Jan. 9, 1962 T. H. KRUEGER 3,015,925

STRIP SERVING AND APPLYING DEVICE

Filed July 23, 1956 3 Sheets-Sheet 1

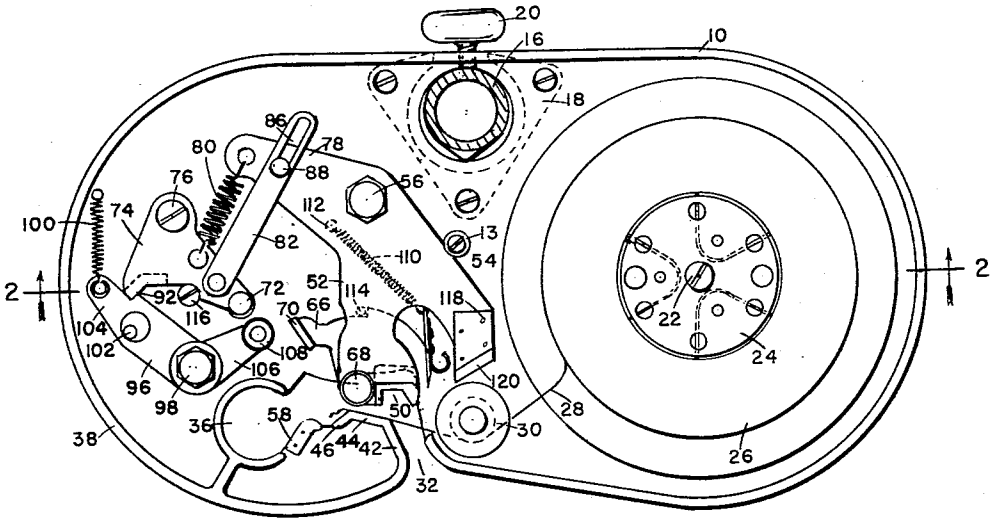


FIG.1

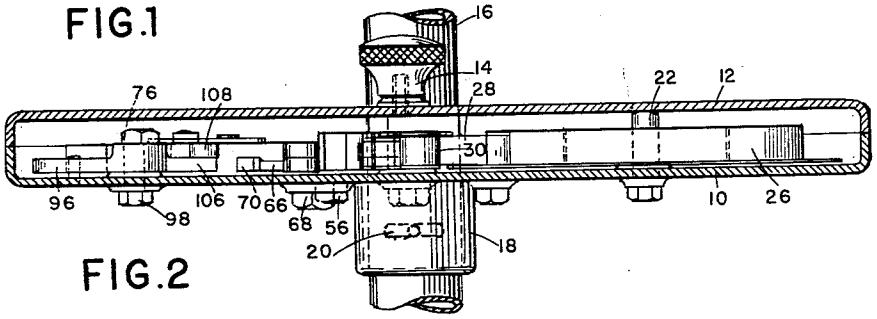


FIG.2

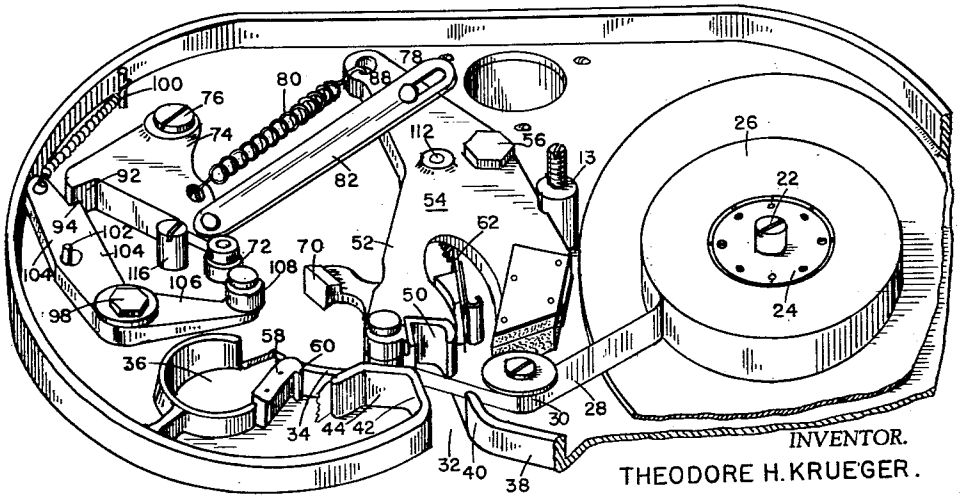


FIG.3

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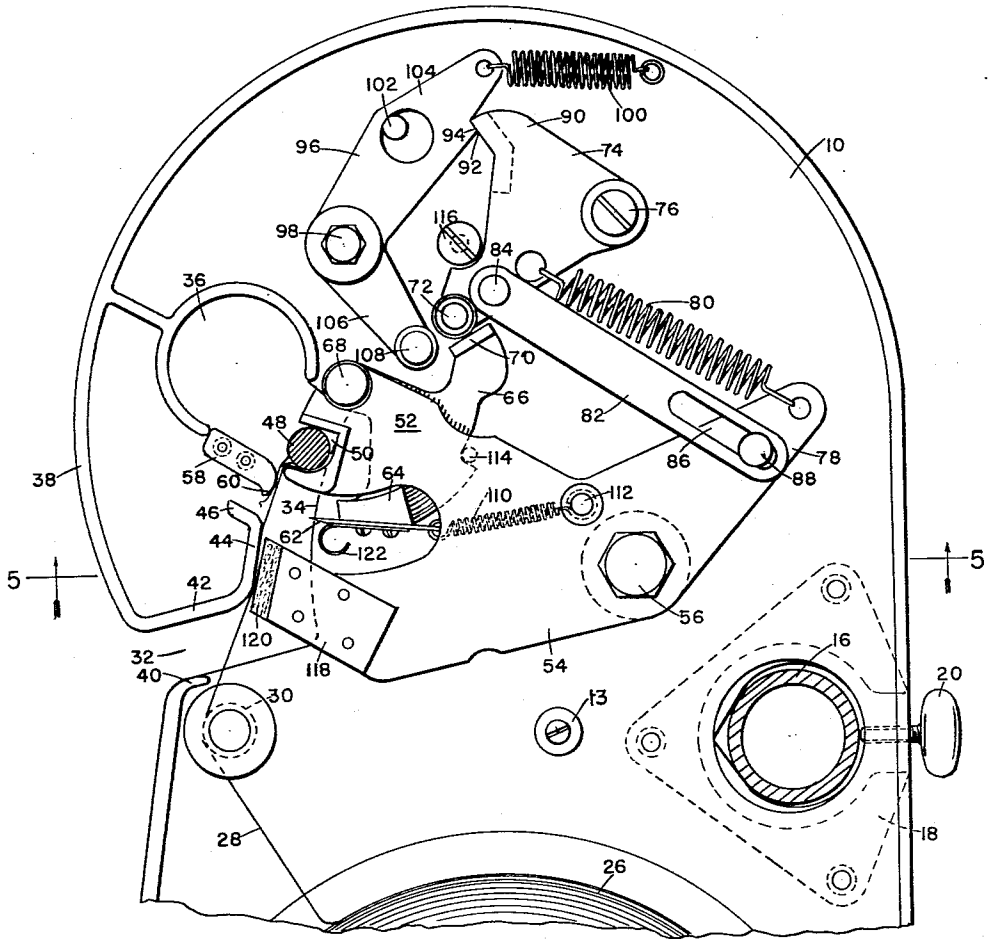


FIG. 4

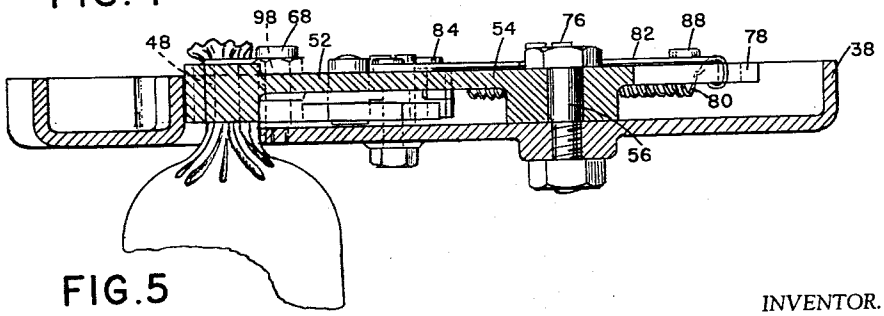


FIG. 5

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Filed July 23, 1956 3 Sheets-Sheet 3

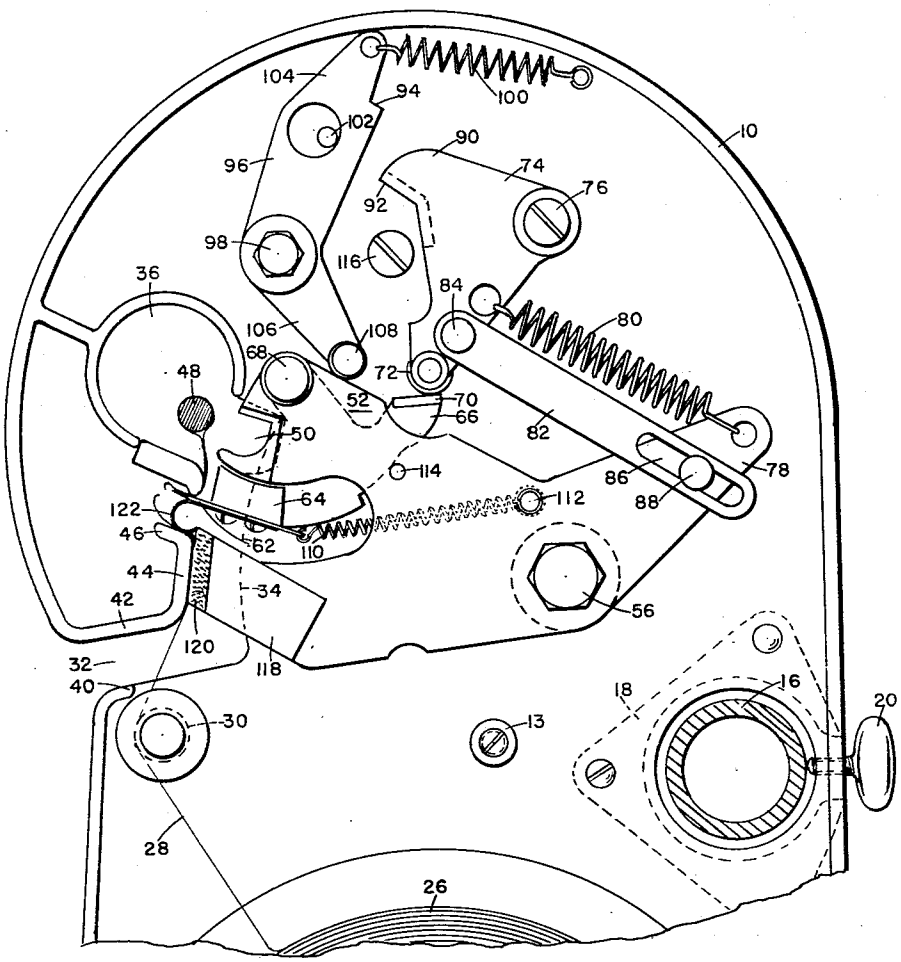


FIG.6

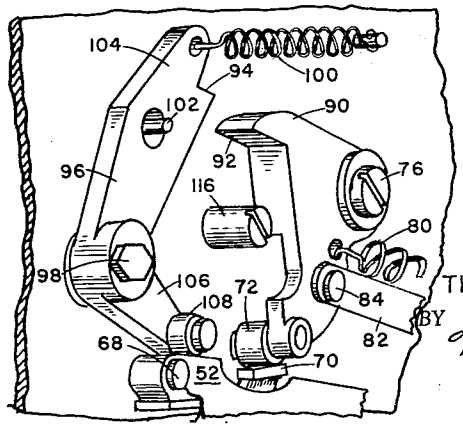


FIG.7

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STRIP SERVING AND APPLYING DEVICE

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Filed July 23, 1956, Ser. No. 599,479
9 Claims. (Cl. 53—198)

This invention relates to a device or machine for applying a band of adhesive tape around an object. It is particularly applicable to the applying of a band of pressure sensitive tape which is wrapped around the object and has its ends brought together so that they adhere to each other and form a tight seal. The invention finds particular utility as a means for sealing a twisted neck of a bag, such as a plastic bag for holding vegetables, etc., so as to hold the bag tightly closed to retain and preserve its contents. The invention, however, is also useful for the application of bands of tape around other objects than bags, such as tubes, rods, or wires for the purpose of identification, or to hold a small bundle or group of slender articles, rods for example, together.

The present invention is in the nature of an improvement on a machine shown in an application filed by Theodore H. Krueger and Everett E. Sharpe, Serial No. 513,688, filed June 7, 1955; now U.S. Patent No. 2,970,416.

An important feature of the present invention relates to an automatic cutting device for cleanly severing the tape band which has been applied to the article from the supply of tape coming from the tape roll. Other novel features and specific objects of the invention appear in the course of the description of a preferred embodiment thereof chosen to illustrate the principles of the invention.

In the accompanying drawings:

FIGURE 1 is a plan view of a machine embodying the invention with the cover plate removed;

FIGURE 2 is a horizontal section of the machine on the line 2—2 of FIGURE 1;

FIGURE 3 is a perspective view of the machine with the cover removed and parts being broken away;

FIGURE 4 is a view similar to FIGURE 1 on a larger scale, part of the machine being broken away and showing the position of the parts after the band has been applied to the bag neck or other article, and just before the operation of the cutter;

FIGURE 5 is a horizontal section on the line 5—5 of FIGURE 4;

FIGURE 6 is a view similar to FIGURE 4 showing the parts immediately after the cutter has acted; and

FIGURE 7 is a fragmentary perspective view showing the cutter actuating trip mechanism.

Referring to the drawings in detail, the machine is illustrated as comprising a base or frame member 10 on which the parts are mounted, a cover 12 being preferably provided to protect the parts, the cover being removably attached to the base by a knurled nut 14 screwing on the end of a stud 13 set in the base.

The machine may be supported in any suitable manner, for instance upon an upright standard such as a piece of pipe 16, which passes through a hole in a bracket 18 secured to the under side of the cover. The machine may be secured at an appropriate level on the piece of pipe by means of a set screw 20. It is convenient for many purposes to mount the machine in a horizontal position, but this is not essential as it can be mounted in a vertical position or in any other way found most convenient.

Mounted in the base 10 is a stud 22 on which is rotatably mounted a spool 24 adapted to have slipped over it a supply roll 26 of pressure sensitive adhesive tape. The strip of tape 28 passes from the supply roll over a guide roller 30 rotatably mounted on the base. In advance of the guide roller the base is formed with a slot therethrough comprising a receiving portion 32 extending inwardly from the edge of the base, and which communicates with an arc shaped portion 34, which in turn communicates with an enlarged area 36. The cover is provided with a similarly shaped slot, not shown. The base 10 is provided with an upstanding flange 38 which is inwardly curved at 40 to form one side of the mouth for receiving the article to which the tape is to be applied. This flange portion 40 terminates at a position where it will not come in contact with the adhesive surface of the tape strip 28. The flange 38 at the other side of the article-receiving mouth, is provided with an inwardly extending portion 42 which merges into a tape-engaging portion 44 terminating in a short reversely turned lip 46. The tape strip 28 after each operation of the machine is left extending across the mouth portion 32 of the slot and is adhered to the flange portion 44, and may extend around the flange portion 46, where it is left after the previous cutting operation.

As will be understood, it is the adhesive face of the tape which is exposed across the slot mouth. In operation, the twisted bag neck or other article to which the band of tape is to be applied, which is indicated at 48 in FIGURES 4 and 5, is manually passed through the slot portion 32 and into contact with the adhesive surface of the tape strip which is pressed by the bag neck against an abutment on a movable transfer element. In the example shown, the article is pressed into a recess 50 formed in the end of one arm 52 of a forked transfer lever 54, which is pivoted on a stud 56 mounted in the base. The bag neck is then moved through the slot portion 34 to the position shown in FIGURE 4, swinging the lever 54 along with it. This causes the end of the strip of tape to loop itself tightly around the bag neck, the end of the strip being pressed into tight adhesive contact with the part of the strip just in rear of its point of engagement with the bag neck by a wiper block 58. This block may be of any suitable formation, but it is preferably made of an elastic substance such as rubber, and has a slightly flexible yielding nose portion 60. After the tape has been severed in a manner to be described, it will be seen that the bag or other article, to which the tape band has been applied, may be removed by simply withdrawing it through the enlarged opening 36.

The present invention provides an automatic cutter for effecting a clean severance of the tape forming the loop or band about the bag neck from the tape coming from the supply roll. This cutting means comprises a knife 62 mounted on a block 64 formed on a sector shaped lever 66 which is pivoted on a pivot 68 carried by the arm 52 of the transfer lever 54. The knife-carrying sector 66 has an anvil portion 70, which in the form of the invention shown is arranged at a position on the sector about 90° from the knife mounting block 64. The anvil 70 is arranged to be engaged by a roller 72 mounted on a cutter actuating drive lever or sector 74, which is pivoted on a stud 76 mounted in the base of the machine. The drive lever 74 is connected to the tail 78 of the transfer lever 54 by means of a tension spring 80. The lever of sector 74 also has a link 82 pivoted to it at 84 and having in its free end a slot 86 in which slides a pin 88 carried by the tail 78 of the lever 54. The sector 74 is formed with a horn 90 having a face 92 adapted to be engaged by a tooth 94 on a bell crank shaped latch lever 96, which is pivoted on a stud 98 on the machine base. The latch lever is urged in a clockwise direction by means of a tension spring 100. This movement is limited by a stop pin 102 mounted on the base, which projects through a large hole 104 in the latch lever. The latch lever is provided with a trip arm 106 carrying a contact roller 108.

The operation of the cutter is as follows: The bag

neck or other article is moved into the slot portion 32 into contact with the adhesive face of the tape, and it presses the tape into the recess 50 as described. The bag neck is now caused to swing the transfer lever 54 in a clockwise direction, during which movement the tape strip is tightly wrapped around the bag neck, as already described. The movement of the lever 54 also carries the cutter sector and cutter to a position in which the cutter knife is opposite the opening between the flange portion 46 and the wiper block 58. During this time the knife is held retracted by a spring 110, which is anchored at one end to the knife, and at the other end to a stud 112 on the lever 54. The spring causes the sector 66 to swing in a counter-clockwise direction to the limit of its movement, as determined by the position of a stop pin 114 carried by the lever 54. At the start of the operation the parts occupy the positions shown in FIGURES 1 and 3, with the trigger face 92 of the sector 74 in engagement with the tooth 94 of the latch lever 96. At this time the spring 80 is not highly tensioned. On the swinging of the transfer lever 54, it will be seen that the spring 80 becomes stretched. As the parts move to the position shown in FIGURE 4, the anvil 70 moves into contact with the roller 72 on the sector 74, and the parts may be so proportioned that on contact with the roller, the anvil swings the sector 66 slightly about its pivot, although this is not essential. However, such movement will give a slight additional tension to the spring 110, and will insure a close contact between the roller 72 and the anvil. Further swinging of the transfer lever in a clockwise direction brings the side of the transfer lever into engagement with the roller 108 on the trip arm of the latch lever 96, which will swing the latch lever about its pivot stud 98 and move the tooth 94 out of engagement with the face 92 on the sector 74. This will at once release sector 74, which will be forcibly rotated in a counter-clockwise direction by the action of the now highly tensioned spring 80. As the roller 72 on the sector is now in engagement with the anvil 70, it will drive down the anvil and project the knife with a sharp blow against the tape, which it will instantly sever, the parts now occupying the positions shown in FIGURE 6. The sealed bag neck or other article is now cut free of the tape in the machine and removed through the opening 36. Transfer lever 54 now flies in a counter-clockwise direction under the influence of the still tensioned spring 80 to its initial position, where it is stopped by engagement with the stud 13. During the latter part of this movement the pin 88 on the tail of the transfer lever moves up in the slot 86 in the link 82, and when it reaches the upper end of that slot, it pushes the link, thereby swinging the sector 74 in a clockwise direction and causing the horn 90 to pass the tooth 94 on the latch lever which is now drawn down by the spring 100 so as to engage the tooth with the face 92 ready for the next operation. The sector 74 is limited in its clockwise movement by engagement with a stop pin 116 mounted on the base 10.

During the cutting operation it will be seen that the roller 72 on the sector 74 rolls across and off of the lower corner of the anvil as it delivers a powerful force thereto due to the tension spring 80. As soon as it rolls off of the corner of the anvil, however, the sector 66 is released from the high pressure of the spring 80 and is instantly returned under the influence of the spring 110 so that the knife is snapped back out of contact with the tape. A very sharp and positive cutting action is secured, the knife being immediately withdrawn from the vicinity of the tape, so that there is no chance of the tape becoming fouled therewith.

In the construction shown, the left-hand arm of the forked transfer lever 54 carries a block 118 in the end of which may be mounted a piece of felt or rubber 120, which assists in wiping the tape against the part 44 of the flange beyond the mouth. The knife may also carry a small pusher pad 122, which pushes the end of the tape strip, at the instant of severing, around the flange portion 46 and prevents the possibility of the free end of the tape being drawn down by the knife, as the knife snaps back after making the cut. The use of a wiper block and pusher pad, however, are not in all cases found necessary.

While one preferred embodiment of the invention has been illustrated and described in detail, it is to be understood that changes may be made therein and the invention embodied in other structures. It is not, therefore, the intention to limit the patent to the specific constructions illustrated, but to cover the invention broadly in whatever form its principles may be utilized.

I claim:

1. In a machine for applying a single adhesive tape band around an article, a frame having means defining a mouth for reception of an article to which the band is to be applied, means for supporting a roll of tape in the frame with a strip of tape from the roll extending across the mouth with the adhesive surface of the tape exposed, a surface on the frame beyond the mouth for engagement by the adhesive surface of the tape for holding the tape extended across the mouth, a transfer element having a recess therein for receiving the article and a portion of the tape strip in rear of the portion of the tape engaged with the surface on the frame beyond the mouth engaged by the leading end of the tape, means for contacting the non-adhesive face of the leading end of the tape and folding the tape over so as to bring the adhesive face of the leading end of the tape into contact with the adhesive face of the tape coming from the supply roll so as to bind the tape around the article, a severing knife and means for projecting the severing knife to sever the tape between the said surface on the frame engaged by the adhesive surface of the tape, and the said means contacting the non-adhesive surface of the tape.

2. In a machine for applying a single adhesive tape band around an article, a frame having means defining a mouth for reception of an article to which the band is to be applied, means for supporting a roll of tape in the frame with a strip of tape from the roll extending across the mouth with the adhesive surface of the tape exposed, a surface on the frame beyond the mouth for engagement by the adhesive surface of the tape for holding the tape extended across the mouth, a transfer element having a recess therein for receiving the article and the portion of the tape strip behind the free end thereof which is adhered to the surface on the frame when said article is moved through the mouth into said recess, said transfer element being movable so as to carry the article with the tape strip adhered thereto beyond the surface on the frame to which the tape strip is adhered so as to strip the tape strip from said surface on the frame and advance another portion of the tape strip into engagement with said surface, means to engage the non-adhesive surface of the end of the tape strip after it has been stripped from said surface and fold it around the article into contact with the adhesive surface of the tape strip which has been stripped from said surface, and means for severing the tape strip at a point between the article and the surface to which the strip was adhered, said severing means including a knife movably mounted on the transfer element, spring actuating means for projecting the knife to cause it to sever the tape, and means for releasing said spring actuating means when the transfer element reaches a predetermined point in its movement.

3. A construction as claimed in claim 2, in which the severing means include a lever pivoted on the transfer element, a knife carried by the lever, a drive lever pivoted on the frame having a contact portion for engaging and applying force to a part of the knife-carrying lever to project the knife to tape-severing position, spring means for actuating said drive lever, latch means for holding said drive lever out of action, and means for releasing said latch means when the transfer element has been moved to a predetermined point.

4. A construction as claimed in claim 2, in which the severing means include a lever pivoted on the transfer element, a knife carried by the lever, a drive lever pivoted on the frame having a contact portion for engaging and applying force to a part of the knife-carrying lever to project the knife to the severing position and a spring connecting said drive lever to said transfer element, the parts being so constructed and arranged that said spring is placed under increased stress as said transfer element is advanced.

5. A construction as claimed in claim 4, in which latch means are provided for holding said drive lever out of action until a predetermined amount of movement of the transfer element has taken place.

6. A construction as claimed in claim 1, in which the knife carries a tape pusher element for engagement with the end of the tape coming from the supply roll.

7. A construction as claimed in claim 1, in which supporting surfaces for the tape are provided at each side of the position at which the knife is projected to sever the tape, at least one of said surfaces being elastic.

8. A construction as claimed in claim 7, in which said elastic support comprises a block of elastic material having a bendable projection thereon.

9. In a machine for applying a single adhesive tape band around an article, a frame having means defining a mouth for reception of an article to which the band is to be applied, means for supporting a roll of tape in the frame with the strip of tape from the roll extending across the mouth with the adhesive surface of the tape exposed, a surface carried by the frame at a location beyond the mouth to which the leading end of the tape is adhered, a transfer element having a recess therein for receiving the article and the portion of the tape strip

in rear of the end thereof adhered to said surface when the article is moved through the mouth into said recess, means for pivoting the transfer element on the frame for movement with the article in the recess thereof in a direction to draw tape from the supply roll, spring means for returning the transfer element to its initial position after the article is withdrawn from the recess, means for contacting the adhesive face of the end of the tape with the adhesive face of the tape coming from the supply roll as the article and transfer element are advanced, a movable tape severing knife and operative connections between the transfer element spring return means and the knife for actuating the knife to sever the tape at a point between the article to which the tape has been applied and said surface to which the leading end of the tape is adhered.

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