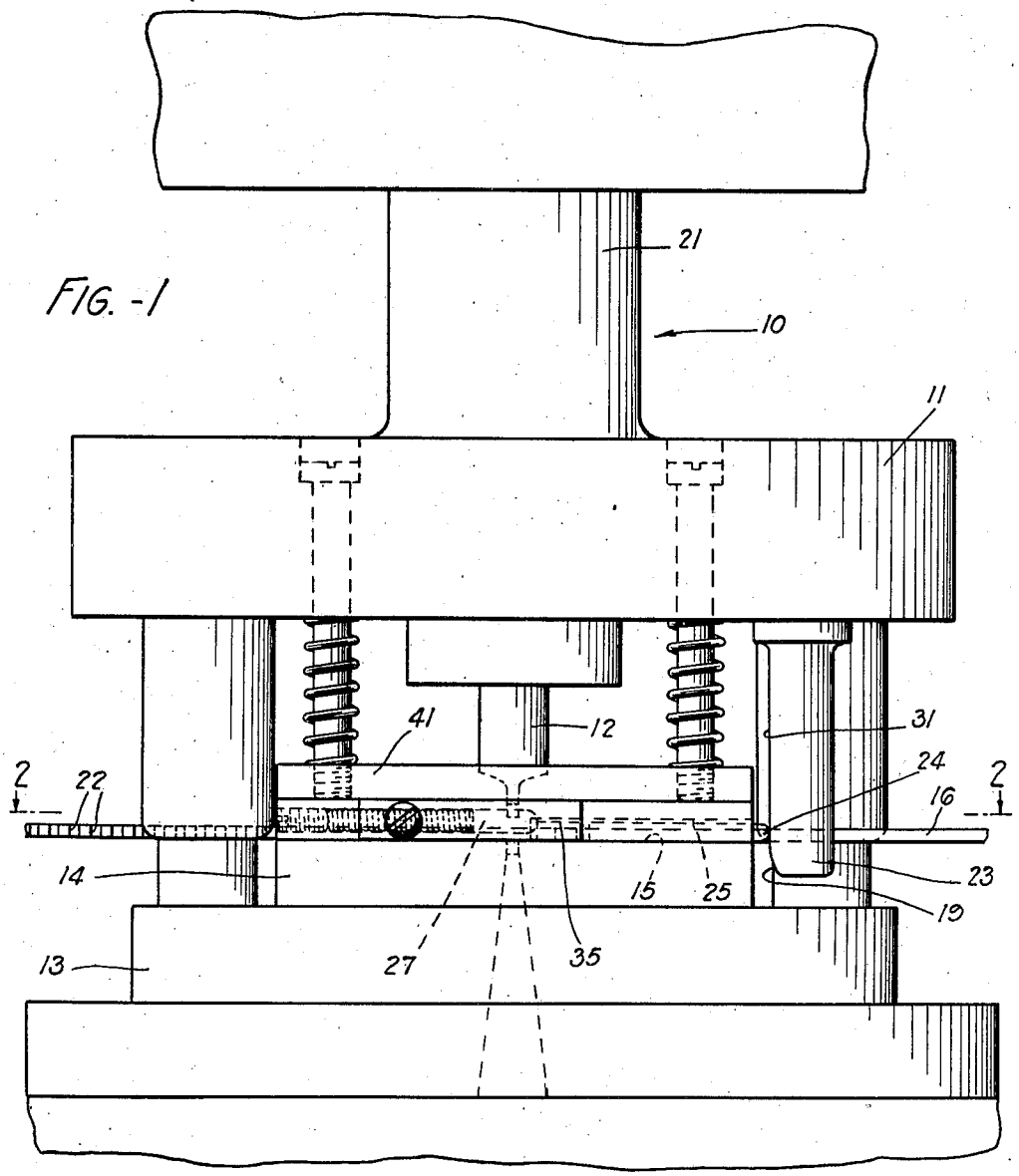
Oct. 7, 1947. A. DEICHMILLER 2,428,698

APPARATUS FOR FEEDING MATERIAL

Filed Feb. 6, 1945 3 Sheets-Sheet 1

FIG. -1



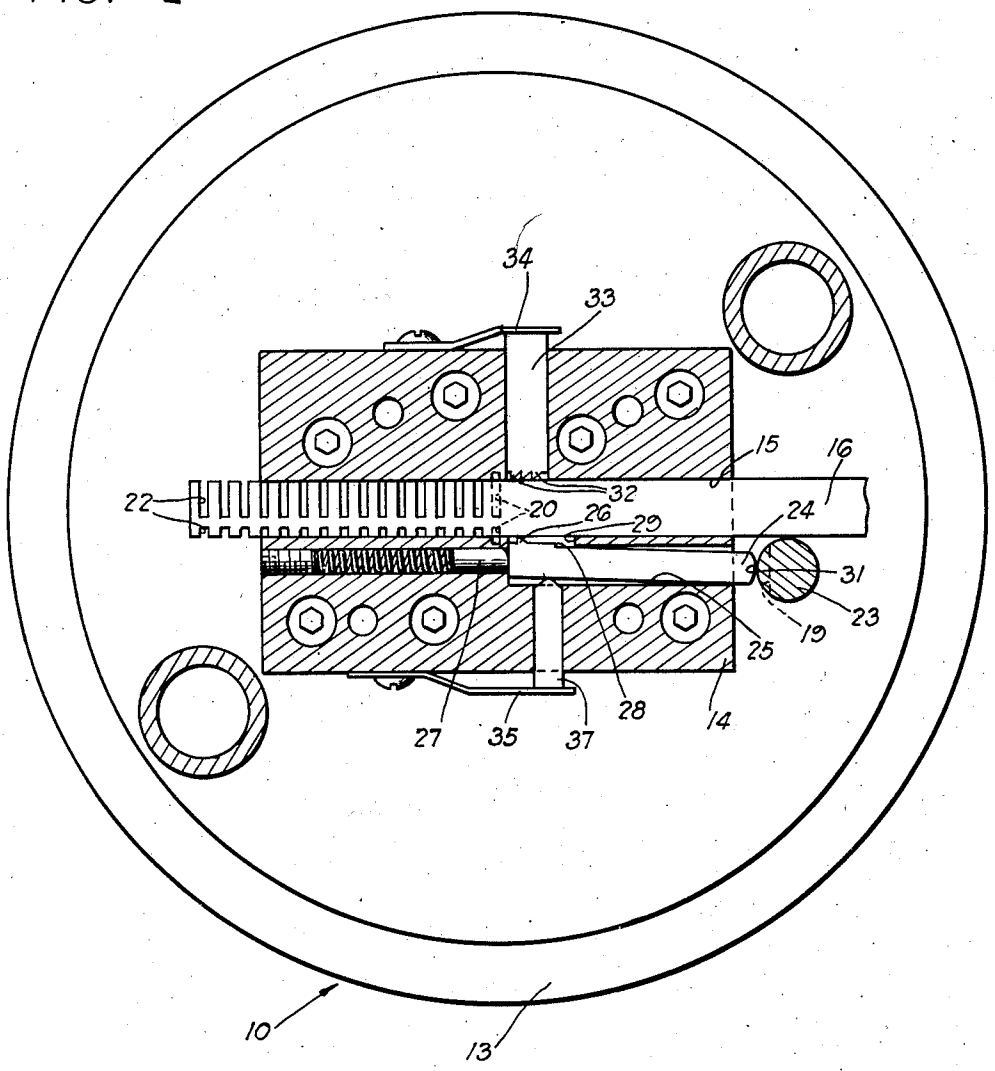
INVENTOR
A. DEICHMILLER
BY
ATTORNEY

Oct. 7, 1947. A. DEICHMILLER 2,428,698

APPARATUS FOR FEEDING MATERIAL

Filed Feb. 6, 1945 3 Sheets-Sheet 2

FIG. - 2



INVENTOR
A. DEICHMILLER
BY
ATTORNEY

Oct. 7, 1947. A. DEICHMILLER 2,428,698

APPARATUS FOR FEEDING MATERIAL

Filed Feb. 6, 1945 3 Sheets-Sheet 3

FIG. - 3

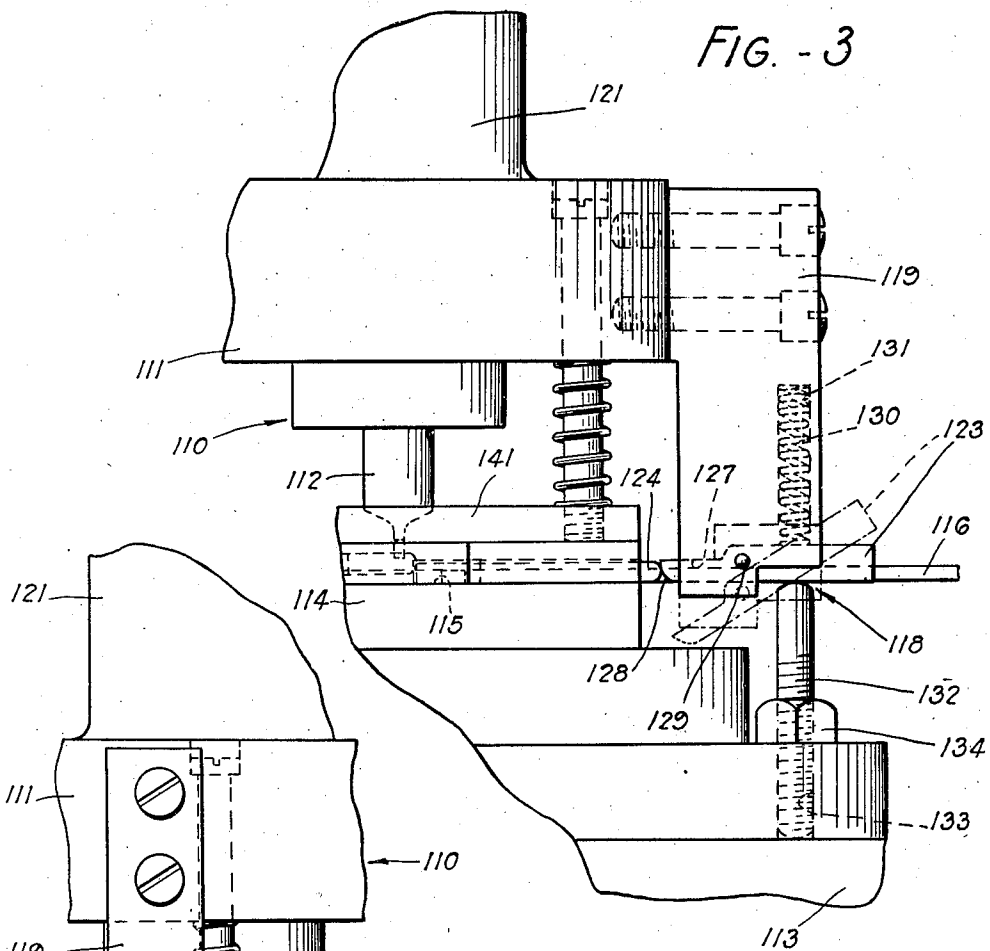
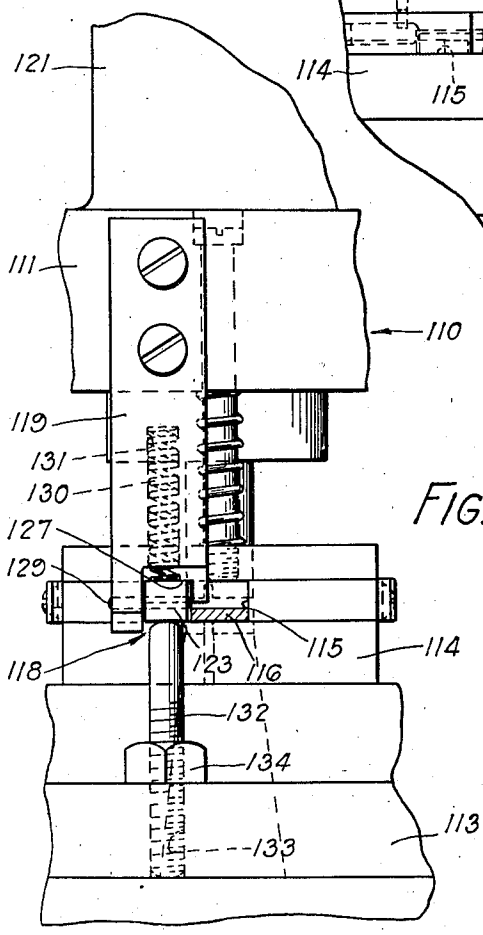


FIG. - 4



INVENTOR
A. DEICHMILLER
BY
ATTORNEY

Patented Oct. 7, 1947

2,428,698

UNITED STATES PATENT OFFICE

2,428,698

APPARATUS FOR FEEDING MATERIAL

Alwin Deichmiller, Pasadena, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application February 6, 1945, Serial No. 576,463

7 Claims. (Cl. 164—117)

1

This invention relates to apparatus for feeding material and more particularly to apparatus for feeding strip material to punch presses.

In the manufacture of articles from relatively thin strips of material wherein it is necessary to notch the edges of the strips along the entire lengths thereof, it is often advantageous to form the notches by a punch press. Heretofore, no mechanism has been provided which is suitable for feeding uniformly and automatically thin strips of material to a punch press so that the punch press can punch notches in the strips along the entire edges thereof.

An object of the invention is to provide new and improved apparatus for feeding material.

An apparatus forming one embodiment of the invention comprises a pusher slidably mounted with respect to the die block of a punch press for engaging the edge of a strip of material to be punched, means for sliding the pusher to advance a strip engaged thereby, and means for holding the strip against movement in one direction relative to the punch press.

A complete understanding of the invention may be obtained from the following detailed description of apparatus forming specific embodiments thereof, when read in conjunction with the appended drawings, in which

Fig. 1 is a fragmentary, side view of an apparatus forming one embodiment of the invention;

Fig. 2 is a horizontal section of the apparatus taken along line 2—2 of Fig. 1;

Fig. 3 is a fragmentary, side view of an apparatus forming another embodiment of the invention, and

Fig. 4 is a fragmentary, front view of the apparatus shown in Fig. 3.

Referring now in detail to the drawings, there is shown in Fig. 1 a punch press 10 of suitable construction, which includes a reciprocable head 11 carrying a punch 12 and a base 13 on which a die block 14 is mounted. The die block is provided with a guide channel 15 along which a short and thin strip 16 of material may be advanced to position the strip between the punch 12 and dies 20—20 formed in the die block 14. The head 11 can be reciprocated toward and away from the base 13 by a ram 21 to move the punch 12 alternately into and out of operative engagement with the dies 20—20, whereby a pair of opposed notches 22—22 is formed by the punch and the dies along the edges of the strip 16 at each reciprocation.

When the head 11 is moved toward the base 13, a cam surface 19 formed on the lower end of a pin 23 secured to the head moves into engagement with the projecting end of a pusher 24, which is slidably mounted in an L-shaped slot 25 formed in the die block 14. The cam surface of the pin moves over the end of the pusher as

2

the pin moves downwardly and slides the pusher to the left, as viewed in Fig. 1, against the action of a spring-pressed plunger 27, which normally forces a shoulder 28 formed on the pusher into engagement with a stop 29 formed on the die block. When the pusher 24 is moved to the left, a tooth 26 (Fig. 2) of a hard wear resisting material, such as "Stellite," formed on the pusher engages the edge of the strip at a point thereon closely adjacent to one of the dies 20—20 and moves the strip a predetermined distance to the left. The head then continues to move toward the die and the projecting end of the pusher is engaged by a straight portion 31 of the pin 23, after which the pusher is moved no farther to the left, but remains stationary as the head continues to move toward the die block.

After the pusher 24 is moved completely to the left and is engaged by the straight portion 31 of the pin 23, the strip 16 is held stationary by the tooth 26 and teeth 32—32 (Fig. 2) formed on a plunger 33, which is pressed against the edge of the strip 16 by a leaf spring 34 bolted to the die block 14. A leaf spring 35 presses a plunger 37 against the pusher 24, whereby the tooth 26 is maintained against the edge of the strip 16.

After the strip 16 has been moved to the left, it is held by the plunger 33 and the pusher 24, and as the head 11 continues its movement toward the die block 14, a conventional stripper 41 (Fig. 1) moves into engagement with the strip 16, after which the punch 12 punches out a pair of the opposed notches 22—22 in the strip. While the punch 12 is in engagement with the strip, the strip is held securely against movement in the channel 15 by the stripper, the plunger 33 and the pusher 24.

In the operation of the apparatus described hereinabove, the ram 21 moves the head 11 toward the die block 14, whereby the strip 16 is moved to the left, as viewed in Fig. 2, the length between adjacent ones of the notches 22—22. The strip is securely held in that position, and the stripper 41 and the punch 12 successively engage the strip. The punch then punches out the notches while the strip is held securely by the pusher 24, the plunger 33 and the stripper.

The ram 21 then acts to draw the head 11 upwardly, as viewed in Fig. 1, whereby the punch 12 is drawn out of the newly formed notches, the stripper 41 is moved away from the strip 16 and the pin 23 is moved out of engagement with the projecting end of the pusher 24. As the pin moves away from the pusher, the spring-pressed plunger 27 (Fig. 2) presses the pusher back to its starting position, that is, to a position in which the shoulder 28 formed on the pusher engages the stop 29 formed on the die block 14. As the pusher is moved to its starting position, the tooth 26 slides along the strip and does not move the strip,

which is held stationary by the teeth 32—32 on the plunger 33. The operation described hereinabove then may be repeated until the entire strip is notched.

Since the tooth 26 of the pusher 24 is positioned closely adjacent to the dies 20—20, almost the entire length of the strip can be moved by the pusher to positions below the punch 12 and over the dies 20—20. Consequently, very short strips of material may be automatically fed almost their entire lengths between the punch and the dies. Even though the pusher and the plunger 33 are positioned closely adjacent to the dies and the path of the punch, the pusher and the plunger lie in the same plane as the strip 16, and, therefore, do not interfere with the notching operations while feeding and holding the thin strip securely. Since the pusher engages the edge of the strip, the pusher does not cause buckling of the strip when the pusher moves the strip.

An apparatus constituting an alternative embodiment of the invention is disclosed in Figs. 3 and 4. This apparatus includes a punch press 110 having a head 111 and a base 113. A die block 114 having therein a channel 115, a punch 112 and a stripper 141 are identical with the die block 14, the punch 12 and the stripper 41, respectively, of the apparatus shown in Figs. 1 and 2. All the other elements of the apparatus shown in Figs. 3 and 4, except an actuating mechanism 118, are identical with the elements of the apparatus shown in Figs. 1 and 2.

The actuating mechanism 118 (Figs. 3 and 4) takes the place of the pin 23 and includes an arm 119 bolted to the head 111. A cam lever 123 having a lobe 128 formed on an end thereof is pivotally mounted by a pin 129 on the lower end of the arm. A compression spring 130 mounted in a socket 131 formed in the arm urges the cam lever in a clockwise direction, as view in Fig. 3, which movement of the cam lever is limited by an abutment 127 formed on the arm.

A stop 132 is threaded into a bore 133 formed in the base 113 and has a locking nut 134 positioned thereon. The stop is positioned directly in the path of the outer end of the cam lever 123. When the head 111 is moved by a ram 121 toward the base 113, the cam lever strikes the stop, whereupon the cam lever is rotated rapidly in a counter-clockwise direction, as seen in Fig. 3, and the lobe 128 formed on the cam lever is moved rapidly past the projecting end of a pusher 124, which is identical with the pusher 24 shown in Figs. 1 and 2.

In the operation of the last-described apparatus, the head 111 is reciprocated toward and away from the base 113. As the head is moved toward the base, the lobe 128 is moved into engagement with the projecting end of the pusher 124, the cam lever 123 strikes the bolt 132 and is rotated in a counter-clockwise direction, as viewed in Fig. 3. When the cam lever is rotated, the lobe 128 rapidly moves the pusher 124 to the left a predetermined distance, whereby a thin strip 116 of material is moved the same distance to the left.

As the head continues to move downwardly, the stripper 141 moves into engagement with the strip 116, the cam lever is pivoted further in a counter-clockwise direction, whereby the lobe 128 is moved out of engagement with the pusher 124. The pusher 124 then is urged to the right to the position it occupied at the start of the operation. The stripper 141 prevents retrogression of the strip 116 (Figs. 3 and 4) in the channel 115 when

the pusher 124 returns to its starting position. The punch 112 then punches notches in the strip.

After the notches are punched in the strip, the head 111 starts its upward stroke and the stripper 141 strips the strip 116 from the punch 112. The head continues to move to its upward position and the cam lever 123 strikes the pusher 124 and rotates in a counter-clockwise direction until it is raised above the pusher 124. Due to the weakness of the spring 130 the pusher is not moved when it is struck by the cam lever in the upward movement of the cam lever. The above-described operation is repeated until the strip 116 is completely notched.

Each of the above-described apparatus serves to feed thin strips of material automatically to punch presses for punching operations on almost the entire lengths thereof. Each serves to feed and punch both short strips and long strips with uniformity in the distances between the notches. No manual handling of the strips is required during the punching operation. In addition to the foregoing advantages, the pushers 24 and 124 operate without buckling the thin strips, whereby the distances the strips are fed are very uniform. Of course, the pushers 24 and 124 may have on each a plurality of teeth, such as the tooth 26, without departing from the spirit and scope of the invention.

What is claimed is:

1. In a material feeding apparatus for a punch press including a die block having a die and a channel formed therein, a punch and means for reciprocating the punch toward and away from the die block, a pusher reciprocably mounted in the die block adjacent to the die and the channel formed therein and having a tooth projecting into the edge of the channel for engaging the edge of a strip of material positioned in the channel at a point thereon closely adjacent to the die, and means for reciprocating the pusher.

2. In a material feeding apparatus, a die block having a die formed therein and also provided with means for guiding a strip of material along a predetermined path extending over the die, a pusher mounted slidably along the edge of the path and having a tooth thereon for engaging at a point closely adjacent to the die an edge of the strip of material guided by the guiding means, and means for actuating the pusher to advance the strip along said path.

3. In a material feeding apparatus, a die block having formed therein a die and a channel extending over the die, said die block having a slot formed therein adjacent to the die and the channel, a toothed pusher mounted in said slot for engaging a strip of material positioned in the channel at a point on said strip closely adjacent to the die, and means for moving the toothed pusher in the slot to advance a strip of material engaged thereby along the channel.

4. In a material feeding apparatus, a die block having formed therein a die and a channel along which a strip of material may be advanced to positions over the die, said die block being provided with a slot positioned adjacent to the die and opening into an edge of the channel, a pusher having a tooth formed thereon mounted in the slot with the tooth projecting into the channel, means for reciprocating the pusher to advance along the channel a strip of material engaged by the tooth, and means for holding the strip of material against retrogression in the channel.

5. In a material feeding apparatus for a punch press including a reciprocable punch and means

for reciprocating the punch, a die block positioned in the path of the punch and provided with a die cooperable with the punch, said die block also having formed therein a channel for guiding a strip of material between the punch and the die and a slot at one edge of the channel closely adjacent to the die, a pusher having a tooth formed thereon mounted reciprocably in the slot, means for pressing the pusher to tend to maintain the tooth against a strip of material laying in the channel, means for urging the pusher in a direction away from the die, means movable with the punch for moving the pusher in a direction toward the die to advance the strip of material between the die and the punch, and means for engaging the strip of material to prevent movement thereof when the pusher is returned by the urging means.

6. In a material feeding apparatus for a punch press including a grooved die block, a punch and means for reciprocating the punch with respect to the die block to form notches in a strip of material, a pusher having a tooth formed thereon and reciprocably mounted in said die block adjacent to the groove therein, means for urging the pusher in one direction, a spring-pressed plunger having teeth formed thereon and slidably mounted in the die block on the side of the groove opposite to the pusher for engaging the edge of a strip of material, a pivoted cam movable with the punch for moving the pusher a predetermined distance along the groove against the action of the urging means when the punch is moved toward the die block, and a stripper for holding the strip against movement relative to the die block when the pusher is moved by the urging means.

7. In a material feeding apparatus for a punch press including a grooved die block, a punch and means for reciprocating the punch with respect to the die block to form notches in a thin strip of material, a pusher having a tooth formed thereon and reciprocably mounted in the die block adjacent to the groove therein, means for urging the pusher in one direction, a lever having a cam formed thereon and movable with the punch, a stop positioned in the path of the lever for pivoting the cam rapidly past the pusher to move the pusher a predetermined distance along the groove against the action of the urging means during a portion of the movement of the punch toward the die block, said lever being pivoted out of engagement with the pusher during a later portion of the movement of the punch toward the die block, and a stripper movable into engagement with the strip for preventing retrogression of the strip of material when the urging means returns the pusher.

ALWIN DEICHMILLER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,217,501	Remsen	Feb. 27, 1917
2,301,064	Meitner	Nov. 3, 1942
674,852	Coe	May 28, 1901
691,883	Zucker	Jan. 28, 1902
2,242,097	Weidauer	May 13, 1941
1,048,136	Davis	Dec. 24, 1912
1,632,593	Gaisman	June 14, 1927