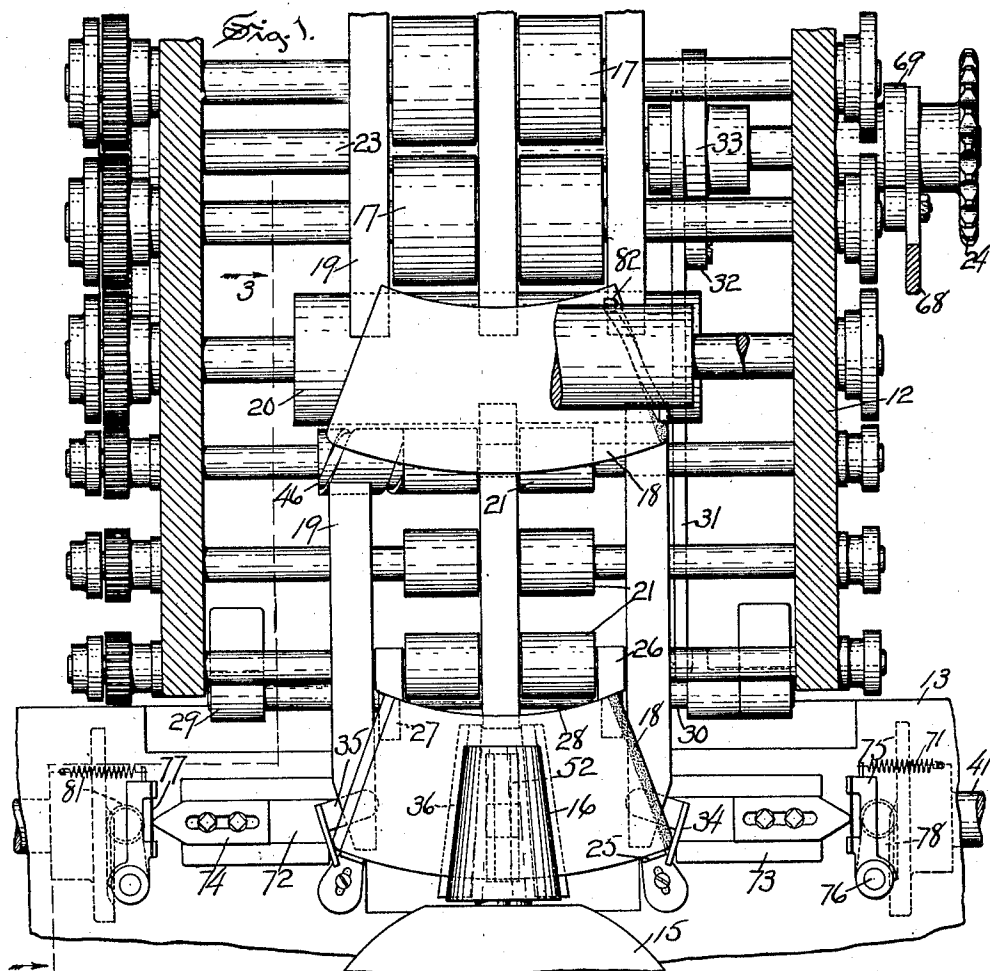
H. B. COOLEY

1,973,406

CUP MAKING MACHINE

Filed Feb. 1, 1933

4 Sheets-Sheet 1



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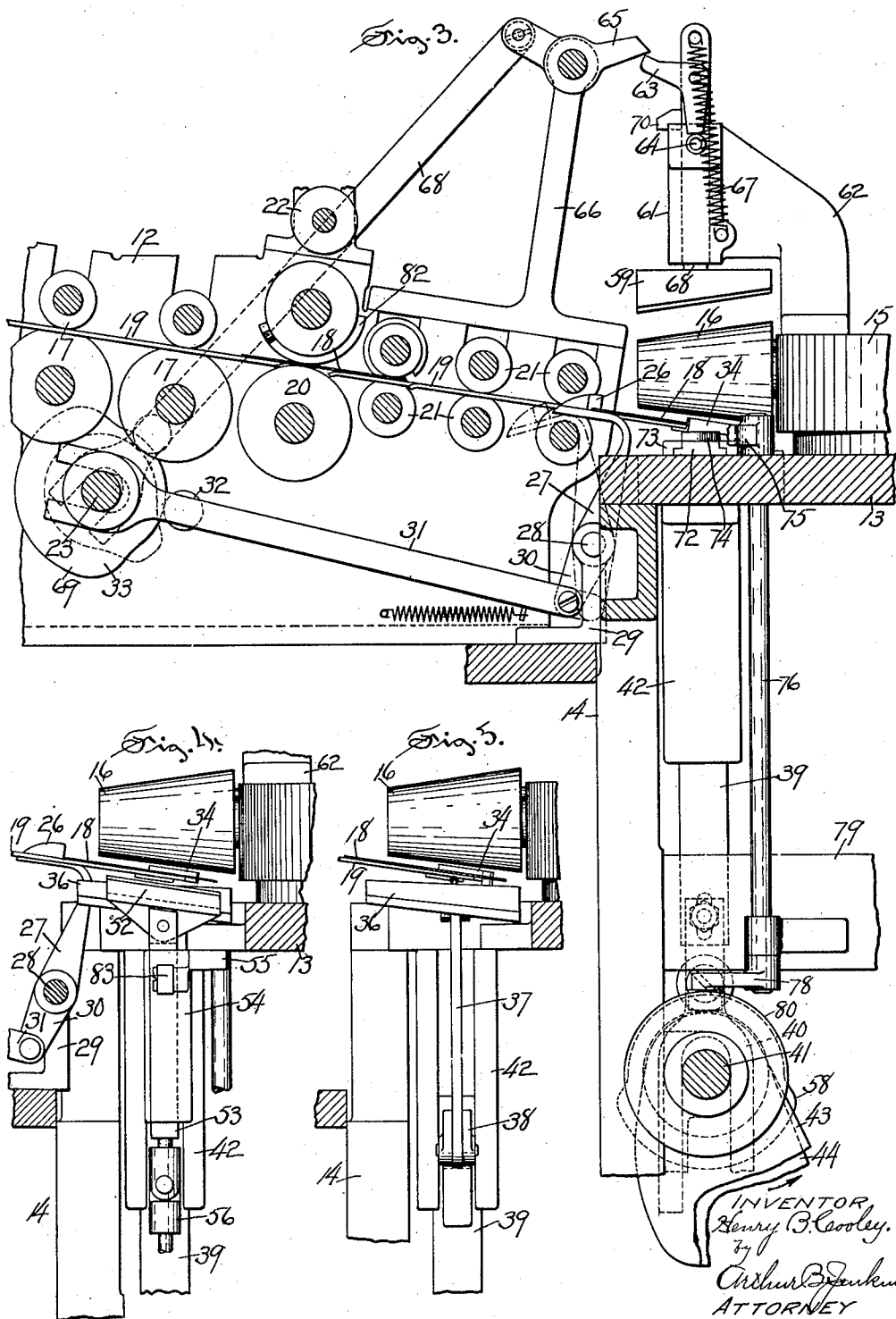
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CUP MAKING MACHINE

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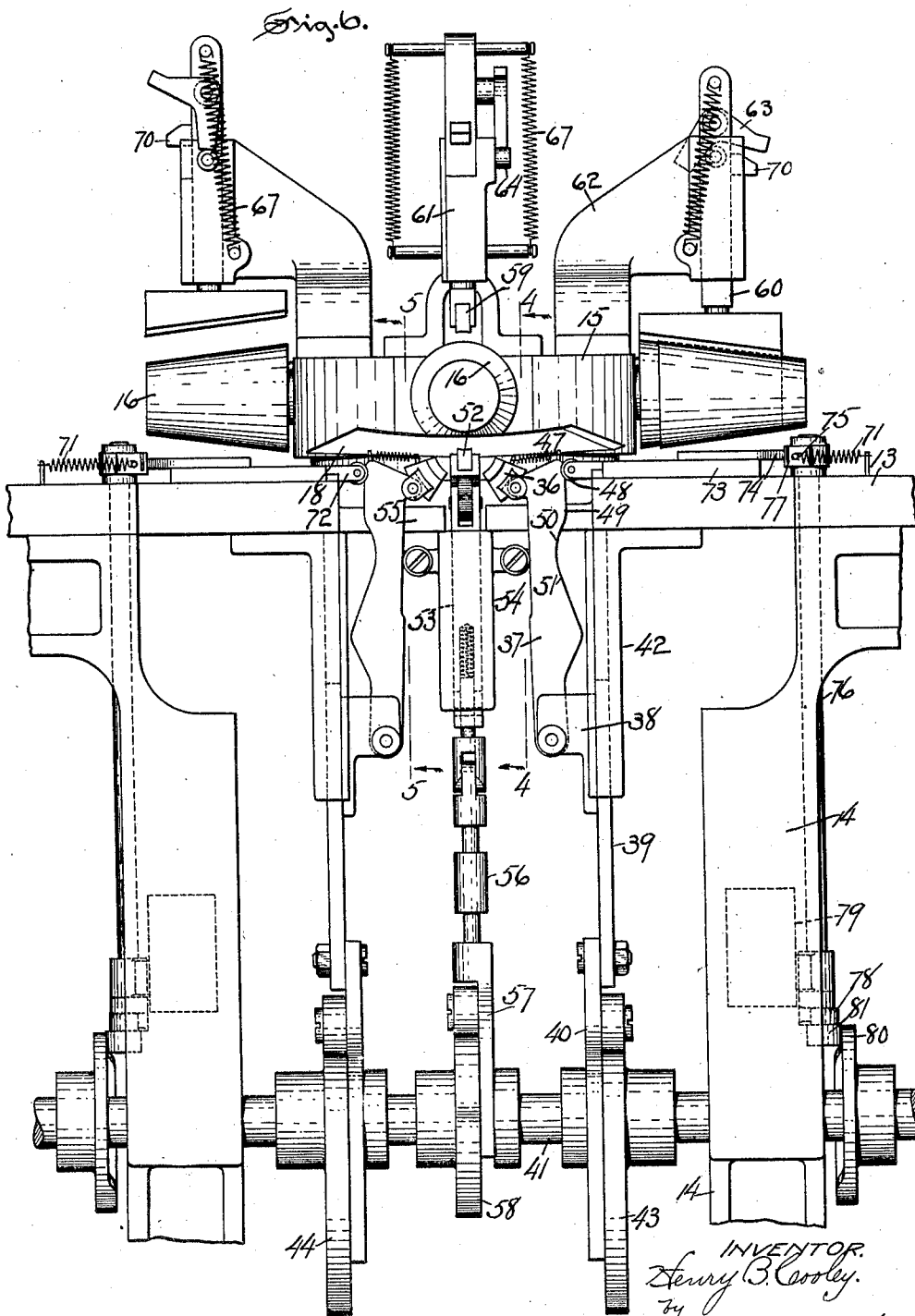
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CUP MAKING MACHINE

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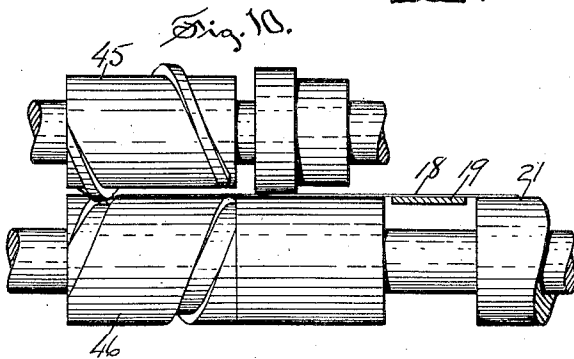
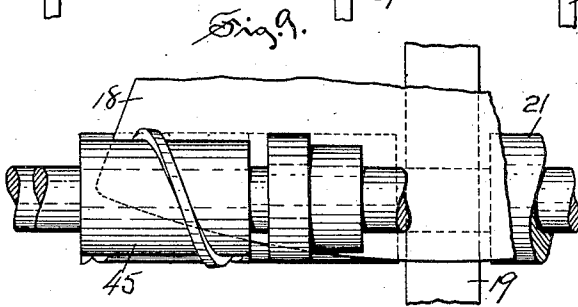
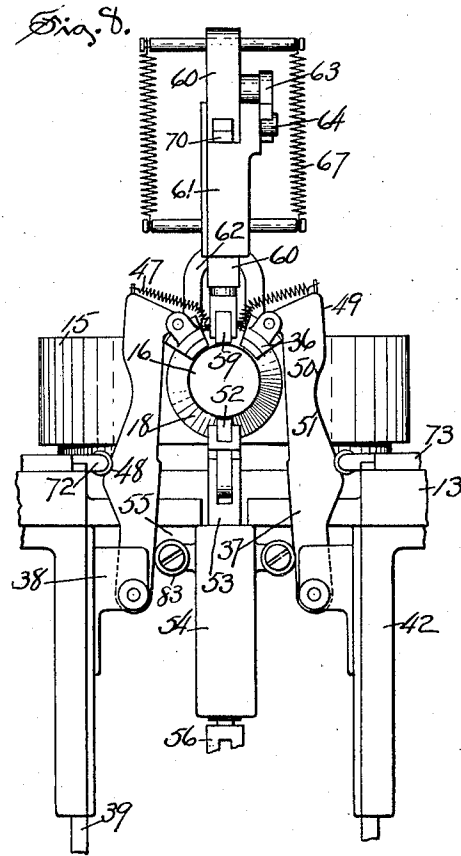
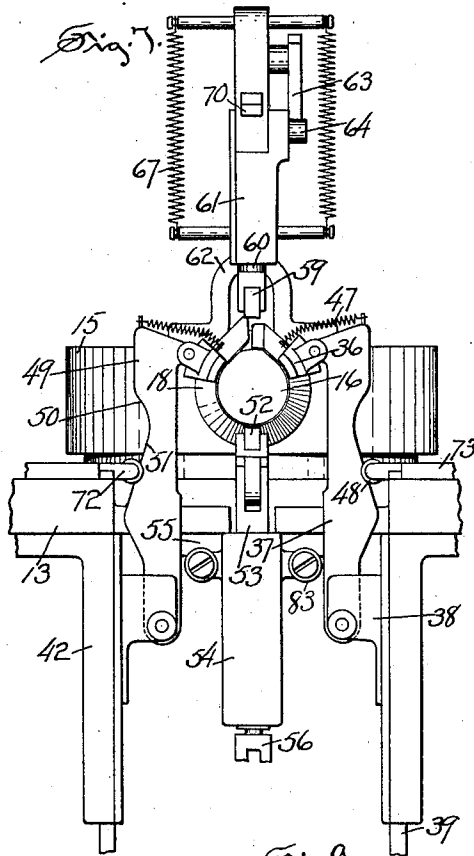
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CUP MAKING MACHINE

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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

1,973,406

CUP MAKING MACHINE

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clair, N. J., a corporation of New Jersey

Application February 1, 1933, Serial No. 654,596

11 Claims. (Cl. 93—39)

My invention relates more particularly to mechanism for forming the bodies of cups, commonly used for drinking purposes, from blanks of thin material, as paper or the like, and an object of my invention, among others, is the production of mechanism for this purpose that shall be rapid in operation as well as unfailing and effective in operation.

One form of a mechanism embodying my invention and in the construction and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in horizontal section through the feeding and forming mechanism of my improved machine and more especially illustrating the lower portions of the feeding mechanism.

Figure 2 is a similar view of the cup body forming member, the turret and mandrel shown in Fig. 1 being omitted.

Figure 3 is a view in vertical section on a plane denoted by the dotted line 3—3 of Fig. 1.

Figure 4 is a detail view in vertical section on a plane denoted by dotted line 4—4 of Figure 6.

Figure 5 is a view in vertical section on a plane denoted by the dotted line 5—5 of Figure 6.

Figure 6 is a view in front elevation of the cup body forming mechanism.

Figure 7 is a view of a portion of the mechanism shown in Fig. 6 but illustrating an advanced step in the formation of a cup body.

Figure 8 is a view similar to Fig. 7 but illustrating the completion of the formation of the cup body.

Figure 9 is a detail top view on enlarged scale illustrating the blank creasing mechanism.

Figure 10 is a similar view in front elevation of the same.

In the accompanying drawings the numeral 12 denotes the side parts of the frame of the feeding mechanism for delivering blanks for cup bodies to the mechanism for forming such bodies, 13 a table supported on legs or standards 14 surmounted by a turret 15 having mandrels 16 which are moved into position to receive blanks from the feeding mechanism in a step-by-step rotating movement of the turret effected by mechanism not herein shown, but common to machines of this type, and which is not material to an understanding of the present invention, it being sufficient to state that the said movement of the turret is synchronous with the feeding of blanks, so that each time a mandrel is presented opposite the feeding mechanism a blank will be moved to

position to be formed into a cup body on said mandrel.

The feeding mechanism, briefly described, comprises pairs 17 of feeding rolls to which blanks are supplied in any suitable manner, said blanks 18 being moved along guide strips 19 to gumming rolls 20 and from said gumming rolls, by pairs 21 of delivery rolls, along more guide strips to the mechanism for forming the cup bodies from said blanks. The gumming rolls 20 receive adhesive from a distributing roll 22 which is supplied in any suitable manner common to machines of this type from a receptacle (not shown) containing the adhesive. The several pairs of feeding, gumming, and delivery rolls are rotatably mounted in the side parts 12 of the frame hereinbefore referred to and all may be of any well known construction and arrangement common to machines of this type and for which reason a more detailed illustration and description is omitted herein, it being sufficient to state that the several rolls are driven by means of intermeshing gears and pinions, a portion only of which are shown in Fig. 1 of the drawings, the arrangement of the omitted gears and pinions not being necessary for a clear understanding of the present invention.

A driving shaft 23 mounted in the side parts 12 of the frame may be rotated as by means of power applied to a sprocket 24 from any suitable source, and this driving shaft is connected as by means of gears with the feed rolls hereinbefore described for the purpose of driving the latter.

Blank stops 25 are adjustably secured to the top of the table 13, as shown in Fig. 1 of the drawings to locate the blanks in proper position with respect to the mandrels lengthwise thereof and just preceding the operation of wrapping said blanks around the mandrels, and pushers 26 are operated to move the blanks against said stops. These pushers are secured at the ends of pusher levers 27 secured to and extending from a pusher shaft 28 mounted for rocking movement in brackets 29 secured to the frame of the machine, and as shown in Figure 2. A pusher actuating arm 30 also secured to said shaft is pivotally attached at one end to a pusher actuating rod 31 having a forked end straddling the shaft 23, as shown in Fig. 3, and a roller 32 rotatably mounted on said rod is yieldingly held against the edge of a pusher actuating cam 33 as by means of a spring shown in Fig. 3 of the drawings, said cam being secured to the shaft 23 and having its edge formed and its rotation timed to retract the pushers 26 to permit blanks 18 to pass from the delivery rolls and to cause the pushers to engage the rear ends of the

blanks and push them into position with respect to the mandrel about which they are to be wrapped. Positioning guides 34 coact with the stops 25 to properly locate the blanks with respect to the mandrels laterally thereof. These guides are secured to and project upwardly from guide supports 35 secured to and projecting from the under sides of the side guide strips 19 for guiding the blanks from the delivery rolls, and as shown in Fig. 1 of the drawings.

When positioned with respect to the mandrels the blanks rest upon the guides 19 and the back-turned ends of the levers 27 just in front of the pushers 26. From this position said blanks are wrapped about the mandrels by wrappers 36 in the form of strips curved on their forming surfaces to correspond substantially to the curve of the mandrels. These wrappers are pivotally attached to wrapper levers 37 pivotally mounted at their lower ends in blocks 38 secured to the upper ends of wrapper actuating bars 39 having forks 40, preferably separately formed and adjustably secured to the lower ends of said bars, said forks straddling a cam shaft 41, as shown in Fig. 3 of the drawings, said shaft being rotatably mounted in bearings secured to the legs 14 comprising part of the frame of the machine. The bars 39 are mounted for lengthwise sliding movement in T-shaped grooves in guide brackets 42 secured to and projecting from the under side of the table 13, said grooves being partially formed by gibbs if desired in a manner common to such structures, and as shown in Fig. 6. Wrapper actuating cams 43, 44 secured to cam shaft 41 engage with their edges rollers secured to the forks 40, said cams being properly formed and timed to wrap a blank about a mandrel during a pause of the latter in front of the feeding mechanism in the step-by-step rotation of the turret. The cam 43 is positioned slightly ahead of the cam 44, as shown in Fig. 3 of the drawings, so that the wrapper located on the rod actuated by said cam 43 wraps its side of the blank around the mandrel slightly ahead of the wrapper located on the other rod, the latter wrapper therefore operating to lap its edge of the blank over and upon the opposite edge of the blank. The wrapper strips 36 are in fact segments cut from a female member comprising a hollow cone shaped in conformity with a cone-shaped male member comprising the mandrels 16, said female member being made to fit said cone and the segments comprising the wrapper strips being then cut out. These strips are preferably at least as long as the mandrels 16.

The upper gumming roll of the pair of gumming rolls 20 hereinbefore referred to has a gumming strip 82 extending therearound to apply gum to the upper surface of one edge of the blank, this being the inner surface when the blank is wrapped about a mandrel as just hereinbefore mentioned.

An important feature of my invention embodies means for eliminating the possibility of the underlapped edge of the blank wiping, with its inner surface, gum from the overlapped edge just before referred to which would cause the blanks to adhere to the mandrels and prevent their discharge therefrom. To this end a crease is formed along that edge of the blank opposite the gummed edge thereby bending the edge inwardly to cause it to conform to the outline of the mandrel and ensure the overlapping of the opposite edge without the two edges coming in contact. This crease is effected by means of creasing rolls 45-46 secured to the feed roll

shafts next to the gumming rolls 20 and to operate upon the opposite edges of the blanks from the edges to which the gum is applied, and as shown in Fig. 1 of the drawings, the lower roll 46 having a spiral groove into which the blank is forced by a spiral rib on the upper roll 45, and as particularly shown in Fig. 10. This construction not only eliminates the possibility of objectionable smearing of the gum on the blanks, but at the same time aids in the location of the ungummed edge of the blank under the overlapped gummed edge in the formation of the cup bodies.

The wrappers 36 are held in retracted positions by wrapper springs 47 each secured at one end to a wrapper and at its opposite end to one of the levers 37, and the back edges of said wrapper levers have a contour to guide the wrappers around the circular surface of the mandrels 16, as shown in Figs. 6, 7 and 8 of the drawings, this contour edge being backed up by a guide 48 in the form of a roller under a spring tension by devices to be hereinafter described. Said contour edge on each lever in contact with a roller comprises a straight portion 49 to guide the lever in a straight path until a blank 18 touches the under surface of a mandrel 16, an inwardly curved portion 50 to guide the lever with its wrapper 36 around the under curved surface of the mandrel and an outwardly curved portion 51 to guide the lever and move its wrapper around the upper curved portion of the mandrel. Acting in conjunction with the wrapper levers and wrappers is a holder 52 in the form of a bar curved to fit the under surface of the mandrels, said holder being pivotally attached to the upper end of an actuating bar 53 supported for vertical sliding movements in a holder guide 54 attached to a bracket 55 secured to the under side of the table 13, as shown in Figures 4 and 6 of the drawings. This holder is actuated to clamp the blanks to the mandrels just in advance of the action of the wrappers to ensure the blanks each being held in a rigid position during the wrapping operation. Rollers 83 mounted on studs secured to the opposite sides of the guide 54 operate to limit the movement of the levers 37 toward each other.

A sectional connecting rod 56 thrusts with its upper end against a spring in a hole in the lower end of the bar 53 to exert a yielding thrust upon said bar in forcing the holder against a blank, and the lower end of said rod has a fork which straddles the shaft 41, a roller on said fork engaging the edge of a holder operating cam 58 secured to the shaft 41, and as shown in Fig. 6 of the drawings. Said cam is shaped and timed to move the holder upwardly just in advance of the upward movement of the wrappers 36 to effect engagement of the holders with the blanks and clamp said blanks against the under surface of the mandrels while the wrappers are being operated to wrap the blanks around the mandrels.

When the blanks have been wrapped completely around the mandrels in the manner just described a presser 59 in the form of a bar having a curved pressing surface to fit the curved surface of a mandrel is pressed against the blanks to stick their meeting edges tightly together, said presser being attached to a presser slide 60 mounted for sliding movement in a presser guide 61 formed at the upper end of a bracket 62 secured to and rising from the turret 15, there being a presser located over and appurtenant to each of the mandrels, as shown in

Fig. 6 of the drawings. Each slide 60 is held normally in a raised position by means of a latch 63 of bell-crank shape having one arm adapted to seat against a stud 64 projecting from the side of the guide 61 and its other arm adapted to be engaged by a presser releasing lever 65 pivotally mounted at the upper end of a post 66 secured to and rising from the frame of the feeding mechanism, as shown in Fig. 3, said presser being held in its lower active position by means of springs 67, as shown in Figs. 3, 6, and 8 of the drawings. At the finish of each wrapping operation the presser 59 is released, and promptly after such release the holder 52 is permitted to drop by the action of the cam 58.

The lever 65 is actuated by means of a presser releasing bar 68 having a forked end straddling the shaft 23 and carrying a roller engaged with a presser actuating cam 69 on the shaft 23, said cam being formed and timed to cause the lever 65 to release the latches 63 just after the wrappers have been operated, as hereinbefore described, to wrap the blanks around the mandrels. Said pressers remain in pressing engagement with the blanks until they are released by engagement of a nose 70 on the slide 60 with any suitable device (not shown) which will lift said slide to the position on the lefthand side of Fig. 6, whereupon the latch 63 will automatically reengage the pin 64, the parts being thus reset for a subsequent operation.

As the levers 37 are moved upwardly to actuate the wrappers 36 the force applied by said levers to said wrappers and the shape of said wrappers causes them to follow closely around the curved surface of the mandrels to wrap the blanks in close engagement with said mandrels, but when a reverse movement takes place means are provided by me to cause the wrappers to travel backwardly spaced from the mandrels so that the blanks which have been wrapped about said mandrels will not be disturbed. I accomplish this purpose by mounting each guide roller 48, hereinbefore referred to, in a guide bar 72 mounted for sliding movement in a guide block 73 secured to the table 13. Each guide bar has a contact bar 74 adjustably secured thereto to contact with a guide bar actuating lever 75 secured to the end of a guide actuating shaft 76 pivotally mounted in the frame underneath the table 13 and projecting through said table, as shown in Fig. 6. In order that the action of the levers 75 shall be a yielding action said levers each includes a yielding contact strip 77 against which a guide bar thrusts, and this provides the action of the wrappers 36 under spring tension as hereinbefore referred to.

Each shaft 76 is mounted in its lower end in a bearing on a cross bar of the frame, as shown in Fig. 3, and has a guide bar actuating arm 78 secured to its lower edge, said cross bar 79 being shown in end view in dotted line in Fig. 6 of the drawings. The arm 78 is pressed against a guide bar actuating cam 80 secured to the shaft 41 and as shown in Fig. 6 of the drawings, said arm bearing a roller 81 that rests in contact with the side face of the cam.

In the operation of the device just described after the blanks have been wrapped about the mandrels the cams 80, being properly formed, permit backward movement of the guide bars 72 to a slight degree under the action of the springs 71 (see Figs. 1, 2 and 6) so that a slight space is created between the wrapper 36 and the cup bodies on the mandrels, and the downward movement of said rollers therefore takes place without

touching the cup bodies and the latter are not therefore disarranged or affected in the movement of the wrapper levers to a position for another wrapping operation.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that my device shown is only illustrative and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A cup making machine including means for feeding a blank, means for applying adhesive to one edge of said blank, means for bending the opposite edge of said blank from its normal flat condition to avoid said adhesive treated edge, and means for moving said blank to a mandrel to shape it thereon.

2. A cup making machine including means for feeding a blank, means for applying adhesive to one edge of said blank, means for creasing the opposite edge of said blank to avoid said adhesive treated edge, and means for moving said blank to a mandrel to shape it thereon.

3. A cup making machine including a pair of feed rolls, one having a groove and the other a rib to fit said groove to crease one edge of a blank to bend said edge to avoid said adhesive treated edge, and means for moving said blank to a mandrel to shape it thereon.

4. A cup making machine including a pair of feed rolls, one having a groove and the other a rib to fit said groove to crease one edge of the blank to bend said edge to avoid said adhesive treated edge, means for applying adhesive to said blank, and means for moving said blank to a mandrel to shape it thereon.

5. A cup making machine including a set of feed rolls, means at one end of said rolls for applying adhesive to one edge of said blank, an intermeshing rib and groove at the opposite ends of said rolls to crease the opposite edge of said blank, and means for applying said blank to a mandrel to shape it thereon.

6. A cup making machine including a mandrel, wrappers for passing a blank around said mandrel to form a cup body thereon, means for moving said wrappers in one direction to form a blank, means for moving said wrappers in the opposite direction out of contact with said blank and guiding means for guiding the wrappers away from the blanks in their initial movements and toward the mandrel in their final movements.

7. A cup making machine including a mandrel, wrappers for passing a blank around said mandrel to form a cup body thereon, wrapper levers to which said wrappers are attached, means for yieldingly pressing said levers toward each other, means for limiting movement of said levers toward each other, contour back edges on said levers for moving them away from and toward said mandrel in their folding movements, and means for operating said levers.

8. A cup making machine including a mandrel, pivotally mounted wrapper levers, wrappers pivotally attached to said levers, means for guiding said levers to pass said wrappers around said mandrel, and means for resiliently pressing said guiding means toward said levers.

9. A cup making machine including a mandrel, pivotally mounted wrapper levers, wrappers pivotally attached to said levers, a guide bar for

guiding the movement of each lever to pass the wrappers around the mandrel, a guide bar actuating lever, a spring carried by said actuating lever in contact with said guide bar, and means
5 for actuating said actuating lever.

10. A cup making machine including a mandrel comprising a male member, wrapper bars comprising segments cut from a female member formed to envelop said male member, means for
15 supporting said bars relatively to said mandrel, means for operating said bars to pass them around said mandrel with a circumferentially

sliding movement to form a cup body thereon, and means for supplying blanks to said bars.

11. A cup making machine including a mandrel of cone shape comprising a male member, wrapper bars comprising segments cut from a
80 female member formed to envelop said mandrel, means for supporting said bars and for passing them around said mandrel with a circumferentially sliding movement to form a cup body thereon, and means for supplying blanks to said wrap-
85 per bars.

HENRY B. COOLEY.

15	90
20	95
25	100
30	105
35	110
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45	120
50	125
55	130
60	135
65	140
70	145
75	150