

Jan. 9, 1973

V. TRUEB ET AL

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ADHESIVE TAPE DISPENSERS

Filed Feb. 11, 1971

2 Sheets-Sheet 1

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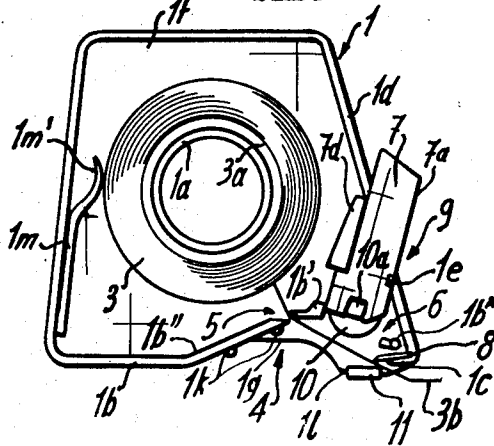


Fig. 1

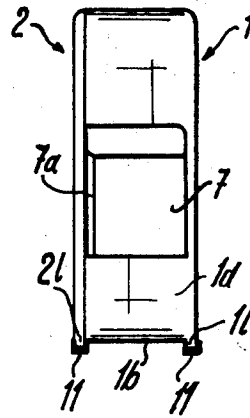


Fig. 2

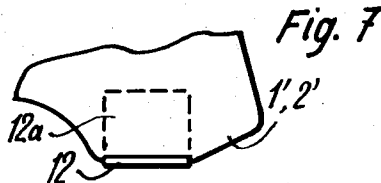


Fig. 7

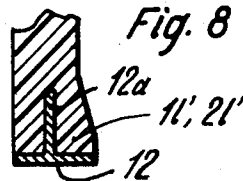


Fig. 8

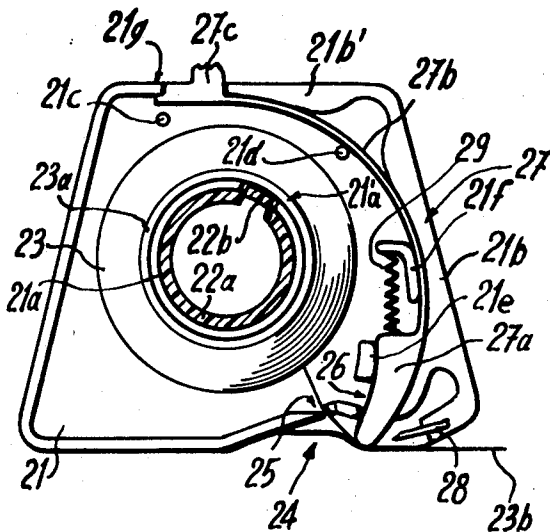


Fig. 9

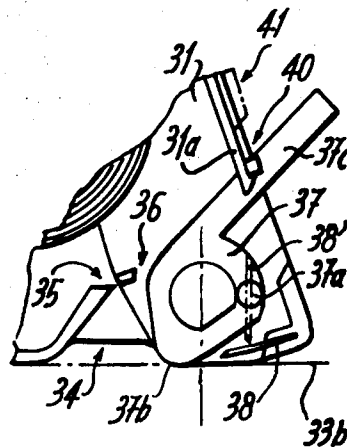


Fig. 10

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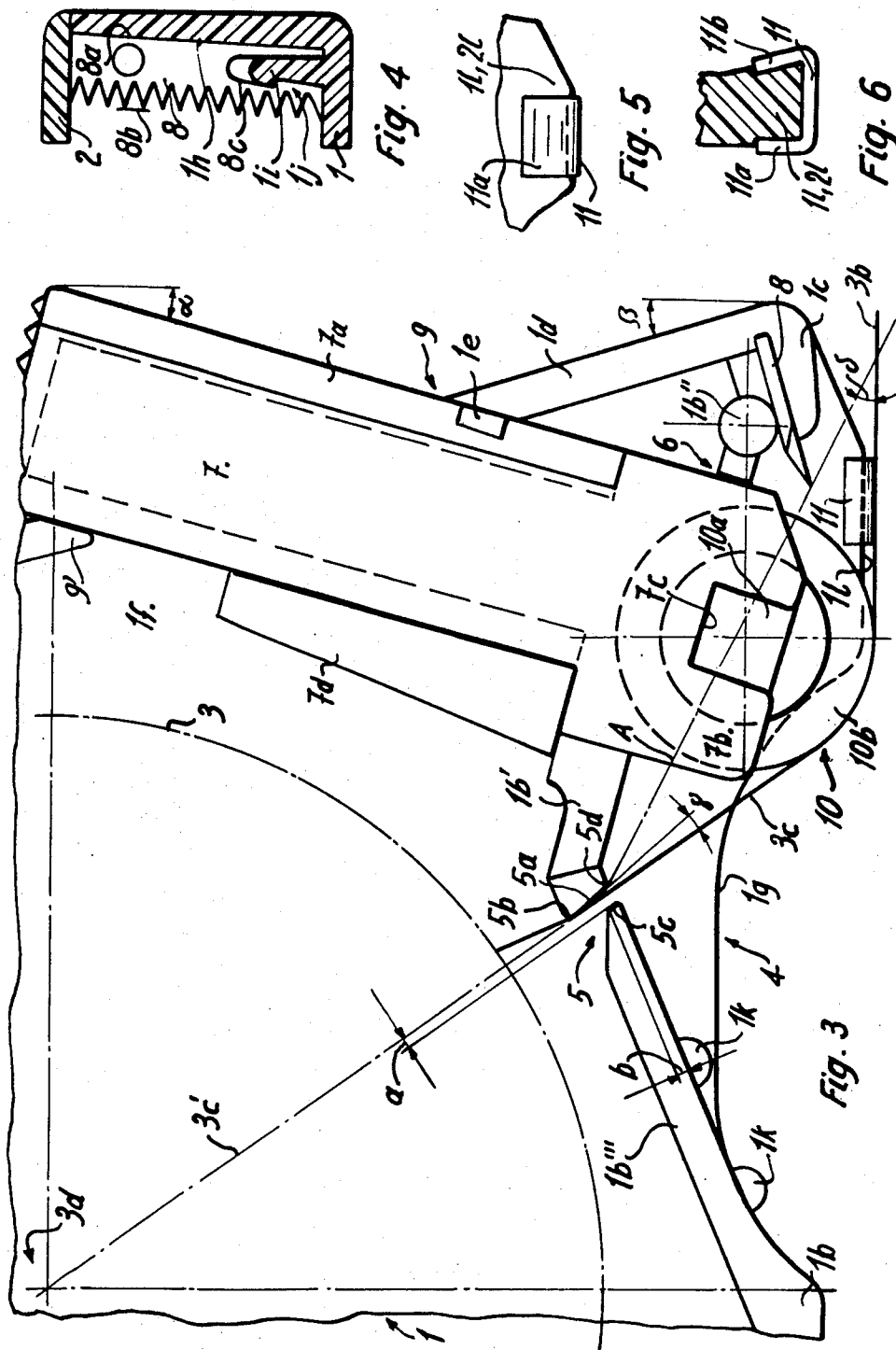
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ADHESIVE TAPE DISPENSERS

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Int. Cl. B32b 31/18, 31/20

U.S. Cl. 156—576

18 Claims

ABSTRACT OF THE DISCLOSURE

A hand-operated dispenser for adhesive tape comprising a casing adapted for rotatably supporting a roll of adhesive tape, a more or less plane under-surface of the casing adapted to glide over the surface of the article to be taped, an inverted trough-shaped portion on the underside of the casing, located rearwardly with respect to the gliding surface, a slit-shaped opening for the tape in said trough-shaped portion, a bridge piece separating said slit from an opening for the lower end of a movable member adapted with its lower projecting end to impart pressure and a change of direction to the tape, and a knife placed forward of the trough-shaped portion with the knife edge pointing towards but ending above the plane of the under-surface of the case.

This invention relates to hand-operated dispensers for adhesive tapes.

The invention is concerned with devices of the type having a casing rotatably housing a roll of adhesive tape, a more or less plane under-surface of the casing adapted to glide over the surface of the article to be taped, a tape opening through which the tape issues, a knife on the underside of the casing and a movable member projecting through an opening in the lower surface of the casing and adapted to apply pressure to the tape and act as a guide to change its direction. The movable member is slidably mounted in the casing and capable of assuming two positions. In one lower position of the movable member, the portion of the tape to be cut off by the knife lies below the knife and in the other position above the knife.

Such a known dispenser has however a number of disadvantages. The adhesive tape was passed through a slit disposed in a member adapted to impart a change of direction on the tape and next to a pressure roller. The tape could only be made to stick when this member was in its upper position. The drawbacks are most apparent as regards the end of the tape left after the cutting operation. This end was invariably too short, never of the same length and had different shapes. Proper adhesion of the tape thus became a matter of chance. It was practically impossible to pull out the adhesive tape by hand as is sometimes necessary. Moreover, after the cutting operation, the tape became stuck and was thus prevented from slipping back into the casing. The opening of the casing had also such large dimensions that the roll of adhesive tape easily dried out.

It is the object of the present invention to avoid all these disadvantages.

According to the present invention, I provide a hand-operated dispenser for adhesive tape comprising a casing adapted for rotatably supporting a roll of adhesive tape, a more or less plane under-surface of the casing adapted to glide over the surface of the article to be taped, an inverted trough-shaped portion on the underside of the casing, located rearwardly with respect to the gliding surface, a slit-shaped opening for the tape in said trough-

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shaped portion, a bridge piece separating said slit from an opening for the lower end of a movable member adapted with its lower projecting end to impart pressure and a change of direction to the tape, and a knife placed forward of the trough-shaped portion with the knife edge pointing toward but ending above the plane of the under-surface of the casing.

By arranging the opening through which the tape issues in the trough-shaped portion, the end of the tape left after the cutting operation is so long that it can be readily seized and manually pulled out. The tape, to a large extent, is thus prevented from accidentally sticking to the support or surface on which the dispenser has been placed. The provision of a bridge piece increases the distance between the opening through which the tape issues and the movable member which imparts a change of direction to the tape and thus again increases the length of tape left after this cutting operation. According to a further feature of the invention, the tape exit slit is narrow and inclined as a result of which the end of the tape is located under the movable member in the proper position for the next sticking operation (application of tape).

A further feature of the invention resides in that the tape exit slit is arranged and constructed in such a manner that an imaginary line running from the point where the movable member changes the direction of the tape to the opening of said slit when projected backwards, runs through the central portion of the bearing for the roll of tape.

Another feature of the invention resides in that the plane of the upper surface of the slit facing the tape is oriented at an acute angle to the path of the tape between said slit and the lower end of the movable member imparting a change of direction to the tape and the lower surface of the slit is formed by a projecting nose which is offset in relation to the edge of the upper surface at which the tape changes direction. In this way the tape is unrolled with the least trouble and the sticking of the tape end is prevented immediately after the cutting operation. Further the tape end is properly oriented for the next tape application or sticking operation.

The roll of adhesive tape is subjected to the action of a suitable braking means such as a resilient tongue or spring mounted on the inside of the casing and the end of the tape is thus prevented from slipping back into the casing.

When using low-grade thermoplastic material for the parts of the casing, the bottom portion of the casing and cover are subjected to undue wear and tear. To permit the use of such low-grade easily worn material, the bottom areas or surfaces of the casing and cover may be made in part of wear-resistant material. This can be achieved for example by the provision of glide shoes or ridges.

Further features of the invention will be clear from the following description having reference to the accompanying drawings showing several forms of the invention. In the drawings:

FIG. 1 shows the interior of the dispenser with the cover of the casing removed;

FIG. 2 shows the dispenser according to FIG. 1 in front view with the casing cover in place;

FIG. 3 shows a detail view to an enlarged scale of a corner of the device of FIG. 1 with the cover removed;

FIG. 4 shows to an enlarged scale a longitudinal section through the knife support in the casing according to FIG. 1;

FIG. 5 shows to an enlarged scale in side view a sliding shoe according to FIG. 1;

FIG. 6 shows a front view of the sliding shoe according to FIG. 5;

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FIGS. 7 and 8 show a different form of sliding shoe in side view and cross-section;

FIG. 9 shows an interior view of a dispenser with an arcuate movable member; and

FIG. 10 shows an interior view of part of the device with the movable member in pivotal form.

In the constructional form according to FIGS. 1-6, reference numeral 1 designates the casing and 2 designates the cover lid which may be placed on the casing with a press-fit.

The casing 1 is formed with a cylindrical bearing sleeve 1a on which the roll of adhesive tape 3 with the core 3a is rotatably supported. A centering sleeve (not shown) is formed on the lid 2 and engages in the bearing sleeve 1a. The lower small side wall 1b of the casing 1 which provides the sliding surfaces is formed as an inverted trough 4. Within the trough are located in the direction of the band feed successively the tape exit slit 5, a bridge piece 1b', and an opening 6 for the lower end of a movable member which is adapted to impart a change of direction to the tape. A knife 8 is arranged in a slot-shaped bearing formed between a wall portion 1c and a bridge piece 1b' limiting the opening 6, the free cutting edge of the knife being downwardly inclined pointing towards the tape as it leaves the casing. The wall portion 1c as well as the knife edge lie above the plane of the small lower side wall 1b of the casing. The movable member 7 is outwardly tilted with respect to the vertical plane at an angle α between 8° and 20° . The upper end of the movable member, which is adapted to be manually operated, extends through a recess or opening 9 in the front side wall 1d of the casing. This side wall is inclined to the vertical plane at an angle β between 10° and 25° . In order to assure that the movable member or slide 7 cannot drop out of the casing 1 when the lid or cover 2 is removed for the purpose of changing the roll of tape 3, the front of the slide is formed with a flattened edge 7a which is engaged by a boss 1c on the edge of opening 9.

The movable member or slide 7 is in the form of a hollow body open at one side and has a downwardly projecting bearing portion 7b which is adapted to hold a roller 10. The stub shafts 10a of roller 10 are clamped with a press-fit in recesses 7c and a resilient surface 10b is arranged thereon so that it can be easily turned. Wear and tear of the bearing is thus prevented.

On the side facing the roll of tape 3, the movable member or slide 7 is formed with a ridge 7d which cooperates at its lower end with a projection 1b' on the cover and its upper end with edge 9' of opening 9, for the purpose of limiting the sliding movement of the slider 7 at either end.

As will be seen in detail in FIGS. 1 and 3, the bottom portion 1f of the casing and the cover 2 (not shown in these figures) are recessed on both sides of the trough-shaped portion 4. In the lower position of the slide 7, the edges 1g of the recesses intersect with the roller surface 10b so that part thereof is exposed. In this way, the dispenser can be easily used for applying the adhesive tape for instance to the edges of a package. The tape exit slit 5 is arranged and oriented in such a manner that an imaginary backward projection 3c' of the path 3c of the adhesive tape extending from the contact with roller (when in its lower position) to the exit slit runs through the central area 3d of the bearing sleeve 1a. The upper side 5a of the slit extends from upper edge 5b (at which the tape changes direction) at an acute angle γ of between 3° and 5° to the path of the adhesive tape. The projecting nose 5c (to which the cut end of the tape is adapted to stick) on the other (lower) side of the slit is displaced downwardly in the direction of travel of the tape with respect to the upper edge 5b. Measured vertically to the path 3c of the tape, the distance a between edge 5b and nose 5c is at most 0.5 mm. The surface of the projecting nose 5c to which the tape is adapted to stick, has a maximum width b in the direction of travel of

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the tape of 0.8 mm. The line A connecting the lower edge 5d of the upper side 5a of the slit (on the side of the slide) and the knife edge extends at an angle β (to the horizontal) of at least 25° .

FIG. 4 shows the manner in which the knife 8 is secured to the knife bearing formed in the casing 1. Parallel to the plane of the drawing, the bearing extends between bridge piece 1b'' and wall portion 1c (see FIGS. 1 and 3). The rear of the bearing 1h is slightly inclined in its longitudinal direction. In this way, the cutting edge 8b, when the knife is inserted, although it runs parallel to the back of the knife, is inclined slightly to the path of the tape. Consequently an improved cutting action is obtained. In the direction of the cutting edge, the knife 8 is secured by a boss 1i which engages in a recess 8c in the knife. By means of an additional engagement 1j formed between boss 1i and recess 8c the knife is retained in its position also when the cover 2 of the casing has been removed.

The advantages which result from the trough 4 in conjunction with the arrangement of the tape exit slit and opening for the movable member which changes the direction of the tape and the knife, will be clear from FIGS. 1 and 3. After the cutting action, the free end of the tape sticks out by such an amount (distance between tape exit slit and cutting edge) that it extends beyond the roller 10 and is ready to be directly stuck to a new surface and also may be seized manually and pulled out. The free end of the tape lies protected in the trough 4 and, since the movable member or slide is lightly clamped in its upper position, the free end is not likely to make any undesired sticking contacts for instance with the surface on which the dispenser is placed. Moreover, the tape exit slit 5 by virtue of the provision of the trough can be located in such a manner that only a slight change in direction of the tape and consequently slight friction takes place within the area of the slit. The slit 5 is located comparatively closely to the roll adhesive tape 3, this being of some importance to ensure sticking of the free end of the tape in the area of the slit.

The dispenser operates as follows:

For directly applying adhesive tape 3b, the dispenser is grasped with the hand and for instance the index finger may apply pressure to the upper end of the movable member or slide 7. The device is now placed onto the article to be taped and during this movement, the roller 10 presses the free end of the tape projecting beyond slit 5 against the surface to which the tape is to be applied. The adhesive tape is then applied to the article by longitudinal movement of the device (see FIG. 3).

To initiate the cutting action, the movable member or slide 7 is released. This is forced into its upper position (see FIG. 1) by the tension in the tape. In this way, the tape comes into contact with the cutting edge of the knife and is severed thereby. As a result of an intentional slight clamping action, the movable member or slide 7 remains in this upper position.

Whilst it is being directly applied, the tape runs from the roll 3 at an acute angle to line 3c' into the slit 5 and continues along line 3c up to the point where it is caused to change direction and moves along the horizontal by the action of roller 10. The tape is thus only subjected to a slight change in direction by the edge 5b, apart from its being re-directed relatively free from friction by the action of roller 10. The edge 5b is so defined that excessive friction is prevented as a result of which adhesion of the free end of the adhesive tape might be prevented at the beginning of the direct sticking-on action. Moreover, vibration is prevented whereby during unrolling of the tape undesired adhesive contact might be caused between the tape and the projecting nose 5c. On the other hand, the distance a (between edge 5b and projection 5c) is designed to be less than 0.5 mm. and in the case of small, thin tapes is about 0.3 mm. so that the tape after it has

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been cut off, comes immediately into adhesive contact with projecting nose 5c and the free end of the tape is held securely in position ready for its next application. Of advantage is the slight vertically off-setting of the edge 5b in relation to the projecting nose 5c as far as adhesion of the free end of the tape on the projecting nose 5C is concerned. The portion of the tape located below the edge 5b, immediately after the cutting action under the action of the tension in the tape and also of edges 5b and 5d is subjected to an angular change in direction towards the left. The most useful effect of this angular movement is to ensure quick adhesion of the tape to the projecting nose. This effect is greatest when seen in the direction of travel of the tape, slightly below edge 5b, whilst the action is practically zero at the level of the edge 5b proper and becomes without effect where its distance is too great as a result of flexibility of the tape.

In addition, the offset arrangement causes the free end of the tape to be oriented towards roller 10 so that the end of the tape is located beneath roller 10 and is located in the correct position for the next direct application. In this connection, the edge 5b in imparting a change in direction to the tape, straightens the tape and removes from the tape any twist which may have been imparted thereto as a result of it having been wound up on roll 3. The width of the projecting nose 5c is less than 0.8 mm. so that adhesive action of the free end of the tape is just right and the end of the tape becomes immediately detached again from this nose when a new application of the tape is initiated or the tape is manually pulled out from the roll.

The angle δ should be more than 25° otherwise the tape could slide past the edge of the knife without being cut. The angles suggested for the inclination of the movable member or slide 7 and the front small side wall 1d of the casing, are designed to facilitate the function of the device and its manipulation. Below the small side wall 1b''' two short ribs 1k of slightly less width are arranged. In the event that the free end of the tape should be bent back and come to bear against wall portion 1b''', the tape would only adhere to ribs 1k and can be easily detached as these ribs do not extend across the full width of this portion of the wall.

In particular, when the dispenser is quickly moved over rough articles such as cartons which are to be sealed, the glide surfaces 1l and 2l which are located between roller 10 and knife edge 8, are subjected to a great amount of friction and are correspondingly heated. As a result, when using low-grade plastics, undesired wear and tear will result.

According to FIGS. 1, 2, 3, 5 and 6, the glide rails 1l, 2l are provided with gliding shoes 11 made from wear resistant material. These shoes 11 may be formed from bent sheet metal or may be sprayed on using a high grade plastics such as "nylon." Since the gliding edges broaden out conically in the downward direction (FIG. 6), there is obtained a secure seating for the sides 11a, 11b of the gliding shoes. The springy glide shoes 11 are usually applied simply by being pressed over ridges 1l, 2l.

According to the modification shown in FIGS. 7 and 8, the gliding shoes 12 may be T-shaped. The projecting portion 12a of the T engages in a groove of gliding shoes 1l, 2l. It is also possible simply to insert pins in the gliding edges or to stick gliding plates to the gliding edges.

FIG. 1 shows a resilient tongue 1m formed on the inside of the casing 1 and bearing with its free end 1m' against the outside of the roll of tape. In this way any undesired rotation of the roll of tape is prevented. In particular, further rotation of the roll 3 is thus prevented after the tape has been cut off and the free end of the tape thus cannot be pulled back into the casing.

In the constructional form shown in FIG. 9, the movable member or slide 27 is of generally arcuate shape and consists of a lower trunk 27a which is continued upward-

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ly by a springy bridge piece 27b. The slide member 27 is supported between curved wall portions 21b, 21b' and guide pieces 21c to 21f integral with casing 21. At the end of the springy piece 27b, there is formed a pressure knob 27c which projects through an opening or recess 21g in the casing. A compression spring 29 urges the slide member 27 into its lower position shown in the drawing.

The application of adhesive tape 23b (using the constructional form according to FIG. 9) differs from the first embodiment in that the sliding member 27 (which has a locked press button 27c) is not actuated during unrolling of the tape. Only when severing the tape, the press button 27c is depressed, as a result of which the flexible bridge piece 27b is freed. The sliding member 27, as a result of the tension in the tape, is moved into its upper position. The tape thus momentarily comes into contact with the knife 28 and is severed thereby. The sliding member 27 is then forced by spring 32 back into its lower position, whereby the bridge piece 27b is automatically re-engaged in recess 21g in the casing.

The device is provided with a trough 24 having a tape exit slit 25 and a recess 26 for the sliding member 27, and thus has the same advantageous features as the first constructional form. The shape and arrangement of the tape exit slit 25 also correspond to that of the first constructional form.

As shown in FIG. 9, a spring braking tongue may also be provided to cooperate with the hollow core 23a of the tape roll 23. For this purpose, the central sleeve 22a of the casing cover (not shown) is formed with a braking tongue 22b. This tongue is radially flexible and extends through the core piece 23a of the tape roll. Obviously a resilient braking member could also act laterally on tape roll 23.

In the arrangement shown in FIG. 10, the movable member for changing direction of the tape is in the form of a pivotal body 37. The body is eccentrically mounted on casing 31 on an axle 37a and by virtue of its oblong shape, the tape 33b is held in a lower plane in the position shown by means of a cam portion 37b. When unrolling the tape, as a result of the tension in the tape 33a, the pivotal body is subjected to a force acting above the axle 37a so that the pivotal body is caused to turn in a clockwise direction. This turning movement is amplified by providing a roller on the cam-shaped portion 37b. Engagement between the arm 37c of the pivotal body 37 and a resilient tongue 31a at point 40 oppose the turning moment.

The cutting action is initiated by the application of pressure to portion 41 of the casing. As a result, the locking tongue 31a is pivoted backwards and is disengaged from the pivotal body 37. This now turns clockwise whereby the cam portion 37b is moved upwardly to such an extent that the tape 33b comes into contact with the cutting edge of knife 38 and is severed thereby. As shown in dotted lines, the knife 38' may also be mounted on the pivotal body 37 so that it may participate in its turning motion. Before applying tape to a new point, the pivotal body 37 is manually moved back to the position for unrolling the tape. In other respects, the form of the dispenser shown in FIG. 10 which is likewise provided with a trough 34, a raised tape exit slit 35 and by a bridge piece 36, corresponds to the previously described form of the invention. The action of the pivotal body may also be obtained by a differently arranged bearing and other shapes.

A compression spring similar to the compression spring 29 in FIG. 9 may be used with any embodiment, whereby the knife would initially be covered when seizing the tape manually. The spring may naturally also have the form of a plastic tongue integrally formed with the movable member or the casing.

We claim:

1. A hand-operated dispenser for applying adhesive tape comprising a casing to be grasped by the hand of the operator and adapted for rotatably supporting a roll of adhesive tape, a cover for said casing, an essentially plane narrow under-surface on the casing adapted to glide over the surface of the article to be taped, an inverted trough-shaped portion on the underside of the casing, located rearwardly with respect to the gliding surface, a narrow slit-shaped opening for the tape in said trough-shaped portion formed between a projecting nose piece on said casing and a bridge piece, a movable member adapted to impart pressure and a change of direction to the tape, a knife placed rearward of the trough-shaped portion with the knife edge ending above the plane of the under-surface of the casing, the movable member being adapted to be held in an upper inoperative and a lower operative position, the arrangement being such that when in its lower position the tape passes around the lower member towards the rear of the casing and the portion of the tape to be applied to the article to be taped travels in the plane of the under-surface of the casing and is thereby kept out of contact with the knife whilst in the upper inoperative position of the movable member the tape is brought into contact with the knife which causes the tape to be severed.

2. A dispenser according to claim 1, wherein the movable member is adapted to be moved in a straight line between the two positions.

3. A dispenser according to claim 1, wherein the movable member is generally of arcuate shape and is movable inside the casing along an arcuate path.

4. A dispenser according to claim 1, wherein the movable member is pivotally mounted on the casing and its projecting portion, which imparts a change of direction to the tape, is raised and lowered as a result of pivotal movement of the member.

5. Dispenser according to claim 1, comprising manually releasable means on the casing for arresting the movable member in its lower position.

6. Dispenser according to claim 1, wherein the casing and its cover are recessed in the general area of the trough-shaped portion to form an opening through which the movable member may project in its lower position.

7. A dispenser according to claim 1, wherein the surface of the trough-shaped portion, which is remote from the movable member, is formed with at least one transverse rib which is shorter than the width of the trough.

8. A dispenser according to claim 1, wherein the knife has parallel longitudinal edges and is mounted in a slit-shaped bearing on the inside of the casing which has an inclined rearward bearing surface.

9. Dispenser according to claim 2, wherein the movable member is securely retained in the casing when the cover has been removed by means such as resilient projecting parts formed on the casing.

10. Dispenser according to claim 1, wherein the portion of the casing and cover located between the lower end of the movable member and the knife is formed with reinforced gliding ridges.

11. A dispenser according to claim 1, wherein the portion of the casing and cover between the lower end of the movable member and the knife is at least in part formed from a wear-resistant material.

12. Dispenser according to claim 1, wherein the slit-shaped opening for the tape is arranged and constructed in such a manner that an imaginary line running from the point where the movable member changes the direction of the tape to the opening of the said slit when projected backwards runs through the central portion of the bearing for the roll of tape.

13. Dispenser according to claim 1, wherein the plane of the upper surface of the slit facing the tape is oriented at an acute angle to the path of the tape between said slit and the lower end of the movable member imparting a change of direction to the tape and the lower surface of the slit is formed by the projecting nose which is offset in relation to the edge of the upper surface at which the tape changes direction.

14. Dispenser according to claim 13, wherein the distance between the edge of the upper surface of the said slit and the projecting nose on the lower surface of said slit is less than 0.5 mm. and the projecting nose forms a surface to which the cut-off tape end adheres, having a width which measured in the direction of travel of the tape amounts to less than 0.8 mm.

15. Dispenser according to claim 2, wherein the front small side of the casing, through which the upper portion of the movable member projects, is inclined to the vertical plane at an angle between 10° and 25° and the other inclination of the sliding member is between 8° and 20° with respect to the vertical plane.

16. Dispenser according to claim 1, wherein the line joining the lower edge of the upper surface of the slit and the cutting edge of the knife is at an angle of at least 25° with respect to the plane of the under-surface of the casing.

17. A dispenser according to claim 1, comprising means for braking the roll of adhesive tape such as a resilient tongue or spring mounted on the inside of the casing and bearing against the roll of tape.

18. Dispenser according to claim 1 comprising compression spring means operating between the casing and the movable member urging the movable member into its lower position.

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