

- [54] **CUTOFF MECHANISM FOR CONTAINER CLOSURE LINING MACHINES**
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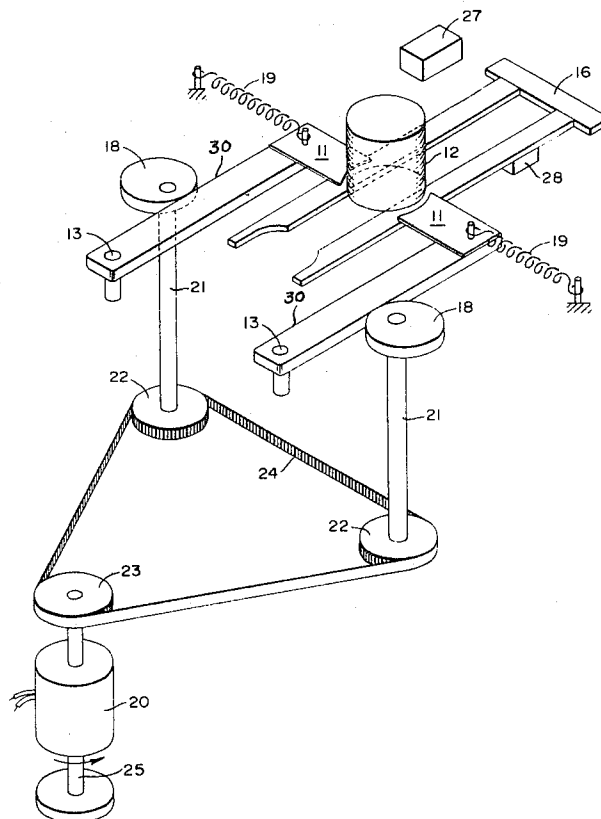
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[57] ABSTRACT

An improved cutoff mechanism for container closure lining machines having reciprocating slides which feed closures to a rotary chuck. The knives which cut off a closure from the infeed stack and drop it on to the work surface, to be fed to a chuck by fingers on the slide, move transversely to the slide axis of the machine. Compression or tension springs push the knives outwardly. Cams force the knives into cut-off position. Alternatively, the cams may carry a slot cam track, and the knives carry a cam roller.

2 Claims, 2 Drawing Figures



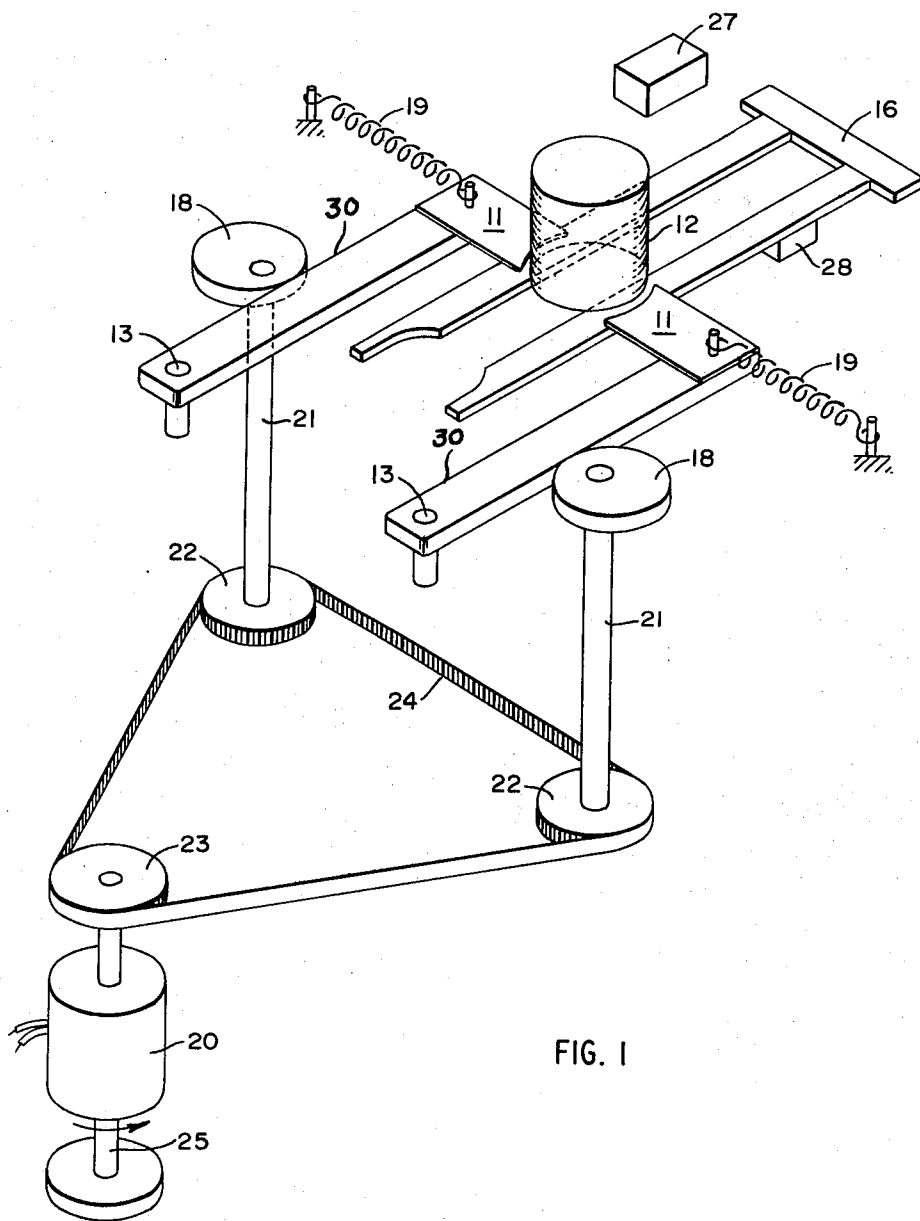


FIG. 1

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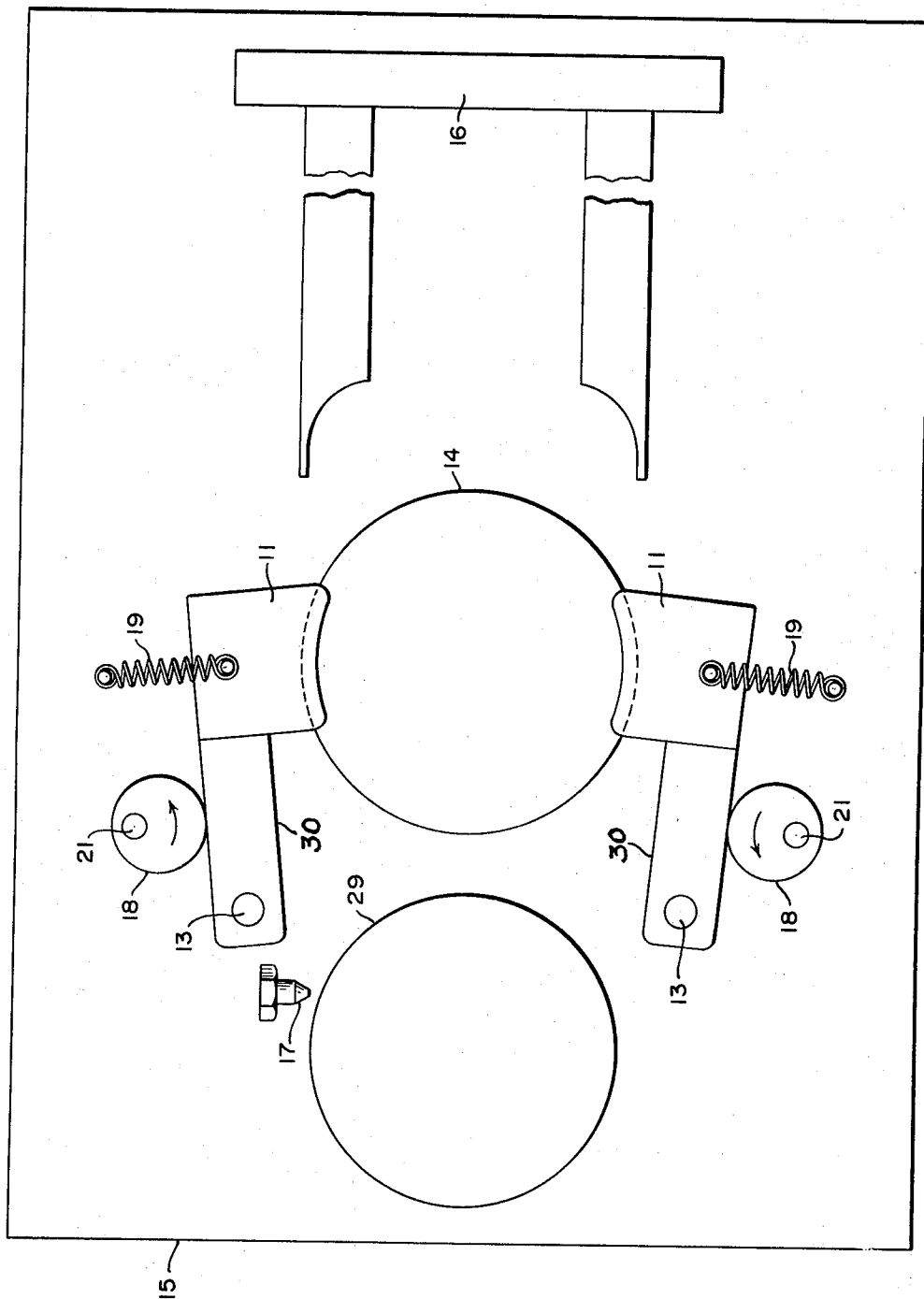


FIG. 2

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CUTOFF MECHANISM FOR CONTAINER CLOSURE LINING MACHINES

This invention relates to a cut-off device for container closure lining machines. Although it will become evident that this new type of cut-off can be used with screw and lug type container closures, the device has particular value in the feeding of can ends and will be so described.

One common type of can end lining machinery is the reciprocating slide machine. In this machine, a stack of unlined can ends is supported on a slide having knives which cut off the lowermost closure at each reciprocation, drop it through a gap in the slide to the machine's work surface, and push it ahead and onto a rotating chuck where the closure is supplied with a ring of liquid gasketing material. Then the can end is pushed ahead and tucked beneath a stack of lined ends at the delivery end of the machine. In some machines belt take-offs are substituted for the delivery stack.

As the demand for speed in lining machinery has risen, the velocity with which the slide approaches the stack of can ends necessarily has been increased because the forward movement must be at least more than twice the diameter of the can end. In consequence, in modern high-speed machines the velocity at which knives engage the can end is so high that should there be the slightest interference with the movement of the closure occasioned, e.g., by a burr or a rough edge or even a slightly bent end, the knives on the slide hit the end so violently that the end is bent, or at the very least the curl is flattened. When this happens, a jam occurs which can be cleared only if the machine is shut down and the bent end is released and removed. This is costly, not only in production time but in labor as well.

It is an object of this invention to avoid damaging the can ends because of the impact of the knives, and to feed can ends freely to the pusher fingers of the slide despite the very slight defects which in the past have caused trouble in feeding. This is accomplished by removing the knives from the slide and causing the end to be cut off, not by the linear forward motion of the slide but by a very short-distance transverse motion which operates in timed relation to the slide movement. The knives can approach the closures so slowly and gently that there is no danger of distorting the closure or bending its rim.

FIG. 1 is a perspective but diagrammatic representation of the improved cut-off mechanism. The lining machine itself is not shown.

FIG. 2 is a top view of the hopper portion of the machine showing the relation and position of the cut-off knives and cams. The lower half of the drawing shows the knife, cam, and slides in the cut-off position.

The cut-off knives, 11, are located on either side of the stack, 12, of the can ends. The knives 11 having extended arms 30, are pivoted at pivots, 13—13 which are attached to the work surface 15 near "hopper" 14 so called because the can ends feed downwardly through an opening of a size larger than a can end. The word "hopper" has been used since, on commonly used machines, it is the name by which the part overlying and guiding the slide bars is known. It should be understood that this part does not necessarily have to be a hopper through which the closures are fed, but may be any bridge overlying the feed bars which will support and guide the pivoted knives.

The knives 11 swing inwardly along the radius which is tangent to the center line of the can end stack 12 and cut off the can ends in timed relation to the reciprocating motion of the slide 16 since the knives are driven inwardly by the eccentric rotary cams, 18—18. The knives 11 are forced to ride on the cams 18 by the compression springs 19—19. The cams 18 are fastened to the shafts 21—21 which in turn are driven by the pulleys 22—22 by the drive pulley 23, all of which are looped by the cog belt 24.

Different models of lining machines have various drive assemblies. The specific member which turns the drive shaft 25 will vary to accord with machine design. Drive shaft 25 must, however, be arranged to rotate in such timed relation to the movement of the slide 16 that the cams will rotate and force the knives 11 into cut-off position in the appropriate position of slide 16.

One of the difficulties encountered in this type of can end lining machinery is that the number of can ends in the in-feed stack may become so low that there is not enough downward pressure to keep the ends in a proper cut-off position. Sometimes low stacks cause misfeeds and a jam ensues.

In the present machine, this disaster is avoided by a device which stops the operation of the knives whenever the height of the infeed stack becomes so low that the can ends would leave the machine before a fresh supply can be placed on the infeed. This is accomplished by interrupting the shaft 25 with an electric clutch 20 which is operated by a sensor 27 controlled by the height of the infeed stack. The sensor can be merely a sensitive switch which interrupts the circuit feeding the electric clutch when the stack height drops to a critical level.

The interruption of the electric clutch circuit may also be arranged to disable the circuit which operates the electropneumatic lining machine nozzle 17 (FIG. 2). In the most common arrangement, the sensor 27 which opens the circuit to the clutch 20 (and sometimes the circuit to the electropneumatic compound nozzle as well), is a photoelectric cell which when the light beam strikes the sensor 27, opens the circuit to the clutch 20. Normally, the light beam focused on the sensor is blocked by the stack of ends but it will shine across a "low stack" and open the electric clutch.

To pick up the synchronism of cam movement after the machine has been shut down by the operation of the sensor, a reed switch 28 is attached either to the hopper or to the work surface of the machine in such a position that the feed bars will throw switch 28 when the bars are in position to accept the can end, and feed it to the chuck 29 without jamming. Closing the switch 28 causes the immediate engagement of the clutch 20. Consequently, the cams 18—18 rotate, the can end is dropped into the proper position and pushed forward onto the rotary chuck 29. Clutch 20 is a commercial unit and includes a spring-actuated braking disc which stops the rotation of the upper portion (above the clutch) of shaft 25 as soon as current through the clutch is interrupted.

The result of the operation of the stack height control is that the cams cease to operate as soon as the sensor is activated and only begin to operate when sufficient can ends are in place to disable the sensor 27 either by interruption of the light beam by the stack of ends, or because the stack now makes contact with the mechanical sensor.

Instead of a movement of approximately 5 ½ inches, if 211 can ends are to be lined, the very small inward movement of the knives approximately one-tenth of an inch on each knife, advance the knives sufficiently to free the can end, but the speed of inward motion is but one-twelfth or even less of what it otherwise would be were the knives attached to the feed bars.

As a result, the output of the machine is in no wise affected. The machine produces the same number of lined can ends per minute, but the feed becomes much more dependable. Most importantly, the ends suffer no damage and this, since the advent of the aluminum can end, because of the softness of the metal, has become a serious problem in the lining operation. Aluminum ends are now handled without damage.

I claim:

1. In a container closure lining machine equipped with main driving means, wherein unlined closures are transported from an infeed stack to a rotary chuck, and from the chuck to a lined closure delivery station by the reciprocating motion of a feed slide bar having feed members engaging the said closure, that improvement which includes:

a. arms pivoted on the machine arranged to move

about the work surface,

b. cut-off knives directed inwardly attached to the free end of said arms and placed so that the center of said knives moves inwardly along a radius tangent to the center line of the said infeed stack,

c. cams operating on a plane above the plane of the work surface of the machine, arranged to bear on the vertical margin of said arms,

d. means to urge the arms into continuous contact with said cams,

e. means to rotate the cams in synchronous relationship to the motion of the said feed slide bars,

f. clutch means to interrupt selectively the rotation of the cams without affecting the main machine driving means, and thereby stop the action of the knives response to a signal controlled by the height of the stack of closures in said machine, and

g. means to re-engage the said clutch and permit closure cutoff only when the said feed slide is in position to receive and transport the said can end.

2. The improved cut-off mechanism as claimed in claim 1 wherein the cams are rotated by shafts driven by a cogged belt.

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