July 24, 1934. J. J. WILLIAMS ET AL 1,967,646

AUTOMATIC LINER FEEDING MECHANISM

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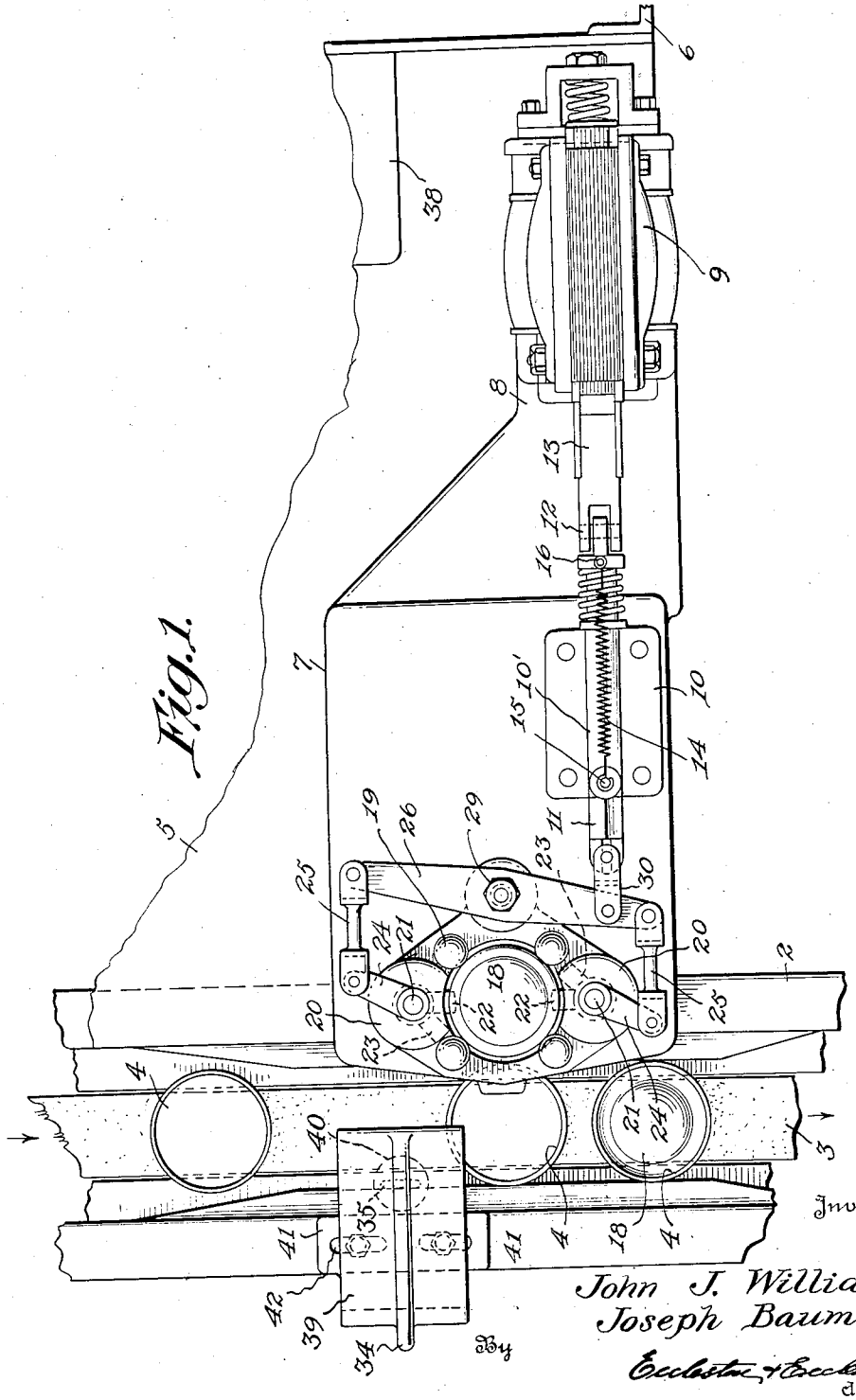


Fig. 1.

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Fig. 2.

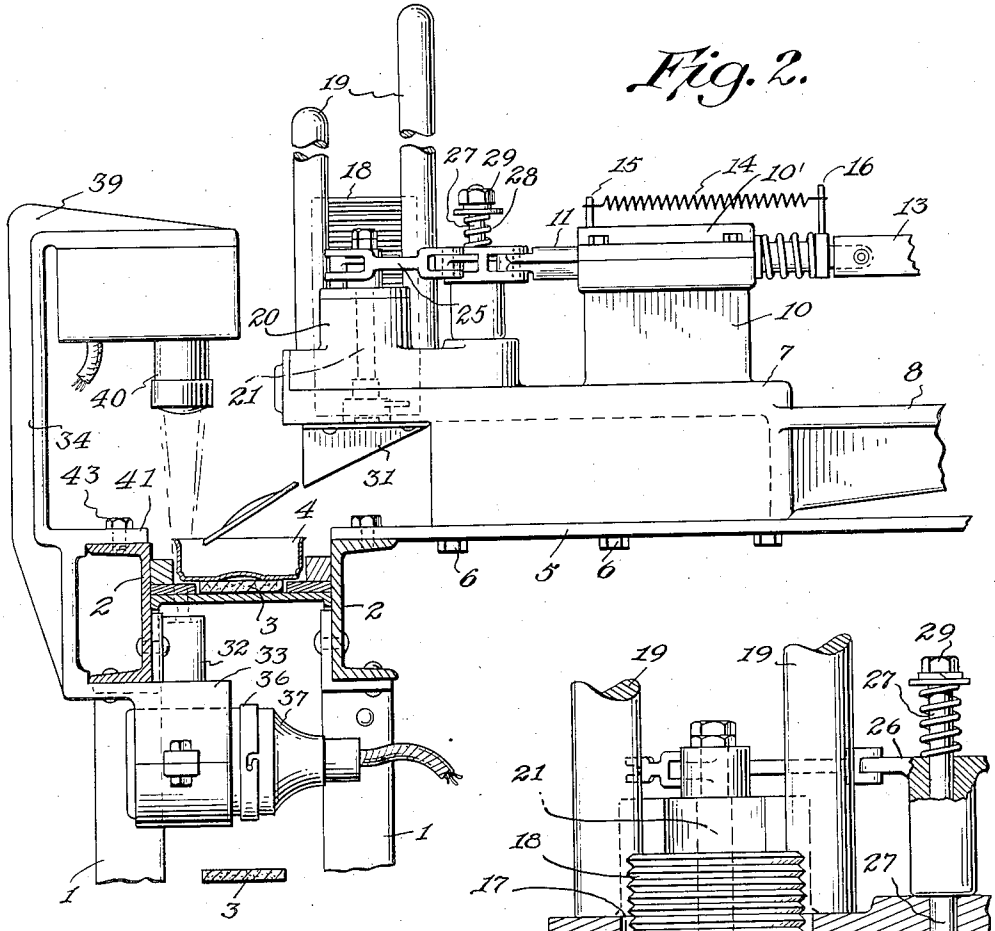
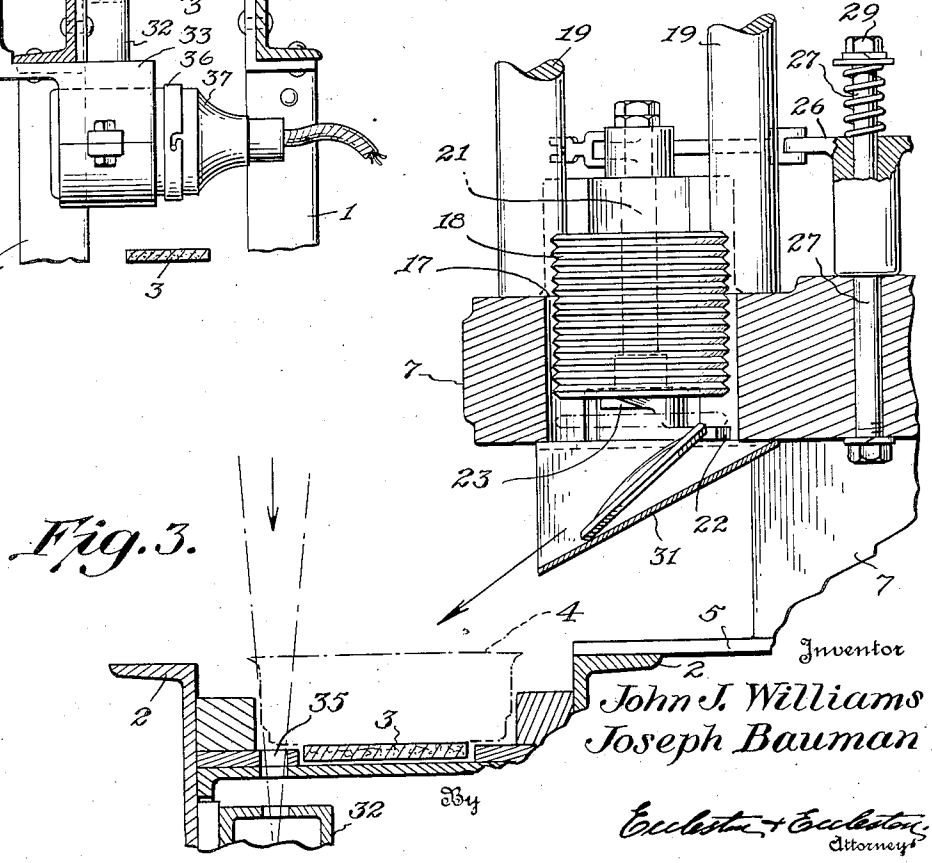


Fig. 3.



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AUTOMATIC LINER FEEDING MECHANISM

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9 Claims. (Cl. 113—80)

In the manufacture of screw caps and the like for fruit jars and similar receptacles, the caps are usually stamped from sheet metal into cup-shaped blanks. These blanks are transferred by means of conveyer belts to threading machines which spin or roll the threads in the skirt of the cap and also crimp or indent the skirt so as to secure therein the conventional porcelain liner which has been previously deposited in the blank. Heretofore the liners have been placed in the blanks by hand as the blanks were conveyed from the stamping press to the threading and crimping mechanism.

The present invention relates to a machine for automatically feeding the liners successively to the cap blanks as they are being conveyed from the stamping press to the threading machine, and includes means under the control of the individual blanks for releasing the liners one by one and permitting them to descend into the respective blanks.

Another object of the invention resides in the use of a light-sensitive cell for setting the liner-dispensing means in operation, and an adjustment for the cell to compensate for the time required for a liner to travel from the supply magazine to the blank.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings, in which,

Figure 1 is a plan view of the apparatus.

Figure 2 is a side elevational view thereof, with parts broken away and parts in section; and

Figure 3 is a fragmentary sectional view on a somewhat larger scale.

Referring to the drawings in greater detail the numeral 1 indicates the supporting legs for channel bars 2 which form the framework of the conveyer 3 for transporting the cap blanks 4 from the stamping press to the threading mechanism, neither of which devices is shown herein as they form no part of the present invention. The numeral 5 designates a plate having one end mounted on one of the channel bars 2 and the other end supported by legs 6. The plate 5 forms the base for the liner dispensing mechanism about to be described.

Secured to the plate 5 adjacent the conveyer 3, as by bolts 6, is a base 7 provided with a rearward extension 8 on which is mounted a solenoid 9. Intermediate the ends of the base 7 is a pedestal 10 which carries a bearing 10′ for a slide rod 11. This rod is pivotally connected at 12 with the plunger 13 of the solenoid. A spring 14 having its respective ends secured to a pin 15 on the housing of the bearing 10′ and a pin 16 on the rod 11, serves to normally draw the rod to the left (Figure 1).

The forward end of the base 7 is provided with a vertically extending opening or passage 17 in which is located the lower end of the stack of liners 18. Mounted in the base adjacent the passage 17 are four uprights 19 arranged in the form of a square to provide a support or magazine for the upper portion of the stack of liners. Preferably two of the uprights are taller than the other two, to facilitate charging the magazine.

Bearing members 20 are provided on diametrically opposite sides of the opening 17 and oscillatably mounted therein are vertically extending shafts 21. On the lower end of each shaft is a pair of lugs 22—23. The lugs 22, which normally support the stack of liners, are arranged in a horizontal plane, and the lugs 23, which are adapted to enter between the lowermost liner and the remainder of the stack are also arranged in a horizontal plane but spaced above the plane of the lugs 22 a distance at least equal to the thickness of one of the liners. The lugs 23 are preferably sharpened or beveled on their forward edges so as to facilitate entrance between the liners in the stack.

The lugs 22—23 of each shaft are arranged at an angle of about 60° so that by only a slight rotation of the shaft 21 either the one or the other of the lugs may be projected under the stack of liners. The upper end of each shaft 21 is provided with an arm 24 to which is pivoted a connecting link 25. The opposite ends of the links 25 are pivoted to the ends of a rocker 26. This rocker is pivoted on a rod 27 extending through base 7, and is held in contact with the base by a coil spring 28 which is positioned on the rod between the rocker and a nut 29. A link 30 connects the rocker 26 with the adjacent end of the rod 11.

By reason of the fact that the arms 24 extend in opposite directions from their particular shafts 21 it will be apparent that these shafts turn in the same direction when the rocker 26 is operated. On account of this action of the shafts 21, the positions of the lugs 22—23 are reversed on the two shafts, so that the lugs 22 will be withdrawn simultaneously and the lugs 23 inserted simultaneously, and vice versa.

Mounted under the opening 17 of the base 7 is a chute 31 which directs the lowermost liner 18, when released from the stack, to the cap 4 as it is carried forward by the conveyer 3.

The operation of this part of the apparatus will now be clear. When the solenoid 9 is energized in a manner to be described, the rod 11 is drawn to the right (Figure 1) against the tension of spring 14. This movement of rod 11 imparts a turning movement to rocker 26, and the latter rotates the shafts 21 in a counter-clockwise direction. By this operation the lugs 22 are withdrawn from the bottom of the stack and the lugs 23 are at the same time forced in between the lowermost liner 18 and the one next above it. The lower liner is thus allowed to descend by gravity into the chute 31 from whence it is directed to one of the inverted caps 4. When the solenoid 9 is de-energized the spring 14 moves rod 11 to the left (Figure 1) and thus rocks the lever 26 about its pivot so as to turn the shafts 21 in a clockwise direction. This movement of the shafts brings the lugs 22 beneath the stack of liners and withdraws the lugs 23 thus allowing the stack to descend as a unit onto the lugs 22. When the solenoid is again energized the foregoing operations are repeated so that the liners are released one by one so long as a supply is maintained in the magazine.

The energizing of the solenoid 9 is controlled by the caps themselves through the medium of a light-sensitive cell 32. This cell is mounted on the lower arm 33 of a bracket 34 and is disposed below a slot 35 formed in the support for the upper run of the cap conveyer 3. Also supported on the arm 33 is a socket 36 for a connector plug 37 of the electric circuit which includes one or more relays, etc., indicated generally by the numeral 38 (Fig. 1). The bracket 34 is provided with a second arm 39 which overhangs the conveyer 3 and forms a support for an electric bulb 40. This bulb is in direct alignment with the light-sensitive cell 32 and the rays of light from the bulb are normally projected onto the cell through slot 35.

The bracket 34 has its flange 41 provided with slots 42 for the reception of machine screws 43 which are threaded into the upper flange of the outer channel iron 2. By loosening the screws 43 the bracket 34 and its aligned cell 32 and light source 40 may be simultaneously adjusted longitudinally of the conveyor 3. This adjustment of the cell 32 and its related parts provides means for insuring the release of the liner at the proper instant to traverse the chute 31 and drop downwardly just as the cap arrives opposite the chute.

In the operation of the device, the bracket 34 having been properly adjusted in the slots 42, and the magazine charged with liners 18, the conveyer carries the caps forward to receive the liners, and as each passes under the slot 35 it will intercept the rays of light impinging on the light-sensitive cell 32. As soon as this occurs the solenoid will be energized through relays, etc., 38, and will draw the plunger 13 and rod 11 to the right thereby rotating shafts 21 in a counter-clockwise direction. This operation of the shafts will cause the fingers 23 to enter between the bottom liner of the stack and the one just above it, and will withdraw the fingers 22 from beneath the lowermost liner, thus allowing this liner to descend into the chute 31. During the slight interval of time consumed in releasing the liner the cap has arrived about opposite the chute 31, if the position of bracket 34 has been properly adjusted, and the liner will therefore descend into the cap. The cap is then conveyed to another machine (not shown) where it is operated upon to secure the liner in place and form the desired screw threads or other receptacle-engaging means. As soon as the particular cap passes beyond the slot 35 the solenoid is de-energized and the shafts 21 are rotated in a clockwise direction through the operation of spring 14 which returns the fingers 22, 23, the plunger 13 and rod 11 to their normal position. The parts remain in their normal positions until another cap arrives and intercepts the light rays projected onto the cell 32, whereupon the cycle is repeated.

From the above description and the accompanying drawings it will be apparent that we have devised an exceedingly simple and reliable device for dispensing cap liners in timed relation to the travel of caps from the blank machine to the threading machine; that the device consists of few parts which are well organized and not easily disarranged; and that the feeding of the liners is controlled by the cap blanks themselves and that therefore the proper timing of the release is positively insured.

The invention has been described in considerable detail, as relating to the feeding of porcelain liners to cap blanks while the cap blanks are being carried from one machine to another machine where the liners are secured in the blanks and the blanks threaded. It will be recognized, however, that the invention is not in any manner so limited in scope, and that the detailed description of the specific apparatus and operation is to be taken merely as illustrative rather than in a limiting sense; for the present invention relates broadly to the feeding of one article to another article as the latter is carried forward; the feeding of the former being controlled by the arrival of the latter at a predetermined position.

What we claim is:

1. A mechanism for feeding liners to caps including a magazine for the liners, a conveyer for the caps, a light-sensitive cell and a source of light between which said caps are conveyed, and means controlled by said cell for individually releasing the liners.

2. A mechanism for feeding liners to caps including a magazine for the liners, a conveyer for the caps, a light-sensitive cell and a source of light between which said caps are conveyed, means controlled by said cell for individually releasing the liners, and means for simultaneously adjusting the position of the cell and the source of light.

3. A mechanism for feeding liners to caps including a magazine for liners, a conveyer for the caps, a light-sensitive cell and a source of light between which said caps are conveyed, means controlled by said cell for individually releasing the liners, and a chute for directing the released liner to a cap.

4. A mechanism for feeding liners to caps including a magazine for liners, a conveyer for the caps, a light-sensitive cell and a source of light between which said caps are conveyed, means controlled by said cell for individually releasing the liners, a chute for directing the released liner to a cap, and means for adjusting the position of the cell with reference to the chute.

5. A mechanism for feeding liners to caps including a magazine for liners, a conveyer for the caps, a bracket mounted adjacent the conveyer, said bracket provided with arms extending respectively above and below the upper run of the conveyer, a light-sensitive cell mounted in one of said arms, a source of light mounted in the other arm, and means controlled by the cell for individually releasing liners from the magazine.

6. A mechanism for feeding liners to caps including a magazine for liners, a conveyer for the caps, a bracket mounted adjacent the conveyer, said bracket provided with arms extending respectively above and below the upper run of the conveyer, a light-sensitive cell mounted in one of said arms, a source of light mounted in the other arm, means for adjusting the bracket longitudinally of the conveyer, and means controlled by the cell for individually releasing liners from the magazine.

7. A mechanism for feeding liners to caps including a magazine for liners, a conveyer for the caps, movably mounted lugs for individually releasing the liners, a solenoid for controlling the movement of the lugs, and a light-sensitive cell associated with the conveyer for controlling the solenoid.

8. A mechanism for feeding liners to caps including a magazine for liners, a conveyer for the caps, movably mounted lugs for individually releasing the liners, means for operating the lugs, a light-sensitive cell for controlling the lug-operating means, and means for adjusting the cell longitudinally of the conveyer.

9. A mechanism for feeding liners to caps including a magazine for the liners, a conveyer for the caps, two vertically disposed shafts arranged on opposite sides of the magazine, lugs on the ends of the shafts adapted to individually release liners when the shafts are oscillated, means for oscillating the shafts, and a light-sensitive cell for controlling the operation of the shaft-oscillating means.

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