May 28, 1974 H. ROTHENBERGER 3,813,274

HANDHELD APPLICATOR FOR ADHESIVE TAPE

Filed Dec. 13, 1971 2 Sheets-Sheet 1

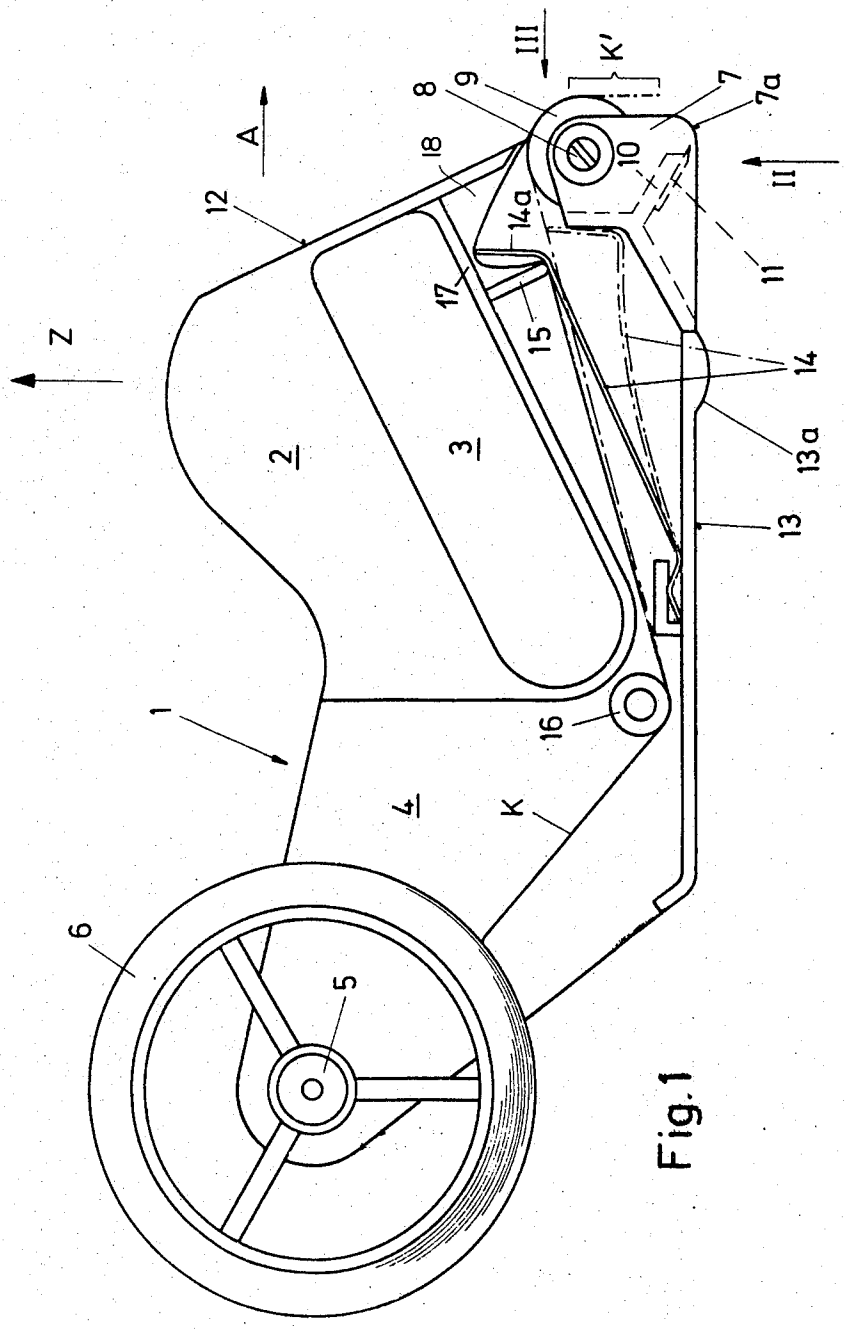


Fig. 1

HANDHELD APPLICATOR FOR ADHESIVE TAPE

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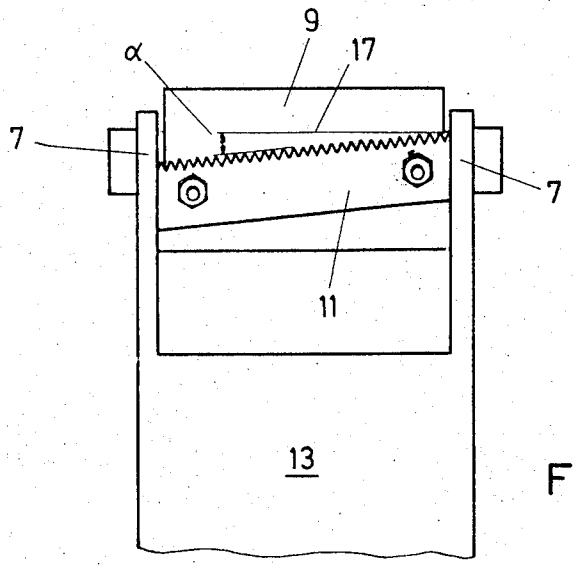


Fig. 2

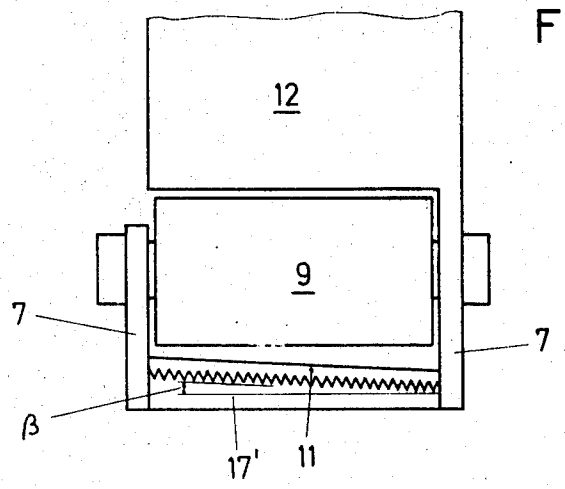


Fig. 3

United States Patent Office 3,813,274
Patented May 28, 1974

3,813,274

HANDHELD APPLICATOR FOR ADHESIVE TAPE

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Filed Dec. 13, 1971, Ser. No. 207,347
Claims priority, application Switzerland, Dec. 17, 1970, 18,735/70
Int. Cl. B32b *31/18*
U.S. Cl. 156—527 6 Claims

ABSTRACT OF THE DISCLOSURE

A handheld dispenser and applicator for tape coated with pressure sensitive adhesive of the type including a supporting body provided with a handle, a tape reel, an exposed pressure roller, guides for guiding tape from the reel past the roller to an object to be taped during application of the tape under the manually generated pressure of the roller, and a blade for cutting the trailing end of the applied piece of tape, is provided with a leaf spring which engages a portion of the tape between the roller and the reel and laterally deflects the engaged tape portion as soon as the tension caused by application of the tape is relaxed when the trailing tape end is cut off. The leading end of the tape remaining on the applicator is thereby pulled back to the roller and is attached under the pressure of the roller during the next taping operation.

This invention relates to handheld applicators and dispensers of adhesive tape, and particularly to an improvement in the known applicators carrying a reel from which tape is guided in a path to a roller by means of which the tape is pressed against the object to be taped while the applicator is moved along the object, thereby unreeling more tape under the tension exerted by the initially fastened leading tape end.

The known devices are equipped with a cutting blade which cuts the tape at a point spaced from the roller in a direction away from the reel when a taping operation is completed so that the new leading end projects slightly beyond the pressure roller when the next taping operation begins. When the pressure roller is set down on the object to be taped next and moved along the surface of the object, it attaches to the object a length of tape which begins a few millimeters from the free end, and it is necessary to smooth down and attach the free end manually, or first to move the applicator backward to fasten the free end before movement away from the free end can begin.

It is a primary object of the invention to avoid such manual smoothing down of the free tape end or reciprocating movement of the applicator along an object to be taped.

With this object and others in view, as will hereinafter become apparent, the invention provides a yieldably resilient deflecting device mounted on the supporting structure of the applicator in such a manner as to engage a portion of the tape intermediate the reel and the pressure roller and tending to deflect the engaged tape portion transversely of the path. An abutment limits the tape deflection. The limit is selected in such a manner that the deflecting device, which is normally inactivated by the tension of the tape during application, deflects the tape and thereby pulls the free end back when the tape is cut at the completion of a taping operation, so that the free end is located on the pressure roller for the next operation. This makes it unnecessary manually to smoothen and depress the free tape end or to move the roller backward at first before moving it along the taped object in a direction to unreel more tape.

Other features, additional objects, and many of the attendant advantages of this invention will readily become apparent as the invention is better understood from the following detailed description of a preferred embodiment when considered in connection with the appended drawing in which:

FIG. 1 shows a handheld tape dispenser and applicator of the invention in side elevation;

FIG. 2 is a fragmentary bottom view of the apparatus of FIG. 1 taken in the direction of the arrow II in FIG. 1; and

FIG. 3 shows a portion of the apparatus of FIG. 1 in front elevation taken in the direction of the arrow III.

Referring now to the drawing in detail, and initially to FIG. 1, there is seen the body **1** of a tape dispenser and applicator which is a unitary plastic molding and carries the operating elements some of which are integrally molded parts of the body **1**. A relatively heavy body portion **2** forms a handle provided with an opening **3** dimensioned to receive four fingers of a normal adult hand. A plate **4** extending rearwardly from the handle portion **2** carries a hub **5** for a reel **6** of Cellophane tape coated with pressure sensitive adhesive on the face directed toward the axis of rotation of the reel.

As is better understood from joint consideration of FIGS. 1–3, the front end of the supporting body **1** is integral with an approximately U-shaped bracket **7** in which the shaft **8** of a cylindrical roller **9** is mounted. The roller **9** projects beyond the body **1** so that the exposed roller portion may engage an object to be taped. A mounting plate **10** between the two sides of the bracket **7** is provided with a cutting blade **11** having a serrated or toothed edge.

Tape K is attached by the roller **9** to an object to be taped by manual pressure exerted in the direction of the arrow A, and the applicator is thereafter moved along the surface of the object, assumed to be vertical, in the direction of the arrow Z. The leading end of the tape being fastened to the object, more tape is unreeled during the movement of the applicator and fastened to the object by the rotating roller **9**. This aspect of tape application is basically conventional, and so are the structural elements of the applicator as far as they have been described hereinabove.

The tape is guided in a path having two straight portions from the reel **6** to the roller **9** during the usual unreeling by a guide roller **16** knurled to prevent sticking of the tape, past the free edge of an abutment plate **15** integral with the body **1** and the angularly offset free end **14***a* of a leaf spring **14**, and through a narrow gap between the roller **9** and a wall or shield **12** of the handle portion **2** as is indicated in chain dotted lines. The leaf spring **14** is mounted on a flange **13** of the body **1** in such a position that a portion of the spring immediately adjacent the offset end portion **14***a* tends to move into engagement with the abutment plate **15** when the tape K is not tensioned.

At the end of a taping operation, the applicator body **1** is swung first about the axis of the roller **9** and thereafter about the corners **7***a* of the bracket **7** counterclockwise, as viewed in FIG. 1, until the serrated edge of the blade **11** engages the tape and cuts the same, leaving a leading edge portion K' projecting beyond the roller **9**, and releasing the tension in the tape which is still on the applicator. The tape tension held the spring **14** in the position indicated by chain-dotted lines, and relaxation of the tension permits the spring to move into the fully drawn position, thereby deflecting the tape K into a space **18** partly bounded by the abutment plate **15**, the wall **12**, and the roller **9**, whereby the tape is moved out of its practically rectilinear normal path from

the roller **16** past the abutment plate **15** and the wall **12** tangentially toward the roller **9**. The deflection is limited by the abutment plate **15** and dimensioned so that the free tape end K' is retracted until its transverse edge lies on the surface of the roller **9**, ready for application to the next object to be taped without requiring an auxiliary manual operation nor a reciprocating motion of the body **1** to ensure adhesive bonding of the leading tape edge to the object.

Cellophane tape is not readily cut by a smooth blade, and the cutting edge of the blade **11** is therefore toothed or serrated. Even so, relatively great effort is required for cutting the tape, and it is easier to cut the tape when the cutting force applied is concentrated in a small portion of the tape which travels across the width of the tape. It is known to arrange cutting blades in tape applicators in a manner to cut gradually across the tape width as the applicator is pivoted about the axis of the pressure roller and the like, but the known blades make a cut which is obliquely inclined to the tape edges, and the resulting free tape end is not readily accommodated on the surface of the pressure roller **9** when pulled back by the spring **14**.

The blade **11** of the invention is therefore attached to the mounting plate **10** in the position evident from joint consideration of FIGS. 2 and 3. The longitudinal end of the cutting edge on the blade **11** which is farthest from the reel **6** in a forward direction is also farthest from the roller **9** in a downward direction in the position of FIG. 1 and is on the right in FIGS. 2 and 3. This longitudinally terminal portion of the serrated cutting edge thus makes contact first with the tape K when the body **1** is pivoted about the axis of the roller **9** and thereafter about the bracket corners **7***a*. At this moment, the tape is located in a plane tangential relative to the roller **9** and passing through the point of engagement between the tape and the front, bottom end of the blade edge. The plane is indicated in the bottom plan view of FIG. 2 by a line **17** which defines a small acute angle α with the direction of elongation of the blade edge. A plane **17'** which is perpendicular to the plane **17** and parallel to the axis of the roller **9** also encloses a small acute angle β with the cutting edge of the blade **11**, as is seen in FIG. 3.

The edge of the blade thus slopes gently upward and rearward from the point of its first engagement with the tape K during pivoting of the body **1**, and the angles α and β are readily chosen in such a manner that the blade **11** cuts gradually across the width of the tape K at right angles to the lateral tape edges. When the spring **14** retracts the free tape end K', the cut tape edge ultimately lies on the cylindrical surface of the roller **9** in a position which it is parallel to the axis of roller rotation, and ready to be pressed against the next body to be taped. A rounded projection **13***a* on the flange **13** is passed over the applied tape to improve its adhesion to the taped object if so desired.

When the next taping operation is started, the cut edge of the leading tape end is pressed against the object to be taped by the roller **9**, and the applicator is moved in the direction of the arrow Z. Initially, the needed amount of tape is taken from the bulge of the tape deflected by the free end **14***a* of the spring **14** which offers relatively little resistance to pulling forces, and thus permits the pulling force to be held small enough so as not to tear the initially attached free end of the tape from the surface of the object. The initial pulling force cannot be transmitted to the reel **6** because the tape is clamped between the leaf spring **14** and the abutment plate **15**. Only after the deflected tape reserve has been consumed, and the tape has been secured to the object over a relatively large, adhesive-covered interface, is tape pulled from the reel under the relatively high tension necessary to peel successive tape layers on the reel **6** from each other. This tension is sufficient to keep the leaf spring **14** out of the normal rectilinear path of the tape between the rollers **16** and **9**.

When not in use, the applicator body rests on the flange **13** and the projection **13***a* as shown in FIG. **1**. The position of the body **1** during use depends entirely on the configuration of the object that it is desired to tape, and will normally be different from the position seen in FIG. 1. For special purposes, the supporting structure of the applicator may be given a shape very different from that of the body **1**, and the several operating elements may not be integral with the supporting structure where shown and described to be integral in the illustrated preferred embodiment, and vice versa.

It should be understood, therefore, that the foregoing disclosure relates only to a preferred embodiment of the invention, and that it is intended to cover all changes and modifications of the example of the invention herein chosen for the purpose of the disclosure which do not constitute departures from the spirit and scope of the invention set forth in the appended claims.

What is claimed is:

1. A tape applicator comprising:

(a) a support;

(b) a handle fastened to said support;

(c) mounting means for mounting a reel of tape on said support;

(d) an exposed pressure roller on said support, said roller having an axis;

(e) guide means on said support for guiding adhesive-coated tape in a path from said reel past said roller during application of the tape to an object to be taped under the manually generated pressure of said roller;

(f) cutting means offset on said support from said roller in a direction away from said reel along said path for cutting the trailing end of the applied piece of tape, said cutting means including

(1) a blade having an elongated cutting edge and

(2) means mounting said blade on said support in a position in which a longitudinally terminal part of said cutting edge first engages said tape during said cutting of said trailing end, the point of engagement defining a first plane tangential to said roller and a second plane perpendicular to said first plane in said point of engagement and parallel to said axis, the direction of elongation of said cutting edge defining a small acute angle with each of said planes;

(g) yieldably resilient deflecting means mounted on said support for engagement with a portion of said tape in said path intermediate said reel and said roller and for deflecting the engaged portion transversely of said path; and

(h) abutment means for limiting the deflection of said tape by said deflecting means.

2. An applicator as set forth in claim **1**, further comprising clamping means for clamping another portion of said tape intermediate said first-mentioned portion thereof and said reel to said support in response to deflection of said first-mentioned portion to the limit defined by said abutment means.

3. An applicator as set forth in claim **2**, wherein said deflecting means include an elongated leaf spring having a free longitudinal end portion angularly offset from an adjacent portion of said leaf spring, said abutment means including an abutment member on said support, said leaf spring being mounted on said support for resilient engagement of said abutment member by said adjacent portion of the leaf spring, said guide means guiding said tape between said adjacent portion and said abutment member, and said free end portion engaging said portion of said tape.

4. A tape applicator comprising:

(a) a support having a wall;

(b) a handle fastened to said support;

(c) mounting means for mounting a reel of elongated tape on said support;

(d) an exposed pressure roller on said support, said roller having an axis;

(e) guide means on said support for longitudinally guiding adhesive-coated tape from said reel past said roller during application of the tape to an object to be taped under the manually generated pressure of said roller;

(f) cutting means offset on said support from said roller in a direction away from said reel for cutting the trailing end of the applied piece of tape;

(g) yieldably resilient deflecting means mounted on said support for engagement with a longitudinal portion of said tape intermediate said reel and said roller for deflecting the engaged portion transversely to the direction of tape elongation; and

(h) abutment means on said support for limiting the deflection of said tape by said deflecting means,

(1) said abutment means including an abutment member,

(2) said abutment member, said wall, and said roller bounding a space, and

(3) said deflecting means deflecting the engaged portion of said tape into said space.

5. An applicator as set forth in claim 4, said wall and said roller defining therebetween a narrow gap.

6. An applicator as set forth in claim 4, wherein said cutting means include a blade having an elongated cutting edge and means mounting said blade on said support in a position in which a longitudinally terminal part of said cutting edge first engages said tape during said cutting of said trailing end, the point of engagement defining a first plane tangential to said roller and a second plane perpendicular to said first plane in said point of engagement and parallel to the axis of said roller, the direction of elongation of said cutting edge defining a small acute angle with each of said planes.

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U.S. Cl. X.R.

156—576, 579