Dec. 16, 1969 C. C. GREEN ET AL 3,483,963

INFEED CONTROL MECHANISM FOR A CLOSURE LINING MACHINE

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Fig. 1

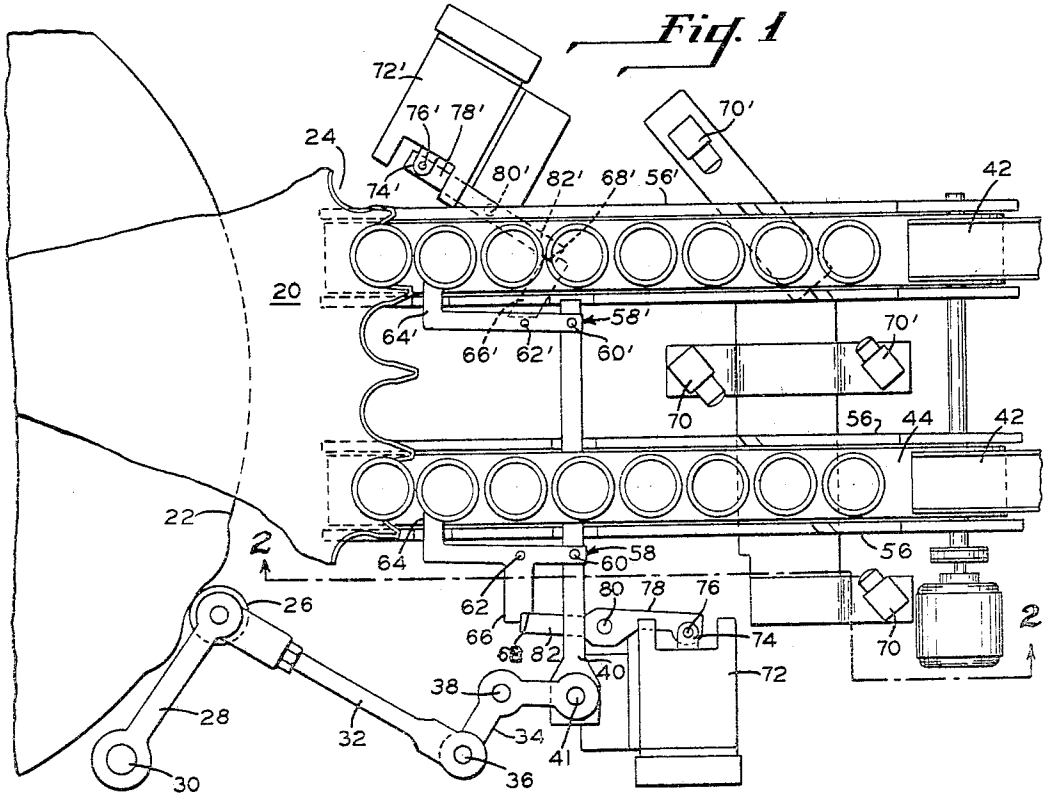
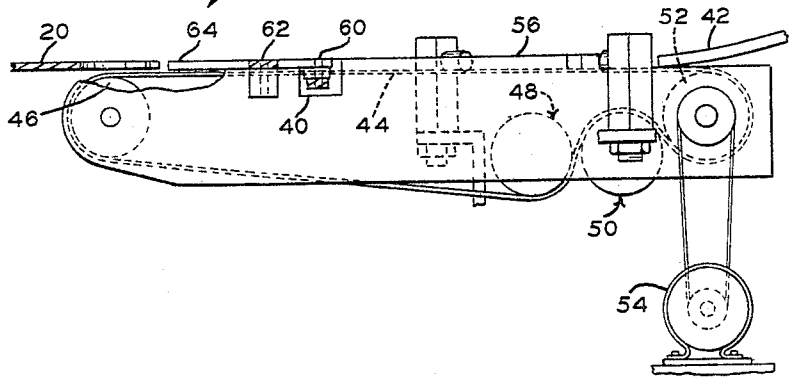



Fig. 2




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Fig. 3

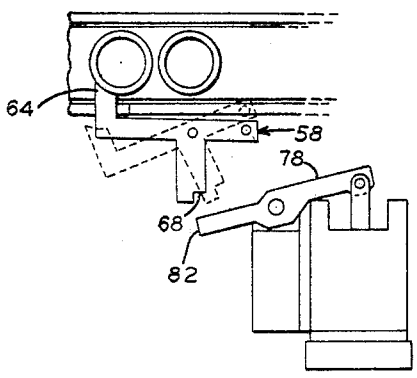
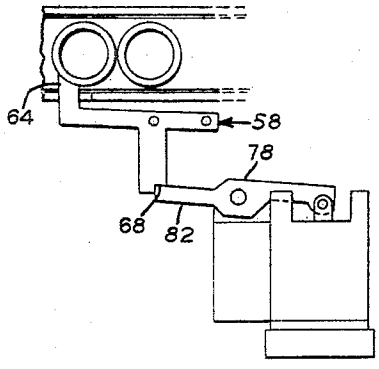



Fig. 4




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# INFEED CONTROL MECHANISM FOR A CLOSURE LINING MACHINE

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U.S. Cl. 198—34 6 Claims

## ABSTRACT OF THE DISCLOSURE

An apparatus for controlling the infeed of closures to a closure lining machine to eliminate jamming. Closures are fed into grooves spaced along the periphery of an intermittently moving circular conveyer. A photocell control circuit senses the lack of closures in the infeed mechanism that supplies the closures to the rotating conveyer. The diminishing of the supply of closures below a certain point prevents the feeding of closures to the conveyer and thereby avoids the improper feeding of closures to the conveyer.

## CROSS-REFERENCE TO RELATED APPLICATION

The particular closure lining machine with its intermittently moving circular conveyer which is being fed by the infeed mechanism of this application is disclosed in the application of Caleb H. Myer, Ser. No. 384,887, filed July 24, 1964, entitled "Method of Forming a Liner on a Closure." This application is directed to an improved form of the distributing means 23 referred to in the above copending application.

## BACKGROUND OF THE INVENTION

### Field of the invention

This invention is directed to an infeed mechanism for supplying closures to the conveyer of a closure lining machine. More particularly, the invention is directed to a photocell control sytem that senses the lack of closures within the infeed mechanism and prevents the feeding of closures until such time as a predetermined number of closures are collected within the infeed mechanism.

## DESCRIPTION OF THE PRIOR ART

The use of a belt conveyer to feed the closures into the groove of the rotating conveyer has been done in the prior art. Prior to the feeding of the closures to the belt conveyer, a conventional orientating device positions the closures so that they will slide down to the conveying belt with the inner surface of the closure facing upward where it will be properly oriented to receive the lining material on the inner face of the closure. The flow of closures from the orientating device tends to be intermittent in nature. Consequently, it is posible that the intermittent flow of closures to the conveyer belt may be such that the conveyer belt will be empty, having fed all of its closures to the rotating conveyer. The sudden flow of closures from the overhead orientating device will cause the leading closure to slide along the conveyer belt and only partly enter the groove of the rotary conveyer when rotation of the conveyer starts. This will crush the closure since it is not fully seated in the conveyer groove. A further problem situation exists when only one or two closures are resting on the conveyer belt preparatory to being fed the rotating conveyer. The frictional contact of the closure with the belt is not



enough to move the closure rapidly forward. A plurality of closures in line must be totaled together to provide enough frictional contact to secure a rapid movement of the closures.

Both of the above situations can be corrected by maintaining a reservoir or quantity of closures on the conveyer belt. This then prevents the leading closure, of a sudden discharge from the orientating device, from sliding along an empty conveyer and entering the groove of the rotary conveyer out of sequence. Also, the reservoir of closures on the conveyer belt provides for rapid movement of the closures toward the grooves of the conveyer due to their total frictional contact with the belt providing a substantial force for moving the closures.

## SUMMARY OF THE INVENTION

The invention is directed to an infeed mechanism for supplying closures to the rotating conveyer of a closure lining machine. The closures are fed from an orientating device by means of a belt conveyer to the closure retaining grooves of the rotating conveyer which carries the closures to the liner placing and forming structures. A control means adjacent the belt conveyer feeds the closures to the rotating conveyer when that conveyer is in position to receive a closure. Normally a plurality of closures are lined up behind the control means awaiting their individual insertion into a groove on the rotating conveyer. A lack of a reservoir of closures, that is, the lack of a plurality of closures lined up on the belt conveyer in back of the control means, may generate a situation that will produce jamming.

This invention utilizes a photocell detection circuit that maintains a proper reservoir of closures on the belt conveyer. When the reservoir of closures on the belt conveyer moves below a set number, the photocell which scans across the belt conveyer is actuated by the lack of a closure and initiates a circuit which locks the control means in position and prevents future feeding of closures to the rotating conveyer. When sufficient closures have been released by the orientating device to again block the photocell path, the control means is unlocked and normal feeding of closures then is permitted.

The maintaining of the reservoir of closures on the belt conveyer then eliminates the possibility that the supply of closures on the belt conveyer is diminished to the point that a sudden discharge of closures from the orientating device can cause a situation which results in damage to the closures.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a top view of the infeed mechanism;

FIGURE 2 is a side view of the belt conveyer structure;

FIGURE 3 is a view of the control means in its unlocked position; and

FIGURE 4 is a view of the control means in its locked position.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGURE 1, the intermittently operated rotary conveyer **20** is operated in the manner described in the above-mentioned copending application, Ser. No. 384,887.

On the underside of the rotary conveyer **20** is fixed a cam **22**, which through appropriate linkage releases the closures for insertion into the grooves **24** of the rotary conveyer. The cam **22** has its raised and lowered areas synchronized with the operation of the rotary conveyer **20** so that the closures are released to the conveyer when

it is in its fixed stationary position ready to receive closures into its peripheral grooves 24. The cam 22 is engaged by a cam roller 26 which is carried by a lever arm 28 secured to a fixed pivot 30. A link 32 is connected with the cam roller and its support so that movement of the cam roller by the raised and lowered areas on the cam 22 will result in reciprocating movement of the link 32. The link 32 is connected to a bell crank 34 by pivot pin 36. Bell crank 34 pivots about fixed pivot point 38. The other end of the bell crank is fastened to a slide 40 by pivot pin 41. Due to the construction of the aforedescribed linkage, slide 40 will reciprocate in response to the contour of the cam 22 as sensed by the cam roller 26.

An orientating device of conventional design feeds the closures down slide 42 onto conveyor belt 44 so that the closures arrive on the conveyor belt with their inner surfaces facing upward preparatory for placement of the closure liners. The endless belt 44 passes around the series of pulleys 46, 48, 50, and 52 which maintain the tension in the belt and drive the belt. Pulley 52 is connected by appropriate means to a drive means 54. Guides 56 retain the closures in alignment while the belt 44 moves the closures from slide 42 towards the groove 24 of the rotating conveyor 20. To provide for higher speed of operation, FIGURE 1 shows two conveyor belts feeding the rotary conveyor. Each conveyor belt feeds an alternate groove in the rotating conveyor. Consequently, each time the conveyor is stopped two closures are fed into two separate grooves on the rotating conveyer.

A control means 58 is provided to permit the release of the closures from the belt conveyer to the groove of the rotary conveyer at the time the rotary conveyer is stopped and in position to receive a closure. The control means 58 is connected to and operated by slide 40. A pivot pin 60 fastens the control means 58 to the slide 40 and provides for the transmission of the reciprocating movement of the slide 40 to the control means 58. The control means oscillates about a fixed pivot point 62 so that a pawl 64 is moved towards and away from the closures. When the pawl 64 is towards the closures, it blocks the closures and prevents the leading closure from moving toward the rotary conveyer under the influence of the belt 44. When the pawl 64 moves away from the closures, the closures are now free to move under the influence of the belt 44 into one of the grooves onto the rotary conveyer 20. The control means 58 is provided with an arm 66 with a notch 68. The control means 58' of the second closure feed structure corresponds generally to the structure of the above-described control means and has similar and related parts indicated by prime members 60–68.

The aforedescribed structure will now provide the orderly and systematic feeding of closures to the rotating conveyer. However, to provide a reservoir of closures, a photoelectrically controlled locking system is used to fixedly position the pawl in its closed position blocking movement of the closures toward the rotary conveyer. As long as a reservoir of approximately six closures is maintained on the belt conveyer, a sudden discharge of closures from the orientating device does not cause jamming and provides a force for rapid movement of the closures.

The pawl locking structure is operated by photoelectric cell system 70 which is positioned on opposite sides of the belt conveyer and is operated only when there is not a closure available to block the pathway between the photocells. Consequently, as long as six or more closures are lined up on the belt conveyer, the photocell structure is not actuated. However, as soon as the number of closures drops below six, a clear pathway exists between the photocell structure and it is actuated.

By conventional electric circuitry, the photocell structure is connected to solenoid 72. The solenoid rod 74 is pivotally fastened by pivot pin 76 to link 78. Link 78 is pivotal about fixed pivot point 80 and has an end 82 which can engage with notch 68 of arm 66 on the control means 58. A corresponding photocell controlled blocking system is shown on the second infeed mechanism with corresponding elements shown by prime numbers.

Referring to FIGURE 3, the control means 58 is shown in its solid lined position when it is blocking movement of the closures and is shown in its dotted line position when it permits the closures to move freely towards the rotary conveyer. The link 78 is shown in its inoperative position since the required number of closures are lined up on the conveyer belt.

FIGURE 4 shows the same structure and its arrangement when an inadequate number of closures is lined up on the conveyer belt. The photocell has caused actuation of the solenoid and moved link 78 into its operative position. Element 82 of link 78 now engages notch 68 of control means 58. The pawl 64 of the control means 58 is now permanently locked in position so that no closures can be fed to the rotating conveyer. The condition shown in FIGURE 4 does not interfere with the reciprocating movement of slide 40 since the pivot pin 60 connecting slide 40 and the control means 58 can be resiliently mounted in a conventional manner to permit the continued operation of slide 42 even when the control means 58 is locked in position.

The aforesaid structure now permits the intermittent feeding or release of the closures into the grooves of the rotating conveyer at the time the rotating conveyer has the grooves in position and stationary. Also a reservoir of closures is maintained behind the control structure which releases the closures to the rotary conveyer so that the closures are moved rapidly and are moved towards the rotary conveyer when it is properly positioned.

Having now described the invention, what is claimed is:

1. Article feeding control apparatus comprising friction feed conveyer means to feed sequentially a plurality of articles, conveyer means positioned to receive articles from said friction feed means when released therefrom, oscillating releasable means to hold a reservoir of articles on the friction feed means and timed to release periodically at least one of said articles in a timed relationship relative to the aforementioned conveyer means, latch means controlling the oscillating releasable means in a stop-feed condition, sensing means positioned adjacent said friction feed means in the vicinity of said reservoir of articles and responsive to the quantity of said articles in said reservoir to operate said latch means, said reservoir of articles being a predetermined number of articles which operate as a means to absorb the impact of a sudden discharge of articles along the friction feed means and operate as a positive pressure on the flow of articles from the friction feed means to the conveyer means, and said sensing means operates to control said latch and said releasable means to positively block passage of articles from said feed means to said conveyer means when said reservoir of articles diminishes to less than said predetermined number of articles and said sensing means permits said latch and releasable means to permit passage of articles from said feed means to said conveyer means only as long as said control means senses the presence of said predetermined number of articles in said reservoir.

2. The apparatus of claim 1 wherein said sensing means is a photocell controlled structure.

3. The apparatus of claim 2 wherein said feeding means includes means for feeding a single line of articles.

4. The apparatus of claim 3 wherein said friction feed conveyer means includes a conveyer belt and guide rails to confine said articles to said single line.

5. The apparatus of claim 4 wherein the oscillating releasable means includes a pawl member removably positioned above said belt in blocking relationship to said articles and freely movable to periodically release said articles unless locked in position by said sensing means determining that less than the predetermined number of articles exists on the feed means.

6. The apparatus of claim 5 wherein said articles are closures.

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