United States Patent [19]

Harrison

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[54] STACK HEIGHT CONTROL USING CUTOFF KNIVES

[76] Inventor: **William B. Harrison,** 8 Ridley Road, Dedham, Mass. 02026

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[52] **U.S. Cl.** **198/59,** 221/14, 221/152, 198/60

[51] **Int. Cl.**.....**B65g 47/06**

[58] **Field of Search** 198/59, 60; 221/14, 18, 19, 221/152

[56] **References Cited**

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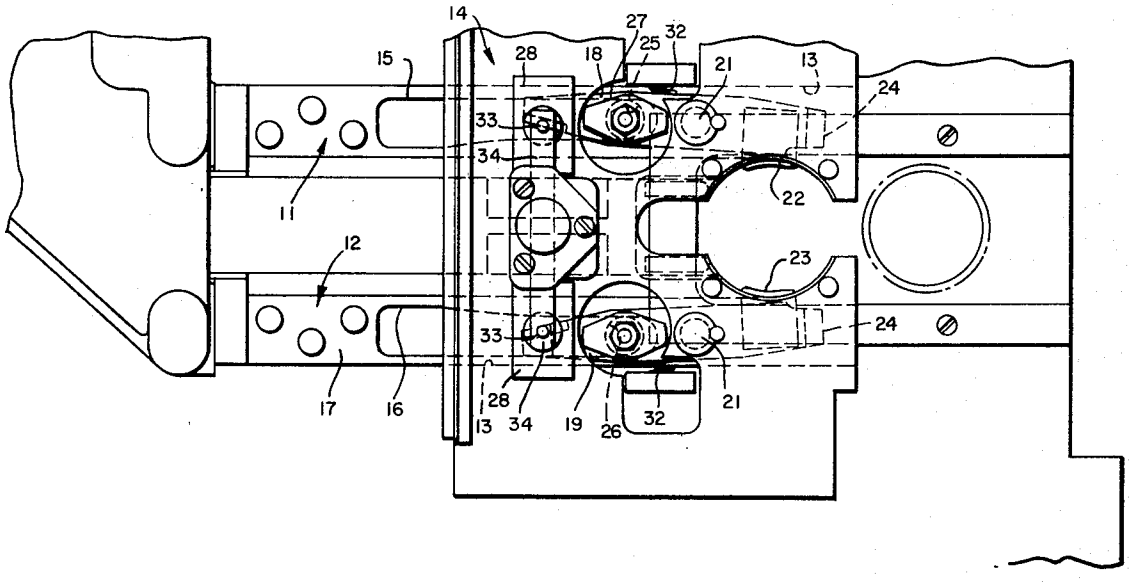
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Primary Examiner—Evon C. Blunk
Assistant Examiner—James Miller
Attorney—C. E. Parker et al.

[57] **ABSTRACT**

In the usual machine which applies sealing compound to a container closure, a special attachment prevents the feeding of the last few container covers remaining in a feed stack, and permits the feed of closures as soon as the stack of closures to be fed is rebuilt to its proper height. The present machine eliminates this entire mechanism, and supports the few remaining closures in the feed stack on the cutoff knives which themselves become disabled when the closures in the feed stack reach the selected low number. Stack bounce and disarranged closures are eliminated by this device.

4 Claims, 3 Drawing Figures



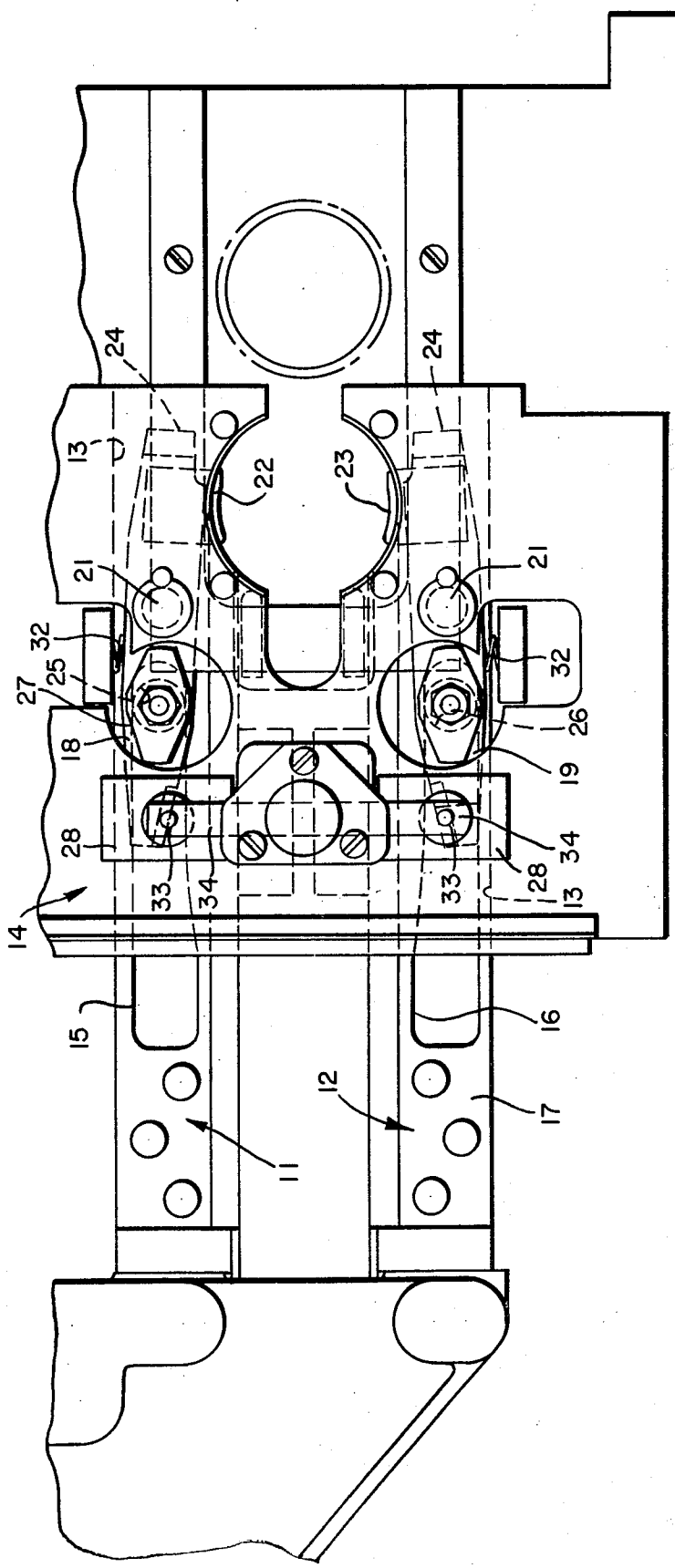


FIG. 1

INVENTOR.
WILLIAM B. HARRISON

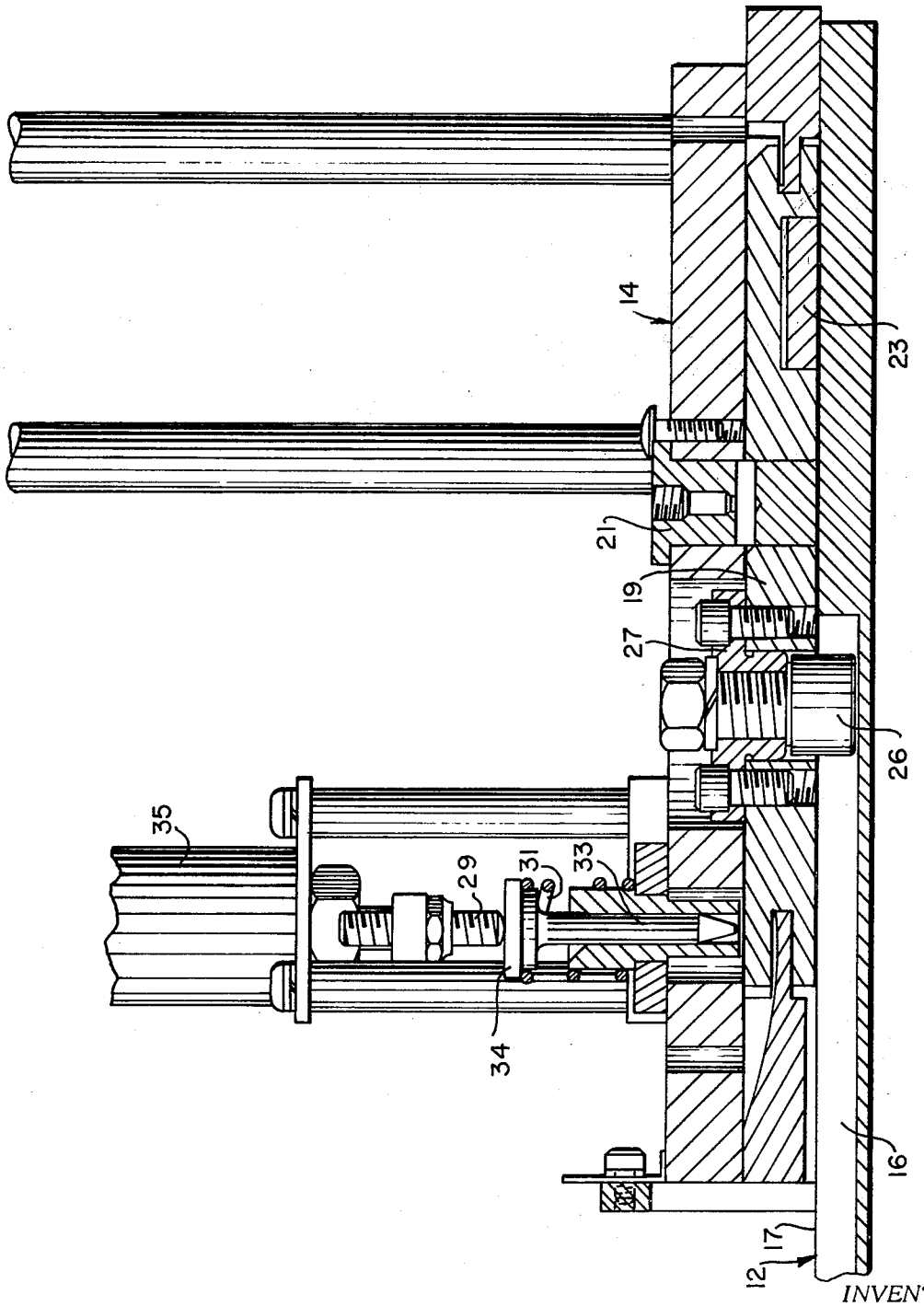


FIG. 2

INVENTOR.
WILLIAM B. HARRISON

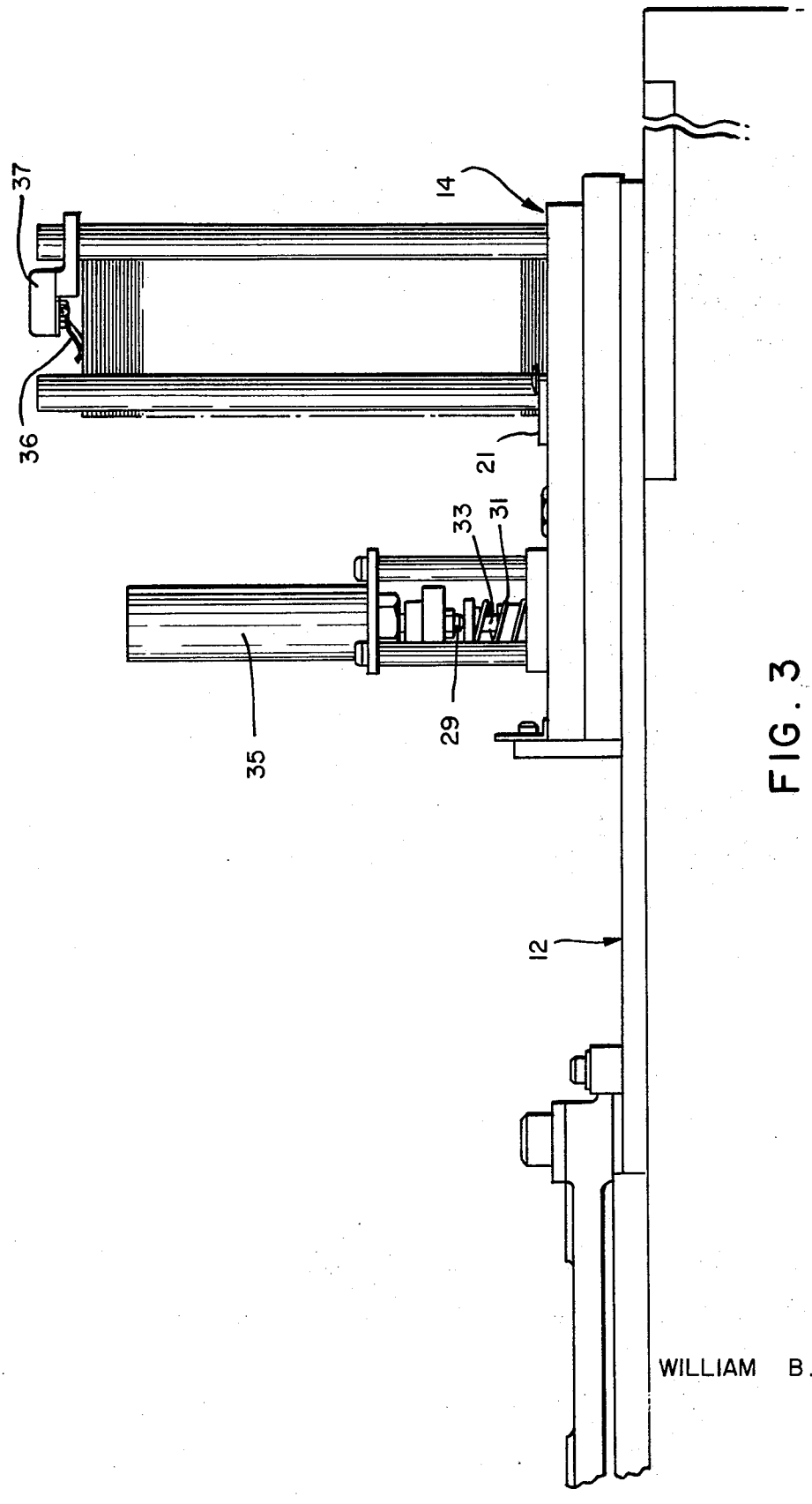


FIG. 3

INVENTOR.
WILLIAM B. HARRISON

STACK HEIGHT CONTROL USING CUTOFF KNIVES

This invention relates to container closure lining machines, and particularly to that type of machine in which the feed of the closures is accomplished by a reciprocating slide. Although the device is particularly designed for operation in association with can ends, it will become obvious that its mode of operation adapts it to the feeding of other types of closures, particularly, press-on caps.

In application Ser. No. 1,209, filed Jan. 7, 1970, by William B. Harrison and Edwin E. Keene, a lining machine was shown in which the cutoff mechanism which separates the lowermost closure of the infeed stack and delivers it to a pushing member which pushes it onto a rotating chuck, disclosed knives which, in contrast to conventional cutoffs attached to the reciprocating slide were attached to cam-driven arms which moved inwardly, transverse to the motion of the slide The movement of those arms was controlled by a cam roller which fitted into an elongated cam track cut in the upper face of the feed bars. That application and the present invention have been assigned to the same assignee. The entire disclosure of the said Harrison and Keene application is incorporated by reference.

The advent of aluminum can ends, particularly the light aluminum end used on fruit juice cans, has exaggerated certain difficulties encountered in the operation of prior machines. When the ends were cut off by knives which were attached to the feed bar, a certain amount of bounce called "stack bounce" took place as the knives engaged the lowermost ends. Stack bounce progressively worsened as the number of ends in the infeed stack became fewer and fewer. When but few ends were left on the infeed, the bounce became so violent that ends were thrown upward and misfed. This occurred with steel ends. Aluminum made matters worse.

To prevent this, it has become customary to put a stack height control on the machine which prevents the feeding of ends to the chuck whenever the number of ends remaining in the stack reaches a predetermined low number. This apparatus has been a separate attachment which, operated either by an air-driven piston or by a solenoid, projected a support beneath the stack of ends when the sensing apparatus, often a photo-electric cell, was activated.

A principal object of the present invention is to simplify the stack height control mechanism and to eliminate any special slide or support. I have found that if means are provided to stop the in-and-out motion of the knives on signal, that the side-operating knives which characterize the said Harrison and Keene invention can act as effective stack supports, and will hold the remaining ends suspended whenever the sensor signals "low stack." As a result, the knives themselves, by remaining in position which interferes with the downward drop of the can end will support the entire stack until a signal is given which reactivates the in-and-out motion of the knives. The result is a considerable simplification of the machine, and some elimination of parts. This, in a machine from which high rates of production are demanded, is a distinct economic advantage, for more parts become accessible, and jams may be cleared more easily.

When the cutoff knives are locked in the "in" or "no feed" position, the slide continues to move back and forth, but as soon as the stack of can ends or closures is replenished and the sensor signals a full stack, the machine recommences its normal operation.

Operation of the device will become apparent from the figures, and as the description proceeds. In the accompanying figures,

FIG. 1 is a top view of the slide feed mechanism of a container closure lining machine,

FIG. 2 is a vertical section of the slide bars, knife-operating lever, and the lockout pin portions of the bounce control mechanism,

FIG. 3 is a side view of the table portion of a lining machine showing the filled feed stack and the height control sensor switch.

The machine, as is conventional, is provided with two reciprocating feed bars, **11** and **12**, driven by a conventional cross-head, and which slide in ways, **13-13**, which are formed in the hopper or bridge, **14**, overlying the bars, **11** and **12**. Each of the feed bars, **11** and **12**, bears a cam track, **15** and **16**, milled into the top surface, **17**. The distinctive feature of the cam track is that its entire outside wall has been cut away so that when necessary the cam roller can pass outside of the normal confines of the track.

Two cutoff knife levers, **18** and **19**, are pivoted at **21—21** on the hopper, **14**, and overlie the reciprocating feed bars, **11** and **12**.

Cutoff knives, **22** and **23**, are fastened adjacent one end, **24—24**, of the bars, **11** and **12**, and so positioned that they may swing into an interference position with the path of the descending container closure.

Cam rollers, **25** and **26**, are fastened in carriers, **27—27**, which are bolted to the bars, **11** and **12**. The free ends, **28—28**, of the levers, **18** and **19**, project rearwardly beyond the cam rollers, **25** and **26**, and into an interference path, with the lockout pins, **33—33**. Pins, **33—33**, are normally raised by compression springs, **31—31**.

Since one wall of both cam tracks, **15** and **16**, has been cut away, the levers, **18** and **19**, carrying the knives, **22** and **23**, are pushed into contact with the inner cam track wall by the push springs, **32—32**, which push the knife levers into the cutoff and closure support position. Essentially, both knives move inward, and interfere with the downward free fall of a closure.

The lockout pins, **33—33**, which prevent the knife levers, **18** and **19**, from moving, are suspended from a small bridge, **34**, which in turn is depressed by the plunger, **29**, of a small electropneumatic cylinder, **35**. The pins are returned to released position by the springs, **31—31**. Accordingly, when the electropneumatic cylinder, **35**, is energized, bridge, **34**, and the two lockout pins, **33—33**, are depressed, and immobilize the knife levers, **18** and **19**. Electropneumatic cylinders are dependable and conventional units, but electrically operated solenoids which push a plunger downwardly are satisfactory. The sensor mechanism may be any of various commercial types, one of the simplest being merely a micro switch operated by a contact arm, **36**.

Movement of arm, **36**, which is hinged to the switch, **37**, will cause an electropneumatic valve to open, push the lockout pins, **33—33**, dowardly, and lock the knife lever arms, **18** and **19**, into inoperative position when the level of the closures drops below the sensor.

As a result, the present improvement on the Harrison and Keene mode of cutoff can, with the modification of the cam track, not only achieve nondestructive low velocity separation of the ends, but the entire special mechanism which was necessary to prevent stack bounce in prior slide-feed type lining machines is no longer necessary. A simple lockout arrangement accomplishes the stack bounce control with much fewer parts and with greater simplicity.

I claim:

1. A container closure lining machine having a rotating chuck, a hopper member, reciprocating slide feed means including spaced parallel feed bars, means to remove container closures from a feed stack and place closures successively on said rotating chuck, the same machine being characterized by

a. one-sided cam tracks formed in each of the said parallel feed bars,

b. spring pressed arms pivoted on the said hopper member,

c. cam rollers affixed to the arms and bearing against said cam track,

d. inwardly facing closure cutoff knives attached adjacent the ends of each arm,

e. pins adapted to be projected into the path of each cutoff arm adjacent its remote end,

f. a stack height sensor arranged to activate said pins whenever the height of the stack of closures reaches pre-determined low limits,

whereby with each reciprocation of the machine a closure is cut off and fed to the chuck until a pre-determined low number of closures remains in the said feed stack, whereupon the remaining closures are supported by the knives which then remain motionless.

2. A container closure lining machine as claimed in claim 1, wherein the sensor controlling the operation of the said cutoff mechanism has a contact arm bearing on the stack of closures.

3. A container closure lining machine as claimed in claim 1, wherein the means to project the lockout pins which disable the knife levers is a solenoid.

4. A container closure lining machine as claimed in claim 1, wherein the means to project the lockout pins which disable the knife levers is an electropneumatic mechanism.

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