R. B. COCHRAN.

MACHINE FOR MAKING BOTTLE CAPS.

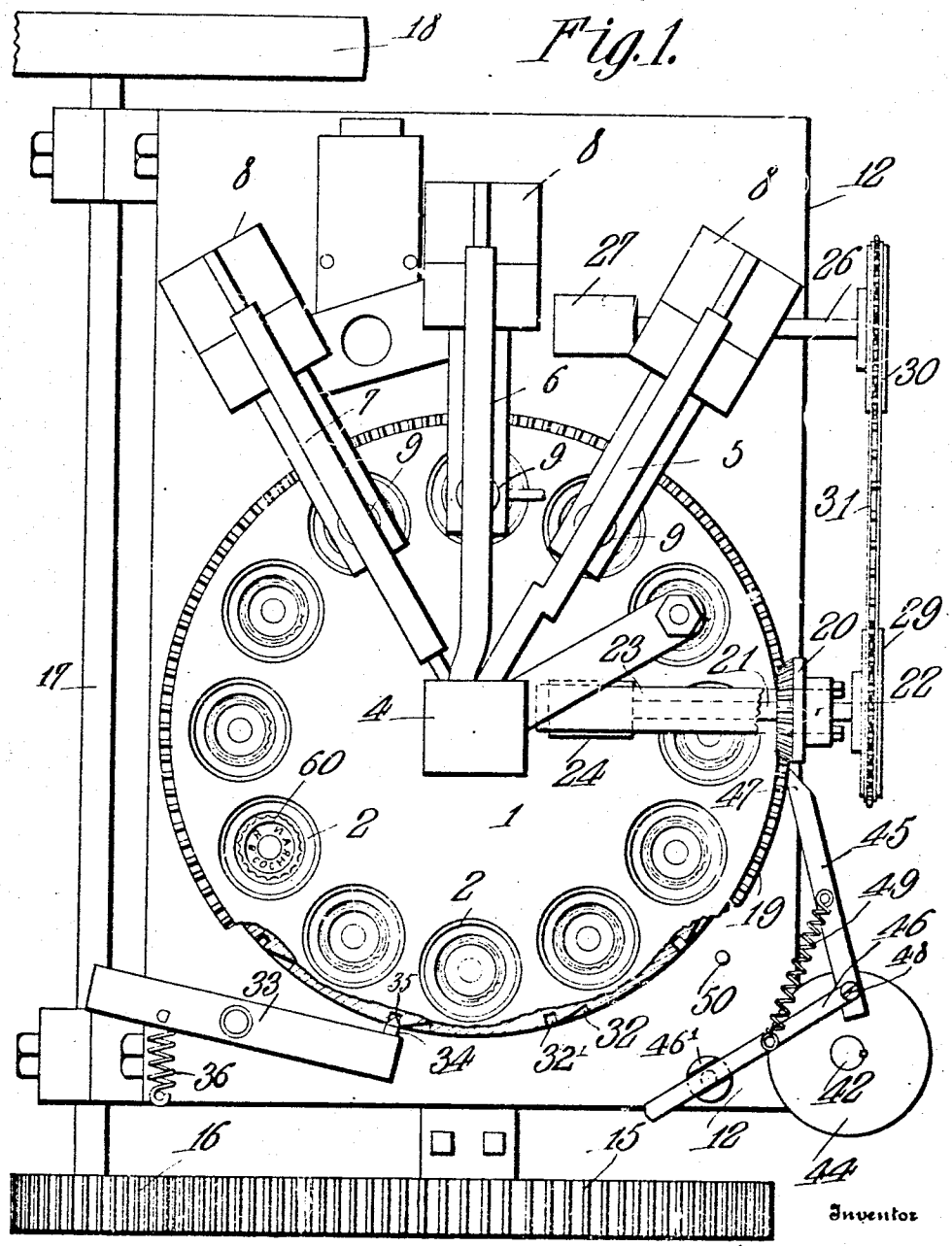
APPLICATION FILED MAR. 11, 1909.

956,887.

Patented May 3, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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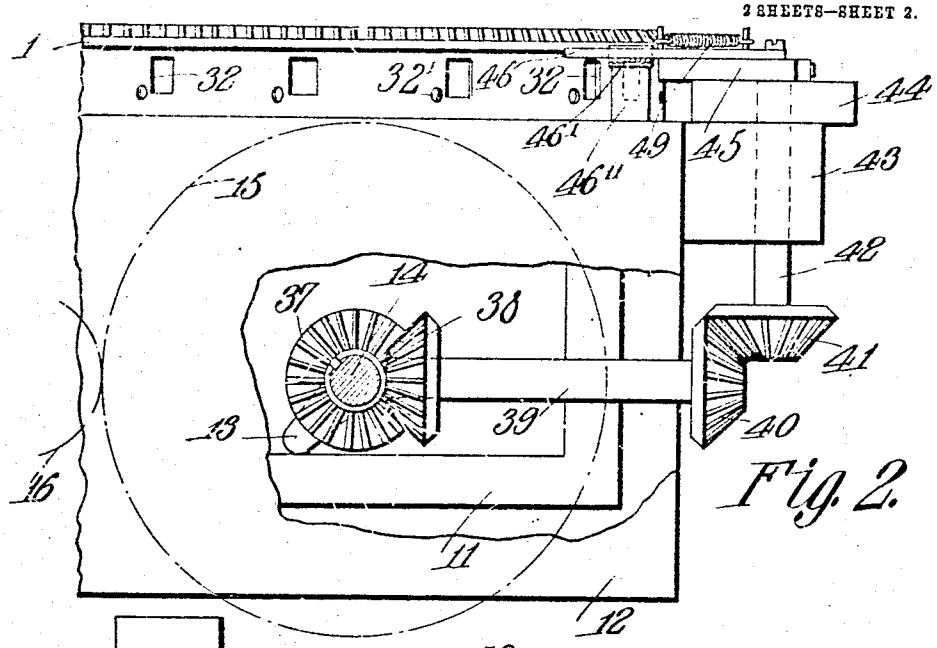

Fig. 2.

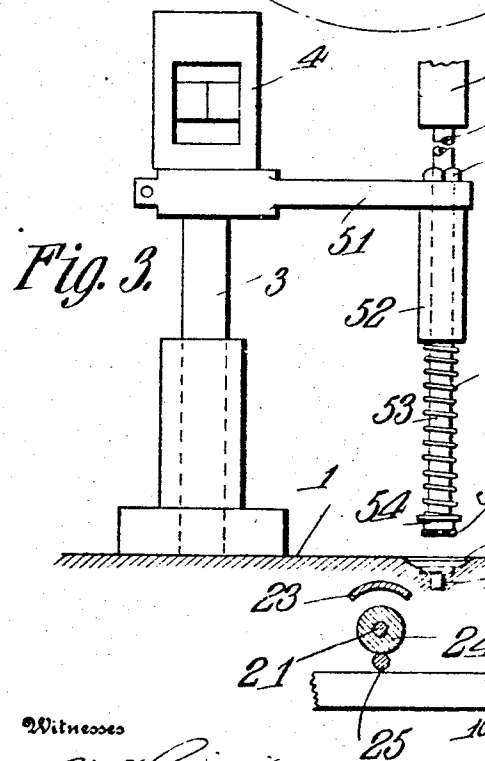

Fig. 3.

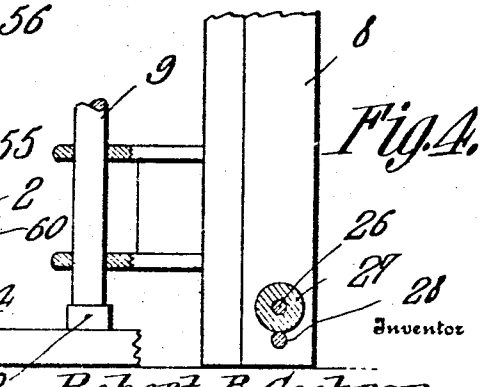

Fig. 4.

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UNITED STATES PATENT OFFICE.

ROBERT B. COCHRAN, OF CHARLOTTE, NORTH CAROLINA.

MACHINE FOR MAKING BOTTLE-CAPS.

956,887. Specification of Letters Patent. Patented May 3, 1910.

Application filed March 11, 1909. Serial No. 482,723.

To all whom it may concern:

Be it known that I, ROBERT B. COCHRAN, 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 Making Bottle-Caps, of which the following is a specification.

This invention has reference to improvements in machines for making bottle caps and has a special reference to the machine for the same purpose shown and described in application Serial No. 457,373, filed by me on October 12, 1908.

The object of the present invention is to improve the construction of the machine disclosed in the aforesaid application in several particulars and also to provide a means whereby any chosen designation may be produced upon the outer or visible face of the bottle cap or crown by the machine during the operation of forming the cap or crown.

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 in which drawings, Figure 1 is a plan view with parts broken away of the improved machine. Fig. 2 is an end elevation of a portion of the machine also with parts broken away and parts omitted. Fig. 3 is a detail elevation with parts in section of the inking apparatus. Fig. 4 is a detail elevation with parts in section of the means for feeding the metal strips out of which the bottle caps or crowns are punched.

In the aforesaid application, in the structure disclosed, of which the present invention is an improvement, there is shown a die plate capable of rotative movement and containing a circular series of dies.

In operative relation to the die plate are a number of plungers arranged in consecutive order, the first in order being adapted to coact with the dies in the die plate to punch out blanks from a strip of metal and shape these blanks into bottle caps or crowns, then the next die in order applies a cement to the interior of the shaped cap or crown, and finally cork disks are moved into position over the shaped and cemented crowns and these cork disks are forced into the crowns by the third plunger, the several plungers acting simultaneously through suitable actuating mechanism.

Provision was made in the structure of the aforesaid application for causing the actuation of the plungers and also the step by step rotative movement of the die carrier.

The present invention has reference more particularly to the means for giving the step by step rotative movement to the die carrier and to added features over and above the showing of the aforesaid application including a means for feeding the metal strips and for applying ink to the dies previous to the punching out of the caps from the metal strips.

Referring now to the drawings there is shown a die carrier 1 having upon its upper face a circular series of dies 2 which latter may be in all essential respects similar to the dies shown in the aforesaid application.

Extending through the axis of the disk is a post or stem 3, (see Fig. 3,) and at the upper end of this post or stem there is a head 4 receiving and actuating three levers 5, 6, 7, at one end, the said levers being pivoted at the other end in the standards 8.

The levers 5, 6, 7 carry respectively a punching die, a cement supplying head or plunger, and a plunger for causing the insertion of the cork disks into the cemented crowns or caps. The stems 9 only of these three plungers are shown except that in Fig. 4 the punching head 10 for cutting out the blanks from a metal strip is indicated.

In the aforesaid application provision is made for causing a longitudinal reciprocation of the stem 3 through a frame 11 within the casing 12 of the machine, and a cam 13 carried on a shaft 14 and arranged to engage the frame 11 to depress the same against a normal upward tendency imparted to the frame by suitable springs, fully illustrated in the aforesaid application but not shown in the present case. By this means the stem 3 is given a positive downward movement at suitable intervals and is allowed to return to normal position through the action of the springs, the downward movement being the only one requiring power.

In the structure illustrated in the present application the shaft 14 exterior to the casing 1 carries a gear wheel 15 in mesh with

a gear pinion 16 on a shaft 17 receiving power through a pulley 18 from any suitable source of power so that the shaft 14 is caused to rotate continuously so long as the power is applied.

The periphery of the disk 1 is in the structure shown in the present drawings provided with bevel gear teeth 19 extending entirely around the die carrier disk 1 and these gear teeth are in mesh with a bevel pinion 20 on a shaft 21 suitably supported in bearings 22 carried by the casing 12 and this shaft extends radially over the disk 1 and at a short distance above the same. The support or bearing 22 may also carry an overhanging bracket 23 extending to the inner end of the shaft 21 and there sustaining the latter. On the shaft 21 near the axis of the disk 1 is a roller 24 and immediately below the same is a small idler roller 25.

Mounted in the post 8 carrying the lever 5 is another shaft 26 carrying a roller 27 with an adjacent idler 28. The rollers 24 and 27 and the punching die 10 are all in the same vertical plane so that a strip of metal fed between the rollers 24 and 25 and continuing through the rollers 27 and 28 will pass under the punch 10 immediately above any one of the dies 2 which at the moment is beneath the punch 10, the arrangement being such that the step by step rotation of the disk 1 will always bring the dies 2 in succession at rest beneath the punch 10.

The shafts 21 and 26 are parallel one with the other although in spaced relation and the shaft 21 carries a sprocket wheel 29 while the shaft 26 carries a corresponding sprocket wheel 30 and the sprocket wheels are of the same diameter and are connected by a sprocket chain 31 so that the shafts 21 and 26 will rotate simultaneously at the same speed.

Since the pinion 20 on the shaft 21 is in constant mesh with the gear teeth 19 on the disk 1 the feeding rollers 24 and 27 will have the same intermittent movement as does the disk 1 so that the feed of the strip from which the cap or crown blanks are punched will occur only during the movement of the die 1 and when the latter comes to rest the strip will also be at rest, after which time the punch 10 acts to punch out a disk from the strip and subsequently form it into a bottle cap or crown in the manner described in the aforesaid application.

The means for imparting step by step rotative movement to the disk 1 is quite different from that shown in the aforesaid application. The periphery of the disk 1 below the gear teeth 19 is provided at spaced intervals corresponding to the spaces between the dies 2 with inclined notches 32, that is the notches are provided with an end radial wall and from the base of this wall the notches gradually decrease in depth until they merge into the periphery of the disk 1. Adjacent to the notches 32 are other notches 32′ which may be in the form of simple round radial holes bored into the periphery of the disk 1 at suitable intervals.

Pivoted at one side of the casing 12 is a rock arm 33 at one end of which there is a stud 34 with a pointed end 35 adapted to enter any one of the notches 32′ in such manner as to hold the disk 1 against rotation except when a sufficiently powerful rotative force is exerted upon the disk 1 to cause the pointed end 35 to ride out of a notch 32′ in which it may at the time be in engagement. The end of the arm 33 remote from the pin 34 is controlled by a spring 36 tending at all times to maintain the pin 34 in a notch 32′.

Mounted on the shaft 14 is bevel pinion 37 in mesh with another bevel pinion 38 on a shaft 39 extending to the exterior of the casing 12 and there carrying a bevel pinion 40 in turn in mesh with a bevel pinion 41 on an upright shaft carried by suitable journal bearings 43 fast on the casing 12. The upper end of the shaft 42 carries a disk 44 and on this disk is pivoted a pawl 45, having at the other end a tooth 47. A pin 48 rising from the disk 44 constitutes the pivot of the pawl 45 and connected to this pin is one end of a bar 46, the other end of which is slidable through a recess in the upper face of a head 46′ pivotally mounted in a stud 46″ on the casing 12. The toothed end 47 of the pawl 45 is arranged to engage constantly the periphery of the disk 1 at a point to engage the notches 32, the said pawl being constantly urged in a direction to move into the notches 32 by a spring 49 connected at one end to the pawl and at the other end to the rod 46. As the disk 44 rotates the pawl 45 will have its toothed end 47 reciprocate along the periphery of the disk 1 for a distance sufficient to engage a notch 32 and rotate the disk to advance the dies step by step. A pin 50 on the casing 12 acts as a stop for the pawl in its retractive movement.

Fast on the stem 3 and projecting laterally therefrom is an arm 51 to the outer end of which is secured a depending sleeve 52 through which extends a rod 53 having at its lower end a head 54 provided on the lower face with a pad 55. Between the head 54 and the sleeve 52 the rod 53 is surrounded by a spring 56 tending to force the head 54 in a direction away from the sleeve but this movement is limited by a nut 57 applied to the rod above the arm 51 or by any other suitable limiting means.

Extending longitudinally through the rod 53 is a passage 58 leading to the pad 55 on

the head 54 and at the other end communicating with the reservoir 59 carried by the upper end of the rod 53.

Each die 2 is provided with an ejecting member 60 and the upper face of this ejecting member may be provided with suitable lettering in the form of a rubber stamp which will receive ink from the pad 55 when the rod 53 is depressed. This occurs at a point immediately preceding the position of a die when beneath the plunger 10 which latter is a cutting and shaping plunger such as shown in the aforesaid application, or such as is commonly employed in machines of this character. The result of this is that when a disk of metal is cut out from a band of metal by the cutting plunger 10 and is forced down into the die 2 it receives an imprint on its outer face from the type on the ejecting head 60, the ink employed being of a character which will not require baking and which when dry is water-proof.

Of course other means for characteristically marking the outer or visible face of the bottle caps or crowns may be employed in place of the inking mechanism shown and described in this case.

It will be observed that with the machine shown in the drawings there are four operations performed simultaneously though in sequence upon any one particular cap or crown except that the imprinting upon the visible face of the crown occurs simultaneously with the forming of the crown.

When the stem 3 and head 4 are depressed then the arm 51 and the levers 5, 6 and 7 all move together, the movement of the arm 51 causing the inking of the ejector head of a die, the arm 5 causing the movement of the cutting and forming punch, the arm 6 causing the deposition of some cement in the formed bottle crown, and the arm 7 causing the forcing of a cork disk into the already cemented crown, thus completing the crown which is afterward ejected from the machine by a mechanism shown in the aforesaid application but not shown in this case as it forms no part of the present invention, and may be of a character common to machines of this type.

What is claimed is:—

1. In a machine for making bottle caps or crowns, a rotatable die carrying disk having a peripheral series of gear teeth, feeding rolls for a strip of metal from which the blanks for the caps or crowns are to be cut, said rolls having their axes of rotation above and substantially parallel with the plane of the active face of the disk, common connections between the rolls for their simultaneous actuation, and a gear wheel connected to one of the rolls and engaging the gear teeth on the periphery of the die carrying disk.

2. In a machine of the character described, a rotatable die carrying disk having a peripheral series of gear teeth, two spaced parallel shafts each carrying a feed roller and having their longitudinal axes above and parallel with the plane of the active face of the disk, sprocket wheels, one on each shaft, a sprocket chain connecting the sprocket wheels, and a gear wheel upon one of the shafts engaging the gear teeth in the periphery of the die carrying disk.

3. In a machine for making bottle caps or crowns, a rotatable die carrying disk having a peripheral series of bevel gear teeth, feeding rolls for a strip of metal from which the blanks for the caps or crowns are to be cut, said rolls having their axes of rotation above and substantially parallel with the plane of the active face of the disk, common connections between the rolls for their simultaneous actuation, and a bevel gear wheel connected to one of the rolls engaging the gear teeth on the periphery of the die carrying disk.

4. In a machine of the character described, a rotatable die carrier having a continuous series of notches in its periphery, a rotatable disk adjacent to the carrier, a pawl mounted on the disk and having its active end in operative relation to the notches in the periphery of the die carrier, a bar connected to the pawl carrying disk at the point of connection of said pawl with the disk, a pivotal support for the bar, through which the bar is slidable, and a spring connected at one end to the pawl and at the other end to the bar between the pivotal support of the latter and its connection with the pawl carrying disk.

5. In a machine of the character described, a rotatable die carrier having a continuous series of notches in its periphery and also a continuous series of recesses in its periphery distinct from the notches, a rotatable disk adjacent to the carrier, a pawl mounted on the disk and having its active end in operative relation to the notches in the periphery of the die carrier, a bar connected to the pawl carrying disk at the point of connection of said pawl with the disk, a pivoted support for the bar through which the latter is slidable, a spring connected at one end to the pawl and at the other end to the bar between the pivotal support of the latter and its connection with the pawl carrying disk, and a yieldable detent having a constant tendency toward the die carrier and provided at its active end with a member adapted to move into the recesses under the normal tendency of the detent, and to be moved out of said recesses by the rotative movement of the carrier.

6. In a machine of the character described, a rotatable die carrier having dies and printing characters interior to the latter, and a series of simultaneously movable plungers acting successively with relation to each die, the first of the plungers in order having

means for depositing ink on the printing characters within the dies and the other plungers having means coacting with the dies for forming bottle crowns and simultaneously imprinting the printing characters on said crowns.

7. In a machine of the character described, a rotatable die carrier having dies thereon and means interior to the dies for making imprints, means coacting with the dies for forming bottle caps or crowns at a fixed point in the rotation of the die carrier, and means for applying ink to the printing means in the dies in advance of the crown forming devices.

8. In a device of the character described, a rotatable die carrier having dies and means for making imprints interior to said dies, means for forming bottle crowns or caps in said dies, and an inking device for the imprinting means in the dies comprising a reciprocatory inking head having one face provided with an ink pad and an ink reservoir carried by the last named means and in communication with the inking pad.

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.

Witnesses:
S. YOUNTS,
E. W. CARR.