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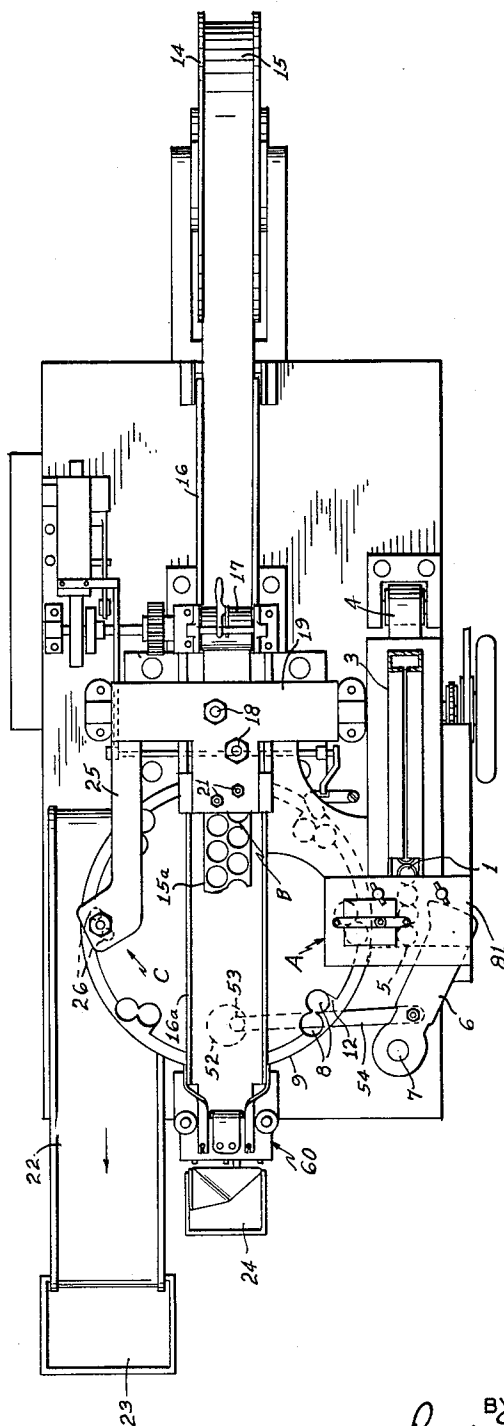
2,598,028

CLOSURE CAP LINING MACHINE

Filed Nov. 8, 1947

2 SHEETS—SHEET 1

FIG. 1



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2 SHEETS—SHEET 2

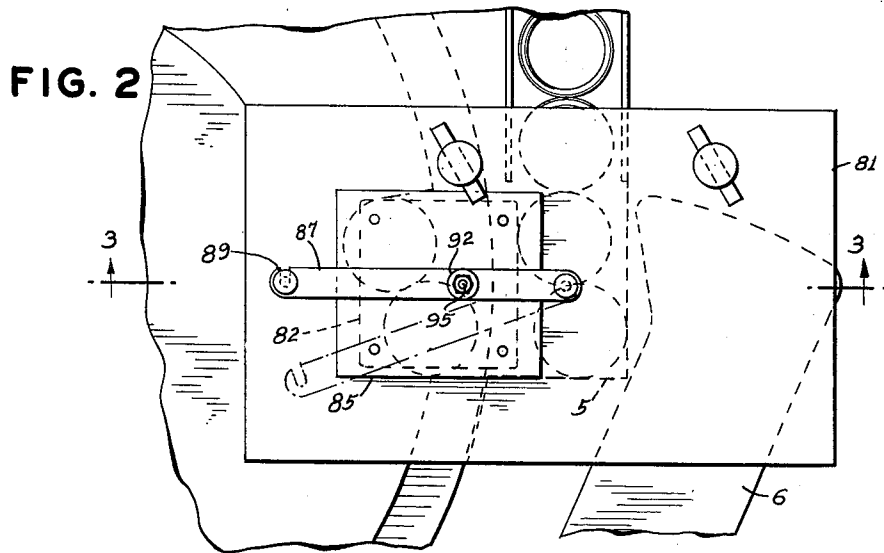
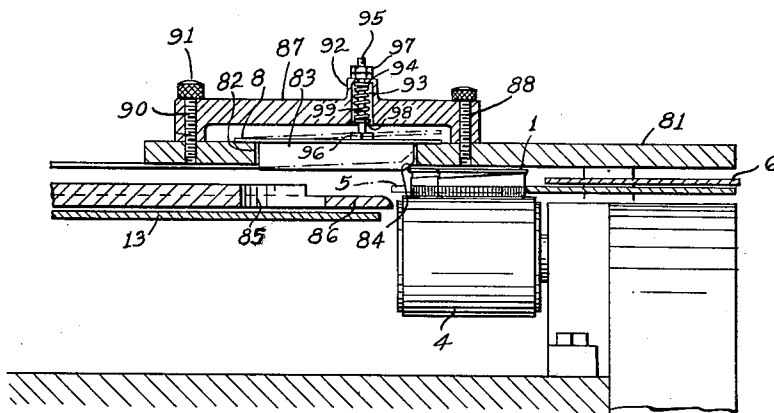


FIG. 3



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CLOSURE CAP LINING MACHINE

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Application November 8, 1947, Serial No. 784,868

5 Claims. (Cl. 113-80)

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In our copending application, Serial No. 656,764 filed March 22, 1946, now matured into Patent No. 2,567,141, September 4, 1951, we have described and claimed a novel and improved closure cap-lining machine. In the operation of that machine, lining disks are severed from a strip of lining material, commonly a thin, faced cardboard, and carried in situ to a lining station above caps waiting to receive them. These caps are carried in holes in a turntable to which they have been fed from a loading station by a reciprocating slide or arm and supported on a fixed plate below the turntable. Plungers push the severed disks from the strip into the waiting caps. Further rotation of the turntable carries the lined caps beyond the supporting plate and over a discharge belt upon which the caps drop by gravity, the holes in the turntable being slightly larger than the caps. It is the object of the present invention to make still further improvements in the cap-lining machine of our earlier application.

We have discovered that at the high speeds at which our machine is otherwise capable of operating, caps occasionally overshoot the holes in the turntable when being fed to it at the loading station. To prevent this, we have cut grooves in the face of the turntable, wide as the holes and about an eighth to three sixteenths of an inch deep, leading from the loading station to the holes.

In accordance with the present invention we have provided additional means for assuring accurate placement of the caps within the holes in the turntable, such means exerting downward pressure on the caps as they are moved over the turntable. To this end we employ a spring-pressed, rockable plate overlying the edge of the turntable at the loading station, its lower face normally spaced from the peripheral area of the turntable, over which the caps are slid to the holes, a distance less than the thickness of a cap. The outer lower edge of the plate is rounded or beveled. When the caps are fed to the holes they engage the beveled edge of the plate and, camming it upward, pass between the plate and the peripheral area of the turntable. Thus the plate exerts a positive downward pressure on the caps as they are moved over the holes, pressing them into the holes and preventing any possible overfeed. The plate performs the additional function of holding the caps in alinement at the loading station, preventing the pressure of the oncoming stream of caps from prematurely forcing a cap over the turntable.

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In the accompanying drawings, we have illustrated a preferred embodiment of our invention. In these drawings:

Figure 1 is a plan view of a closure cap-lining machine embodying the feed control mechanism of the present invention;

Figure 2 is an enlarged plan showing the loading station in greater detail, and

Figure 3 is a vertical section along line 3-3 of Figure 2.

In the operation of the machine illustrated in these drawings, unlined closure caps are loaded on a turntable at a loading station A and carried to a lining station B where lining disks, previously severed from a strip of lining material, are forced into the caps; whereupon the lined caps are conveyed to a discharge station C. The machine is designed to line two caps simultaneously and, therefore, the punches, dies and plungers are in duplicate, punching and feeding two disks and ejecting two lined caps simultaneously. The turntable is provided with eight equi-spaced pairs of cap-receiving openings and the loading arm is designed to engage two caps at a time.

Unlined caps 1 are fed from a hopper, not shown, through a chute 3 to a continuously moving feed belt 4, which moves the caps toward the left, as shown in Figure 1, and against a stop 5 at the loading station, so that there will always be two caps in loading position. A horizontal loading arm 6 is mounted for oscillation about a pivot 7. This arm in its forward movement engages two caps, the forward one of which has engaged the stop 5, and pushes them into holes 8, near the periphery of the turntable 9, all as will be described in greater detail presently. The turntable is provided with cutout portions 12 cut in its upper face and leading to the holes 8, the bottoms of these cutout portions being in the same plane with the upper run of belt 4, and merging with a thinned peripheral edge 16 of the turntable. The holes 8, being of slightly larger diameter than the caps, would permit them to fall through were it not for an arcuate supporting plate 13 immediately below the turntable extending through an arc of a little more than 180° from the loading station, past the lining station to the discharge station. During the loading operation, just described, the turntable is stationary. As soon as the caps have been loaded, the turntable is rotated through 45° to move the caps to the lining station B.

Mounted at the right-hand end of the machine is a jumbo roll 14 of lining material 15 in strip form. This material is fed from the roll through

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a guide channel 16 to a pair of intermittently rotated feed rollers 17. From the feed rollers the strip passes between the punches and dies 18, the punches being mounted on the base of the machine, while the dies, depending from a cross-bar 19, are reciprocated to engage the punches and punch lining disks from the strip 15 while leaving them in situ.

Carried by and depending from the cross-bar 19, but beyond the dies, are a pair of plungers 21 spaced to engage a pair of severed disks. These plungers are sufficiently longer than the dies, so that at the end of the downward stroke their lower ends will engage the bottoms of the caps at the lining station. Thus on each reciprocation of the cross-bar 19, a pair of lining disks are punched from the strip and a preceding pair, previously punched and severed from the strip, are carried downward by the plungers 21 into the waiting caps at the lining station. On the second forward movement of the turntable, the lined caps are carried beyond the edge of the supporting plate, and normally drop by gravity at the discharge station C upon the upper run of a discharge conveyor belt 22, which carries them to a waiting receptacle 23. Meanwhile the punched strip 15a proceeds through a guide channel 16a to a cutting mechanism 60 and then to a waste receptacle 24.

In order to insure positive discharge of the lined caps at the discharge station C, we have fixed to the cross-bar 19a forwardly extending plate 25 from which depend a pair of plungers 26, positioned immediately above the holes 8 at the discharge station. These plungers reciprocate with the cross-bar 19 and by engaging the lined caps at the discharge station assure their positive discharge and ejection from the turntable.

We shall not describe the driving mechanism in detail, because of itself it forms no part of the present invention, and the reader may find it fully described in our previously mentioned copending application Serial No. 656,764, now Patent 2,567,141; in our copending application Serial No. 666,153, filed April 30, 1946, now abandoned; and in our copending application Serial No. 777,560, filed Oct. 2, 1947, now abandoned. For our present purpose it is sufficient to point out that the turntable is intermittently rotated by a Geneva movement on the upper end of whose driver shaft is mounted a collar 52 to which is affixed an eccentric pin 53 connected by means of a bar 54 to the loading arm 6. Thus oscillation of this arm is synchronized with the intermittent rotation of the turntable, and feeds caps at the loading station to the holes in the turntable—as we shall now describe in some detail.

Overlying the stop 5, the inner end of the arm 6 and the holes 8 at the loading station is a cover 81, preferably made of "Lucite" or other transparent plastic. This cover has a rectangular opening 82 immediately over the loading station, and in this opening is loosely seated a metal plate 83 having a beveled forward edge 84 and provided with flanges 85 which overlie the cover and support the plate. This plate, when horizontal and when its flanges are in engagement with cover 81, extends about $\frac{1}{8}$ of an inch below the underface of the cover to within a distance of the thinned peripheral edge 86 of the turntable, which distance is less than the thickness or height of a cap 1. A bar 87 lying radially of the turntable extends over the middle of the plate 83 and is pivotally mounted to be swung about the vertical

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axis of screw 88 passing through one end of the bar and into the cover plate. The other end of the bar is provided with an open notch 89 designed to embrace a setscrew 90 and when in that position the bar can be clamped in place by means of the knurled head 91 of the setscrew.

Between the screws 88 and 90, but nearer the former, the bar 87 is provided with a boss 92 drilled to form an opening 93 narrowed at its upper end by an annular flange 94. Extending through this opening 93 is a threaded pin 95, provided at its lower end with a head 96, at its upper end with an adjusting nut 97 and intermediate the two with a fixed collar 98. Encircling the pin and held between the flange 94 and the collar 98, is a compression coil spring 99 which presses the head 96 against the upper face of the plate 83 and holds it yieldably in position within the opening 82.

The apparatus just described operates as follows: A constant stream of empty caps is fed through the chute 3 and carried by the belt 4 to a position against the stop 5 at the loading station where there are two holes 8 in the turntable in readiness to receive two caps, as shown. Thereupon the arm 6 is swung inwardly, engaging two foremost caps and sliding them from the upper run of the belt 4 and between the lower face of the plate 83 and the upper face of the thin peripheral edge 86 of the turntable. This action tilts plate 83 upward about its rear or inner flange under the resistance of gravity and the pressure of the spring 99. Once the caps have passed the pin 98, the plate 83 is tilted about its outer flange, and continues to exert pressure on the caps, although because of the position of the pin 98, a pressure slightly less than the initial pressure. Thus as the caps approach the holes 8, they are under pressure exerted by the plate 83 and the spring 99, and are forced gently into position within those holes. The plate 83 with its associated parts performs two functions: it prevents premature movement of a cap onto the turntable due to the pressure of the oncoming stream of caps and prevents over-feed of caps beyond holes 8. Because of the staggered position of the punches and dies, one hole 8 of each pair is farther from the periphery of the turntable than the other; thus one cap of each pair must be carried farther than the other at the loading station. We accomplish this by shaping the cap-contacting edge of the arm 6, as shown in the drawings.

We claim:

1. A machine for lining closure caps comprising a lining station, a turntable for carrying caps to the lining station, the turntable having holes for receiving the caps slightly larger than the caps, a loading station, means at the loading station for feeding caps over the turntable to the holes in the turntable, a cover over the loading station, a rockable plate normally extending through the cover to a distance from the turntable less than the height of a cap and supported by the cover, said plate having a beveled edge adjacent the loading station, a bar on the cover extending over the plate, a spring-pressed pin in the bar bearing against the top of the plate, whereby the caps are pressed into the holes, means at the lining station for placing lining disks in the caps, and a support for the caps in the turntable extending from the loading station, past the lining station to the discharge station, a discharge station for the lined caps.

2. A machine for lining closure caps comprising a lining station, a turntable for carrying caps

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to the lining station, the turntable having holes for receiving the caps slightly larger than the caps, a loading station, means at the loading station for feeding the caps over the turntable to the holes in the turntable, a yieldably mounted plate at the loading station overlying the turntable and normally spaced from it a distance less than the height of a cap for exerting downward pressure on the caps as they are fed over the turntable to the holes whereby the caps are pressed into the holes, said plate having a lower surface shaped to permit admission of a cap between it and the turntable, means at the lining station for placing lining disks in the caps, a discharge station for the lined caps, and a support for the caps in the turntable extending from the loading station past the lining station to the discharge station.

3. A machine for lining closure caps comprising a lining station, a turntable for carrying caps to the lining station, the turntable having holes for receiving the caps slightly larger than the caps, a loading station, means at the loading station for feeding caps over the turntable to the holes in the turntable, a cover over the loading station, a rockable plate normally extending through the cover to a distance from the turntable less than the height of a cap and supported by the cover, said plate having a lower surface shaped to permit admission of a cap between it and the turntable, a bar on the cover extending over the plate, a spring-pressed pin in the bar bearing against the top of the plate, whereby the caps are pressed into the holes, means at the lining station for placing lining disks in the caps, a discharge station for the lined caps, and a support for the caps in the turntable extending from the loading station, past the lining station to the discharge station.

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4. A machine for lining closure caps comprising a lining station, a turntable for carrying caps to the lining station, the turntable having holes for receiving the caps slightly larger than the caps, a loading station, means at the loading station for feeding caps over the turntable to the holes in the turntable, a rockable plate yieldably mounted at the loading station and normally extending to a distance from the turntable less than the height of a cap, said plate having a lower surface shaped to permit admission of a cap between it and the turntable, whereby caps fed over the turntable to the hole are pressed into the holes, means at the lining station for placing lining disks in the caps, a discharge station for the lined caps, and a support for the caps in the turntable extending from the loading station past the lining station to the discharge station.

5. A machine for lining closure caps according to claim 4 in which the rockable plate has a beveled edge adjacent the loading station.

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