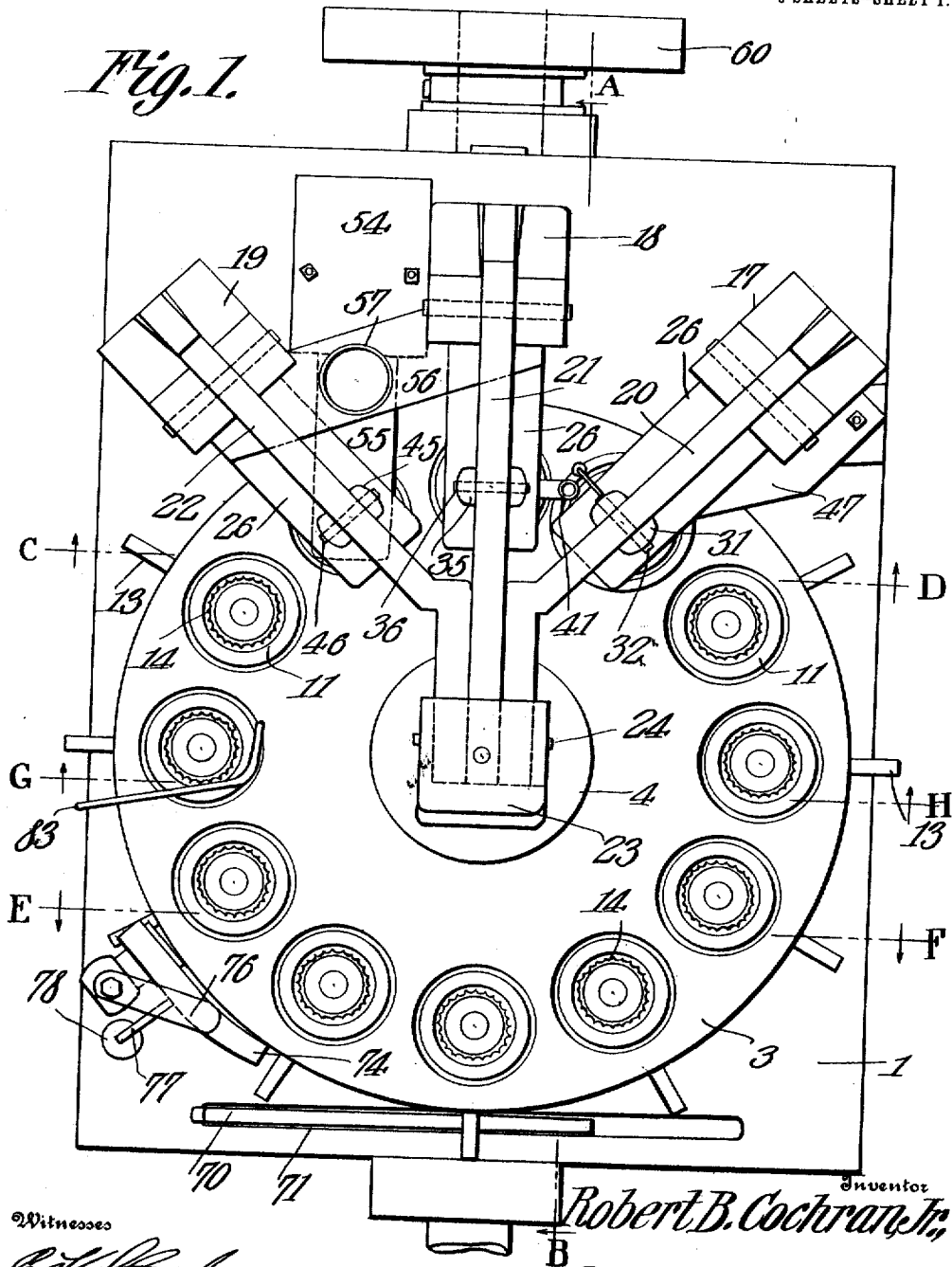


R. B. COCHRAN, JR.
MACHINE FOR MANUFACTURING BOTTLE CROWNS.
APPLICATION FILED OCT. 12, 1908.

1,006,997.

Patented Oct. 24, 1911.

3 SHEETS-SHEET 1.



Witnesses

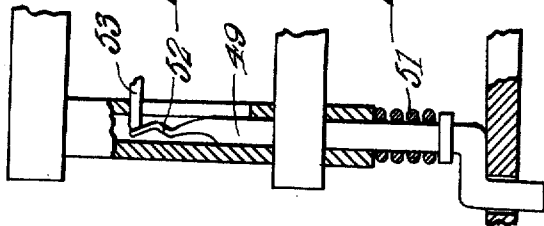
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3 SHEETS-SHEET 2.



F. T. Chapman

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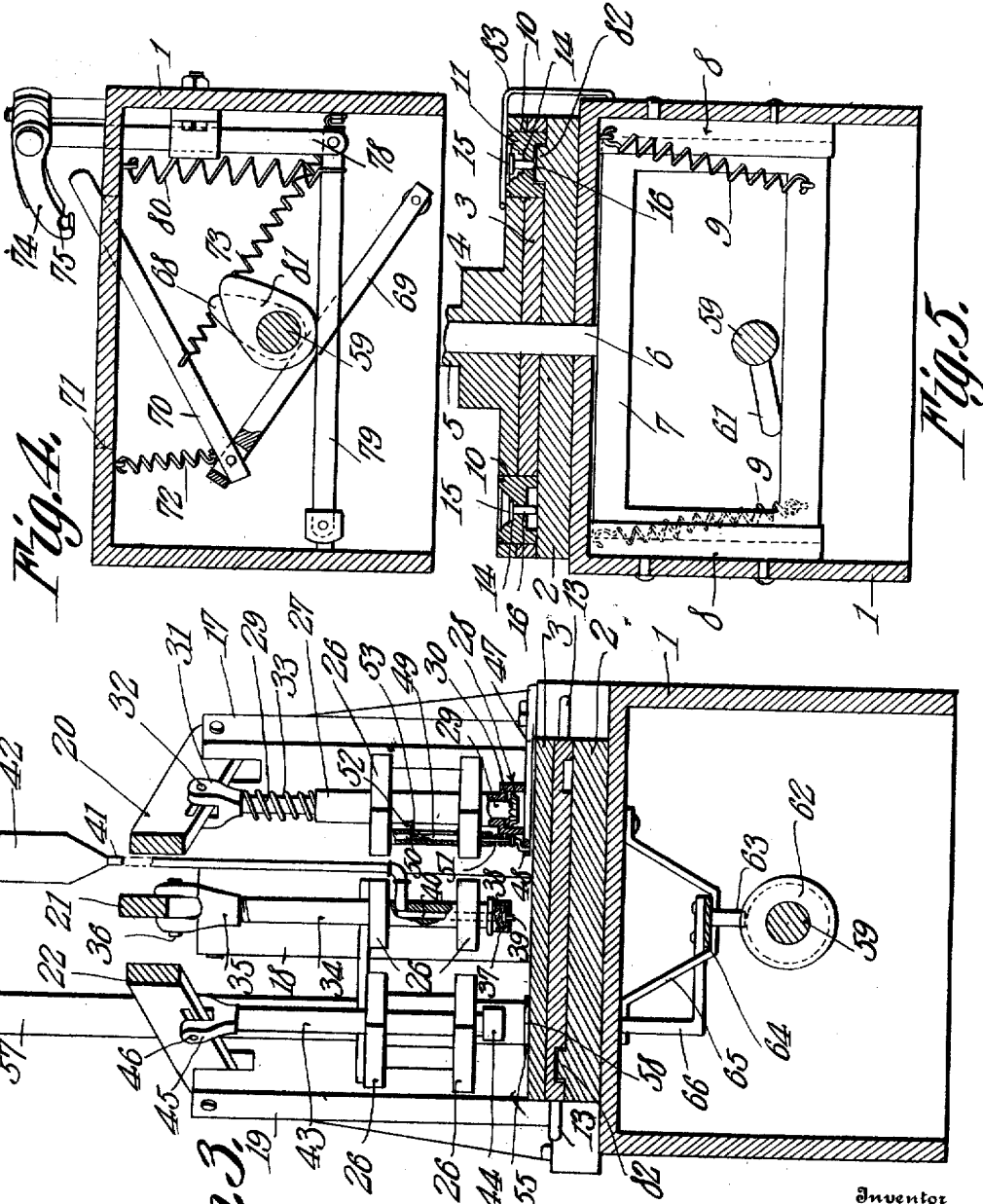
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UNITED STATES PATENT OFFICE.

ROBERT B. COCHRAN, JR., OF CHARLOTTE, NORTH CAROLINA.

MACHINE FOR MANUFACTURING BOTTLE-CROWNS.

1,006,997.

Specification of Letters Patent.

Patented Oct. 24, 1911.

Application filed October 12, 1908. Serial No. 457,373.

To all whom it may concern:

Be it known that I, ROBERT B. COCHRAN, Jr., 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, of which the following is a specification.

This invention has reference to improvements in machines for manufacturing bottle crowns and is designed more particularly for the production of bottle crowns provided with a thin cork disk and designed to be crimped about the neck of the bottle in the manner commonly employed for soda bottles and beer bottles and like bottles.

In accordance with the present invention there is provided a step by step rotatable disk provided with dies shaped to mold or form the crimped metal portion of the bottle cap and in conjunction with this rotatable plate there is provided a plunger capable of cutting disks from a strip and then forming these disks into the crimped cup shaped cap by means of a plunger of suitable shape. These crimped cups are made successively as the plate or table revolves step by step. As soon as the cup has been formed it is carried one step forward to the next plunger which is supplied with a suitable cement which this plunger deposits in the already formed cup. On the next forward step in the rotation of the disk or table the formed metal cap is brought into coincidence with another plunger but between this plunger and the cap there is a sliding carrier for conveying disks of cork from a magazine therefor to a point immediately below the plunger and at the proper time the plunger descends and forces the cork disk into the cap and against the cement therein. As soon as the machine has progressed a suitable distance, provision is made for the lifting of the finished cap from the die and the directing of the same away from the disk or table into a suitable receptacle.

The invention will be best understood from a consideration of the following detail description taken in connection with the accompanying drawings forming a part of this specification, with the understanding however that the structure shown in the drawings is not to be taken as the exact structure of the invention since various changes in such structure may be made

without departing from the true scope of the invention.

In the drawings, Figure 1 is a top plan view of the machine embodying the invention. Fig. 2 is a vertical section on the line A—B of Fig. 1. Fig. 3 is a vertical cross section on the line C—D of Fig. 1. Fig. 4 is a vertical cross section on the line E—F of Fig. 1 with parts omitted. Fig. 5 is a vertical cross section on the line G—H of Fig. 1 with some parts omitted. Fig. 6 is a detailed view of a stop mechanism forming part of the machine.

Referring to the drawings there is shown a casing 1 constituting the base or supporting structure of the machine designed to inclose certain portions of the mechanism, but which may be otherwise constructed than shown in the drawings. Upon the upper face of the casing 1 there is secured a disk 2 and upon the disk 2 there is mounted another disk 3 capable of rotating on the disk 2 which latter is fixed against rotation on the casing 1. The disk 3 is provided with a central boss 4 and hub 5 and through the disks 2 and 3 and the boss 4 and hub 5 there extends a rod 6 entering the casing 1 and there having formed upon it or carrying a frame 7 shown in the drawings as a rectangular frame and having a sliding movement in the direction of the length of the rod 6 in guides 8 fast on the inner faces of the sides of the casing 1. The frame 7 is held normally in an elevated position by means of springs 9 fast at one end to the frame and at the other end to the casing 1. The purpose of the frame 7 and rod 6 will appear hereinafter.

The disk 3 is provided with a circular series of perforations 10 near its periphery and in each perforation there is located a die block 11 held in place by a screw 12 terminating at the outer end in a projecting rod or pin 13 extending radially beyond the outer edge of the disk 3 for a purpose which will presently appear. Each die 11 is formed at its upper face with a depression 14 of proper form to shape a bottle cap of the crimped type. The bottom of the die recess is formed by a button 15 having a stem 16 extending toward the under side of the die through the body thereof.

Mounted upon the casing 1 adjacent to the disks 3 are three posts 17, 18 and 19 respectively and in substantially radial relation to the axis of the disk 3. The post 17

has pivoted to it one end of an arm 20, the post 18 has pivoted to it one end of an arm 21, and the post 19 has pivoted to it one end of an arm 22. The arm 21 enters a head 23 fast on the upper end of the rod 6 and is pivotally connected to this head by a through pin 24, the head being hollowed out to receive and partially house the end of the arm. The arms 20 and 22 are appropriately bent to also center the hollow portion of the head 23 in parallel relation to the corresponding portion of the arm 21 and are likewise pivoted to the said head 23 by the pivot pin 24. The several arms where engaged by the pin 24 are recessed or slotted as indicated at 25. Each post 17, 18 and 19 is provided with laterally extending guide members 26 overhanging the disk 3 and above the path of the dies 11 as the disk 3 is rotated in a manner to be presently described.

In the guides 26 of the post 17 there is mounted a tubular stem 27 terminating at its lower end in a cutter head 28. Extending through the hollow stem 27 is a rod 29 terminating at the lower end within the head 28 in a punch 30 of suitable shape to conform to the shape of the recess 14 of the die blocks 11. The rod 29 terminates at the upper end in a forked head 31 connected to the arm 20 by a pivot pin 32 and between the head 31 and the upper end of the hollow spindle 27 the rod 29 is surrounded by a helical spring 33.

The guides 26 of the standard or post 18 receive a stem or rod 34 having a head 35 at the upper end straddling the arm 21 and pivoted thereto by a pin 36. The lower end of the rod 34 carries a cap 37 containing sponge or other suitable absorbent material as shown at 38 and having at the lower end a perforation closed normally by a valve member 39 having a portion projecting beyond the lower face of the cap 37. Within the rod or stem 34 is a passageway 40 leading into the cap 37 and at the other end connected to a pipe 41 carrying at its upper end a reservoir 42 for an appropriate cement. Moving through the guides 26 of the post 19 is a rod or stem 43 ending at the lower end in a plain head 44 while the upper end of the rod 43 carries head 45 pivotally connected to the arm 22 by a pivot pin 46.

Fast on the base or casing 1 and over-riding the disk 3 beneath the die 28 is a plate 47 between which and the disk 3 a strip of metal is passed so as to be in the path of the cutting member 28 when the latter is lowered in a manner to be presently described. In the path of such metal strip is a stop pin 48 on the lower end of a rod 49 guided in a tube 50. This rod is urged downward by means of a spring 51 and at the upper end has a tooth 52 in the path of a trip 53 carried by the hollow stem 27.

Mounted in a block 54 on the casing or base 1 is a sliding member 55 so arranged as to over-ride the disk 3 in close relation thereto and immediately beneath the plunger head 44.

Mounted in a suitable support 56 is a tubular reservoir 57 for cork disks and the lower end of this reservoir is traversed by the sliding member 55 which latter is provided with a perforation 58 of such size and the sliding member 55 is of such thickness as to receive a cork disk from the reservoir and when the slide 55 is moved in a longitudinal direction to carry such cork disk away from the reservoir into coincidence with the plunger head 44.

Extending through the casing 1 is a shaft 59 constituting the driving shaft of the machine. This shaft has suitable bearings formed on or carried by the casing 1 and beyond the latter is provided with a pulley 60 by means of which power may be applied to said shaft in the usual manner. The shaft 59 carries a radially projecting plate 61 designed to engage the lower member of the frame 7 and force the latter against the action of the springs 9 in a direction toward the bottom of the casing, the said springs 9 serving to return the frame to its upper position. The shaft 59 also carries a worm or cam drum 62 engaging a finger 63 depending from a sliding plate or arm 64 mounted in the frame in suitable guiding brackets 65. Fast on the plate 64 is an angle arm 66 extending up through the top of the casing 1 and made fast to the sliding plate 55 before referred to. At the end of the shaft 59 remote from the cam member 62 is another cam 68. In the same end of the casing 1 on the interior wall thereof there is pivoted an arm 69 at one end thereof and at the other end the arm carries a bar 70. The bar 70 extends up through a slot indicated in dotted lines at 71 in the top of the casing 1 as shown in Fig. 4, and in full lines in Fig. 1 and the upper end of this bar is movable into engagement with the pin 13 on the edge of the disk 3. The arm 69 and bar 70 are under the control of suitable springs 72 and 73.

Mounted upon the casing 1 is a pawl 74 having a notch 75 at its free end adapted to engage over the pins 13. This pawl is normally urged in a direction to engage the pins by a suitable spring 76 and projecting laterally from the pawl 74 is a pin 77 in the path of a rod 78 rising through the top of the casing 1 and at its lower end within the casing connected to the free end of a pivoted arm 79 normally uplifted by a spring 80. The arm 79 is normally controlled by a cam 81 on the shaft 59.

Let it be supposed that the reservoir 42 has within it a suitable quantity of an appropriate cement and that the reservoir 57 is

filled with cork disks such as are used in connection with bottle stopper caps. Since the caps in which the cork disks are inserted and which constitute the bottle stopping caps are usually made of tin or other light metal it will be assumed that the tin is in the form of long strips of appropriate width and thickness. Such strips are fed under the plate 47 and beneath the cutting head 28 until arrested by the stop member 48. Assuming now that the machine is in operation and the parts are all properly timed the radial member 61 engages the bottom member of the frame 7 and depresses the same along with the rod or bar 6. This causes the simultaneous downward movement of the converging ends of the several arms 20, 21 and 22 and the simultaneous operation of the several parts carried thereby but for simplicity of description the course of a single cap will be described in the making thereof. The cutting member 28 cuts from the tin strip a disk of appropriate size. As soon as the cutting member 28 is arrested by engagement with the corresponding die after having cut through the tin strip the spring 33 will yield and then the rod 29 will be forced into the die and thereby mold the tin disk into a cap of appropriate shape, the die being so formed as to cause the skirt of the cap to be crimped. As soon as the punching and crimping of the metal portion of the cap has been accomplished, the continued rotation of the shaft 59 begins to release the frame 7 to the action of the springs 9 and the rod 6 is raised thus elevating the arms 20, 21 and 22 and permitting the plungers 28 and 30 to be raised out of the path of the metal strip and the engagement of the trip 53 with the head 52 of the rod 49 will raise the stop end 48 out of the path of the metal strip so the latter may be advanced a sufficient distance for a new blank to be cut therefrom. The full raising of the stem 27, however will cause the trip 53 to escape from under the head 52 and the stop 48 is again returned into the path of the strip so that it has only a chance to feed to the requisite distance forward for the cutting of the new blank.

Considering now the cap which has been formed, the disk 3 has been rotated a sufficient distance to bring this cap under the head 38 of the plunger rod 34. During the cutting of the blank and the shaping of the cap the disk 3 has been held from rotation by the engagement of the notch 75 of the pawl 74 over one of the pins 13. The rotation of the shaft 59 as soon as the punching and shaping has been finished brings the cams 68 and 81 in engagement with the arms 69 and 79 respectively, the cam 81 being shown as slightly in advance of the cam 68. As soon as the cam 81 becomes active the arm 79 is moved against the action of the spring

80 thus lowering the rod 78 and releasing the pawl 74 to the action of the spring 76 so that the pawl retains the disk 3 in the fixed position. As soon however as the cam 81 begins its inactive movement then the spring 80 returns the rod 78 to its upper position lifting the pawl 74 free from the engaged pin 13 of the disk 3. In the meantime the cam 68 has become active to move the arm 69 in a direction to cause the bar 70 to engage one of the pins 13 and this engagement becomes such as to rotate the disk 3 about its vertical axis immediately after the pawl 74 has been lifted from its pin 13. The parts are so adjusted that the movement of the disk 3 is equal to the distance between the centers of two of the perforations 10, and as soon as this last named movement has been accomplished then the pawl 74 is again lowered until its notch 75 engages the next pin 13 thus locking the disk 3 against further movement until the next cycle of operation is accomplished.

The cap which has been formed by the action of the plungers 28 and 30 as just described, is now under the plunger 34 and the next rotation of the shaft 59 will cause the lowering of the said plunger so that end 37 is caused to enter the cup shaped cap and the engagement therewith of the projecting end of the valve 39 will permit the outflow of a quantity of cement gravitating from the reservoir 42 into said cap. On the raising of the rod 34 the flow of cement is arrested by the closing of the valve 39. On the next forward movement of the disk 3 the cap with the cement in it is brought under the plunger rod 43 and the third rotation of the shaft 59 will bring the plunger head 44 into the cup thereunder, but in the meantime the slide 55 has been moved from the reservoir 57 by the action of the worm or cam drum 62 and has carried a disk of cork into the path of the plunger 44 and immediately above the cemented cap so that on the downward movement of the plunger 44 the disk of cork is forced into the cap and against the cement and so properly seated in the cap. It will be understood that the next succeeding cap at the same time receives cement while coincident with this operation a new cap is being formed by the co-action of the plungers 28 and 30.

After the continued rotation of the disk 3 has carried the finished cap away from under the plunger 44, the stem 16 of the button or disk 15 under-riding the cap in the die 11 is brought into engagement with a boss or cam 82 on the disk or table 2 and the pin 16 riding up this cam 82 will force the button 15 upward so as to lift the finished cap out of its seat in the die 11. Over-riding the disk 3 at a point immediately adjacent to the position of the cam 82 on the table 2 is a curved finger 83 fast on the cas-

ing 1 or other fixed portion of the structure so as to engage the lifted cap and direct it away from the die in which it was formed and the cap will be caused to fall into a suitably placed receptacle.

It will thus be seen that the machine is continuous and progressive in operation and is entirely automatic except for the feeding of the metal strip from which the blanks are originally cut. If this feed be also made automatic then the machine becomes entirely automatic, but as the feed of the strips forms no part of the present invention it is not shown in the drawings.

What is claimed is:—

1. In a machine of the character described, a rotatable die support having a circular series of dies, a plunger coacting with the dies to cut and shape bottle caps, another plunger and means coacting therewith for applying fluid cement to the interior of the cap while in the dies, and a third plunger for forcing cork disks into the cemented caps.

2. In a machine of the character described, a rotatable support adapted to hold a series of shaped bottle caps, means for applying fluid cement onto the inner end wall of the shaped caps while in the rotatable support, and means for forcing cork disks onto the cement within the caps.

3. In a machine of the character described, a rotatable support adapted to hold a series of shaped bottle caps, means for applying fluid cementing material to the shaped caps, means for forcing cork disks onto the cementing material within the caps, and means for causing the simultaneous action of the cement applying and cork disk inserting means at spaced points in the series of bottle caps on the rotatable support.

4. In a machine of the character described, a rotatable series of receptacles adapted to hold bottle caps, means for automatically introducing the caps into said receptacles, a plunger adapted to enter the caps in succession while in the receptacles, said plunger having at its active end a valve with a projecting stem adapted to engage the inner wall of the end of the cap and to open the valve by the progressive movement

of the plunger into the cap, a cement receptacle communicating with the valve end of the plunger, and means for introducing cork disks into the caps and onto the cement deposited therein.

5. In a machine of the character described, a rotatable die support having a circular series of dies, a composite plunger coacting with the dies and having both cutting and shaping members acting in sequence to cut and shape bottle caps, another plunger for applying cement to the interior of the caps while in the die, and a third plunger for forcing cork disks into the cemented cap.

6. In a machine of the character described, a plunger for applying cement into the interior of the shaped cap comprising a head housing material for retarding the flow of cement there-through and provided with a conduit leading to said head, a valve in said head nearer the outer end of the head than the retarding material, and the cement reservoir exterior to the stem of the plunger and communicating with the conduit therein.

7. In a machine of the character described, a rotatable support adapted to hold a series of shaped bottle caps, means for applying fluid cementing material to the shaped caps, means for carrying cork disks into coincidence with the caps, and means for forcing the cork disks onto the cementing material within the caps.

8. In a machine of the character described, a series of receptacles for shaped bottle caps, plungers for introducing fluid cement 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, a drive shaft, a cam on said shaft, and a frame on said rod engaging with the cam.

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

ROBERT B. COCHRAN, JR.

Witnesses:

M. B. COCHRAN,
M. A. COCHRAN.