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F. McCULLOUGH ET AL

2,387,673

MACHINE FOR RESHAPING BOTTLE CAPS

Filed Dec. 23, 1942

4 Sheets-Sheet 1

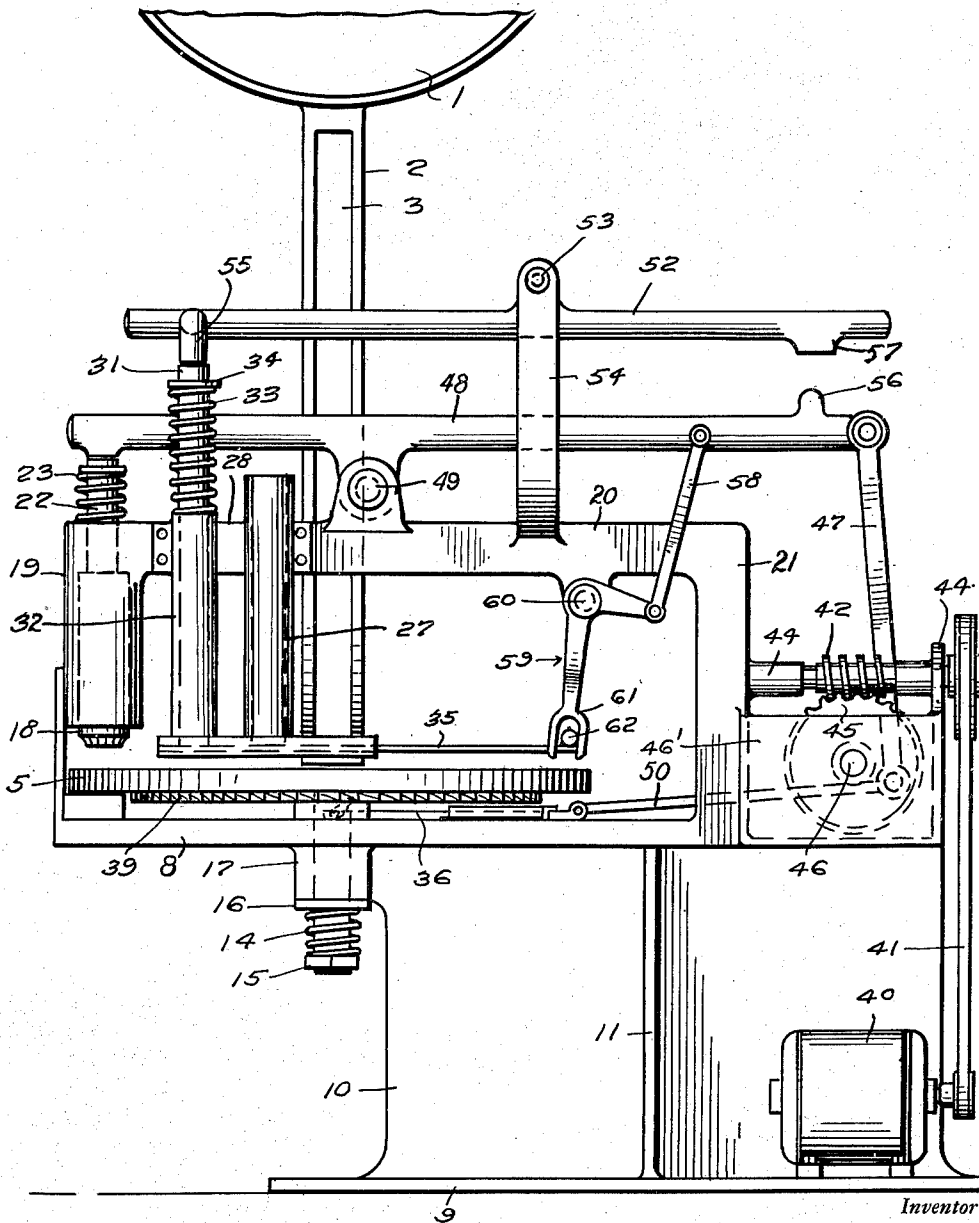


Fig. 1.

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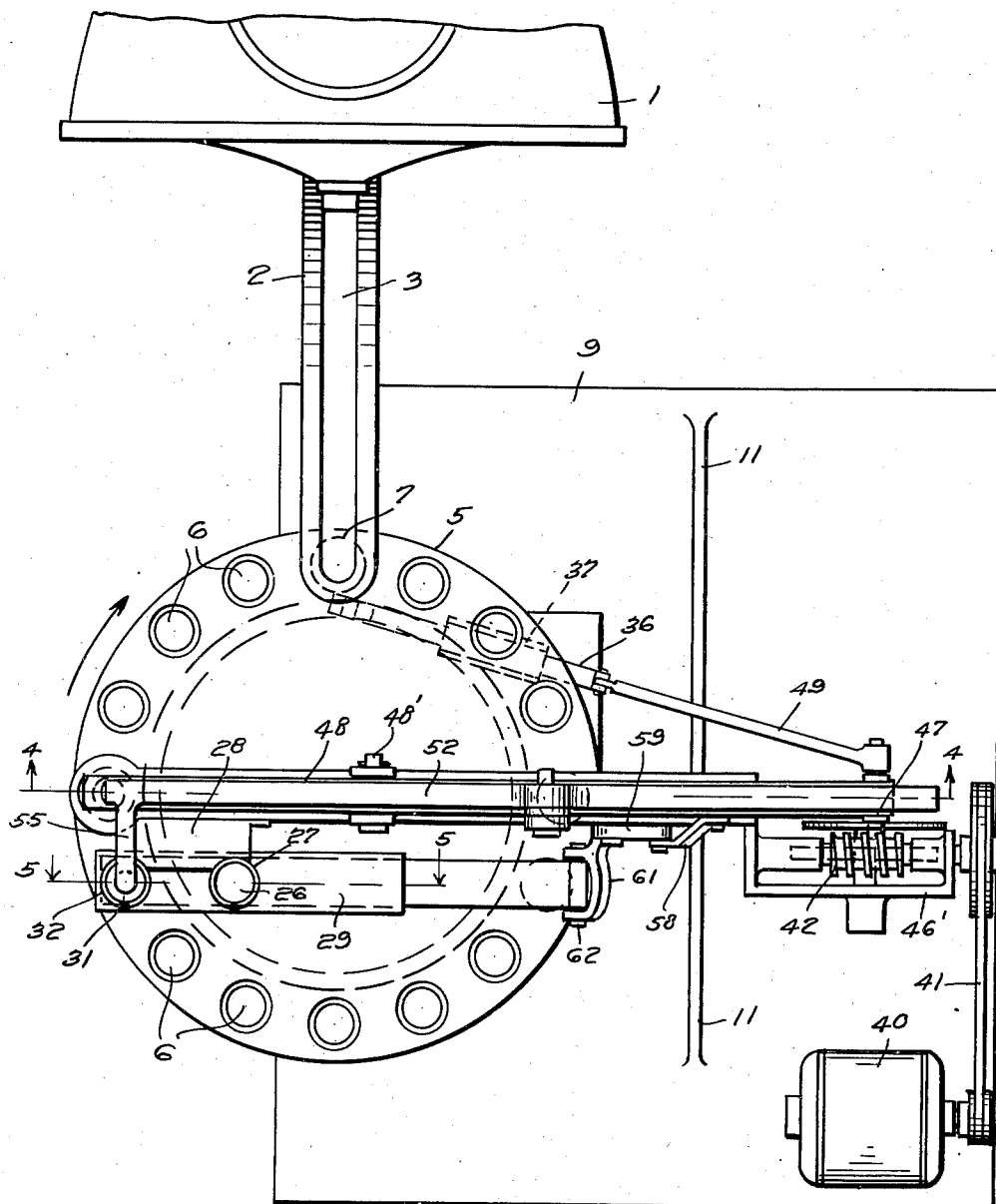
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4 Sheets-Sheet 2



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Fig. 2.

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4 Sheets-Sheet 3

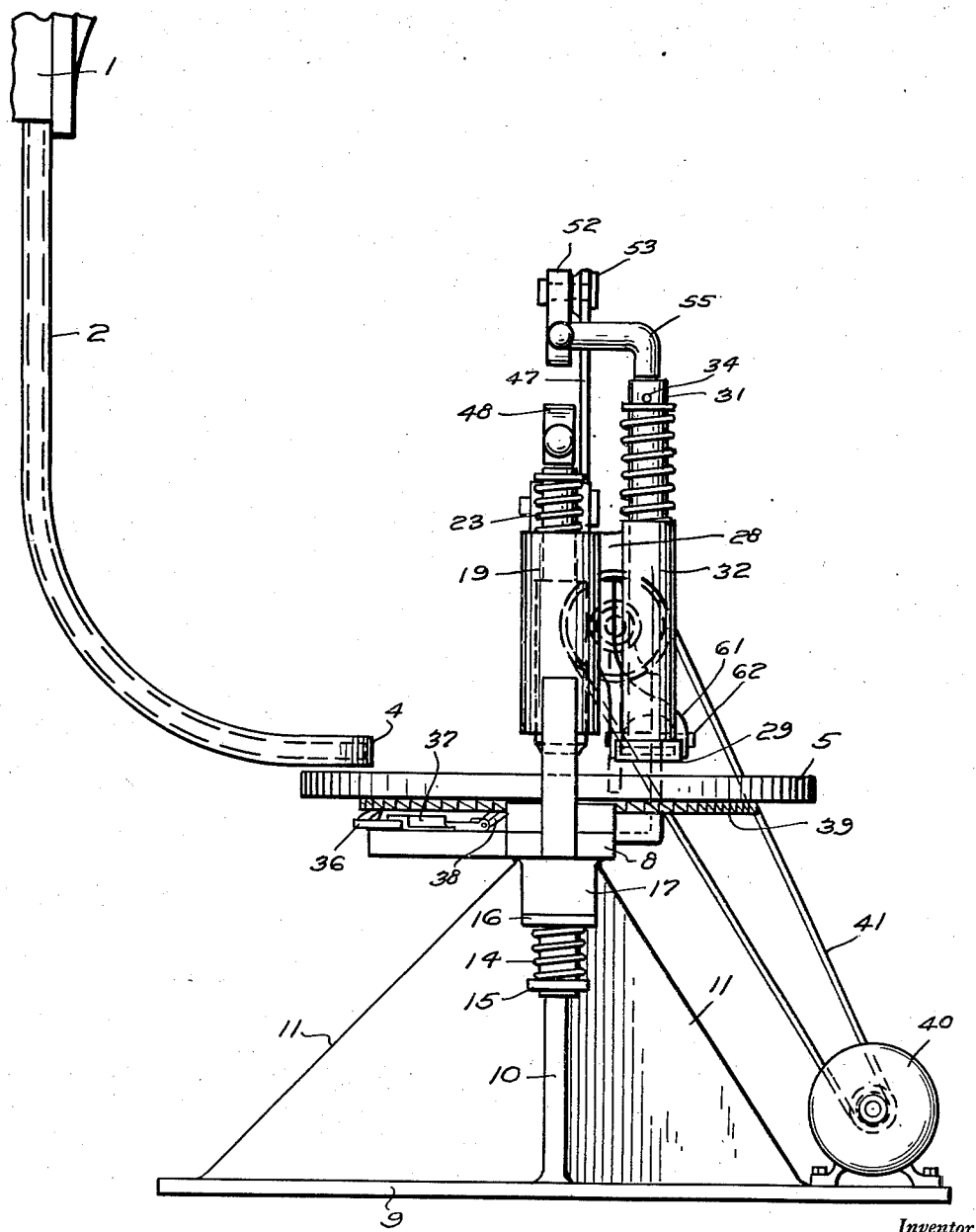


Fig. 3.

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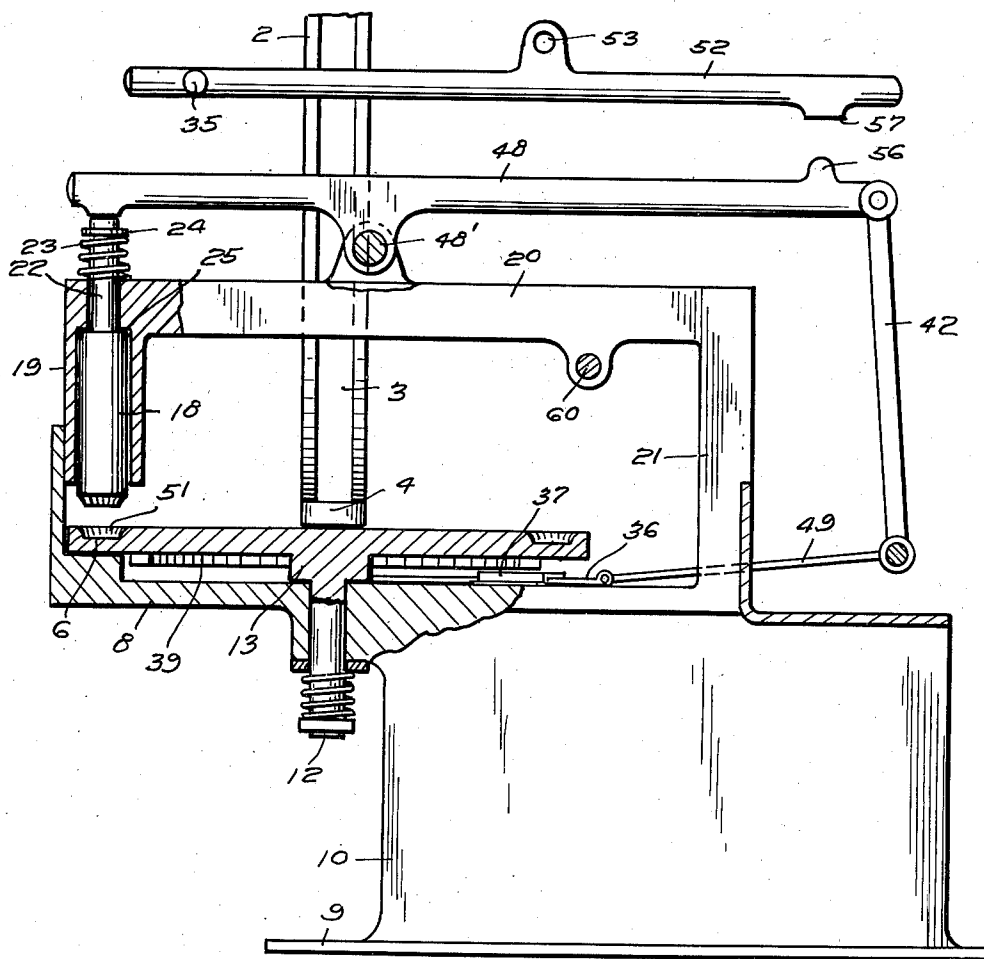


Fig. 4.

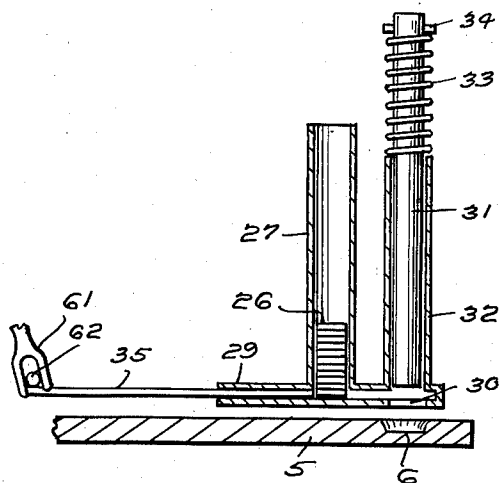


Fig. 5.

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UNITED STATES PATENT OFFICE

2,387,673

MACHINE FOR RESHAPING BOTTLE CAPS

Frank McCullough and Earl Gray,
Fort Smith, Ark.

Application December 23, 1942, Serial No. 469,902

1 Claim. (Cl. 113—80)

Our invention relates to improvements in machines for reshaping and reconditioning crown caps for bottles and of the crimped on skirt type lined with a cork sealing disk.

Our invention is designed with the principal object in view of providing a high speed, power driven machine equipped for continuous operation to insert the disks in such caps and to subsequently reshape the caps around the disks so that contraction occurring in the caps in reshaping will cause the caps to grip and retain the disks.

Another object is to provide simply constructed, efficient means in such machines for accurately centering the disks in the caps rapidly and without injuring either.

Other and subordinate objects are also comprehended by our invention, all of which, together with the precise nature of our improvements, will be readily understood when the succeeding description and claim are read with reference to the drawings accompanying and forming part of this specification.

In the drawings:

Figure 1 is a view in side elevation of a machine embodying our improvements,

Figure 2 is a view in top plan,

Figure 3 is a view in front elevation,

Figure 4 is a view in vertical section taken on the line 4—4 of Figure 2, and

Figure 5 is a fragmentary view in longitudinal section taken on the line 5—5 of Figure 2.

Referring to the drawings by numerals, in the preferred, illustrated embodiment thereof, our improved machine includes a suitable hopper 1 for the caps and which may be mounted, by any desired means, in elevated position. A channel-type, gravity feed chute 2 depends from the bottom of the hopper 1. The chute 2 is of a width adapting the same to feed the caps in a line and comprises a closed back 3, with the exception presently noted, and a closed front end 4. The lower portion of the chute 2 curves laterally to dispose said front end 4 horizontally over and close to a horizontal turntable 5 at one side of the same.

The turntable 5 is provided in the upper face thereof with a circular, edge series of closely spaced flat-bottomed sockets forming circular female dies 6 adapted for shaping the caps in a well known manner and to be revolved under rotation of the turntable 5 beneath a discharge opening 7 provided in the bottom of the end 4 of the chute 2, said dies receiving successively the caps dropping out of said opening 7. As will

be understood, the female dies 6 can only receive a cap when in registration with said opening 7. The front end of the chute 2 is spaced close to the top of the turntable 5 so that the turntable, between dies 6 prevents caps from issuing from the discharge opening 7 of the chute.

The turntable 5 is mounted for rotation, in the direction of the arrow in Figure 2, in a horizontal bed 8 forming part of a base structure including a base plate 9 and right angularly related, upright webs 10, 11 elevating the bed 8 from said plate. For mounting the turntable in said bed, said turntable is provided with an axial depending arbor 12 journaled in said bed and extending below the same, an enlarged boss 13 on its bottom face having a bearing on said bed being provided to space the turntable above the bed for a purpose presently seen. A coil spring 14 circumposed on the arbor 12 between a nut 15 and washer 16 urges the latter upwardly against a boss 17 on the bed 8 to act as a friction brake preventing overrunning of the turntable 5.

Cooperating with the female dies 6 to reshape the caps is an upright, plunger-type, male die 18 mounted, as presently described, for reciprocation above the turntable 5 into and out of each die 6 as each die rotates through an angle of 270 degrees from a position in registration with the opening 7 in the bottom of the chute 2. The die 18 is slidably mounted in a sleeve-like guide 19 depending from the outer end of a horizontal bracket arm 20 extending diametrically above the turntable 5, crosswise of the chute 2, and projecting laterally from a riser 21 upstanding from the bed 8. A reduced axial shank 22 at the upper end of the die 18 slidably extends upwardly through and above said bracket arm 20 for a purpose presently seen. A coil spring 23 surrounds said shank 22 between the bracket arm 20 and a fixed collar 24 on said shank, and thereby yieldingly retains said die 18 in its upward limit of movement against a stop shoulder 25 in the guide 19. In the upward limit of movement of the die 18, its lower end is spaced above the turntable 5. The lower end of said die 18 is beveled and otherwise constructed for cooperation with the female dies 6 to reshape the caps.

On the side of the bracket arm 20 opposite the chute 2 is a magazine for the cork disks 26 comprising an upright tube 27 for containing a stack of said disks to feed under the influence of gravity out of the lower end of the same. The tube 27 depends from a casting 28 suitably secured to the bracket arm 20. At the lower end of the tube 27, and forming part of the magazine, is a

horizontally disposed hollow disk guide 29 into which said tube opens and which is of rectangular form and extends over the turntable 5 close thereto. The guide 29 is provided with an end discharge opening 30 in the bottom thereof adapted to align vertically with a female die 6 preceding one similarly aligned with the male die 18. The discharge opening 30 is of a size to permit a disk 26 to be forced through the same and into said preceding female dies 6.

Axially aligned with the aperture 30 is an upright disk driving, or tamping, plunger 31 mounted for reciprocation in a tubular guide 32 upstanding from the top of the disk guide 29 into which said tubular guide 32 opens. The tubular guide 32 also depends from the casting 28. A coil spring 33 surrounding the plunger 31 between the top of said guide 32 and a pin 34 in the plunger yieldingly retains said plunger in a raised position with its lower end above the guide 29.

As will be apparent, the bottom disk 26 of the stack in the described magazine rests on the bottom of the guide 29 for feeding from the stack in said guide to a position over the aperture 30. For so feeding said disks 26, a slide bar 35 is extended at one end into the end of the guide 29 opposite the discharge end of the same for advance and retraction to push the lowermost disk 26 of the stack over said opening 30.

Returning now to the turntable 5, said turntable is designed to be rotated step by step to similarly advance the female dies 6 beneath the discharge opening 30 of the disk magazine guide 29, the male die 18, and the chute discharge opening 7. For so rotating the turntable 5, a pawl carrying slide 36 is suitably mounted beneath said turntable 5 in a guide 37 for reciprocation to operatively engage a pawl 38 thereon successively with the ratchet teeth of a circular rack 39 fast on the lower face of the turntable 5.

Describing now the driving mechanism:

Suitably mounted on the plate 9 is an electric motor 40 operatively connected, through a belt and pulley drive 41, to a horizontal worm shaft 42 journaled in suitable bearings 44, above the bed 8, and meshing with a vertically disposed worm gear 45 rotatable on a shaft 46 mounted in a bearing bracket 46' in the rear of the riser 21. A pitman rod 47 operatively connects the gear 45 to one end of a rocker bar 48 extending along the bracket arm 20, above the same, and pivotally mounted, intermediate its ends, on said arm, as at 49, for vertical rocking movement. The other end of the rocker bar 48 overlies the upper end of the male die 18 to drive said die down under rocking of said bar in one direction. A second pitman rod 50 operatively connects said gear 45 to the pawl carrying slide 36. The pitman rods 47, 50 and gear 45 are so arranged that in one revolution of said gear the slide 36 is first advanced to rotate the turntable 5 one step and the rocker bar 48 is then rocked in the proper direction to drive the die 18 down into a cap 51 deposited in the female die 6 located under said male die so that said cap is reshaped.

Above the rocker bar 48 is a similarly arranged rocker bar 52 pivoted intermediate its ends, as at 53, on an upright 54 arising from the bracket arm 20, said bar 52 having a lateral extension 55 overlying the upper end of the disk driving plunger 31 and adapted under rocking of said bar 52 in one direction to drive said plunger 31 down so that the latter forces a disk 26 out of the

aperture 30 and into the reshaped cap 51 in a female die 6. The rocker bar 52 is rocked in the proper direction by the rocker arm 48 and through the medium of coacting tappet bosses 56, 57 on said arms.

In this connection, it should be explained that the rocker bars 48, 52 and the tappets 56, 57 are so arranged that the bar 52 is operated to drive the plunger 31 down through the opening 30 into a cap 51 and female die 6 located one step of movement from the die 18 so that said cap is lined with a cork disk 26 just before it is moved into vertical alignment with the die 18.

The rocker bar 48 is operatively connected, by a link 58, to a bell crank 59 pivoted, as at 60, on the bracket arm 20 and having a forked terminal 61 straddling the slide bar 35 and a transverse pin 62 on said bar, whereby said terminal is operatively connected to said slide bar 35. The described connections between the rocker bar 48 and the slide bar 35 are such that under return movement of the rocker bar 48, the slide bar 35 is advanced to feed a disk 26 from the bottom of the stack into a position in which it registers with the opening 30 for driving out of said opening by the plunger 31 in a manner already described.

Any suitable means may be provided for removing the lined, reshaped caps from the dies 6 and from the turntable 5. For instance, the top lifting means and sweeper arm disclosed in U. S. Patent No. 882,060, issued to George G. Glenn, and dated March 17, 1908, may be utilized.

The foregoing will, it is believed, suffice to impart a clear understanding of our invention without further explanation.

Manifestly, the invention, as described, is susceptible of modification without departing from the inventive concept, and right is herein reserved to such modifications as fall within the scope of the appended claim.

What we claim is:

In a machine for reshaping and reconditioning crown caps, a horizontally disposed turntable rotatably mounted and provided in the upper face thereof with a circular concentric series of female cap reshaping dies therein spaced apart equidistantly, means to rotate said turntable step by step in degree corresponding to the spacing of said dies, gravity feed means for loading caps one at a time in the dies of said series successively as said turntable is rotated step by step in one direction, means cooperating with said female dies to reshape said caps comprising a vertically reciprocating male die member beneath which the loaded female dies are rotated successively, a gravity feed magazine for cap lining disks, and means to feed such disks one at a time from said magazine into the loaded caps successively as said turntable is rotated, and means to operate said feeding means and said male die member successively in the order named and in timed relation to step-by-step rotation of said turntable, the last-mentioned means comprising a rocker for operating said male die member, a tamping plunger for compressing said disks in the caps, and operating connections between said rocker and plunger, said operating connections including a second rocker and coacting tappets on said rockers acting to delay operation of said last-mentioned means until the plunger has completed its compression stroke.

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