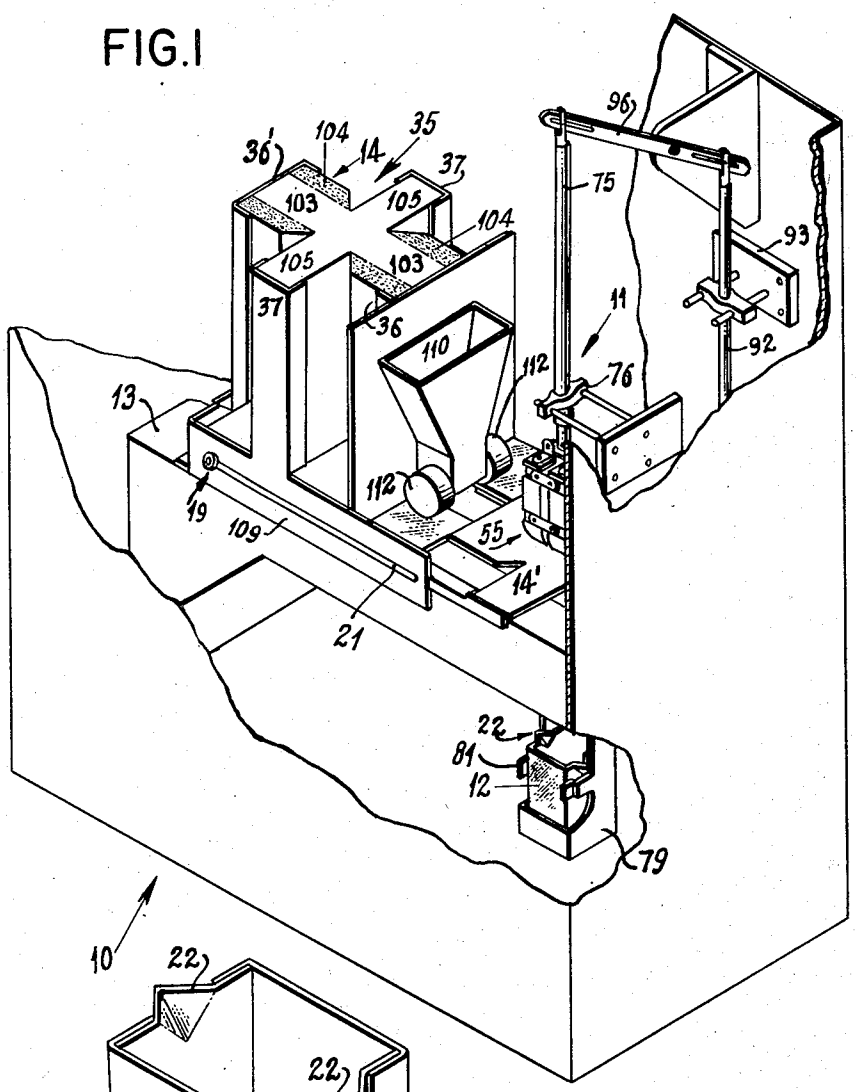
Nov. 20, 1951 J. H. KING 2,575,386

CUP FORMING AND DISPENSING MECHANISM
FOR BEVERAGE VENDING MACHINES

Filed June 20, 1950 4 Sheets-Sheet 1

FIG.1



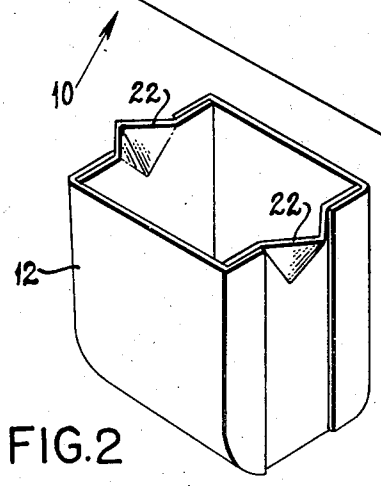


FIG.2

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CUP FORMING AND DISPENSING MECHANISM FOR BEVERAGE VENDING MACHINES

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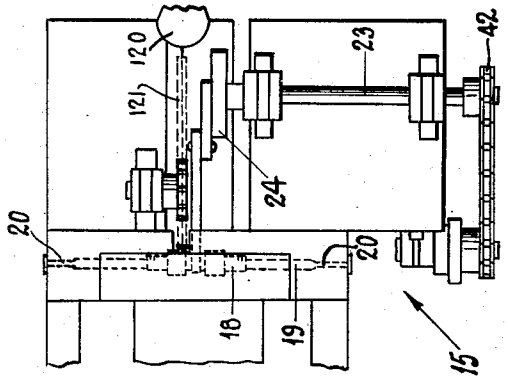


FIG. 4

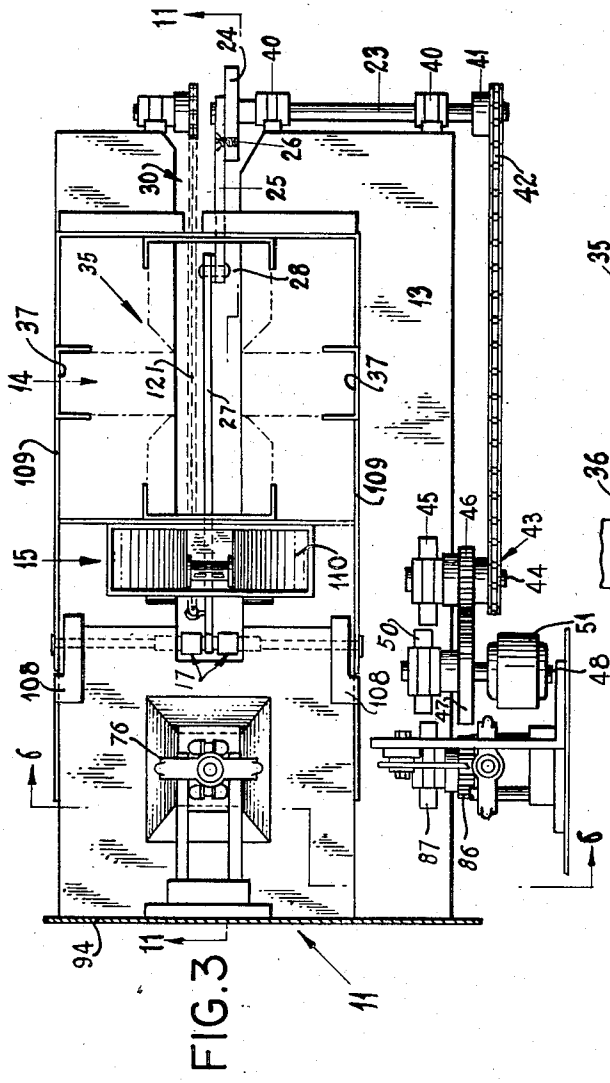


FIG. 3

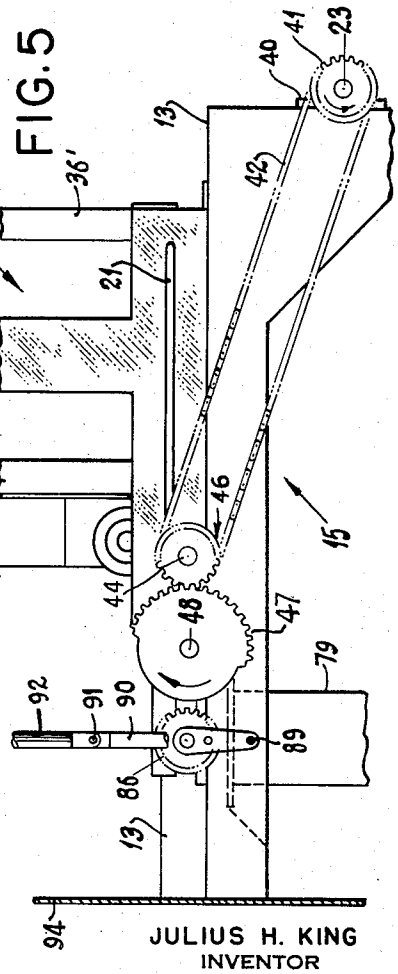


FIG. 5

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CUP FORMING AND DISPENSING MECHANISM FOR BEVERAGE VENDING MACHINES

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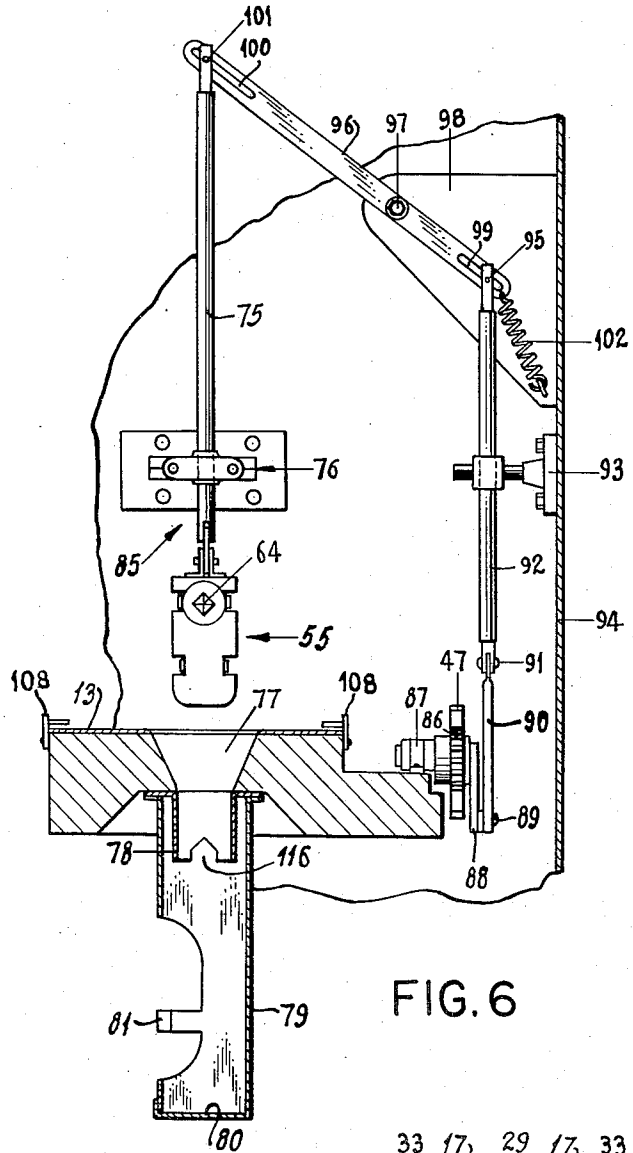
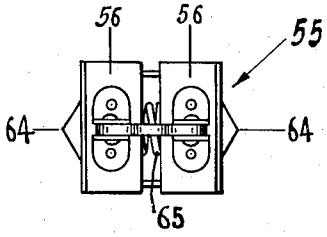


FIG. 6

FIG. 7



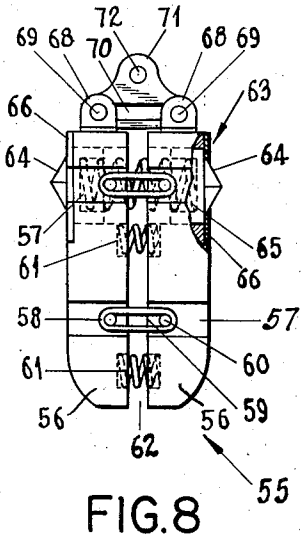


FIG. 8

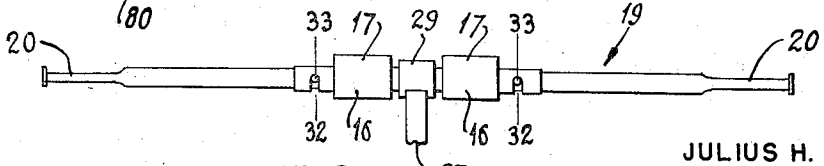


FIG. 9

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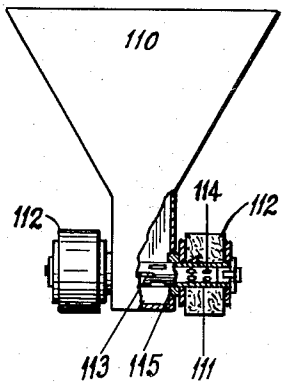
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CUP FORMING AND DISPENSING MECHANISM FOR BEVERAGE VENDING MACHINES

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FIG.10



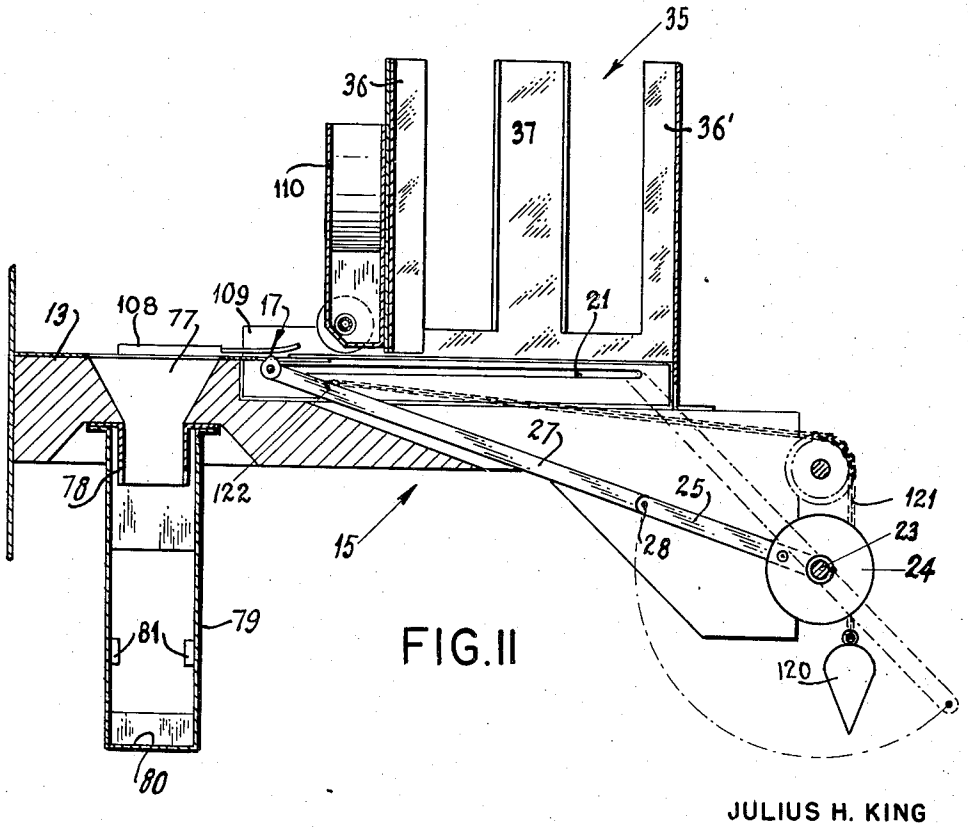


FIG.11

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UNITED STATES PATENT OFFICE

2,575,386

CUP FORMING AND DISPENSING MECHANISM FOR BEVERAGE VENDING MACHINES

Julius H. King, New York, N. Y.

Application June 20, 1950, Serial No. 169,159

6 Claims. (Cl. 93—36.05)

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This invention relates to a combined cup forming and dispensing mechanism for a beverage vending machine using drinking cups.

An object of this invention is to provide a mechanism for forming drinking cups from die-cut and pre-glued blanks and whereby the feeding of the individual cup blanks from a stack of blanks will take place at the lower level of the stack of blanks, thereby permitting a stack of practically unlimited height to be serviced to the vending machine.

Another object of this invention is to provide cups having pre-glued side flaps, the glue being of a pre-determined consistency so that when moistened, the flaps will quickly adhere to the dry sides of the formed drinking cups.

Another object of this invention is to provide mechanism for forming drinking cups of substantially rectangular form and which are inherently open for use, each cup having two pouring lips.

With the above and other objects in view, the invention will be hereinafter more particularly described, and the combination and arrangement of parts will be shown in the accompanying drawings and pointed out in the claims which form part of this specification.

Reference will now be had to the drawings, wherein like numerals of reference designate corresponding parts throughout the several views, in which:

Figure 1 is a perspective view of the combined cup forming and dispensing mechanism, the casing being partly broken away to show the mechanism therein.

Figure 2 is a perspective view of a formed cup having pouring lips thereon, the cup being shown on an enlarged scale.

Figure 3 is a top plan view of the mechanism.

Figure 4 is an end view of a fragmentary portion of the mechanism shown in Figure 3.

Figure 5 is a side view of a fragmentary portion of the mechanism.

Figure 6 is a cross-sectional view taken on line 6—6 in Figure 3, and shows supporting and actuating mechanism for the male cup forming die.

Figure 7 is a top plan view of the two-part male die.

Figure 8 is a side view of the male die.

Figure 9 is a side view of a gripping and feeding device for the cup blanks.

Figure 10 is a front view of a water tank having a perforated roller shaft, the tank and shaft being partly broken away to show water transfer means.

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Figure 11 is a cross-sectional view taken on line 11—11 in Figure 3.

In the illustrated embodiment of the invention, the numeral 10 indicates a beverage vending machine having a mechanism 11 for forming drinking cups 12 from flat blanks stacked in the vending machine. The vending machine 10 includes a base or platform 13 upon which a plurality of die-cut and pre-glued cup blanks 14 are supported in vertically stacked relation.

As shown in Figures 2 to 5 inclusive, there is provided a gripping and feeding mechanism 15 for the cup blanks 14. The mechanism 15 comprises cam shaped rubber grippers 16, each having an eccentric portion 17. The grippers 16 are suitably fixed to a slotted tube 18 which is mounted to oscillate on an elongated rod 19. The rod 19 has flattened ends 20 which are slidably mounted in slots 21, best shown in Figures 4 and 5.

Fixedly mounted on a shaft 23 is a disk 24. A lever arm 25 engages the shaft 23 and is fixed to the disk 24 by a screw 26. A connecting arm 27 has one end pivotally secured to the lever arm 25 by a pin 28. The other end of the connecting arm 27 has a collar 29 mounted on the mid portion of the slotted tube 18. The base 13 has an elongated rectangular opening 30 through which the eccentric portions 17 of the cams 16 pass upwardly into gripping contact with the lowest blank 14. It is to be noted that the cup blanks 14 are made of flat waterproofed paper.

The tube 18 has two slots 32 positioned radially therein. Pins 33 are fixed radially in the rod 19 and engage the walls of the slots 32. The pins 33 permit limited oscillations of the tube 18 on the rod 19. The cams 16 are fixed to the tube 18 and oscillate with the tube.

It is to be noted that the slots 32 are of sufficient extent to permit the grippers 16 to oscillate to a position below the base during the return motion to the initial feeding position.

As best shown in Figure 5, there is provided a magazine 35 comprising a front upright channel 36, a rear upright channel 36' and two side channels 37, 37. It is to be noted that the elongated rectangular opening 30 forms a pocket below the base 13.

The engaging and feeding means 15 for the cup blanks 14 consists of the connecting arm 27 which is pivotally secured to the lever arm 25 by the pin 28. The feeding means 15 also includes the disc 24 which is fixedly mounted on the shaft 23.

The shaft 23 is rotatably mounted in bearings 40 suitably fixed to the base 13. A sprocket

41 is fixed to the free end of the shaft 23 and is driven by a sprocket chain 42 in meshed engagement with a sprocket 43 on a shaft 44 rotatably mounted in a bearing 45 on the base 13. A spur gear 46 mounted on the shaft 44 is in meshed engagement with a segmental gear 47 mounted on a shaft 48 which is rotatably supported in a bearing 50 on the base 13.

The machine 10 includes a male die 55 comprising two die members 56, 56 having side grooves 57, 57. The grooves house clamps 58, 58 each having a slot 59 which engages pins 60, 60 fixed in the die members 56. The pinned clamps maintain the die members in assembled relation. Springs 61, 61 positioned between the die members 56 cause the die members to be spring-pressed from each other so as to form a clearance space 62 between the die members.

At their upper end portions, the die members 56 have through openings 63 in which lip-forming plungers 64 are slidably mounted. A coil spring 65 positioned intermediate the plungers causes the plungers to be spring-pressed from each other. Clamp strips 66 suitably fastened to the die members 56 retain the plungers 64 in operating position in the male die 55.

Brackets 68 are suitably fixed at the upper faces of the die members 56 and have pins 69 which engage a slot 70 in a connecting bracket 71. The bracket 71 has an aperture 72.

Figure 6 is a cross-sectional view taken on line 6—6 in Figure 1 and shows the male die 55 depending from a rod 75 suitably supported for vertical sliding movement in a bearing 76. The male die 55 is positioned centrally with an over an opening 77, formed by bevelling the base downwardly so as to communicate with a cup forming female die 78. Below the female die is a cup chute 79 having a base 80 forming a rest for a finished cup. The cup chute 79 has two frictionally engaging cup retaining arms 81.

Figure 6 shows supporting and actuating mechanism 85 for lowering the male die 55 downwardly into the female die 78 to form a cup or for raising the male die 55 upwardly into non-operating position.

The mechanism 85 comprises a gear 86 rotatably mounted in a bearing 87 fixed to the base 13. A crank 88 is fixed to the gear 86 and has its free end engaged by a pivot pin 89 to a link 90. The other end of the link 90 is connected by a pivot pin 91 to the lower end portion of a rod 92 which is slidably mounted in a bearing 93 fixed to a side wall 94 of the beverage vending machine 10.

The upper portion of the rod 92 is connected by a pivot pin 95 to an angularly directed lever 96 which is fulcrumed on a bolt 97 to a bracket 98 supported on the wall 94. The pin 95 is slidably mounted in a slot 99 in the lever 96.

The upper end portion of the lever 96 has a slot 100 which receives a pivot pin 101 in slidable engagement. The pin 101 is fixed to the upper portion of the rod 75. A coil spring 102 connected at one end to the lever 96 and at the other end to the wall 94 retains the rod 75 and the male die 55 in raised position while a cup blank is being fed to cup forming position.

It is to be noted that each cup blank 14 has two sides 103, each with pre-glued flaps 104 and two non-glued sides 105. These sides are of generally rectangular shape so that the formed or finished cups 12 will have a generally rectangular outline.

The mechanism for forming the drinking cups 12 also comprises a water tank 110 suitably supported above the base 13 and having a perforated tubular shaft 111 and water absorbing moisture transfer rollers 112, rotatably mounted on the shaft 111. The lower surfaces of the moisture transfer rollers 112 are positioned to contact a cup blank 14 when the blank is passed thereunder and to moisten the glued side flaps 104 on the cup blank.

It will be noted that the tubular shaft 111 has perforations 113 at its mid-portion and in position to receive water from the water tank. It will also be noted that the tubular shaft 111 has small perforations 114 which are positioned substantially at the mid-portions of the moisture transfer rollers 112. The rollers are made of water absorbing material and absorb the water passing through the perforations 111 and 113. The shaft 111 is maintained in water sealing relation at both side walls of the water tank by suitable annular packing 115.

As shown in Figure 5, the segmental gear 47 has teeth which extend only around one-half of its circumference. The numbers of teeth on the gears 47 and 86 are equal. When the gear 47 is rotated so that its teeth mesh with the teeth of the gear 86, the gear 86 is rotated a complete revolution, whereby the crank 88 actuates the link 90, the rod 92, the lever 96 and the rod 75 and this causes the male die 55 to be lowered and to lower a cup blank 14 into the female die 78 to form a drinking cup 12.

In operation, when a coin is inserted into the vending machine 10, the drive shaft 48 which is suitably connected to a motor 51, causes the segmental gear 47 shown in Figure 5 to rotate the gear 46 mounted on the shaft 44.

When the segmental gear 47 rotates one-half a revolution, the gear 46 actuates the sprocket gear 43 and the sprocket chain 42, and the sprocket gear 41 and the shaft 23.

The shaft 23 rotates the disk 24 which moves the lever arm 25 and the connecting arm 27 up to the position shown in Figure 11, when the eccentric portion 17 of the gripping and feeding mechanism 15 has completed the feeding movement of a cup blank 14 from the magazine 35 to a position in registration with the chute 79. The cup blank 14 is guided by side plates 109 and top plates 108. When the segmental gear 47 rotates the gear 86 the male die 55 is moved downwardly and lowers the cup blank 14 lying on the base 13 above the opening 77 and forces the cup blank into the female die 78 and forms a drinking cup 12.

The cup forming male die 55 has two duplicate die members 56, 56, which are pushed towards each other by the walls of the female die 78 against the action of the springs 61, 61. At the same time the lip-forming plungers 64 are pushed towards each other by the walls of the female die 78 against the action of the spring 65. When the major portion of the die 55 passes below the female die 78 and before the formed cup is disengaged from the dies, the lip-forming plungers 64 are caused by the pressure of the spring 65 to move radially outwardly and move two upper side portions of the cup 12 beyond the walls of the female die 78 and through two triangular openings 116 in the lower portion of the said die thereby forming the pouring lips 22.

When the formed drinking cup 12 is lowered by the male die 55 below the female die 78, the two pouring lips 22 extend beyond the sides of the female die which then acts as a stripper and releases the cup and makes it impossible for the

male die 55 during its rising motion to remove the formed cup from the chute 79. The drinking cup 12 then drops down and rests on the bottom wall 80 of the chute 79.

I have found that when glue is applied to the flaps of the cups while the cups are formed from pre-formed but unglued blanks, that the applied glue does not set quickly and therefore the formed cup comes apart before use when released from the forming die. I have accordingly applied quick-setting glue to the flaps and when the cup is formed the flaps remain in adhered position.

It is to be noted that instead of glueing the side flaps I may apply a substance such as plastic to the flaps and I will then secure the flaps merely by applying heat and pressure.

It is also to be noted that the gist of this invention is to make it possible to mount a stack of superposed flat blanks of practically unlimited height so as to reduce the amount of servicing required in the operation of the machine.

It is also to be noted that this invention is not limited to coin operated vending machines, but may be incorporated for use in all types of liquid dispensing machines.

In operation, when the eccentric feeding portions 17 of the rubber grippers 16 have delivered a cup blank 14 in registry with the chute 79, the segmental gear 47 is out of engagement with the gear 46, and a counter-weight 120 connected to a chain 121 which is secured to the connecting arm 27 at a point 122, causes the chain to pull the rubber grippers 16 back to the starting or initial feeding position. The eccentric portions 17 are then in position to start feeding another cup blank to the dies and this feeding takes place as soon as the teeth on the gear 47 engage the teeth on the gear 86. Accordingly, the cup forming mechanism 11 and the blank feeding mechanism 15 work in timed relation.

In accordance with the patent statutes I have described and illustrated the preferred embodiment of my invention, but it will be understood that various charges and modifications can be made therein without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. In a beverage vending machine, mechanism for forming drinking cups having pouring lips, comprising a base upon which a plurality of die-cut and pre-glued flat cup blanks are supported in vertically stacked relation, said base having an opening, engaging and feeding mechanism for said cup blanks mounted below said base, said feeding mechanism having eccentric cam portions positioned to extend slightly above said base through said opening, said eccentric cam portions contacting the lower blank of said stack for feeding one blank at a time laterally of said stack, a water tank supported on said base and having water-absorbing rollers mounted on said shaft for transferring moisture to said blank, the lower surfaces of said rollers being positioned to contact said lower blank when said blank is fed thereunder for moistening the glue on said blank, a male die comprising two relatively movable members spring-pressed from each other, means for guiding said blank for movement to said male die, said eccentric feeding mechanism being adapted to feed said moistened blank into registry with said male die, a female die, said base having a downwardly bevelled opening communicating with said female die, each of said cup blanks having two pre-glued flaps and two non-glued sides, means for moving said male die and said registering cup blank downwardly into said female die to form said cup, the spring-pressure between said male die members causing said pre-glued and moistened flaps of said cup to adhere to the non-glued sides of said cup, said pouring lips acting as strippers for stripping said cup from said male die, means for raising said male die into non-operating position above said base while said blank feeding mechanism feeds another blank into registry with said dies and means for lowering said male die when said blank is moved into registry with said dies while said blank feeding mechanism is at rest.

2. In a beverage vending machine, mechanism for forming drinking cups therefor, comprising a base upon which a plurality of die-cut and pre-glued cup blanks are supported in vertically stacked relation, said base having an opening, engaging and feeding mechanism for blanks mounted below said base, said engaging mechanism having an eccentric portion positioned at the moment of feeding to extend slightly above said base through said opening, said eccentric portion contacting the lower blank of said stack for feeding one blank at a time laterally of said stack as limited by a single blank passageway, a moistening water tank supported on said base and having a water-absorbing roller rotatably mounted therein and having end portions adapted for transferring moisture to said blank, the lower surface of said moisture transfer roller being positioned to contact said lower blank when said blank is fed thereunder for moistening the glue on said blank, a contractible spring-pressed cup forming die, means for guiding said blank for movement to said cup forming die, said eccentric engaging mechanism being adapted to feed said moistened blank to said cup forming die, a forming chute, said base having a downwardly bevelled opening communicating with said forming chute, each of said cup blanks having two pre-glued sides and two non-glued sides, said cup forming die comprising two relatively movable members spring-pressed from each other, means for moving said cup forming die and said cup blank downwardly into said forming chute to form said cup, the spring pressure between said cup forming die members causing said pre-glued and moistened side walls of said cup to adhere to the non-glued sides of said cup, said cup having lips acting as strippers for stripping said cup from said cup forming die, means for raising said cup forming die into non-operating position above said base while said blank feeding mechanism feeds another blank to said forming chute, and means for lowering said cup forming die when said blank is moved into registry with said forming chute while said blank feeding mechanism is at rest.

3. In a beverage vending machine, mechanism for forming drinking cups therefor, comprising a base upon which a plurality of die-cut cup blanks having pre-glued side flaps are supported in vertically stacked relation, said base having an opening, engaging and feeding means for said cup blanks mounted below said base, said engaging and feeding means having eccentric cam portions positioned to extend slightly above said base through said opening during the feeding action of each blank, a single blank passageway, said eccentric portions contacting the lowest blank of said stack for feeding one blank at a time laterally of said stack as limited by said passageway, a water tank supported above said base and having a hollow perforated shaft and water-absorbing

moistening rollers rotatably mounted on said shaft, the lower surfaces of said moisture transfer rollers being positioned to contact said lower blank when said blank is fed thereunder for moistening the glue on said blank, a contractible spring-pressed cup forming die, spaced-apart means for guiding said blank for movement to said cup forming die, said eccentric engaging means being also adapted to feed said moistened blank to said cup forming die, a cup forming chute, said base having a downwardly bevelled opening communicating with said cup forming chute, each of said cup blanks having two pre-glued flaps and two non-glued sides, said cup forming die comprising two relatively movable members spring-pressed from each other, means for moving said cup forming die and said cup blank downwardly into said forming chute to form said cup, the spring pressure between said cup forming die members causing said pre-glued and moistened side flaps of said cup to adhere to the non-glued sides of said cup, said formed cup having lips acting as strippers for stripping said cup from said cup forming die, means for raising said cup forming die into non-operating position above said base while said blank feeding means feeds another cup blank to said forming chute, and means for lowering said cup forming die after said other cup blank is moved into registry with said forming chute while said blank feeding means is at rest.

4. In a beverage vending machine, mechanism for forming drinking cups therefor, comprising a base upon which a plurality of cup blanks having pre-glued side flaps are supported in vertically stacked relation, said base having an opening, engaging and feeding means for said cup blanks mounted below said base, said engaging and feeding means having eccentric cam portions positioned to extend slightly above said base through said opening during the feeding action of each blank, a single blank passageway, said eccentric portions contacting the lowest blank of said stack for feeding one blank at a time laterally of said stack as limited by said passageway, a water tank supported above said base and having a perforated tubular shaft and water-absorbing moistening rollers rotatably mounted on said shaft, the lower surfaces of said moisture transfer rollers being positioned to contact said lower blank when said blank is fed thereunder for moistening the glued side flaps on said blank, a contractible spring-pressed cup forming male die, spaced-apart means guiding said lower blank for movement to said cup forming male die, said eccentric engaging means being adapted to feed said moistened blank into registry with said cup forming male die, a cup forming female die, said base having a downwardly bevelled opening communicating with said cup forming female die, each of said cup blanks having two sides each with pre-glued flaps and two non-glued sides, said male die comprising two relatively movable members spring-pressed from each other, means for moving said male die and said registering cup blank downwardly into said female die to form said cup, the spring pressure between said male die members causing said pre-glued and moistened side flaps to adhere to the non-glued sides of said cup, said formed cup having lips coacting with the bottom edge of said female die for stripping said cup from said male die, means for raising said cup forming male die into non-operating position above said base while said blank feeding means feeds another cup blank into registry with said forming dies, and means for lowering said male cup forming die after said other cup blank is moved into registry with said forming dies while said blank feeding means is at rest.

5. In a beverage vending machine, mechanism for forming drinking cups therefor, comprising a base having a magazine wherein a large number of cup blanks having pre-glued side flaps are supported in vertically stacked relation, said base having an opening, engaging and feeding means for said cup blanks mounted below said base, said engaging and feeding means having eccentric cam portions positioned to extend slightly above said base through said opening during the feeding action of each blank, said magazine having a single blank passageway, said eccentric portions contacting the lowest blank of said stack for feeding one blank at a time laterally of said stack as limited by said passageway, a water tank supported above said base and having a perforated tubular shaft and water-absorbing moistening rollers rotatably mounted on said shaft, the lower surfaces of said moisture transfer rollers being positioned to contact said lower blank when said blank is fed thereunder for moistening the glued side flaps on said blank, a contractible spring-pressed cup forming male die, spaced-apart plates guiding said lower blank for movement to said cup forming male die, said eccentric engaging means being adapted to feed said moistened blank into registry with said cup forming male die, a cup forming female die, said base having a downwardly bevelled opening communicating with said cup forming female die, each of said cup blanks having two sides each with pre-glued flaps and two non-glued sides, said male die comprising two relatively movable members spring-pressed from each other, means for moving said male die and said registering cup blank downwardly into said female die to form said cup, the spring pressure between said male die members causing said pre-glued and moistened side flaps to adhere to the non-glued sides of said cup, said formed cup having pouring lips coacting with the bottom edge of said female die for stripping said cup from said male die, means for raising said cup forming male die into non-operating position above said base while said blank feeding means feeds another cup blank into registry with said forming dies, and means for lowering said cup forming male die after said other cup blank is moved into registry with said dies while said cup blank feeding means is at rest.

6. In a beverage vending machine, mechanism for forming drinking cups therefor from cup blanks having pre-glued side flaps, each of said cup blanks having two sides each with pre-glued flaps and two non-glued sides, comprising a base having a magazine wherein a large number of said cup blanks are supported in vertically stacked relation, said base having an opening, engaging and feeding means for said cup blanks mounted below said base, said feeding means having eccentric cam portions positioned to extend slightly above said base through said opening during the feeding action of each blank, said magazine having a passageway for a single blank, said eccentric portions contacting the lowest blank of said stack for feeding one blank at a time laterally of said stack as limited by said passageway, a water tank having a perforated tubular shaft and moistening rollers mounted on said shaft, the lower surfaces of said rollers being positioned to contact said lower blank when said

blank is fed thereunder for moistening said glued flaps thereon, a contractible spring-pressed cup forming male die, spaced-apart plates guiding said lower blank for movement to said cup forming male die, said eccentric engaging means being adapted to feed said moistened blank into registry with said cup forming male die, a cup forming female die, said base having a bevelled opening communicating with said cup forming female die, said male die comprising relatively movable members spring-pressed from each other, means for moving said male die and said registering cup blank into said female die to form said cup, the spring pressure between said male die members causing said pre-glued and moistened flaps to adhere to the non-glued sides of said cup, said male die having slidable members adapted to form pouring lips on said cups, said pouring lips coacting with the bottom edge of said female die

for stripping said cup from said male die, means for raising said male die into non-operating position while said blank feeding means feeds another cup blank into registry with said forming dies, and means for lowering said male die into said female die after said other cup blank is moved into registry with said dies while said cup blank feeding means is at rest.

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