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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Method of and Device for Cutting a Composite Strip

We, DYMO INDUSTRIES INC., a Corporation organised and existing under the Laws of the State of California, United States of America, of 2950, 7th Street, Berkeley, California, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns the cutting of composite strip material such as is generally employed in marking or embossing tools for applying indicia to the strip for the production of identification labels and the like and is more particularly directed towards a mechanism for transversely cutting a length of marked or embossed tape from the strip in such a manner as to facilitate removal of a protective liner or backing from the cut tape.

In order to provide a convenient method of marking or identifying a wide variety of objects, the use of the embossing tool of our British Patent No. 856111 has become widespread. Such tool is adapted to receive a roll of strip or tape which is suitably marked, by embossing, as the strip advances through the tool. The strip may be of metal, plastic or other material, and is conventionally provided with an adhesive backing so that after embossing thereof, the marked tape may be conveniently secured to the object to be identified by the tape label.

The provision of the adhesive presents a problem in that if the adhesive were exposed, difficulty would be encountered in removing the tape from the coiled tape roll, and additional difficulty would be encountered in feeding the tape through the tool and effecting embossment thereof.

Accordingly, where the tape is provided with an adhesive backing, it is customary to utilize a protective liner for the adhesive. Such a liner may be formed of a thin sheet of polyethylene or other material having a low affinity for the adhesive. The lined tape may then be readily coiled into rolled form, advanced through the tool, and cut off after the desired indicia has been embossed or otherwise marked, without difficulty.

While the use of such a protective liner overcomes the difficulties present where no liner is provided, a new problem has been developed thereby, namely, that of removing the liner from the cut tape so as to expose the adhesive and permit the marked tape or label to be attached to an object. Since the liner is coextensive with the cut tape, it has heretofore been necessary to pry a corner of the liner away from the adhesive manually with a finer nail or the like, until the liner could be grasped, and then to complete the removal thereof.

It is an object of the present invention to provide a method and apparatus for facilitating the removal of a protective liner from an adhesive backed tape.

Another object of the invention is to incorporate such a mechanism in a tape cut-off apparatus.

A further object of the invention is to provide a device and method as above described in which a severed tape strip will be provided with a tab which may be manually grasped, and by means of which the liner may be removed from the tape.

With these objects in view, the present invention provides a method of producing a self-adhesive label from a composite strip comprising a tape having adhesive on one surface thereof and a detachable protective liner overlying the adhesive, which comprises cutting a label length from the strip by severing the latter and also cutting into the label length near to one end thereof to a depth no greater than through the tape and adhesive so as to form, at said one end of

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facilitates

the label, a tab which is attached to the entire liner and facilitate subsequent stripping thereof.

The invention further provides a device for cutting a composite strip comprising a tape having adhesive on one surface thereof and a detachable protective liner overlying the adhesive, said device comprising a knife which is movable to sever a length of the strip which, in use, extends therepast, an anvil disposed adjacent the knife, and a blade co-operating with the anvil to slit the tape adjacent the cut end of the strip length, whilst leaving the protective liner intact, so as to form, at said end of the label, a tab which is attached to the liner and facilitates subsequent stripping thereof.

The invention will be described further, by way of example, with reference to the accompanying drawings which illustrate a preferred form thereof. It is to be understood, however, that variations may be made to the illustrated embodiment within the scope of the invention as set forth in the claims.

Referring to the drawings:—

Fig. 1 is a cross-sectional side elevation view of an embossing tool provided with the cut-off mechanism of the present invention;

Fig. 2 is a cross-sectional plan view taken substantially in the plane indicated by line 2—2 of Fig. 1;

Fig. 3 is an end elevational view taken substantially in the plane indicated by line 3—3 of Fig. 1, on an enlarged scale;

Fig. 4 is a cross-sectional view taken substantially in the plane indicated by line 4—4 of Fig. 3;

Fig. 5 is another cross-sectional view taken substantially in the plane indicated by line 5—5 of Fig. 3;

Fig. 6 is a cross-sectional view taken substantially in the plane indicated by line 6—6 of Fig. 4; and

Fig. 7 is a perspective view of a severed embossed tape strip or label and indicating the manner in which the protective liner may be removed.

The mechanism of the present invention is illustrated in the drawing in association with an embossing tool which is generally similar to that described in our prior British Patent No. 856111. The tool comprises an elongate body 12 and a handle 13 pivotally attached thereto. A strip 14 of material to be embossed is adapted to be carried by the body 12 for longitudinal movement therealong, the strip 14 constituting one end of a roll 16 disposed in a magazine 17 provided at the rear end of the body 12. The strip 14, as shown in Fig. 7, includes a metal or plastic tape 21 having an upper surface 22 which bears an embossed indicia or marking 23, a lower surface coated with an adhesive 24, and a protective liner 26, for the adhesive 24, formed of polyethylene or the like.

The embossed indicia or marking 23 is provided on the strip 14 by passing the same through suitable embossing dies 28 carried by the body 12, the embossing taking place when the handle 13 is squeezed towards the body 12. More particularly, a stud 29 on the handle 13 transmits embossing pressure to a slidable die punching element 31 causing the dies 28 to emboss the strip 14. The strip 14 is advanced after each embossing operation by a strip feed roll 32 which engages the strip 14, a ratchet wheel 33 and a pawl 34 which is actuated upon squeezing of the handle 13 towards the body to ride over one tooth of the ratchet wheel 33 and, upon return of the handle 13 to its illustrated position to rotate the ratchet wheel 33 by one tooth.

In accordance with conventional embossing systems, after the strip 14 has been embossed with the desired indicia, the forward end portion 36 thereof is severed from the remaining portion of the strip to provide a label 37. While a variety of types of cut-off mechanisms have previously been proposed, they all have the common characteristic of providing a generally transverse cut through the strip, such as the cut line 38 shown in Fig. 7. With such a cut, there exists the previously discussed difficulty of removing the protective liner 26 from the tape 21 so as to expose the adhesive 24 on the latter.

The cut-off system employed in the present invention overcomes this defect by providing a compound cutting action. Firstly, a complete severance is provided, such as the cut 38, which separates the label 37 from the remaining portion of the strip. Secondly, a transverse slit 39 is provided on the label parallel to and adjacent to the cut 38, this slit 39 extending completely through the tape 21, while leaving the liner 26 intact. The portion of the label 37 between the cut line 38 and the slit 39 defines a tab 41 which may be easily grasped in one hand, and by holding the portion of the label 37 adjacent the tab 41 with the other hand, the user may tear the tab 41 downwardly as indicated in Fig. 7, and thereby remove the entire liner 26 together with the tab 41 from the remaining tape portion.

A variety of devices could be utilized to provide the cut 38. However, in the illustrated tool, a combination cutter and slitter is provided as a unit carried at the forward end of the body 12, the latter being provided with a downturned flange 43 whose end terminates above the strip 14 as it emerges from the tool. The lower surface of the strip 14, after leaving the embossing dies 28, is supported on a platform 44, and as will be presently made clear, a strip guide in the form of a leaf spring 46, is

utilized in order to insure proper feeding of the strip 14 to and through the cutter and slitter.

Attached to the body flange 43 is a spacer 48 having a stud 49 seating in a suitable aperture provided in the flange 43, (See Fig. 4), the spacer 48 substantially completely covering the flange 43 and being secured thereto by means of screws 51 (See Fig. 5). The lower surface of the spacer 48 is provided with a forwardly projecting lip 52. The screws 51 serve also to secure a backup plate 53 to the tool body 12, such plate 53 being of generally rectangular form and substantially completely overlying the front end of the tool. The plate 53 is provided with a transverse slot 54 through which the strip 14 may pass, with a vertical slot 56 extending upwardly from the central portion of the transverse slot 54. An additional vertical slot 57 is provided at the central lower end portion of the plate 53. As can be seen in Figs. 4 and 6, the upper and lower edges 58 and 59 of the transverse slot 54 are bevelled or tapered to facilitate the strip shearing action presently to be described. The strip guide or spring 46 has a bent portion secured to the rear surface of the plate 53.

Slidably carried on the front surface of plate 53 is a strip cut-off knife 61, the latter being formed as a generally rectangular plate and provided with a transversely inclined slot 62, having a sharpened edge 60, through which the strip 14 passes. A rectangular aperture 63 is provided in the knife 61 in registry with the additional vertical slot 57 in the backup plate 53, and vertically elongated apertures 64 are also provided in the knife 61 in registry with circular apertures 66 in the plate 53. Additional circular apertures 67 are provided in the upper portion of the knife 61 and a central tapped screw-receiving aperture 68 is disposed between the apertures 67.

As will be understood from the foregoing, the knife 61 is capable of vertical sliding movement against the plate 53, and with the strip 14 extending through the slots 54 and 62 of the plate 53 and knife 61 respectively, a shearing action is achieved by coaction of the sharpened edge 60 against the lower edge 59 of the slot 54 in the plate 53.

Secured to the front surface of the knife 61, above the slot 62 thereof, is a spacer 71 having rearwardly directed projections 72 seated in the additional circular apertures 67 in the knife 61 and similar forwardly directed projections adapted to seat in apertures 73 of a semi-cut-off blade 74. The latter is of generally rectangular form and provided with a central screw-receiving aperture 76 and a sharpened lower edge 77 normally positioned above the level of the strip 14. A screw 78 secures the blade 74, the spacer 71 and the knife 61 together for unitary movement, the inner end of the screw 78 extending into the vertical slot 56 in the backup plate 53.

An anvil 81 is positioned below the semi-cut-off blade 74, such anvil being of generally rectangular form and being spaced from the knife 61 by a suitable spring washer 82. Rivets 83 pass through the anvil 81, the washer 82 and the circular apertures 66 of the backup plate 53 as well as through the vertical elongated apertures 64 of the knife 61 so that the latter, while being a part of the riveted assembly, may move relative to the remaining parts of the assembly to the extent of the length of the vertical apertures 64.

The upper edge 84 of the anvil 81 is provided with a notch or slot 86 of sufficient width to receive the strip 14, such notch having a lesser transverse extent than the width of the semi-cut-off blade 74. The depth of the notch 86 is of critical importance since as the semi-cut-off blade 74 moves downwardly with the strip cut-off knife 61, the semi-cut-off blade 74, in cooperation with the anvil 81, will only penetrate into that portion of the strip which protrudes from the notch 86 above the upper edge 84 of the anvil 81. Accordingly, if the strip liner 26 is, for example, .0035 inches thick, the slot 86 is made of a depth of about .004 or .005 inches, so that the thicker tape 21 will be substantially severed without danger of cutting into the liner 26.

In order to provide for appropriate blade movement, an actuating lever 87 (Figs. 1 and 4) is utilized, such lever 87 being pivoted to the body 12 by a pivot pin 88 and having a forwardly directed tip 89 which passes through the additional vertical slot 57 of the backup plate 53 and engages the rectangular aperture 63 of the knife 61 (See Fig. 3). Thus, as the actuating lever 87 is rocked about its pivot pin 88, the knife 61 will move downwardly as indicated in dotted lines in Fig. 4 until the strip 14 is completely severed. Likewise, the semi-cut-off blade 74 will move downwardly until its sharpened lower edge 77 contacts the anvil 81, thereby effecting the transverse slit 39 through the tape 21 alone.

The lever 87 may be actuated as follows. A spring loaded control member 91 is carried by the handle 13 and is adapted to be laterally displaced by a spring loaded push button 92. Normally, the control member 91 is disposed between the stud 29 and the die punching element 31 so that movement of the handle 13 effects embossing. Upon depression of the button 92, control member 91 is displaced so as to avoid actuation of the dies 28 upon squeezing of the handle 13, and a tongue portion 93 of the member 91 moves into operative engagement with the actuating lever 87.

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From the foregoing description, it will be clear that with a single operation, namely squeezing of the handle 13 whilst the button 92 is depressed, the strip 14 will be completely severed to provide the label 37, and at the same time the label 37 will be provided with the tab 41 so that a short length of tape and the entire liner 26 can be readily removed from the label 37 so as to expose the adhesive 24 thereon.

WHAT WE CLAIM IS:—

1. A method of producing a self-adhesive label from a composite strip comprising a tape having adhesive on one surface thereof and a detachable protective liner overlying the adhesive, which comprises cutting a label length from the strip by severing the latter and also cutting into the label length near to one end thereof to a depth no greater than through the tape and adhesive so as to form, at said one end of the label, a tab which is attached to the entire liner and facilitates subsequent stripping thereof.

2. A method as claimed in claim 1 wherein the label length is marked by applying indicia thereto prior to cutting from the strip.

3. A method of producing a self-adhesive label from a composite strip substantially as hereinbefore described.

4. A device for cutting a composite strip comprising a tape having adhesive on one surface thereof and a detachable protective liner overlying the adhesive, said device comprising a knife which is movable to sever a length of the strip which, in use, extends therepast, an anvil disposed adjacent the knife, and a blade co-operating with the anvil to slit the tape adjacent the cut end of the strip length, whilst leaving the protective liner intact, so as to form, at said end of the label, a tab which is attached to the linear and facilitates subsequent stripping thereof.

5. A device as claimed in claim 4 wherein the knife and blade are secured together for unitary movement.

6. A device as claimed in claim 4 wherein the knife is movable relative to a member having a strip-receiving slot therethrough to sever the strip.

7. A device as claimed in claim 6 wherein the member having the strip-receiving slot therethrough is a plate against which the knife is slidably arranged, the anvil being secured relative to the plate.

8. A device as claimed in any of claims 4 to 7 wherein the anvil has a tape-receiving notch therein of depth at least equal to the thickness of the liner so that upon movement of the blade towards the anvil, the latter prevents penetration of the blade into the liner.

9. A marking tool comprising means for progressing, past embossing dies, a composite strip comprising a tape having adhesive on one surface thereof and a detachable layer overlying the adhesive, and means for actuating the dies to emboss said strip, said tool embodying a device, for cutting the strip, as claimed in any of claims 4 to 8.

10. A marking tool as claimed in claim 9 wherein the tool comprises a body and a handle pivoted thereto, squeezing of the handle serving to operate the means for actuating the dies and the means for progressing the strip.

11. A marking tool as claimed in claim 10 wherein squeezing of the handle serves alternatively to actuate the device for cutting the strip.

12. A marking tool substantially as hereinbefore described with reference to and as illustrated in Figs. 1 to 6 of the accompanying drawings.

13. A self-adhesive embossed label in the form of a composite strip comprising a tape having adhesive on one surface thereof and a detachable protective liner overlying the adhesive, wherein the tape has a slit thereacross, adjacent one end, so as to provide on the strip a tab of the tape which is attached to the liner and facilitates subsequent stripping of the liner from the rest of the tape.

14. A self-adhesive label substantially as hereinbefore described with reference to and as illustrated in Fig. 7 of the accompanying drawings.

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2. A method as claimed in claim 1 wherein the label length is marked by applying indicia thereto prior to cutting from the strip.

3. A method of producing a self-adhesive label from a composite strip substantially as hereinbefore described.

4. A device for cutting a composite strip comprising a tape having adhesive on one surface thereof and a detachable protective liner overlying the adhesive, said device comprising a knife which is movable to sever a length of the strip which, in use, extends therepast, an anvil disposed adjacent the knife, and a blade co-operating with the anvil to slit the tape adjacent the cut end of the strip length, whilst leaving the protective liner intact, so as to form, at said end of the label, a tab which is attached to the linear and facilitates subsequent stripping thereof.

5. A device as claimed in claim 4 wherein the knife and blade are secured together for unitary movement.

6. A device as claimed in claim 4 wherein the knife is movable relative to a member having a strip-receiving slot therethrough to sever the strip.

7. A device as claimed in claim 6 wherein the member having the strip-receiving slot therethrough is a plate against which the knife is slidably arranged, the anvil being secured relative to the plate.

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9. A marking tool comprising means for progressing, past embossing dies, a composite strip comprising a tape having adhesive on one surface thereof and a detachable layer overlying the adhesive, and means for actuating the dies to emboss said strip, said tool embodying a device, for cutting the strip, as claimed in any of claims 4 to 8.

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