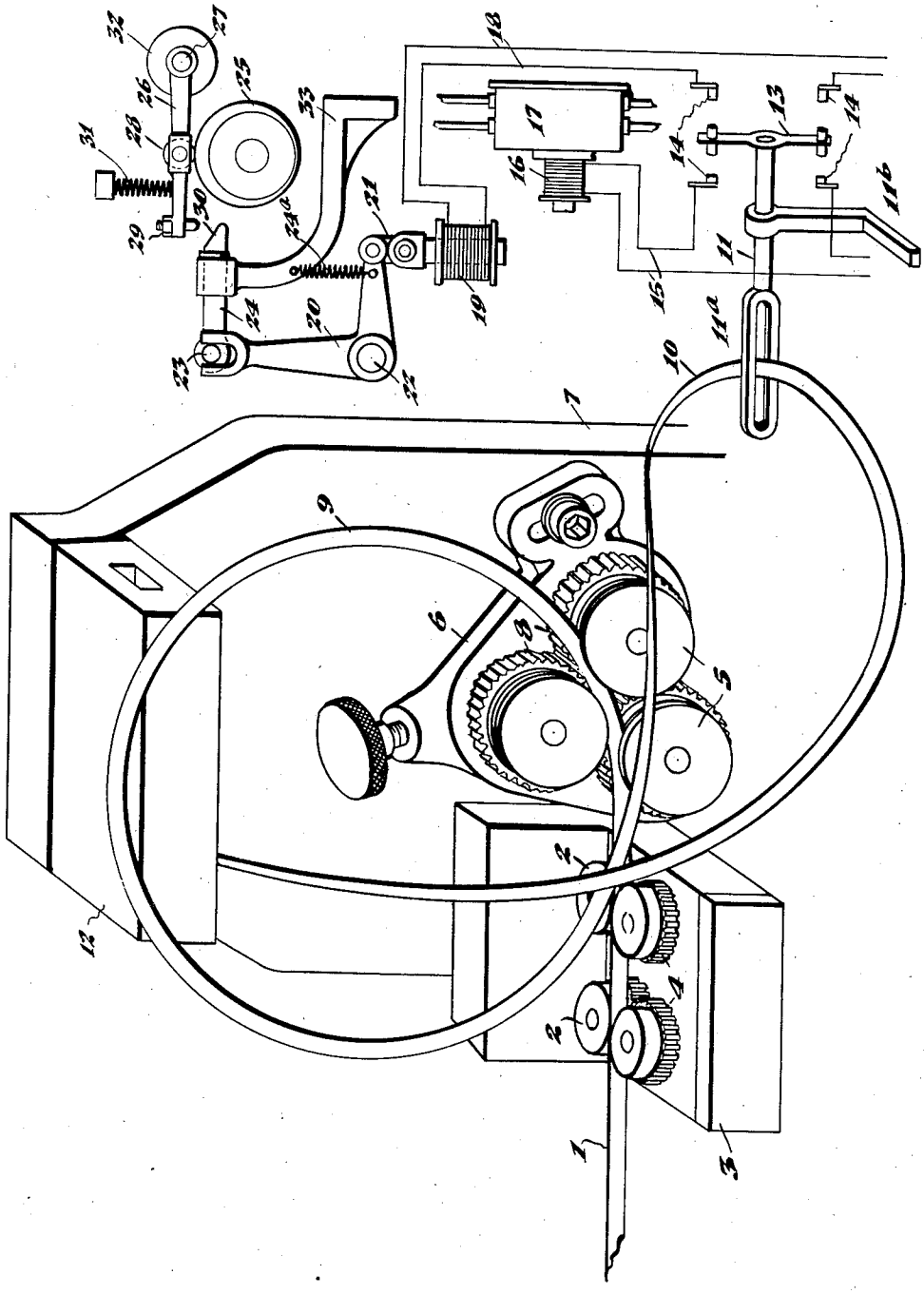
Aug. 18, 1942. V. F. ZAHODIAKIN 2,293,526

AUTOMATIC FEED CONTROL FOR METAL FORMING MACHINES

Filed June 23, 1939



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Patented Aug. 18, 1942 2,293,526

UNITED STATES PATENT OFFICE

2,293,526

AUTOMATIC FEED CONTROL FOR METAL FORMING MACHINES

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Application June 23, 1939, Serial No. 280,835

2 Claims. (Cl. 271—2.3)

This invention relates to machinery for bending strip steel to form circular articles such as piston rings. More particularly, the invention is directed to apparatus for controlling the machinery.

In forming piston rings of the type disclosed and claimed in my Patent 1,957,927, issued May 8, 1934, a ribbon of steel is fed into the machine between feeding and coiling rollers for forming the ribbon of steel into circular form. The continuous coil strip is then delivered into a die box where a multiplicity of slides or dies operate on the strip to form the special contour or shape of the ring.

Now it is important that the feed of the strip be regular, that is to say, the passage of the strip through the coiling rollers and the die box must be at the same rate. If the delivery is retarded at the coiling rollers, drag takes place and the slides or dies will be damaged or the strip broken. Normally a fair amount of slack should be maintained between the coiling rollers and the die box.

The present invention is concerned with the provision of a device acting responsively to take-up of the slack to stop the machine automatically. Also it is provided that the device is responsive to too much feed, that is, too much slack will slow down the feed.

Accordingly, the invention resides in an apparatus automatically effective for controlling the feed whether it be by way of adjusting the feed or stopping the feed to permit hand adjustment. Otherwise stated, the invention consists of mechanism adapted to be moved for circuit controlling purposes upon increase or decrease in the amount of slack or loop in a strip of material passing from one forming unit to another regardless of the nature of the article being formed.

Other objects and certain advantages will be more fully apparent from a description of the drawing in which:

The figure is a perspective view showing the control device associated with the slack of the strip of material and illustrating diagrammatically the feed controlling means.

Referring to the drawing, the strip of material is indicated at 1. It enters the machine between feeding and straightening rollers 2 mounted on a bracket 3 and driven by gears 4. The strip then passes edgewise between three coiling rollers 5. These rollers are mounted on an adjustable bracket 6 carried by the frame 7 and are driven by gears 8. The rollers 5 are grooved and form the strip into flat coils, one of which is indicated at 9. The strip is then looped as at 10 to provide a slack portion before it enters the next forming unit 12.

A link 11 having a longitudinally slotted end 11*a* traversed by the looped portion 10 is slidably mounted in a bracket 11*b*. The link carries a contact closing element 13 adapted to connect the contacts 14. One set of contacts 14 is inserted in one of the leads 15 extending to the magnet 16 of a magnetically opened motor control switch 17. The other set of contacts is inserted in one of the leads 18 extending to the solenoid 19. The solenoid 19 is operatively connected to one arm of a bellcrank by means of a link 21. The bellcrank is pivoted from a stud 22 and its other arm provides a bifurcated end engaging a pin 23 in the end of an interrupter slide 24 mounted in a bracket 33. The interrupter is held back normally by means of a tension spring 24*a*.

A cam 25 is driven in synchronism with the mechanism and is effective through the lever 26 for feeding the strip by means of rollers 2 and 5. The lever 26 is fixed to a shaft 27, which shaft conveys the feeding motion through an overrunning clutch 32. The lever carries a roller 28 intermediate its ends engaging the cam on the outer end of the lever. A spring 31 holds the roller against the cam. An adjustable contact screw 29 is provided extending toward the inclined cam end 30 of the interrupter slide.

Thus when the magnet 19 is energized due to the occurrence of too much slack, the cam surface 30 is moved under the contact screw 29 and part of the feeding stroke is interrupted thus slowing down the feed. As soon as the loop decreases sufficiently the loop will be effective for pulling the link 11 to the left and breaking the circuit to the feed slowing mechanism.

Having described my invention, I claim:

1. A control apparatus for controlling the feed of a strip of material between forming mechanism responsively to variation in the slack between forming units; comprising, a contact closing member actuated by engagement with the slack portion of the strip, one set of contacts for stopping the feed when there is a decrease in the amount of the slack portion, a second set of contacts, and a feed slowing mechanism controlled by said second set of contacts, the contact actuating member adapted to contact either of said sets of contacts and having a neutral position to which it returns after operation of said feed adjusting mechanism.

2. An automatic mechanism for controlling the amount of slack in a strip passing from one forming unit to another; comprising, a slotted link traversed by a loop of said strip having no tension therein, a contact closing element carried by said link, sets of contacts engaged by said contact closer upon actuation thereof in either direction, a feed controlling unit actuated by the circuit controlled from one set of contacts, and a feed stopping switch actuated by the circuit controlled by the other set of contacts.

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