

B. L. BUCHANAN.
MACHINE FOR MANUFACTURING BOTTLE CROWNS OR CAPS.
APPLICATION FILED OCT. 9, 1908.

987,084.

Patented Mar. 14, 1911.

3 SHEETS—SHEET 1.

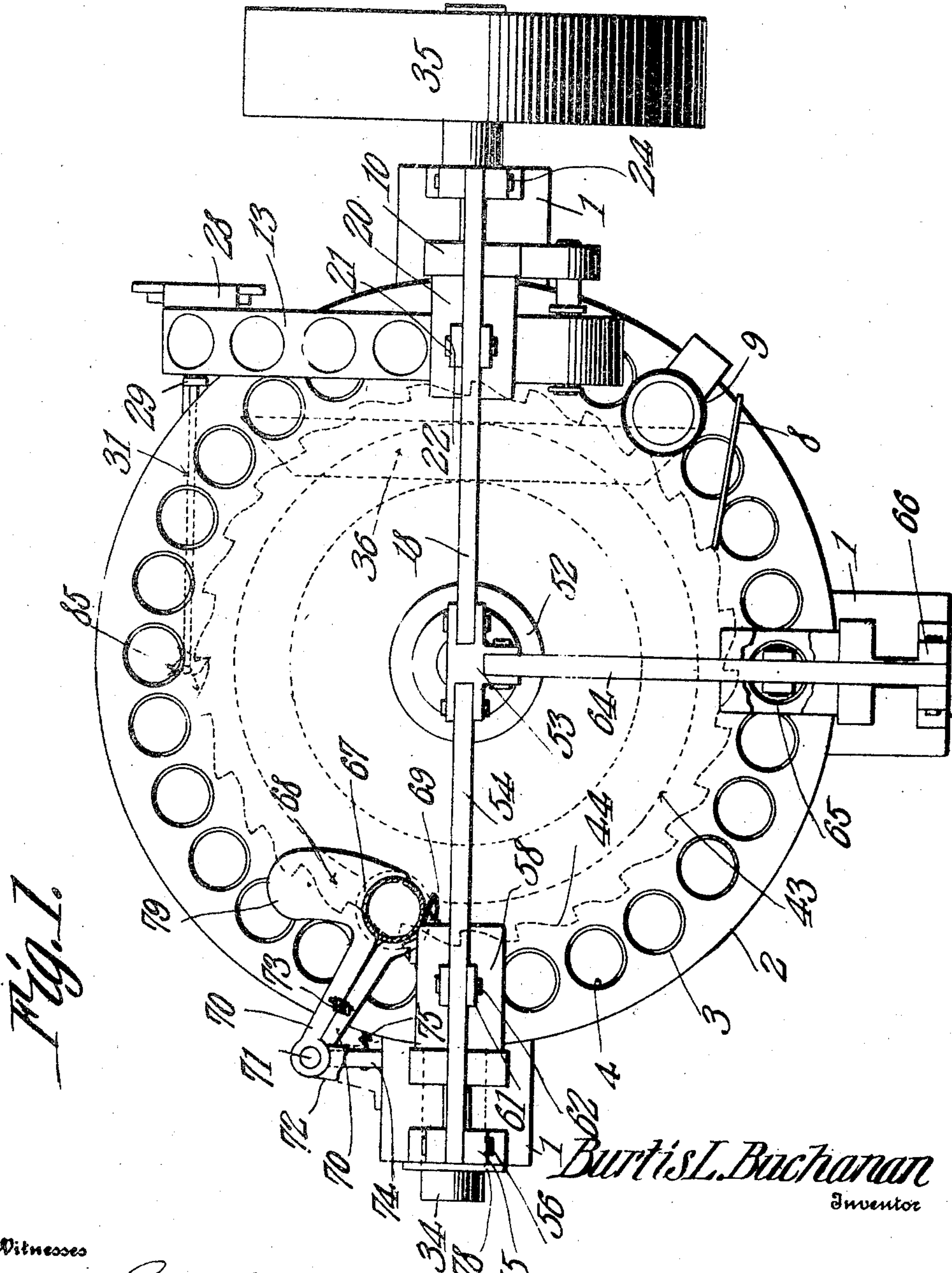


Fig. 1.

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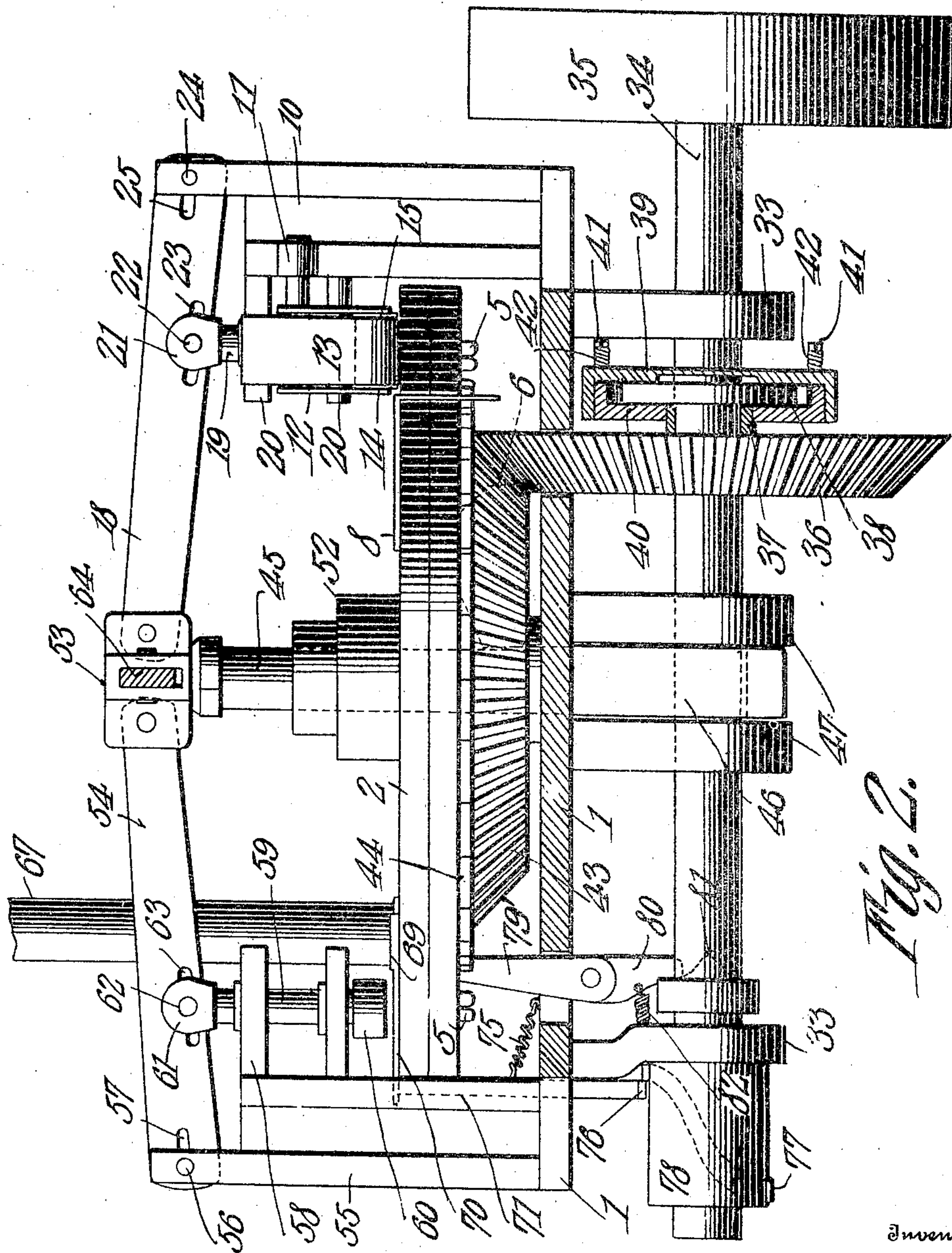
Cadnow & Co.
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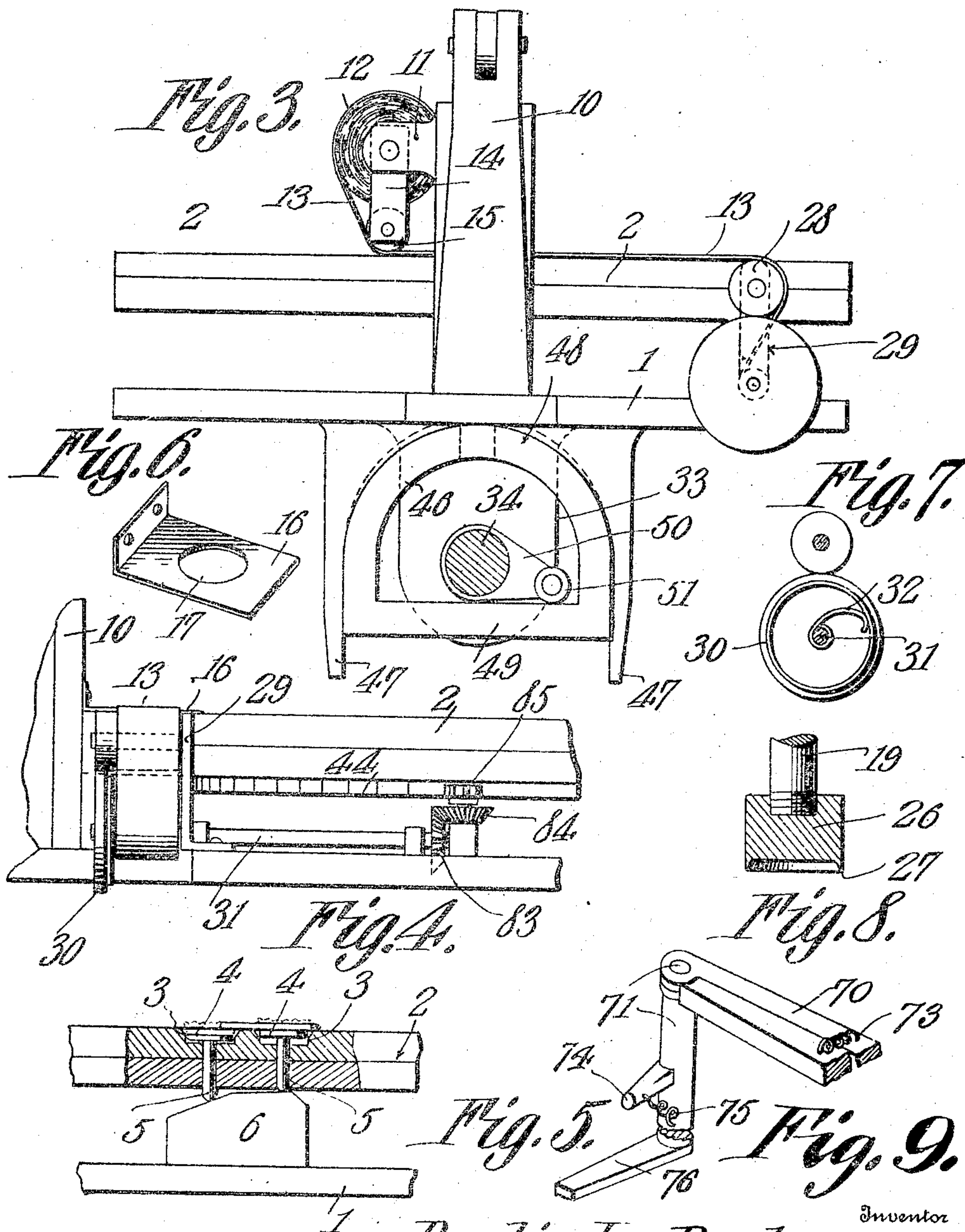
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UNITED STATES PATENT OFFICE.

BURTIS LAWSON BUCHANAN, OF CHARLOTTE, NORTH CAROLINA.

MACHINE FOR MANUFACTURING BOTTLE CROWNS OR CAPS.

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Specification of Letters Patent.

Patented Mar. 14, 1911.

Application filed October 9, 1908. Serial No. 456,955.

To all whom it may concern:

Be it known that I, BURTIS L. BUCHANAN, a citizen of the United States, residing at Charlotte, in the county of Mecklenburg and State of North Carolina, have invented a new and useful Machine for Manufacturing Bottle Crowns or Caps, of which the following is a specification.

This invention has reference to improvements in machines for manufacturing bottle crowns or caps and its object is to produce a machine which will finish the crowns or caps ready to be applied to bottles with great rapidity.

In accordance with the present invention there is provided a rotatable member in the form of a carrier having receptacles adapted to receive bottle caps in blank, that is without the usual cork filling, and in conjunction with this rotatable carrier with its circular series of receptacles there is provided a suitable number of plungers, the first of which in order is designed to cut from a web of suitable fabric such for instance as a paper strip having cementing material on each surface, disks of such size as to fit snugly within the caps. At a subsequent point in the cycle of operations the cap with the paper disk therein is brought under another plunger by means of which a cork disk coming from a suitable reservoir through the intermediary of appropriate mechanism, is deposited, and finally the caps are brought to another plunger which forces the cork disk already deposited therein firmly into the cap, after which the caps are automatically removed from the machine and are then subjected to suitable sterilization. The invention however will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings with the understanding that the invention is not confined to the exact embodiment thereof illustrated in said drawings, but the structure may be variously modified in the form and location of parts and in other respects so long as the salient features of the invention are retained.

In the drawings, Figure 1 is a plan view of the machine with some of the remoter parts not visible in the view, shown in dotted lines, and other parts shown in section. Fig. 2 is a side elevation of the structure of Fig.

1 with some of the parts shown in section. Fig. 3 is an end elevation, with parts in section and parts removed, of the machine as viewed from the power side. Fig. 4 is an elevation of a portion of the machine, showing the paper feeding mechanism. Fig. 5 is a detail section through the rotatable carrier with parts in section, showing the ejector mechanism for the finished crown. Fig. 6 is a perspective view of a perforated plate used in connection with the paper cutting mechanism. Fig. 7 is a detail view of the paper winding drum showing a means for compensating for the increasing diameter of the paper wound thereon. Fig. 8 is a detail section of a punch used in the machine. Fig. 9 is a view of a portion of the actuating structure for feeding the cork disks.

The machine of the present invention is not designed to shape the metal parts of the bottle crown or caps but these metal parts are to be shaped in another machine suited for the purpose but which machine in itself forms no part of the present invention and is not shown in the drawings. The shaping machine and the machine constituting the subject matter of the present invention are designed however to work in synchronism for a purpose which will presently appear.

In the drawings there is shown a frame 1 which however is but a portion of the main frame of the machine, which main frame will be of such size and structure as to adapt it to the purposes of the present invention.

Above the frame 1 is a rotatable carrier 2 in the form of a disk and this disk may for structural purposes be made of two pieces of the same size as indicated in the drawings or may be made entirely of one piece as found desirable. In the following description this disk-like carrier will be considered as made of one piece. About the carrier near the periphery thereof is formed a circular series of recesses 3 of such size and shape as to readily receive and hold a shaped bottle cap or crown coming from the shaping machine, with the upper edge of the cap, which cap is deposited in the receptacle in an inverted position, either flush with or slightly below the surface of the said disk or carrier 2. In the bottom of each receptacle 3 is a small disk or plate 4 having a central stem 5 extending

through a perforation in the bottom of the disk 2 and said stem extends below the lower surface of the disk 2 so as to be in the path of a cam block 6 on the frame 1 or other fixed portion of the structure. The purpose of this cam block is to engage the pins 5 of the disks 4 and elevate the said disks 4 to a sufficient extent to lift the crowns or caps so that their lower surfaces as located in the disk 2 are flush with or above the upper surface of said disk. This is for the purpose of facilitating the removal of the caps from their seats in the disk 2 after they have been finished by their treatment in the machine forming the subject matter of the present invention and the cam block 6 is appropriately located for this purpose. In order to cause the caps to leave the receptacles 3 after being elevated by the disks 4 there is provided a finger 8 in the path of the receptacles or seats 3. This finger 8 is suitably inclined to direct the elevated caps toward the periphery of the disk 2 and they ultimately fall therefrom into a suitable receptacle which latter however is not shown in the drawings.

Adjacent to the point where the finished caps or crowns are removed from the disk 2 provision is made for the placing of shaped but otherwise unfinished crowns into the seats in the disks 2. For this purpose immediately adjacent to the finger 8 there is located a funnel or conduit 9 in close relation to the bottom or discharge end of which the pockets or receptacles 3 travel as the disk 2 is rotated step by step in a manner to be hereinafter described. This funnel receives the caps or crowns one at a time from the shaping machine and the shaped crowns fall with the skirt upward into the receptacles 3.

The operations of the shaping machine and of the machine forming the subject matter of the present invention are so timed one relative to the other that a crown is shaped by the shaping machine and then falls into the funnel 9 and is directed to a pocket 3 and becomes seated therein, then the disk 2 is turned a step to carry the seated crown toward the portions of the machine for treating it while the next pocket in order is carried under the funnel 9 and then receives the next shaped crown which becomes seated in the corresponding pocket, and then the disk 2 is turned another step, and so the operation proceeds in this manner so long as the machines are running.

The first operation to which the shaped crown is subjected after being seated in a pocket 3 is to have a disk of paper inserted therein. For this purpose there is provided a paper feed mechanism for a strip of paper of appropriate width and means for cutting a disk from said paper strip and forcing it in the cap are provided. For this purpose there is connected on the frame 1 a post or standard 10 on which there is secured or

formed a bracket 11 carrying a reel 12 designed to receive and hold a roll of paper 13 in the form of a narrow strip having cementing material on both sides for a purpose which will presently appear. The bracket 11 carries an angle extension 14 directed toward the disk 2 on each side of the paper roll and these angle extensions 14 receive the journals of an idler roller 15 serving to direct the paper strip in close relation to the surface of the disk 2. Fast on the post or standard 10 and over-riding the disk 2 in close relation thereto is a plate 16 best shown in Fig. 6 and this plate has a perforation 17 under which the pockets 3 are brought successively. The post 10 carries one end of an arm 18 pivotally connected thereto and this arm carries a plunger rod 19 passing through brackets 20 projecting from the post 10. The upper end of the plunger rod 19 is formed with a bifurcated or forked head 21 straddling the arm 18 and connected thereto by a pivot pin 22 passing through a slot 23 in said arm. The connection between the arm 18 and the post 10 is by means of a pivot pin 24 passing through a slot 25 in the corresponding end of said arm.

The lower end of the plunger rod 19 carries a head 26 having an annular cutting edge 27 adapted to extend through the perforation 17 in the plate 16 in shearing relation thereto. The length of travel of the plunger head 26 is sufficient to carry the cutting portion thereof into close relation to the bottom of a receptacle or pocket 3 so as to force a paper disk cut by the action of the cutting edge 27 in passing through the slot 17 into the cap to the end thereof.

After leaving the cutting head the paper band or ribbon is directed away from the disk 2 over a roller 28 mounted upon a bracket 29 rising from the frame 1 or other fixed portion of the structure in close relation to the edge of the disk 2, and from this roller 28 the paper passes to a winding drum or reel 30 mounted on a shaft 31, the shaft however being in frictional engagement with the reel or drum by a driving spring 32. This is to permit a certain amount of slip between the shaft 31 and reel or drum 30 to allow for the increasing thickness of the roll of paper winding upon the reel 30. The periphery of the drum or reel 30 may be in driving engagement with the roller 28 so that the latter will aid in keeping the paper in a taut condition under the punch, especially if the reel 12 works somewhat stiffly. The means for driving the shaft 31 will be described hereinafter in connection with other structures.

Depending from the frame 1 or suitably mounted on other fixed portions of the structure are journal bearings 33 for a main or drive shaft 34 carrying at one end a pulley 35 by means of which power may be applied

through a suitable belt. Of course it will be understood that the pulley 35 may be replaced by an electric motor or other form of drive as is customary under modern practice.

Upon the drive shaft there is mounted a bevel gear 36 provided with a hub 37 to which is secured one member 38 of a friction clutch. The other member 39 of this clutch is made fast on the shaft 34 and carries a friction plate 40 which together with the member 39 houses the friction member 38. The plate 40 is held to the friction member 39 by pins 41 surrounded by springs 42 tending at all times to move the plate toward the said friction member 39. The friction member is constrained to be at all times active so that the gear wheel 36 will be driven except when the resistance to its motion exceeds a predetermined limit.

The gear wheel 36 is in mesh with another gear wheel 43 fast on the under side of the disk 2 which latter is also provided with a circular series of ratchet teeth 44 concentric with and exterior to the gear wheel 43. The disk 2 as well as the parts carried thereby are centered for rotation on the frame 1 by a rod 45 capable of longitudinal movement through the disk and frame and formed at its lower end below the main frame 1 with a cam frame 46 capable of moving with the rod 45 in the direction of the length of the latter between guide members 47 carried by the main frame 1 or other fixed portion of the machine. The upper member of the frame 46 is semi-circular in shape as indicated at 48, while the lower member 49 is straight and substantially parallel with the table or disk 2. The shaft 34 extends through this frame 46 and within the frame the shaft carries a cam 50 terminating at its active end in an anti-friction roller 51. The action of the cam 50, on engaging the member 49 of the frame 46, is to force said frame in a downward direction and on engaging the curved member 48 to elevate said frame. In order to center and steady the disk or table 2 the latter is provided with an elongated hub 52 on its upper face through which hub the rod 45 extends.

The upper end of the rod 45 in the particular structure shown in the drawings carries a three way head 53, two of the members of the said head being diametrically opposite and the third disposed at an angle of 90° to the other two. One of the members of the head 53 has pivoted thereto the corresponding end of the arm 18 and the diametrically opposite portion of the head 53 has pivoted thereto in like manner another arm 54 the remoter end of which latter is pivotally connected to the upper end of a post 55 diametrically opposite the post 10 before referred to, and the connection be-

tween the arm 54 and the post 55 is by way of a pivot pin 56 passing through a slot 57 in said arm 54 similar to the connection of the arm 18 to the post 10.

The post 55 is provided with guide members 58 projecting laterally therefrom and through these guide members there extends the stem 59 of a suitable plunger 60 fast on the lower end of said stem 59. The upper end of the stem 59 is formed with a head 61 shaped to straddle the arm 54 and is secured thereto by a pivot pin 62 passing through a slot 63 in said arm.

The third member of the head 53 carries an arm 64 similar to the arms 18 and 54 and this arm carries a plunger 65 similar to the plunger 60 before described. The outer end of the arm 64 is secured to a post 66 like the posts 10 and 55 before referred to and rising from the frame 1.

Erected over the table or disk 2 is an upright tubular member 67 constituting the magazine for the cork disks which are designed to be inserted in the caps or crowns for the bottles. The bottom of this reservoir 67 is in close relation to but elevated a short distance above the upper surface of the table 2 and in operative relation to the lower or discharge end of the reservoir is a device for carrying the cork disks one at a time into proper relation to the crowns or caps which have been deposited in the receptacles 3 and which have already received the paper disks.

The device for transferring the cork disks from the reservoir into operative relation to the receptacles 3 comprises a pair of jaws 68 and 69 of a thickness corresponding to that of the cork disks and having the active portions curved to grasp a cork disk. Each jaw is provided with an arm 70 pivotally supported upon a pin 71 journaled in brackets 72 mounted on an appropriate fixed portion of the frame of the machine. The arm 70 of the jaw 68 is fast on the pin 71 while the arm 70 of the jaw 69 is loose thereon but the two jaws are held together by means of a spring 73 so that under appropriate conditions these jaws may separate a limited distance. The lower end of the pin 71 has fast thereto an arm 74 under the control of a spring 75 so that the two jaws have always a normal tendency to return to a position coincident with the bottom of the reservoir 67. The pin 71 also carries a side extension 76 in the nature of a crank arm in the path of a cam 77 upon a cam drum 78 mounted on the shaft 34. The jaw 68 has a side extension 79 designed to close the lower end of the reservoir 67 against the escape of the cork disks when the jaws have been moved away from the said reservoir toward one of the receptacles 3 in the disk 2. The jaw 68 and its extension 79 are of such thickness as to readily pass beneath the

lower end of the reservoir 67 and the upper surface of the disk 2 while the jaw 69 has a portion somewhat thicker so as to engage the side of the reservoir 67 and prevent the jaw from moving toward the reservoir to a greater extent. This is for the purpose of slightly separating the jaws to take in disks of the greatest diameter, since the disks may vary slightly in diameter and when the jaws are moved toward the receptacles 3 then the spring 73 which was slightly extended when the jaw 69 engaged the reservoir 67 will bring these jaws again into close relation thereby firmly clamping the disk between them.

The operation of the parts described is such and so timed that the disk 2 will be moved forward a single step and then the cork disk transferring member will be actuated by the engagement of the cam 77 with the crank arm 76 so as to carry the cork into coincidence with a receptacle beneath the plunger 60 and the latter will be operated to a sufficient extent to cause the cork disk to drop into the respective cap or crown. As soon as the plunger 60 has been retracted then the arm 76 has escaped from the action of the cam 77 and the spring 75 returns the parts to their normal position with the jaws beneath the bottom of the reservoir and another cork disk is dropped thereinbetween. After the cork disk has been deposited in the crown or cap the latter is carried forward until ultimately it comes under the plunger 65 and the action of this plunger is to force the cap firmly into place. Since the last named plunger does not have to coact with the cork holding jaws it may be made to fit quite closely into the crown and inequalities of the fit of the cork may thereby be remedied.

In the operation of the machine it is necessary that the disk 2 be fed step by step in proper sequence with the other operations. For this purpose there is provided a pawl or dog 79' suitably pivoted upon the frame 1 or other fixed portion of the machine and this dog has an extension 80 on one side of its pivot point in the path of a tooth or cam projection 81 on the shaft 34. A spring 82 acts on the dog 79' in opposition to the tooth or cam 81. The end of the dog 79' remote from that acted on by the cam 81 is in normal engagement with one of the teeth 44 on the under side of the disk 2. Suppose now that the shaft 34 is in constant rotation the disk 2 will participate in such rotation until a tooth 44 comes in engagement with the dog 79' and then further rotation is arrested and the clutch member between the shaft 34 and the gear wheel 36 will slip. Ultimately however the cam member or tooth 81 will be brought into engagement with the dog 79' and the latter will be moved away from the tooth 44 with

which it was in engagement and then the clutch will become active and the disk 2 will participate in the movement of the shaft 34. The cam or tooth 81 however is made so short that before another tooth 44 can pass the dog 79' the latter has been returned into the path of the next tooth by the spring 82 and consequently the rotation of the disk 2 is again arrested. The proportions of these parts are such that the disk 2 will be rotated a distance equal to the distance between the centers of two adjacent receptacles 3. Thus at every rotation of the shaft 34 the disk 2 is advanced one step. The shaft 31 carries at the end remote from the drum 30, a bevel gear 83 in mesh with a bevel gear 84 on a stub shaft carrying a star wheel 85 in the path of the teeth 44. When the disk 2 is moved a step then the star wheel is moved a tooth and the paper 13 is fed accordingly.

With a machine such as described the sequence of operation is as follows: The shaped caps or crowns come one by one from the shaping machine and are deposited in the pockets or receptacles 3 between each step by step movement of rotation of the disk 2. Then each crown is brought in succession under the paper punch which inserts into said crown a disk of paper carrying cement on each side thereof. The crowns with the paper disks therein are then brought one after the other into operative relation to the punch which causes the deposition of a cork disk from the cork carrying jaws coming from the magazine. Then the cork disk is forced firmly into the cap or crown by the third member which is the plunger 65. Finally the caps with the corks firmly embedded therein are brought to the point where the cam block 6 becomes active and the caps are elevated so that their under surfaces are flush with or above the top surface of the disk 2. Now these lifted caps or crowns are swept off of the disk 2 by the action of the finger 8 and ultimately drop into a suitable receptacle. Finally the finished caps or crowns are subjected to a sterilizing process which will cause a sufficient softening of the cement on the paper on both sides of the latter to cause adherence of the paper to the metal of the crown or cap and the adherence of the cork to the paper, thus thoroughly cementing the cork disk in the crown. The finished crowns are now ready to be applied to bottles in the usual manner.

What is claimed is:—

1. In a machine of the character described, a rotatable support adapted to hold a series of shaped bottle caps, means for applying cementing material to the caps, a reservoir for cork disks, an oscillating carrier provided with means for grasping the disks peripherally at the reservoir and mov-

able to transfer the cork disks one by one into coincidence with the caps, and means for forcing the cork disks onto the cementing material within the caps.

2. In a machine of the character described, a rotatable support having a series of receptacles for shaped bottle caps, means for introducing shaped caps, one at a time, into the receptacles in order, plungers for introducing cementing material and cork disks respectively in sequence into the caps and a common operating means for the plunger comprising a reciprocating rod extending axially through the rotatable support, connections between the rod and the plungers, a drive shaft below the rotatable support, a cam on the shaft, and a frame on said rod below the rotatable support and surrounding and engaged by the cam.

3. In a machine of the character described, a series of receptacles for shaped bottle caps, plungers for introducing cementing material and cork disks respectively, in sequence in the caps, and a common operating means for the plungers comprising a reciprocating rod connections between the latter and the plungers, and means operating intermittently upon the rod to cause the full operation of the plungers with a time interval of rest between said operations.

4. In a machine of the character described, a reservoir for cork disks, and a means for conveying the disks from the reservoir to a point of deposit comprising coacting jaws mounted to turn on a common pivot to traverse the bottom of the reservoir, means for moving the jaws from coincidence with the mouth of the reservoir, and a spring for returning the jaws into operative relation to the mouth of the reservoir.

5. In a machine of the character described, a reservoir for cork disks, and a means for conveying the disks from the reservoir to a point of deposit comprising coacting jaws mounted to turn on a common pivot to traverse the bottom of the reservoir and one of said jaws having an extended portion for maintaining the reservoir closed when the jaws are out of coincidence therewith.

6. In a machine of the character described, a reservoir for cork disks, and a means for conveying the disks from the reservoir to a point of deposit comprising coacting jaws mounted to turn on a common pivot to traverse the bottom of the reservoir, one of said jaws having means for engaging the reser-

voir to move said jaws apart as they approach coincidence with the said reservoir.

7. In a machine of the character described, a reservoir for cork disks, and a means for conveying the disks from the reservoir to a point of deposit, comprising two coacting, spring connected jaws, one of which is adapted to engage the reservoir to cause the spreading of the jaws as they are brought into coincidence with the reservoir.

8. In a machine of the character described, a reservoir for cork disks, and a means for conveying the disks from the reservoir to a point of deposit, comprising two coacting, spring connected jaws, one of which is adapted to engage a fixed portion of the structure to spread the jaws as they are brought into coincidence with the mouth of the reservoir, and the other jaw having an extended portion adapted to underride the reservoir as the jaws are moved out of coincidence with the mouth of said reservoir.

9. In a machine of the character described, a rotatable member having pockets or receptacles for shaped bottle crowns or caps, a positive stop for said rotatable member, a power shaft, a friction clutch between said power shaft and rotatable member, means for releasing the rotatable member at predetermined intervals to the action of the power shaft, means for directing shaped bottle caps or crowns to the receptacles on the rotatable member in regular order, a paper punch in operative relation to the receptacles to cut paper disks and deposit the same in the crowns in said receptacles, a reservoir for cork disks, means for transferring the cork disks one at a time from the reservoir into coincidence with the crowns or caps subsequent to the deposition of the paper disks therein, a plunger for causing the deposition of the cork disks in the caps or crowns, a plunger for seating said cork disks in the caps or crowns, and means for removing the finished caps or crowns from the seat in the rotatable member and for directing the said caps or crowns away from said rotatable member.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

BURTIS LAWSON BUCHANAN.

Witnesses:

FRED FLETCHER,
C. E. HOOPER.