Aug. 14, 1945. R. E. ENGBERG 2,382,406

METHOD AND APPARATUS FOR DISPENSING GUMMED TAPE

Filed Nov. 11, 1943 2 Sheets-Sheet 1

Fig. 1.

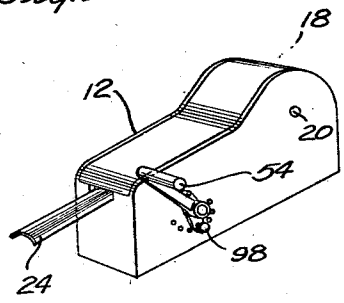


Fig. 2.

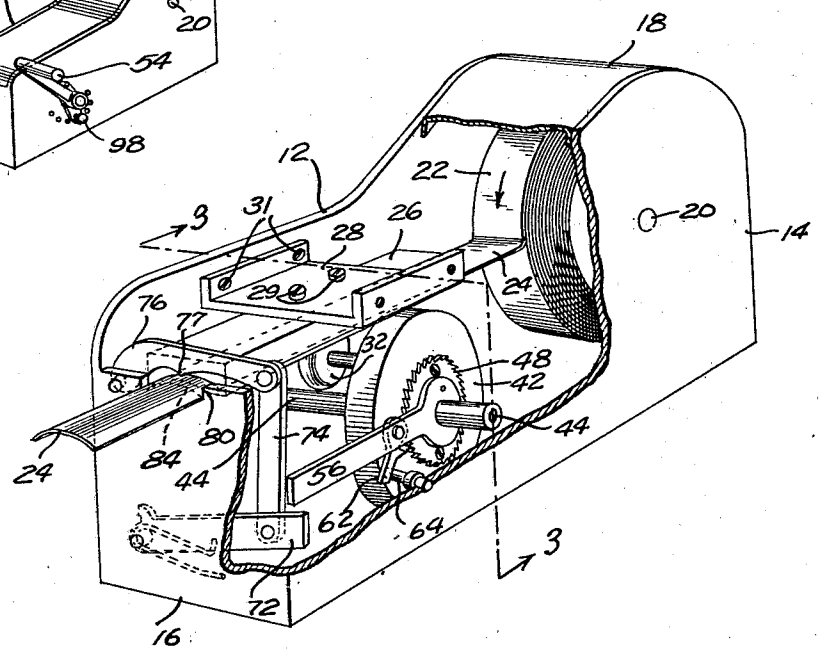
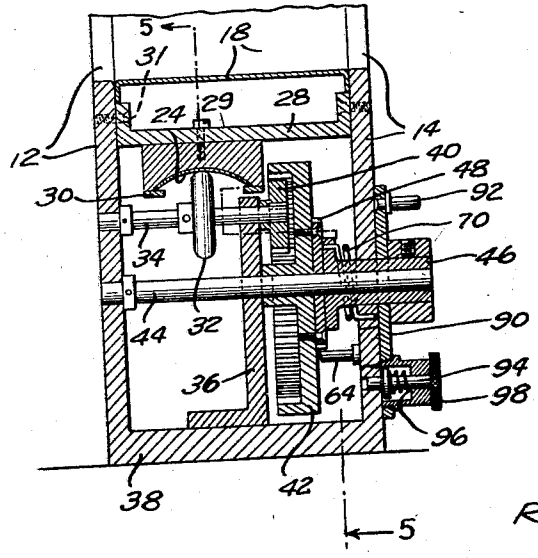


Fig. 3.



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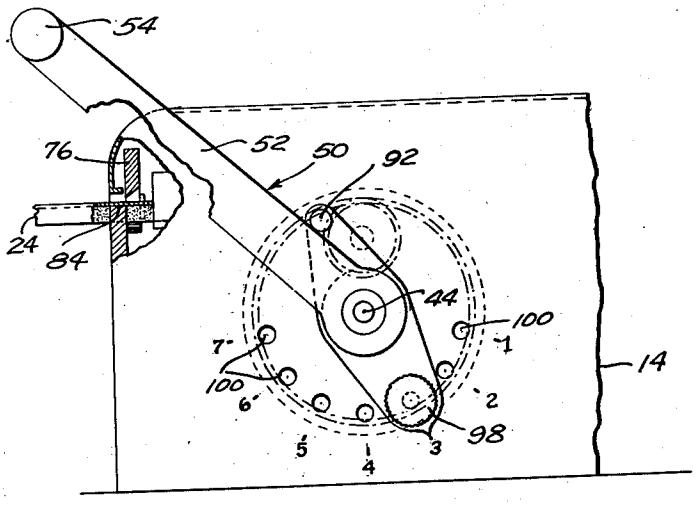


Fig. 4

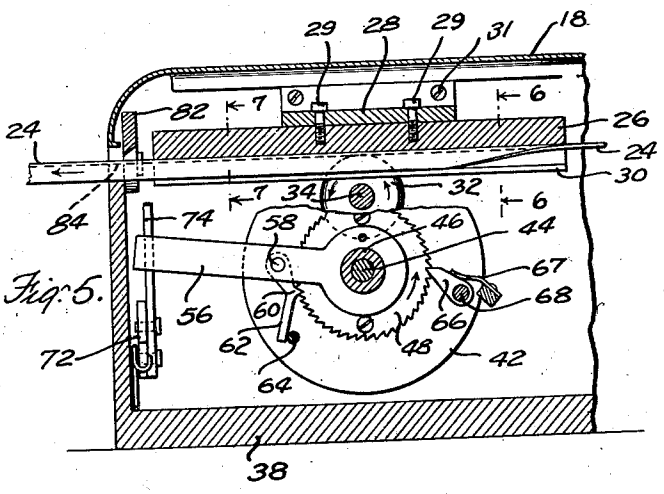


Fig. 5.

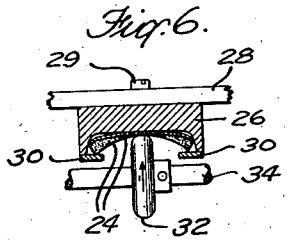
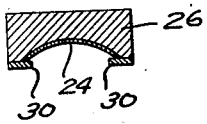


Fig. 6.

Fig. 7.



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METHOD AND APPARATUS FOR DISPENSING GUMMED TAPE

Ralph E. Engberg, Clayton, Mo.

Application November 11, 1943, Serial No. 509,863

15 Claims. (Cl. 164—42)

This invention relates to methods and apparatus for feeding sheet material, and more particularly relates to feeding of strip material, especially such material when coated with a non-drying or pressure sensitive adhesive. The invention is particularly adapted for application to the dispensing in relatively short lengths of pressure sensitive adhesive tape for sealing packages and similar uses.

It is an object of this invention to provide a method and apparatus for feeding tacky pressure sensitive tape which utilizes the tackiness of the tape to aid in the feed thereof.

It is a further object to provide such method and apparatus whereby any desired lengths of tape may conveniently and easily be fed.

A further object is to utilize the natural stiffness of pressure sensitive tape when shaped in channel form to permit use of a push type feed wherein the feed means engages the tape near the point of supply and pushes it forward through the machine to the point of delivery.

Another object is to provide such a machine in which the feed means will contact the tacky side of the tape and will by the adhesion thereof draw the tape from the roll and thrust it forward through the machine, at the same time making provision for removal of the tape from the feed means after it passes the feed device.

Other and further objects and advantages of the invention will appear more fully from the following detailed description and drawings of a preferred manner of practising the method of this invention, and a preferred embodiment of the apparatus thereof, which detailed description is to be taken as illustrative of the principle involved and of the best mode now known to me for practising the same and is not to be understood as limiting in any way.

In the drawings:

Figure 1 is a perspective view of a dispenser illustrating the delivery of a strip of tape from the delivery point thereof;

Figure 2 is an enlarged perspective view of the machine shown in Fig. 1 with parts of the outside cover broken away for illustrative purposes, the mechanism being shown in position at the end of a feed stroke just prior to operation of the severing means;

Figure 3 is a transverse vertical section taken on the line 3—3 of Fig. 2;

Figure 4 is an enlarged side elevation of the front portion of the apparatus showing the feed handle side with parts broken away to illustrate the feed aperture;

Figure 5 is a longitudinal vertical section of the front portion of the apparatus taken on line 5—5 of Fig. 3, illustrating a position of the parts during delivery of a strip of tape;

Figure 6 is a section taken on line 6—6 of Fig. 5 looking in the direction of the arrows; and

Figure 7 is a section taken on line 7—7 of Fig. 5 looking in the direction of the arrows.

The machine shown in the drawings has side walls 12 and 14, front wall 16, all of which may be integral or suitably secured to one another, and top cover 18, removable for insertion of a new tape supply, or cleaning or inspection of parts. A shaft 20 is removably journaled in side walls 12 and 14 and supports a supply roll 22 of tacky tape 24.

The tape 24 is drawn from the roll as shown particularly in Fig. 2, tacky side down in the example illustrated, and is fed into tape guide block 26 which, at or near the point of entry of the tape, has a cross-sectional configuration as shown in Fig. 6 (see also Fig. 5). The tape is forced into arcuate or channel form by the changing form of the block which, from a beginning at the point of entry of the tape to the block, at which point the top wall of the channel is flat, the tape entering flat, is gradually formed to the shape illustrated in Fig. 6, wherein the side walls have begun to close in on the tape, turning the side edges thereof downward, until finally the tape assumes the arcuate shape of the block as shown in Fig. 7 and is held in the block by the inwardly extending flanges 30. From this point on the shape does not change, the tape passing over a feed element, past severing means and to the delivery point of the machine.

The tape guide block 26 may suitably be mounted beneath plate 28 by screws 29 for ready removal and replacement by blocks of different sizes for varying widths of tape. Plate 28 is secured to the side walls of the machine in any convenient manner, as by screws 31.

The tape 24 is drawn from the supply and thrust forward in the machine by a movable feed element shown in the form of a pressure or feed roller 32 mounted on the shaft 34 for rotation in tape advancing direction only, in a manner to be described. As will be recognized by those familiar with the art, the feeding of tacky tape by a feed roller in contact with the tacky side of the tape presents great practical difficulties, and push feed machines have heretofore been found practically impossible to design, because the tacky tape on contacting the feed roller with

its tacky side wraps itself about the feed roller and thus prevents further operation of the machine. This difficulty has been overcome in the present invention by confining the tape in a channel, while forcing the center of the web upward into arcuate shape, whereby the combination of the natural stiffness of the tape in arcuate shape and its confinement in the guide block 26, where it is supported by the flanges 30, prevents the tape from wrapping about the feed roller and permits separation of the surface of the roller from the web after frictional or adhesive contact sufficient to draw the web from the roll has taken place.

The feed roller 32 is mounted on shaft 34 which is journaled for rotation in side wall 12 and interior bracket 36 through which it extends. Bracket 36 may suitably be secured to the base 38 of the machine. The extending end of shaft 34 carries spur gear 40 rigidly mounted thereon. Gear 40 is driven by internal gear 42 which is mounted on shaft 44 journaled for rotation in side wall 12, partition 36 and sleeve 46, which sleeve is itself rotatably mounted in an opening in side wall 14 (see Fig. 3). Ratchet wheel 48 is secured to gear 42 and rotates therewith. Firmly mounted on sleeve 46 and rotatable to turn said sleeve is handle 50 which includes arm 52 and handpiece 54. Secured to sleeve 46 and rotating therewith is a ratchet arm 56 carrying pawl 60, which is pivotally mounted on pivot 58 for engagement with ratchet 48. Pawl 60 also has a finger 62 which meets pin 64 secured in side wall 14 under certain circumstances for a purpose to be described. Pawl 66 is pivotally mounted on pin 68 secured in side wall 14 and is spring pressed against ratchet 48 by spring 67. Spring 70, the ends of which are secured respectively in the hub of arm 56 and in side wall 14, is stressed by a forward stroke of handle 50 and tends to return the handle to normal position.

Means are preferably provided for severing the tape, such means being shown as comprising the cutter actuating lever 72 pivoted to the front of the frame, and adapted to be engaged by the end of the ratchet arm 56 at the forward end of the stroke of the actuating handle. The lever 72 is connected by link 74 to the cutter 76 which is pivoted at one end to the front of the frame. The cutter preferably has a beveled sharpened edge and may be formed with a central pointed portion 77 which will pierce the central part of the strip of tape, and then sever it with a shear action taking place from the central point towards the edges of the strip. The front of the machine is provided with a tape issuing slot 80 which has a bottom wall or shoulder 84 forming a ledger blade for co-action with the cutter in shearing the tape. The shoulder is preferably convex and curved to the same shape as the curved tape fed from the guide block 26. When the cutter comes down to cut the tape it forces the tape into engagement with the shoulder 84 with sufficient pressure to cause the tacky side of the tape to adhere to such shoulder so that the severed piece of tape is supported in position for removal by the operator. It is desirable to support the tape in this manner until removed, so that it will not come in contact with any object to which it might accidentally adhere before being taken by the operator and applied to the point of use. Furthermore by causing the tape to adhere to the arched wall, the tape is retained in its channel shape so that it will project more or less straight out from the machine, is easily grasped, and will be prevented from curling down and touching the front of the machine to which it might stick, and from touching the table or support upon which the machine rests.

Operation of the machine is as follows: the feed handle 50, on being drawn forward rotates sleeve 46 and arm 56 in a counterclockwise direction (see Fig. 5). This causes pawl 60 to engage ratchet 48, with which rotates internal gear 42, thus driving gear 40. This drives feed roller 32 which rotates in contact with the tacky side of the tape in the tape guide and feeds the tape. When arm 62 of the pawl meets pin 64, pawl 60 is disengaged from ratchet 48 and feeding ceases. Backward rotation of the feed roller 32 is prevented by pawl 66 which is constantly engaged on ratchet 48 by spring 67. After feed ceases arm 56 may continue its travel and strike lever 72, and cutter 76 is thereby operated to sever the delivered strip. Spring 70 returns to feed handle, pawl 60 riding freely over ratchet 48 and the delivered strip may be removed and the machine is ready to be operated again.

As may be seen from the description above, any desired length of strip may be delivered from the machine, especially since two or more strokes of handle 50 may be made without each time bringing the handle far enough forward to actuate the cutter. In ordinary practise, however, it will not be desired to deliver strips of such lengths and because of this, provision may be made for positive limitation of the length of strip obtainable on one stroke and for variation of that length. Any suitable means to attain this end may be employed, but I have found especially suitable the following:

The plate 90 is rotatably mounted upon bearing sleeve 46 outside of side wall 14 and has rigidly mounted at one end thereof stop pin 92. At the other end of the plate is an inwardly directed pin 94 pressed by spring 96 and withdrawable outwardly against pressure of spring 96 by pulling knurled knob 98. Index holes 100 are formed in the wall 14 and are adapted to receive pin 94. The pin 94 may be inserted into a desired hole 100 and stop pin 92 will then prevent the back travel of the handle 50 beyond its position as determined by the particular hole chosen, thus controlling the length of strip to be delivered by a stroke of handle 50 as the disengagement of the feeding means and the cutting occur at fixed times in the forward stroke of the handle. The internal gear 42 having many more teeth than the pinion 40 causes the latter to be rapidly rotated so that small movement of the operating handle will feed a substantial length of tape.

While I have illustrated and described in detail certain preferred forms of my invention, it is to be understood that changes may be made therein and the invention embodied in other structures. I do not therefore desire to limit myself to the specific construction illustrated, but intend to cover my invention broadly in whatever form its principles may be utilized.

I claim:

1. The method of dispensing pressure sensitive adhesive tape which includes the steps of forming the strip into transverse arcuate shape with the tacky side in, bringing the tacky side of the tape into contact with feed means with sufficient pressure to cause the strip to adhere to the feed means by the action of its own tacky surface, and advancing the feed means to feed tape while maintaining said strip in substantially transverse arcuate shape.

2. The method of feeding pressure sensitive adhesive tape which includes the steps of bending the tape between an arcuate form engaging the non-tacky side of the tape and a movable feed element engaging the tacky side of the tape to form the tape into arcuate shape in transverse section and to cause the feed element to adhere to the tacky surface of the tape, and advancing the feed element to feed the tape through said arcuate form, the adhesion between the tape and the feed element causing the tape to advance with the feed element.

3. In a method for feeding tacky tape by means of a feed roller, the step which includes maintaining the tape in transverse arcuate form tacky side in during and after contact with the feed roller.

4. The method of presenting a strip of tacky material for delivery which includes the steps of forming the material into arcuate cross-section tacky side in, and severing said material while causing the severed part of the material to adhere to a convex surface of substantially the same shape as the arcuate shape of said tape.

5. The method of presenting a strip of tacky material for delivery which includes the step of adhering a severed section of the strip to a surface curved transversely of the length of the strip so as to support said strip for delivery in a substantially straight piece, curved transversely into channel shape.

6. The method of feeding pressure sensitive adhesive tape which consists of advancing the tape in contact with a guide surface extending longitudinally of the tape and concave transversely of the tape, by means of a feed roller rotatable about an axis transverse to the tape, causing said roller to engage the tacky surface of the tape, and rotating said roller to feed the tape along the guide surface while supporting the edges of the tape for travel in a substantially straight path longitudinally of the tape.

7. In a machine for feeding pressure sensitive adhesive tape, means to hold a supply of tape, feed means to engage the tacky side of the tape and draw the tape from the supply and thrust it forward in the machine, and forming means mounted to engage the strip as it comes from the supply and form it into arcuate shape for engagement by said feed means, said feed means being so formed, constructed and arranged as to engage the tape in such arcuate shape without further deformation of the tape.

8. In a machine for feeding pressure sensitive adhesive tape, means to hold a supply of tape, an arc shaped guide mounted to contact the non-tacky side of the tape to form the tape into arcuate cross section, a feed roller mounted for rotation in tape feeding direction forwardly of the beginning of said guide to contact the tacky side of said tape while in arcuate form and feed the tape, said roller having pressure contact with said tape while it is supported by said guide.

9. In a machine for feeding strip coated on one side thereof with pressure sensitive adhesive, a supply of strip, means to feed the strip including an arc shaped guide member adapted to engage the non-tacky side of the strip, and a driving member mounted to contact the coated side of said strip and to press it against said guide member while drawing it from said supply.

10. In a machine for feeding strip coated with a pressure sensitive adhesive, means to form said strip into arcuate cross-section, and feed means to feed said strip while in arcuate form by contact with the coated portion thereof, said feed means engaging only the coated side of the strip.

11. In a machine for feeding strip coated on one side thereof with pressure sensitive adhesive, means to feed the strip, forming means to form the strip into arcuate shape, said forming means comprising a guide member having on one side thereof and at one end thereof a flat portion for initial contact with the strip, a gradually deepening depression formed in said side until the cross section of said guide has an arcuate cut therein to accommodate the strip in arcuate form and holding means at each end of said arc to hold the strip from escape therefrom.

12. In a machine for dispensing pressure sensitive adhesive strip, an elongated guide for forming and holding said strip in arcuate form comprising a member having an arcuate shaped depression formed therein, and narrow flanges at each side of said depression to engage the edges of the strip and hold the strip in said depression, the guide being open between said flanges so as to expose the concave face of the strip.

13. In a machine for dispensing pressure sensitive adhesive strip, a strip guide of arcuate cross section having flanges at each edge thereof for supporting the edges of the strip, and a feed roller adapted to engage the adhesive side of the strip and press the non-adhesive side of the strip against said arcuate guide, while feeding the strip, said guide and supporting flanges being substantially straight in the direction of feed of the strip, so that said strip is progressively engaged and fed by said feed roller, and is progressively detached from said roller so as to be prevented from following the roller around the circumference thereof.

14. In a machine for feeding tacky pressure sensitive adhesive tape, means to form the tape into arcuate shape tacky side in, and a feed roller in contact with the tacky side of said arcuately shaped strip, said feed roller having a contact surface of convex cross-section and of less radius of curvature than the radius of curvature of the arcuate tape.

15. In a strip feeding machine having an oscillating feed handle, means to predetermine the length of a strip to be fed including an adjustable plate adjustable about the center of oscillation of the handle, one end of said plate carrying a stop which extends into the path of said handle and the other end of said plate carrying a retractable pin, and fixed means with which said retractable pin is adjustably registrable to determine the setting of said plate and thereby limit the amount of travel of said handle before it reaches said stop and thus limit the length of strip feedable on one stroke of the feed handle.

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