April 25, 1939. T. A. ANDERSON 2,155,578

CUTTING MACHINE

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FIG. 1.

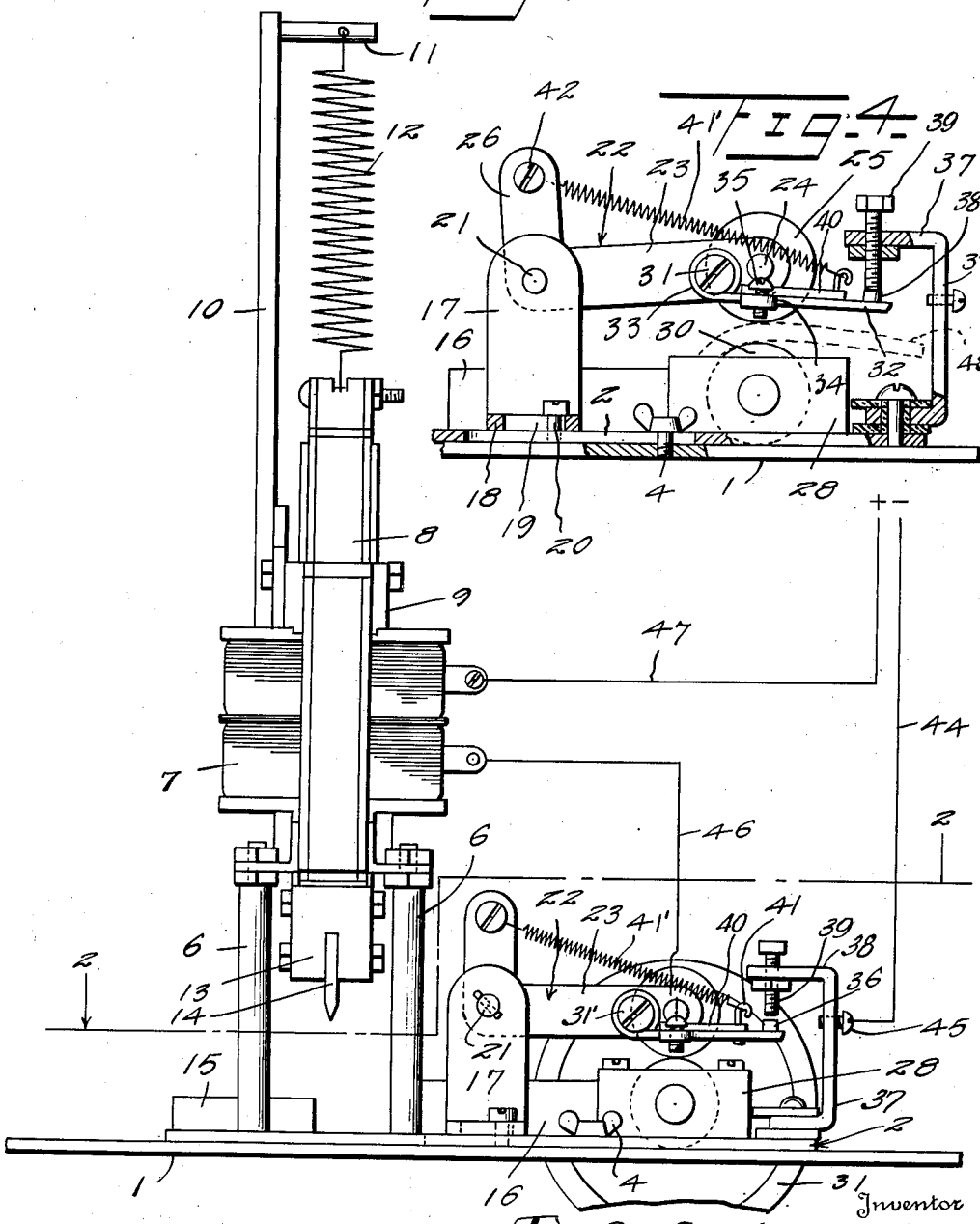
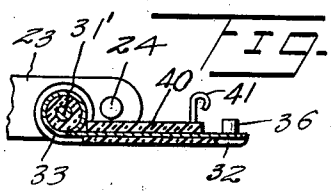


FIG. 4.

FIG. 5.



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Fig. 2.

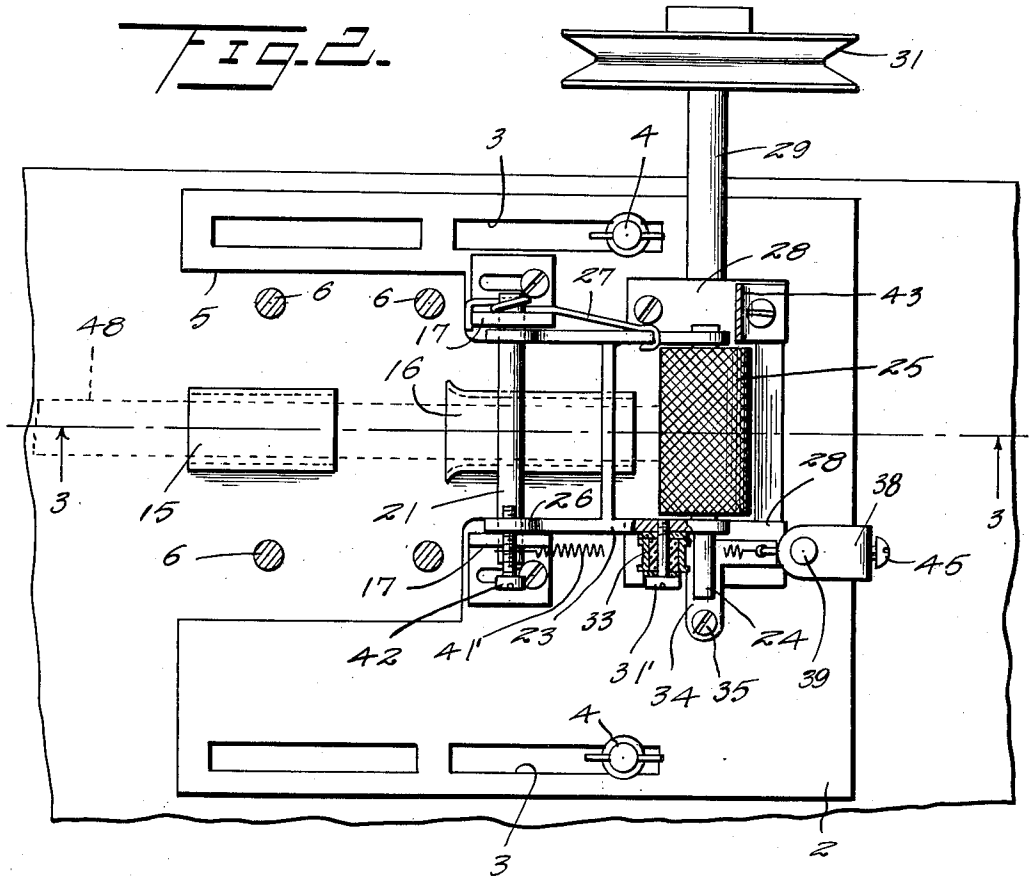
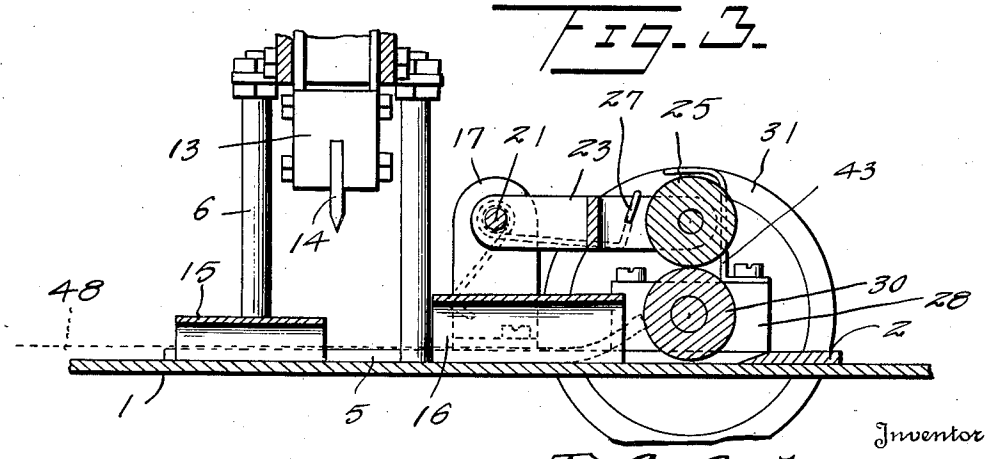


Fig. 3.



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CUTTING MACHINE

Thomas A. Anderson, Hartwell, Ga.

Application September 28, 1937, Serial No. 166,222

8 Claims. (Cl. 164—49)

This invention relates to the class of cutting machines and pertains particularly to a machine which is designed primarily for automatically cutting regular lengths of material.

The primary object of the present invention is to provide a mechanism designed to be used in association with a sewing machine on which is formed a continuous length of material which is later to be cut into short lengths for use as belt strap loops on trousers or other garments and which is designed to cut such material into sections of equal length as the material is fed from the sewing machine.

Another object of the invention is to provide a mechanism of the above described character in which the operation of cutting the belt loop material is continuous so long as the material is fed from the sewing machine upon which it is formed, without checking or holding back upon the advance movement of the material toward the cutter or exerting any forward pull upon the material which would tend to place strain upon the sewing machine needle.

A further object of the invention is to provide a novel mechanism associated with an electromagnetically operated cutter, which is so designed and operated as to perform the two successive steps of closing an electric circuit to energize the electromagnetically operated cutter when the advancing end of the belt loop material reaches a selected point from the cutter beneath which it passes and to rapidly remove the cut belt loop from the machine so that the electric circuit of the magnetic cutter will be instantly opened.

Still another object of the invention is to provide in association with an electromagnetically operated reciprocating cutter, a novel mechanism comprising a pair of rapidly rotating contacting rollers which take a hold upon the advancing end of the material as it passes beneath the cutter so that one of the rolls will be raised to close a circuit controlling switch by which the cutter is energized to effect the actuation of the cutter, the rolls being rotated at high speed whereby the cut strip of material will be moved between them with such high rapidity as to maintain the said switch closed for only a fraction of a second.

Other objects and advantages of the invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawings but may be changed or modified so long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Fig. 1 is a view in side elevation of the mechanism embodying the present invention, showing a strip of material being fed thereto from a suitable source of supply.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is a detail on an enlarged scale of the switch closing and tape ejecting mechanism.

Fig. 5 is a section taken longitudinally through the oscillating contact.

Referring now more particularly to the drawings wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 1 indicates a base upon which the cutting apparatus is mounted and where this apparatus is used in association with a sewing machine which is forming strap material from which belt loops are to be cut, this base may constitute the bed plate of the machine. It is to be understood, of course, that whereas the present mechanism is described as being intended for use in association with a sewing machine from which a strip of belt loop material is issuing, the invention is not to be restricted to such an association as it will be obvious that the mechanism may be efficiently employed for cutting any form of strip material as it is fed in any manner from a source of supply.

Mounted upon the base 1 in advance of the supply source (not shown) for the material which the machine is to cut into selected lengths, is a carrier plate 2 upon which a portion of the apparatus is mounted. This plate is provided at its sides with slots 3 through which extend the threaded shank portions of wing nuts 4 for engagement in the base plate 1 so that the carrier plate may be secured to the base plate in any desired adjusted position relative to the supply source of the strip material as hereinafter more specifically described. This carrier plate 2 is provided with the recess 5 which extends forwardly from its rear edge and which is provided to receive a part of the apparatus which is mounted upon the base 1. This part of the apparatus comprises the four supporting posts 6 which are arranged to define a rectangular area lying within the recess 5 and upon the upper ends of these

posts is mounted the coil unit 7 of an electromagnet through the center of which a vertically disposed reciprocating core or armature 8 is adapted to move.

Extending upwardly from the top of the magnet coil 7 and rigidly secured to the frame 9 of the magnet, is a standard 10 upon the upper end of which is a pin 11 or other suitable means for the attachment thereto of a contractile spring 12. The lower end of this spring is attached to the upper end of the magnet core 8, as illustrated, so that the spring constantly tends to pull the core upwardly from within the magnet.

Attached to the lower end of the magnet core 8 is a cutter block 13 in which is secured a cutting blade 14, the edge of which is directed downwardly and designed to contact the base 1 when the electromagnet is energized so as to cause the core 8 to be drawn downwardly against the tension of the spring 12.

Secured to the base 1 between the posts 6 is a guide in the form of an elongated tube or housing 15 which extends in the direction followed by the material issuing from the sewing machine in association with which the device may be used or from another source of supply. This tube is open at its ends and the forward end terminates adjacent to the area contacted by the cutting blade 14 when it is driven downwardly, as described. A second guide tube, indicated by the numeral 16, is arranged in alinement with the tube 15 and at the opposite side of the cutting blade so as to guide the material to the circuit closing and throw-out mechanism which is about to be described. This second guide is also mounted upon the base 1 so that its position and the positions of the other guide and the cutting knife relative to the source of supply for the strip material, are fixed.

Mounted upon the carrier plate 2 at opposite sides of the recess 5 and at the sides of the forward guide 16 are the upstanding bearing brackets 17, the lower portions of which are laterally turned to form feet 18, each of which has a slot 19 through which an attaching screw 20 passes. The slot 19 of each bracket foot runs lengthwise of the device or parallel with the guides so that the positions of the brackets may be shifted along paths extending lengthwise of the mechanism.

Supported between the upper ends of the brackets 17 is a shaft 21, the ends of which pass through the brackets, as shown. This shaft has secured to it a frame indicated generally by the numeral 22 and consisting of the two spaced parallel side bars 23 which extend forwardly in parallel relation with the longitudinal centers of the guides and which carry at their forward ends the transverse roller supporting shaft 24. The roller which is supported upon and secured to this shaft is indicated by the numeral 25 and has its surface roughened or knurled so that proper non-slipping contact will be made with the strip material which passes beneath. At one side of the frame 22 an upstanding arm 26 is formed integral with the adjacent side bar 23 while at the opposite side of the frame a spring 27 is located which has one end fixed to the adjacent bracket 17 while its other end engages the top edge of the adjacent bar 23 so that this spring constantly tends to force the frame to swing or oscillate downwardly.

Beneath the forward ends of the bars 23 of the oscillating frame 22 are bearing blocks 28 which are mounted upon the carrier plate 2 and these bearing blocks support a drive shaft 29 which extends beneath and in parallel relation with the shaft 24 and carries beneath the roller 25 a driving roller 30. This roller 30 is knurled or corrugated like the roll 25. The shaft 29 is supplied with a pulley 31 or any other suitable means which will facilitate the application of driving power thereto so that the roll 30 may be continuously rotated while the mechanism is in operation.

The bar 23 from which the upright arm 26 extends, carries a pivot screw 31' which extends outwardly from the side thereof in spaced relation with the adjacent end of the shaft 24 which, as shown in Fig. 2, is also extended beyond the bar 23. This pivot screw supports the metallic contact plate 32 through the medium of the sleeve 33 formed integral with the plate and through which the screw passes. As illustrated in Fig. 5, this sleeve 33 is suitably insulated from the screw and from the adjacent metallic parts of the device so that there shall be no short circuiting of electric current from the plate 32 into the adjacent parts of the apparatus. Integral with the plate 32 is a lateral arm 34 which carries a terminal screw 35 which facilitates the attachment of an electric wire thereto and the free forward end of the plate 32 carries the contact 36 which is directed upwardly.

Secured to the carrier plate 2 in advance of the contact plate 32 is an upstanding bracket 37. This is electrically insulated from the plate on which it is mounted and has its upper end turned rearwardly, as indicated at 38, and threaded through this end is the adjustable contact screw 39 which overlies the contact 36 of the plate 32 and is adapted to electrically engage therewith during the operation of the mechanism.

The upper surface of the contact plate 32 has a strip of insulation material 40 secured longitudinally thereon and to this strip is attached a hook 41 which has one end of the contractile spring 41' coupled therewith while the other end of the spring is attached by the screw 42 to the upper end of the arm 26. This spring 41' constantly urges the contact plate 32 to swing upwardly but this upward movement of the plate is limited by the engagement of the insulation strip 38 with the extended end of the shaft 24 which lies thereover. The spring 27 engaging the opposite side of the frame 22 from the contact plate 32 constantly maintains the frame in depressed position so that the roller 25 will rest upon the roller 30 and when the rollers are in this relation, a supply space or gap exists between the contacts 36 and 38, as is shown in Fig. 1.

At the opposite side of the rollers from the contacts, a movement limiting or stop arm 43 is secured in any suitable location as upon the top of the adjacent bearing block 28, and has its upper end turned inwardly to overlie the end of the adjacent part 23 so that it will prevent the frame being moved upwardly to an extreme position.

In the operation of the present mechanism, the same is disposed in position in front of the needle and feed dog mechanism of the machine with the guides 15 and 16 in the proper position to receive the sewn material as it moves forwardly from the machine needle. The material will pass beneath the upraised cutter and will be guided to the engaged rollers 25—30 by the forward guide 16. These rollers are rotated at a high

speed while the machine is in operation, preferably at a speed of approximately 3,000 revolutions per minute. This rotation of the rollers will cause them to take a hold upon the advancing end of the strip of material as it leaves the forward end of the guide 16 and rides upwardly upon the under roll 11 and the spacing of the contacts 36—38 is such that the thickness of the material passing between the rolls will be sufficient to raise or oscillate the upper frame the necessary distance to bring the contacts into engagement. As illustrated in Fig. 1, electric current is supplied from any suitable source by the wire 44 which leads to the terminal or binding screw 45 which is carried by the bracket 37. From here, when the contacts 36—38 are in engagement, the current flows to the screw 35 and through the wire 46 to one side of the magnet coil 7, leaving the other side of the coil to return to its source by way of the wire 47.

When the frame 22 is raised by the advancement of the end of the strip of material which is designated by the numeral 48, between the rolls so as to bring the contacts into engagement, the circuit for the magnet will be closed and the armature 8 will be drawn downwardly rapidly so as to cause the blade 14 to sever the strip against the underlying base 1. Due to the high speed at which the rollers 25—30 are run, this operation of closing the switch contacts, energizing the magnet and actuating the cutter and advancing the severed section of the strip through and beyond the rolls, is almost instantaneous. In other words, the consecutive movements of the parts or consecutive steps occur with such great rapidity that the frame 22 is allowed to drop back so as to open the contacts and thus de-energize the magnet coil before the lowered knife can interfere with the further advancement of the strip material and before any burning or arcing of the contacts can occur. By the novel mounting of the contact carrying plate 32, it will be seen that the machine may be used to cut strips of different thicknesses without necessitating re-adjustment of the contact 36 relative to the contact 38 because of the fact that the plate 32 may swing down after the two contacts have been drawn together if further upward movement of the roller 25 is necessary.

By the provision of means for adjusting the carrier plate 2 upon which the circuit closing and cut strip ejecting mechanism is mounted, relative to the guides and the cutter, it will be apparent that the machine may be used to cut sections of different required lengths.

With the present machine any number of belt loops or other pieces of strip material may be cut from a continuous supply strip without variation in the lengths of the sections whereas in other machines constructed for a like purpose great difficulty has been experienced in obtaining cut strips of constant length.

What is claimed is:

1. A machine for cutting tape-like material into lengths, comprising a vertically movable cutter beneath which the material is fed from a source of supply, electrical means for moving said cutter for a cutting operation, an electric current carrying circuit having said means therein, a normally open switch in said circuit, and means at a predetermined distance from and upon the opposite side of the cutter from said source of supply for engaging the advancing end of the material and effecting the successive operations of closing said switch and removing the severed portion of material after the knife has rapidly been actuated.

2. In a machine for cutting definite lengths from a strip of material, a vertically movable cutter beneath which the material strip is fed from a source of supply, an electric current conducting circuit having therein a pair of normally separated switch contacts and electromagnetic means connected with the cutter and operating when energized to actuate said cutter to strip cutting position, a pair of roller members disposed in the path of movement of the material upon the side of the cutter opposite from the source of supply and adapted to have the material pass therebetween, one of said rollers being movable relative to the other to admit the material therebetween, means for connecting a driving means with the rollers whereby the rollers may be constantly rotated at a high speed, said rollers being intermittently separated by the material and means whereby the movable roller when separated from the other roller by the engagement of the advancing end of the material therebetween will effect the closing of said switch contacts to energize said magnetic cutter controlling means to effect severance of the material.

3. A cutting machine for strip material, comprising a vertically reciprocatable cutting blade beneath which the strip material is fed from a source of supply, electromagnetic means connected with said blade and which when energized effects the movement of the blade for a cutting operation, means for controlling the supply of electric current to said magnetic means, a pair of normally contacting superimposed rollers disposed transversely of the path of travel of the strip upon the side of the cutter opposite from the source of supply, means for connecting driving means with said rollers said rollers being rotated at a high rate of speed, and means for effecting the energization of said electromagnetic means simultaneously with the engagement of the advancing end of the strip by and between the rollers, said electromagnetic means being de-energized simultaneously with the passage of the cut section of the strip between the rollers.

4. A machine for cutting strip material into lengths, comprising a vertically reciprocatable cutting blade, electromagnetic means which when energized effects the movement of the cutting blade for a cutting operation, a pair of roller members disposed in superimposed relation transversely of the path of travel of the strip of material, means carrying one of said rollers permitting its separation from the other roller by the strip of material passing therebetween, and a pair of electrical contacts controlling the flow of electric current to said electromagnetic means and one of said contacts being movable with said movable roll to be brought into electrical engagement with the other contact simultaneously with the separation to a predetermined extent of the rolls by a piece of material therebetween.

5. A machine for cutting strip material into lengths, comprising a vertically reciprocatable cutting blade, electromagnetic means which when energized effects the movement of the cutting blade for a cutting operation, a pair of roller members disposed in superimposed relation transversely of the path of travel of the strip of material, means carrying one of said rollers permitting its separation from the other roller by the strip of material passing therebetween, and a pair of electrical contacts controlling the flow of electric current to said electromagnetic means

and one of said contacts being movable with said movable roll to be brought into electrical engagement with the other contact simultaneously with the separation of the rolls to a predetermined extent by a piece of material therebetween, said rolls and contacts being mounted for adjustment relative to the cutting blade whereby the lengths of the pieces of material may be varied.

6. In a cutting machine for strip material, the combination with a vertically reciprocatable electromagnetically actuated cutting knife beneath which the material moves from a source of supply, of a fixed roller member disposed transversely of the path of movement of the material and upon the side of the cutter opposite from the source of supply, means for rotating said roll, a frame mounted for oscillation upon an axis extending transversely of the path of travel of the material, a roller rotatably carried by the frame and normally resting upon the top of the first roller, said rollers being constantly rotated and designed to engage the advancing end of the strip material between the contacting parts thereof, a fixed electric contact, a second contact normally disposed in spaced relation to the fixed contact and carried by said frame for oscillation in a vertical plane, said contacts controlling the flow of electrical energy to said magnetic means, means yieldably holding said rollers in engagement one with the other, and means yieldably holding said oscillatable contact against movement away from the fixed contact.

7. A machine for cutting strip material into lengths, comprising a vertically reciprocatable cutting blade, electromagnetic means which when energized effects the movement of the cutting blade for a cutting operation, a pair of roller members disposed in superimposed relation transversely of the path of travel of the strip of material, means carrying one of said rollers permitting its separation from the other roller by the strip of material passing therebetween, and a pair of electrical contacts controlling the flow of electric current to said electromagnetic means and one of said contacts being movable with said movable roll to be brought into electrical engagement with the other contact simultaneously with the separation to a predetermined extent of the rolls by a piece of material therebetween, and said rolls being driven at high speed to effect the rapid advancement of a piece of material after being cut.

8. A tape cutter comprising a pair of rollers disposed one upon the other, means for turning said rollers, a frame supporting one of the rollers for oscillatory movement away from the other roller, means for guiding tape material between the rollers to be gripped thereby, the gripped tape raising the said one of the rollers, a knife disposed in spaced relation with the rollers and supported for movement across the path of travel of the tape, electrical means coupled with the knife which when energized moves the knife for a cutting operation and switch means controlling the flow of current to said electrical means, said switch means being closed when said tape is engaged between and maintaining said one roller raised to energize said electrical means for the actuation of said knife to cut the tape.

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