Aug. 19, 1958 R. O. BIRCHLER ET AL 2,848,223

ADJUSTABLE TAPE FEEDING MECHANISM

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FIG. 1

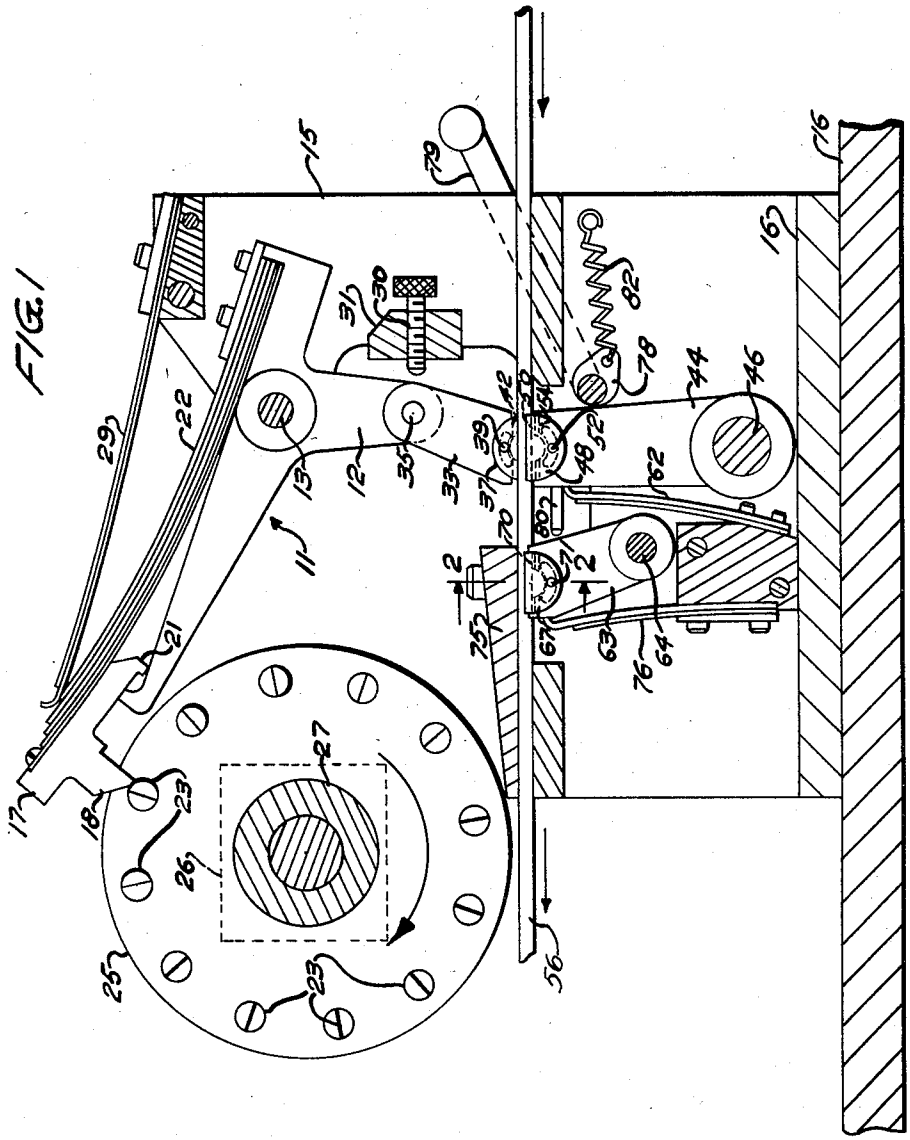
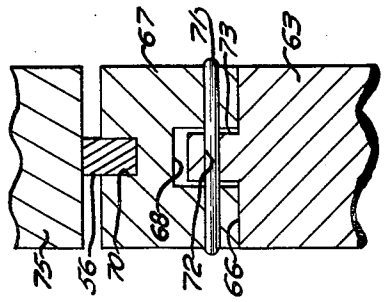


FIG. 2



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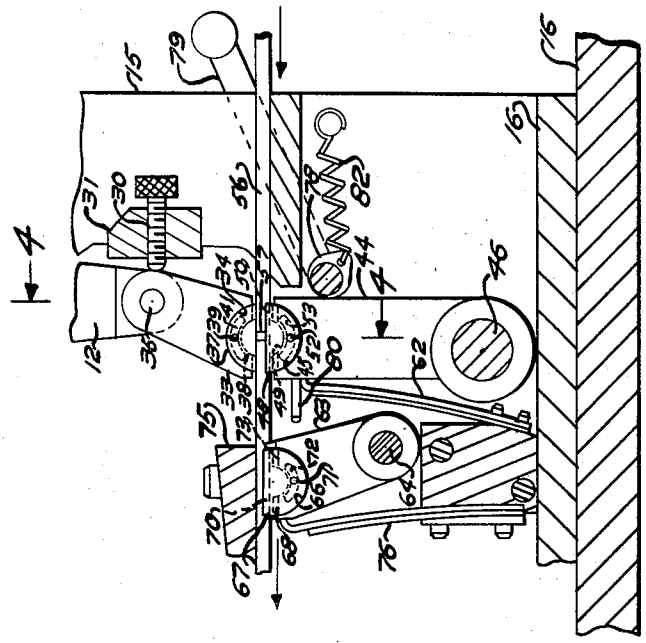


FIG. 3

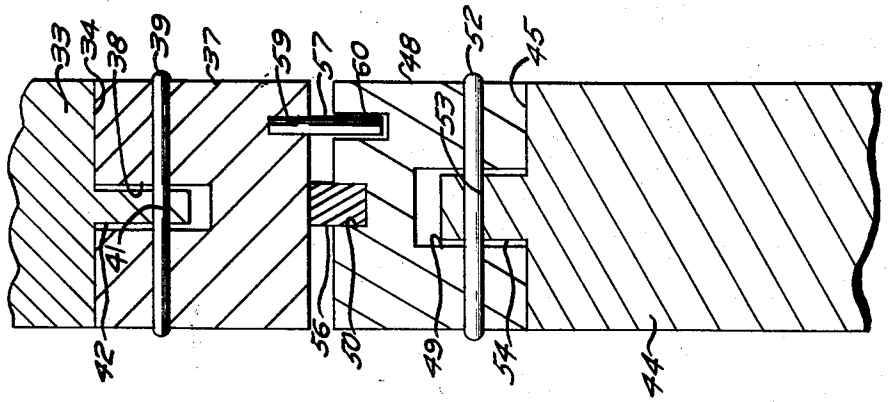


FIG. 4

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ADJUSTABLE TAPE FEEDING MECHANISM

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Application November 30, 1954, Serial No. 472,011

7 Claims. (Cl. 271—2.5)

This invention relates to material feeding apparatus and more particularly to an adjustable device for feeding metal tape.

An object of this invention is to provide an improved damage-proof device for accurately feeding tape.

Another object of this invention is to provide a device for accurately feeding tape in which the length of feed may be adjusted.

A further object of this invention is to provide a tape feeding device in which a soft tape may be fed without deformation caused by members which grip the tape to advance it.

One embodiment of the invention for feeding tape may include a pair of movable members having rockable jaws for gripping the tape, means for actuating the movable members to advance the tape, gripping means for preventing backward movement of the tape, and means for adjusting travel of the movable members to vary the length of tape fed.

A complete understanding of the invention will be obtained from the following detailed description of an apparatus forming one embodiment thereof, when read in conjunction with the appended drawings, in which

Fig. 1 is a front elevation of the device at the completion of its feed stroke,

Fig. 2 is a partial section taken on line 2—2 of Fig. 1,

Fig. 3 is a fragmentary front elevation of the device at the beginning of the feed stroke, and,

Fig. 4 is an enlarged section taken along line 4—4 of Fig. 3.

Referring now in detail to the drawings a lever 11 (Fig. 1) having a depending portion 12 is shown pivotally connected by a pivot 13 to a frame 15 supported by a base 16, the depending portion 12 being directly beneath the pivot 13. A member 17 having a surface 18 and a depending portion 21 is secured to the lever 11 with the depending portion 21 held in engagement with the lever 11 by a pile-up of leaf springs 22, one end of the pile up of leaf springs 22 being secured to the member 17 and the other end thereof being secured to the right hand end of the lever 11. This spring construction protects the device in case of jamming, in that, if the lever 11 or its associated mechanism becomes jammed for any reason, a lug 23 which engages the surface 18 of the member 17 to move it will not break the lever 11 or any of the associated mechanism as it moves the member 17, but will merely further deflect the leaf springs 22. A rotatable disc 25 connected to a driving motor 26 by a shaft 27 and having a plurality of spaced projecting lugs 23 is supported by the frame 15, the lugs 23 on the rotating disc 25 engaging the member 17 at predetermined intervals to move the lever 11 clockwise about the pivot 13. The lever 11 is urged by a pile up of leaf springs 29 counter-clockwise about the pivot 13 into abutment with the end of a set screw 30 threaded through a block 31 secured to the frame 15, the set screw 30 being adjusted to vary the position to which the lever 11 is moved by the leaf springs 29. Thus, rotation of the disc 25 by the motor 26 will cause the lever 11 to oscillate about the pivot 13.

A lever 33 having a flanged arcuate recess 34 on its lower end is pivotally connected at its upper end to the depending portion 12 of the lever 11 by a pin 35. A semi-cylindrical upper jaw 37 having a groove 38 on its curved surface is rockably secured in the arcuate recess 34 in the lower end of the lever 33 by a pin 39 which passes through a slot 41 in a flange 42 (Fig. 2) in the arcuate recess 34 in the lower end of the lever 33, the arcuate flange 42 being positioned in the groove 38 in the jaw 37.

A lower lever 44 having a flanged arcuate recess 45 on its upper end is pivotally connected at its lower end to the frame 15 by a pivot 46 so that its upper end is directly beneath the jaw 37 of the lever 33. A semi-cylindrical lower jaw 48 having a groove 49 (Fig. 4) on its arcuate surface and a slot 50 on the flat portion of its surface is rockably held with the slotted flat portion uppermost in the arcuate recess 45 in the upper end of the lower lever 44 by a pin 52 which passes through a slot 53 in a flange 54 in the arcuate recess 45 in the upper end of the lower lever 44, the arcuate flange 54 being positioned in the groove 49 in the lower jaw 48. The slot 50 in the flat upper surface of the lower jaw 48 is adapted to receive the lower portion of a rectangular tape 56 which is to be fed, the upper and lower jaws 37 and 48 being rockably supported to grip a soft tape 56 without deforming it as they advance it. The jaws 37 and 48 are separated by a pin 57 (Fig. 4) which has one end fastened in a hole 59 in the upper jaw 37 and the other end loosely positioned in a hole 60 in the lower jaw 48 whereby the jaws are maintained in spaced alignment. Leaf springs 62 secured to an upright integral portion of the base 16 engage and urge the lever 44 clockwise about the pivot 46 toward its position at the beginning of the feed stroke.

A third lever 63 is pivotally connected at its lower end to the frame 15 by a pivot 64 in alignment with the lever 44, the upper end of the lever 63 having a flanged arcuate recess 66. A semi-cylindrical jaw 67 having a groove 68 (Fig. 2) on its arcuate surface and a slot 70 on the flat portion of its periphery is rockably held with the slotted flat portion uppermost in the arcuate recess 66 in the lever 63 by a pin 71 which passes through a slot 72 in a flange 73 in the arcuate recess 66 in the upper end of the lever 63, the arcuate flange 73 being positioned in the groove 68 in the jaw 67. The slot 70 in the flat upper surface of the jaw 67 is adapted to receive the lower portion of the tape 56 to be fed, the jaw 67 cooperating with a rigid portion 75 of the frame 15 to grip the tape 56. The possibility of deformation of a soft tape 56 due to the gripping of the tape by the jaw 67 and the rigid portion 75 of the frame 15 is eliminated, since the jaw 67 is rockably held in the recess 66 in the lever 63 to distribute the force applied to the tape 56 over the area of the tape in engagement with the jaw 67. A leaf spring pile up 76 secured to the base 16 urges the lever 63 to move the jaw 67 to resiliently grip the tape against the rigid portion 75 of the frame 15 to permit the tape 56 to be advanced as the jaws 37 and 48 are advanced and to firmly grip the tape 56 to prevent its backward movement as the jaws 37 and 48 are retracted, the jaws 37 and 48 being advanced by the lever 11 when a lug 23 engages the surface 18 of the member 17 and retracted by the lever 11 as it is returned to feed position by the leaf springs 29 after the lug 23 moves beyond the surface 18.

A cam 78 secured to a handle 79 is pivotally secured to the frame 15 and positioned whereby when it is rotated by the handle 79 it will engage the lower lever 44 and move it to deflect the leaf springs 62 and open the jaws 37

and 48 to allow a tape 56 to be manually inserted therein, the upper jaw 37 being moved by the pin 57 which connects the jaws 37 and 48. A pin 80 which is fastened to the lower lever 44 near its upper end projects toward the lever 63 so that when the cam 78 is rotated by the handle 79 to move the lower lever 44, the pin 80 will engage and pivot the lever 63 to permit a tape 56 to be inserted between the jaw 67 and the rigid portion 75 of the frame 15. A spring 82 is secured to the cam 78 and to the frame 15 to urge the cam 78 out of engagement with the lower lever 44. Thus, by moving the handle 79 the operator may open the jaws 37, 48 and 67 to insert the tape 56 into the jaws. When the operator releases the handle 79 the jaws 37 and 48 will be returned to feed position (Fig. 2) by the leaf springs 62 and 29 and the lever 63 will be returned to its gripping position by the leaf springs 76, the cam 78 being moved by the spring 82 out of engagement with the lower lever 44 when the operator releases the handle 79.

In operating the device to feed tape positioned therein the lugs 23 of the rotating disc 25 pivot the lever 11 clockwise to advance the tape 56 and the leaf springs 29 pivot it counter-clockwise to return the jaws and leverage system to the feed position. As a lug 23 of the rotating disc 25 engages the surface 18 of the member 17 and begins to pivot the lever 11 clockwise about the pivot 13, deflecting the leaf springs 29, the upper end of the lever 33 is urged to the left (Figs. 1 and 2) to firmly grip the tape 56 between the upper jaw 37 and the lower jaw 48, the jaws being aligned by the pin 57 and the lower lever 44 being biased to the right by the leaf springs 62. Further movement of the member 17 by the lug 23 will further pivot the lever 11 to advance the tape 56, the tape being firmly gripped between the jaws 37 and 48. As the tape 56 is advanced it slides between the jaw 67 of the lever 63 and the rigid portion 75 of the frame 15 since the lever 63 moves slightly counter-clockwise because of the resiliency of the springs 76.

At the end of the feed stroke the lug 23 moves beyond the member 17 and the leaf springs 29 and 62 return the jaws and leverage system to its feed position, the lever 63 being urged by the leaf springs 76 to grip the tape 56 between the jaws 67 and the rigid portion 75 of the frame 15 to prevent backward movement of the tape 56 so that the jaws 37 and 48 slide along the tape 56 on the return stroke. Thus, on the advance stroke the jaws 37 and 48 grip the tape 56 to slide it between the jaws 67 of the lever 63 and the rigid portion 75 of the frame 15 to advance it and, on the return stroke, the jaws 67 and the rigid portion 75 grip the tape 56 to prevent backward movement of the tape while the upper and lower jaws 37 and 48 are being moved back along the tape to the feed position.

As previously described, the length of feed may be accurately adjusted by adjustment of the set screw 30 since the position of the end of the set screw 30 determines the position on the tape 56 to which the upper and lower jaws 37 and 48 will be returned after the feed stroke, the jaws being actuated by the lever 11 which abuts with the set screw 30 when in the feed position.

It is to be understood that the above-described arrangements are simply illustrative of the application of the principles of this invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

1. A device for feeding material comprising a pair of cooperating members for gripping the material to advance it, means for actuating the members to grip and advance the material, means for guiding the material, means for adjusting the travel of the members to vary the distance the material is fed, means preventing backward movement of said material, means for actuating the cooperating members into inoperative position whereby material can be inserted therebetween, and means responsive to movement of the cooperating members into inoperative position for rendering said backward preventing means inoperative.

2. An apparatus for feeding material comprising a pair of cooperating jaws for gripping the material, actuating means for moving the jaws to advance the material, means for adjusting the travel of the actuating means to vary the distance the material is fed, a clamping jaw for cooperating with the guiding means to prevent backward movement of the material, means for actuating the jaws into inoperative position whereby material can be inserted therebetween, and means responsive to actuation of the jaws into inoperative position for rendering said clamping jaw inoperative.

3. A device for feeding material comprising a pair of movable members, a pair of cooperating jaws supported by the movable members for gripping the material to advance it, means for actuating the movable members to urge the jaws to grip and advance the material, means for preventing backward movement of the material, means for varying the travel of the jaws to vary the distance which the material is fed, means for operating the movable members to carry the cooperating jaws into inoperative position whereby material can be inserted therebetween, and means carried by one of the movable members for rendering the backward preventing means inoperative when the cooperating jaws are moved into inoperative position.

4. A device for feeding strip stock comprising a pair of cooperating jaws for gripping the strip stock to advance it, means for actuating the jaws to grip and advance the strip stock, means attached to the actuating means for rendering said actuating means inoperative when the apparatus becomes jammed, means for holding the strip stock to prevent its backward movement, means for moving the cooperating jaws into inoperative position whereby strip stock can be inserted therebetween, and means responsive to said moving means for rendering the strip stock holding means inoperative when the jaws are moved to inoperative position.

5. An apparatus for feeding strip stock comprising a frame, a pair of members pivotally supported by the frame, a pair of jaws supported by the members, said jaws cooperating to grip and advance the strip stock when the members are actuated, a gripping member pivotally supported by the frame for cooperation with the frame to grip the strip stock to prevent backward movement of said stock, means for actuating the members, means for adjusting the travel of the members to vary the distance which the strip stock is fed, means for moving the pair of members to carry the pair of jaws into inoperative position whereby strip stock can be inserted therebetween, and means mounted on one of said members for rendering the gripping member inoperative when the pair of members are moved to carry the jaws into inoperative position.

6. An apparatus for feeding strip stock comprising a frame, an actuating member pivotally supported by the frame, a lever pivotally mounted on the actuating member, an upper jaw secured to the lever, a second lever pivotally mounted on the frame, a lower jaw secured to the second lever for cooperation with the upper jaw to grip and advance the strip stock, means mounted between the upper and lower jaws for maintaining the jaws in spaced alignment, a clamping member pivotally mounted on the frame, a clamping jaw secured to the member to cooperate with a portion of the frame to grip the strip stock to prevent its backward movement, means for adjusting the movement of the cooperating jaws to vary the distance the strip stock is fed, means for driving the actuating member to advance and retract the jaws, and means attached to the actuating member for rendering the actuating member inoperative when the device is jammed.

7. An apparatus for feeding strip stock comprising a frame, an actuating member pivotally supported on the frame, a first lever pivotally mounted on the actuating member, an upper jaw rockably secured to the first lever, a second lever pivotally mounted on the frame, a lower jaw rockably secured to the second lever for cooperation with the upper jaw to grip and advance the strip stock, a clamping member pivotally mounted on the frame, a clamping jaw rockably secured to the clamping member for cooperation with a portion of the frame to grip the strip stock to prevent its backward movement, a rotatable disc having portions for engaging the actuating member to drive it to advance and retract the upper and lower jaws, means mounted on the frame for engaging

the actuating member to vary its travel whereby the stock feed distance is adjusted, means for moving the first and second levers to move the upper and lower jaws into inoperative position to permit insertion of strip stock therebetween, and a pin secured to the second lever for engaging the clamping member to move the clamping jaw into inoperative position when the upper and lower jaws are moved into inoperative position.

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