

June 25, 1968

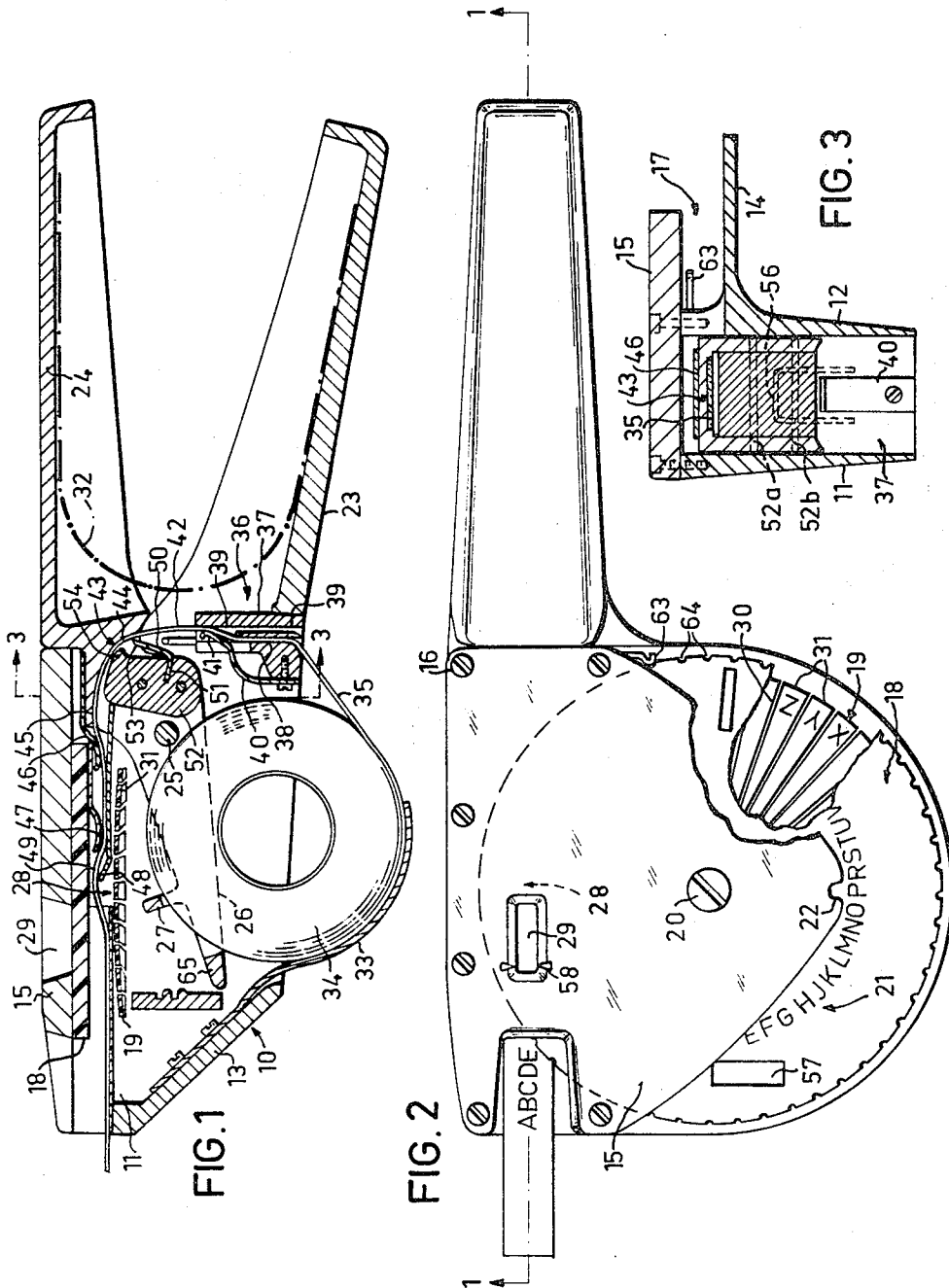
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3,389,772

PROPORTIONAL SPACING TAPE EMBOSSING TOOL

Filed Dec. 13, 1966

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

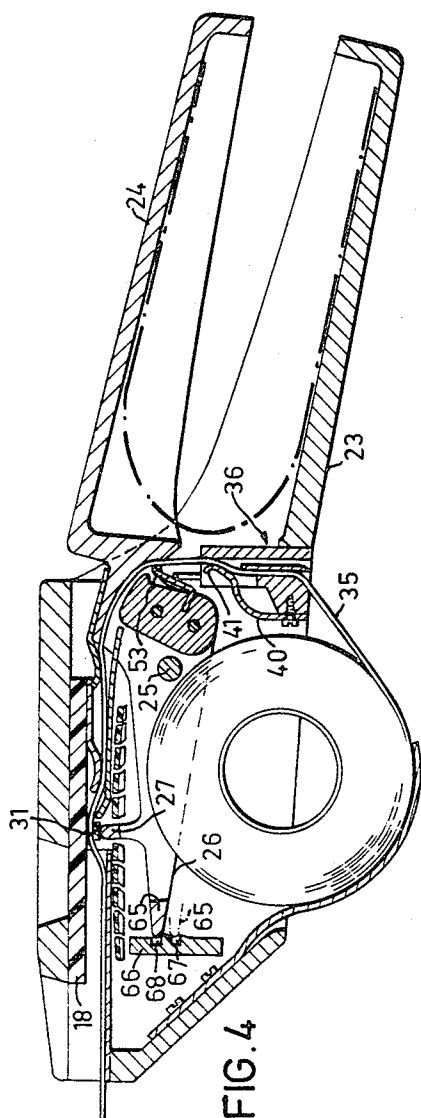


FIG. 4

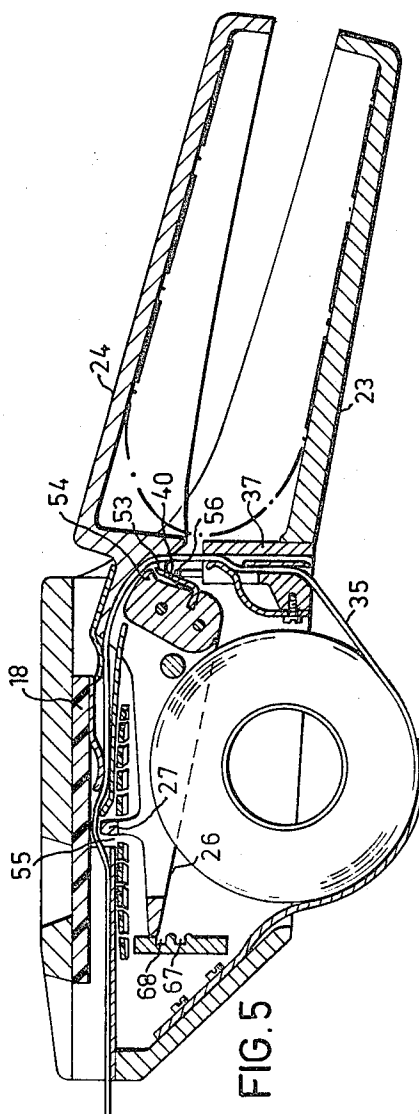


FIG. 5

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3 Sheets-Sheet 3

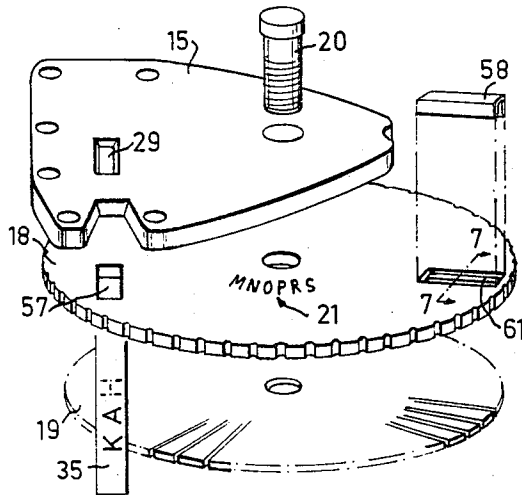


FIG. 6

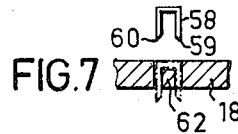


FIG. 7

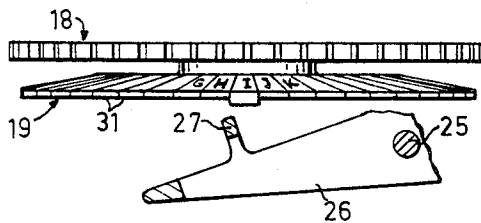


FIG. 8

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3,389,772 PROPORTIONAL SPACING TAPE EMBOSSING TOOL

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16,392/65
14 Claims. (Cl. 197—6.7)

ABSTRACT OF THE DISCLOSURE

As shown in FIG. 1 in the enclosed drawing the tape 35 passes a first guide 36 in the handle 23 which is integral with the tool body 10, and then a second guide 43 in the pivotal handle 24. The second guide has a spring biased feeding knife 50 resting at an oblique angle against the tape. When squeezing the handles the feeding knife slides along the tape which is held stationary by a brake 40, 41 at the first guide, and upon a subsequent release of the handles the feeding knife will slightly bite into the surface of the tape to withdraw it a feeding step against the action of the brake 40, 41.

This invention relates to manual tools for embossing characters such as letters, numerals and other symbols on a plastic tape. Such tools have an embossing wheel formed by two interconnected die discs, which are provided with a circular row of pairs of female and male die elements. The embossing wheel is rotated to position any selected pair of die elements on opposite sides of the tape at an embossing station. By means of a pair of handles, the selected pair of dies is then pressed together against the tape so as to emboss on the tape the desired letter or number.

After each embossing operation the tape is fed forwardly a predetermined step by means of a feeding mechanism in response to the release of the handles after they have been actuated for effecting the embossing.

In prior tools of the kind under consideration, the feeding mechanism includes cog-wheels, lock members such as pawls and feeding rolls of rubber. The tape is fed between a pair of feeding rolls. However, the tape has a smooth and relatively hard surface which may result in that the rolls slip on the tape so that the space between the letters embossed on the tape may vary. Furthermore, the feeding step is intended to be constant and, accordingly, if an embossing wheel having letters of a smaller size is replaced by a wheel having letters of a greater size, results in that the larger letters will come closer or too close to each other on the tape.

The general object of the invention is, therefore, to provide an embossing tool having a considerably simplified feeding mechanism which still will give a more accurate feeding step and which enables in a simple manner an adjustment of the feeding step to any desired value within a predetermined range for various embossing wheels having characters of different sizes.

Another object is to provide an embossing tool which will permit in a simple manner the disengagement of the feeding mechanism to permit retraction of the tape.

Another object is to provide an embossing tool enabling so called proportional writing, that is writing with substantially equal space between all letters and numerals including the letter I.

A further object is to provide means for enabling an inspection of the character most recently embossed.

A still further object is to provide means for enabling a simple replacement of a cutting die.

These and other objects of the invention and the ad-

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vantages derived therefrom will be disclosed more in detail with reference to the accompanying drawings showing a preferred embodiment of the embossing tool according to the invention.

FIG. 1 is a longitudinal section on line 1—1 of the embossing tool shown in FIG. 2 with the two handles in their fully released position.

FIG. 2 is a plan view of the embossing tool.

FIG. 3 is a cross-section on line 3—3 in FIG. 1, the die discs being omitted.

FIG. 4 is a sectional view corresponding to FIG. 1 with the handles in their fully squeezed position.

FIG. 5 is a sectional view corresponding to FIG. 4 with the die discs in a position to permit the pivotal handle to pass its fully squeezed position in order to release the feeding mechanism from its engagement with the tape.

FIG. 6 is a diagrammatic perspective view of the upper die disc illustrating mounting and removal, respectively, of a cutting die provided with a cutting knife; FIG. 7 is a section on line 7—7 in FIG. 6.

FIG. 8 is a detail view of the die discs and the radial fingers of the lower die disc, the radial finger provided with the die element for the letter I having a greater axial thickness than the other fingers.

In the figures numeral 10 generally indicates a hollow tool body of metal or plastic, having two spaced side walls 11, 12 and a front wall 13. Integral with the side wall 12 is a bracket plate 14. A cover plate 15 secured by screws 16 on top of the tool body forms with the bracket plate a space 17 (FIG. 3) for receiving two interconnected die discs 18, 19 rotatably mounted on a bolt 20 extending through the cover plate and screwed to the bracket plate. The discs 18, 19 fit closely between the plates.

As shown in FIG. 2, the cover plate 15 leaves a circumferential portion of the upper disc 18 uncovered to expose a circular row 21 of characters provided on the upper face of the disc 18 and passing an indexing recess 22 in the outer end of the plate 15.

A lower handle 23 is rigidly secured to or, as shown, is formed integral with the tool body. An upper handle 24 extends into the tool body between its side walls 11, 12 and is pivotally mounted on a pin 25 secured in the walls 11, 12. On the opposite side of the pin 25 the handle 24 is formed with a jaw 26 provided with a projection or tooth 27 which when the handles 23, 24 are squeezed will engage the lower disc 19 at an embossing station 28 located just ahead of a rectangular viewing window 29 formed in the cover plate 15.

The lower disc 19 is provided with a plurality of radial slits 30 to form radial fingers 31 supporting each a male die element. The male die elements are located along a circle, and a corresponding circular row of female die elements is formed in the underside of the upper disc 18 in a manner known per se.

Between the handles is a leaf spring 32 indicated by a dotted line in FIG. 1 which will return the handles to their released position shown in FIG. 1 after they have been squeezed to any of the positions shown in FIGS. 4 or 5.

A tape roll magazine is formed between the side walls 11, 12 and a flexible arm 33. This arm supports the tape roll 34 and is secured to the front wall 13.

The plastic tape 35 is passed through a first guide 36 in the form of a small block 37 secured to the tool body and provided with two parallel channels 38, 39, one for a narrow tape and one for a wider tape. The tape shown is passed through the narrow channel 38 and is pressed by a brake member against a slide surface 39 formed at the upper end of the block. The brake member may simply be a leaf spring 40 secured to the block and having its free

end 41 located to press the tape against the sliding surface in order to effect a predetermined braking action against movement in either direction.

From the first guide 36 the tape passes freely at a certain length 42 of its path up to a second guide 43 formed in the pivotal handle 24. As shown in FIGS. 1 and 3 the second guide 43 is a groove having a parabolic extension with a lower end portion or inlet portion 44 formed substantially by a circular arc having its centre at the pivot pin 25. The curved path of the groove will thereafter have an increasing radius of curvature and the upper end portion or outlet portion 45 of the groove will be directed towards the embossing station 28 and pass between the discs 18, 19 in a tangential direction relative to the discs.

Before reaching the embossing station 28 the tape 35 will be guided by a flexible guide plate 46 secured to the handle 24 and by two flexible guide plates 47, 48 secured to the tool body. At the embossing station 28 the tape is guided to form a bend 49 upwardly to be placed close to the respective female die element of the upper die disc 18, as shown in FIG. 1.

In cross-section the profile of the second guide groove 43 has along the inlet portion 44 a smooth bottom surface for tapes of various widths, and about at the middle between the ends of the groove 43 it will start to have a stepped cross-section as indicated in FIG. 3, to provide for two different guides, one for narrow tapes 35 as shown in FIG. 3, and the other for wider tapes.

At the smooth inlet portion 44 of the second guide 43 there is provided a spring biased member having a metal member with a sharp knife edge provided to resiliently rest against the tape at an oblique angle. In the example shown this member is a leaf spring 50 secured with one end 51 in a block 52 which by means of two pins 52a, 52b (FIG. 3) is secured to the pivotal handle 24. The leaf spring or feeding knife 50 extends obliquely upwardly in FIG. 1, and its free end has a sharp knife edge 53 and forms an acute angle with the inlet portion 44 of the guide groove 43. This angle may be preferably of the order of 45°.

At its upper end the block 52 is formed with a small nose 54 to protect the tape from the knife edge 53 in the position shown in FIG. 5.

When the handles 23, 24 are squeezed to the position in FIG. 4 for embossing, the tape will be held stationary by the brake member 40, 41, and the knife edge 53 will slide along the tape 35. When the handles are released for returning to the position shown in FIG. 1, the knife edge 53 will slightly bite into the surface of the tape 35 and provide a positive engagement therewith for advancing the tape a step proportional to the movement of the pivotal handle 24. Upon this feeding movement the tape will slide past the brake member 40, 41.

The sliding movement of the knife edge 53 along the free length of the tape between the first and the second guide 36 and 43, respectively, is permitted due to the fact that normal tapes for embossing in tools of the kind under consideration have a stiffness sufficient to permit said free length.

By omitting one of the radial fingers 31 of the lower die disc 19 to provide a corresponding gap 55 in the disc 19, the jaw tooth 27 may move into direct contact with the tape as shown in FIG. 4, when the gap 55 is placed at the embossing station. Thus a greater movement of the handle is obtained as compared with that upon embossing as shown in FIG. 4, and the knife spring 50 will then abut against a stop member 56 and be resiliently bent towards the block so that the knife edge 53 will be located under the nose 54 and thus prevented from engaging the tape 35. In this position the tape 35 is free to be retracted, for instance for replacement of the tape.

The stop member 56 in the drawing is in the form of a U-member secured to the block 37 (FIG. 3).

If the narrow tape 35 shown is replaced by a wider

tape for embossing characters of a greater size thereon, that is characters having a greater height and width, the die discs 18, 19 shown are replaced by another pair of discs having die elements of the desired greater size. In order to adjust the feeding step to these greater characters, the radial fingers of the lower die disc will have a smaller axial thickness than the radial fingers 31 having the smaller die elements. Accordingly, the thinner radial fingers will permit a longer stroke of the pivotal handle 24 when squeezed for embossing, and the feeding step will thus be correspondingly longer to provide a proper space between the larger characters embossed on the tape. This feature of the invention accordingly permits an esthetically satisfactory embossing of characters of two or more different sizes with one and the same tool.

The principles of the feeding mechanism according to the invention may also be utilized for obtaining a proper space between the letter I and adjacent letters. In hitherto known embossing tools of the kind under consideration, the space between the letter I and adjacent letters will be unesthetically greater than the space between the other letters embossed on the tape. If it is desired to avoid this, the radial finger 31 supporting the die for the letter I should have a somewhat greater thickness than the other radial fingers, as indicated in FIG. 8. The letter I on the radial finger is then displaced to a position somewhat nearer one of the side edges of the finger 31 than to the other as indicated in FIG. 8.

As shown in FIGS. 2 and 6 the upper die disc 18 is provided with a rectangular viewing window 57 of the same size and radial position as the window 29 in the cover plate 15. By rotation of the die discs the window 57 may be positioned below the window 29, and thus the registering windows 29, 57 will permit inspection of the most recently embossed character on the tape appearing in the windows as illustrated in FIG. 6, where the letter A is the most recently embossed character which is seen in the windows, whereas the next character to be embossed is H indicated by dotted lines on the tape and positioned at the embossing station.

An index 58 at the window 29 will facilitate the selection of proper free end portions of a label.

One of the female dies of the upper disc 18 may be replaced by a cutting-die, cooperating with a radial finger having a smooth surface. This cutting-die is in the form of a channel member 59 formed at least one sharp cutting edge 59 and/or 60, as shown in FIG. 6. A corresponding aperture 61 is provided in the disc for receiving the channel member. A rib 62 divides this aperture into two slots as shown in FIG. 7. The side walls of the channel members are clamped in the slots as indicated in FIG. 7 by dotted lines, and the upper portion of the channel member will be flush with the upper surface of the die disc 18, so that the cutting-die may pass freely under the cover plate 15. At the embossing station the cover plate 15 will form a back member against which the radial arms with their embossing dies or the cutting-die, respectively, will press the tape against the upper disc 18 resting against the cover plate.

The two die discs 18, 19 may be arrested in any desired position by means of a resilient pawl 63 (FIG. 2) secured to the tool body 10 and engaging the adjacent groove of a plurality of equally spaced grooves 64 in the periphery of the disc 18.

The tool shown enables further an easy control of the two positions indicated in FIG. 4 by the outer end 65 of the jaw 26, shown in solid lines 65 in the embossing position and in dotted lines 65' in an intermediate position, respectively. In the intermediate position the respective pair of die-elements have been brought into contact with the tape and is just about to start the embossing upon further squeezing of the handles. To obtain said control a portion of the tool body in the form of a transverse wall 66 is provided with two recesses 67, 68 facing the free end 65 of the jaw. When the handles 23, 24 are

squeezed the free end 65 of the jaw 26 will first snap into the first recess 67 creating a first click sound which indicates that the intermediate position is reached. If the handles are released from this position, no embossing will have taken place and the tape is moved a step forwards corresponding substantially to a normal feeding step when embossing consecutive characters. Accordingly, a separating space between words embossed on the tape will be obtained in this manner. However, when the handles are squeezed beyond the intermediate position, the embossing starts and when it is completed, the free end 65 of the jaw will snap into the second recess 68 creating a second click sound indicating that no further squeeze of the handles is needed for obtaining proper embossment. Alternatively, the jaw 26 or handle 24 may have the two recesses 66, 67 cooperating with a projection on the body 10.

What we claim is:

1. In a tool for embossing characters on a plastic tape and having a main body, cooperating die members for embossing said characters at an embossing station and a pair of spring-biased pivoted handles for actuating said die members at said embossing station to emboss said tape when said handles are squeezed together, one of said handles being rigidly connected to the main body of said tool and the other being pivoted with respect thereto, and means for advancing and guiding said tape in response to the relative movement of said handles, the combination which comprises a first tape guide disposed on said main body of said tool, means for effecting a predetermined braking action on said tape adjacent said first tape guide, a second tape guide disposed on said other pivoted handle, a spring-biased knife edge member disposed adjacent said second tape guide and resiliently engaging said plastic tape at an oblique angle permitting relative sliding movement of said knife edge along said plastic tape when said handles are moved together and said tape is locked by said braking means, and means for moving said knife edge into positive gripping engagement with said plastic tape when said handles are allowed to move apart following and embossing operation for advancing said tape against the action of said braking means for a subsequent embossing operation at said embossing station.

2. A tool as defined in claim 1, in which said second guide forms an arcuate path for the tape, the outlet end portion of the arcuate guide being directed towards the embossing station and the inlet end portion of the arcuate guide being directed towards said first guide provided with said brake.

3. A tool as defined in claim 2, in which the inlet end portion of the arcuate guide forms substantially a circular path having its center at the pivot axis of the pivotal handle, and that the arcuate guide is substantially parabolic.

4. A tool as defined in claim 2, in which the inlet end portion of the arcuate guide has a smooth guide surface opposite the knife edge for guiding tapes of different widths, whereas the outlet end portion of the arcuate guide has stepped side walls forming a widening guide groove for tapes of different widths.

5. A tool as defined in claim 1, in which the spring biased member provided with the knife edge is a leaf spring secured at one end to the pivotal handle and having its free end formed with said knife edge.

6. A tool as defined in claim 1, in which said brake at said first guide is a spring biased member provided to frictionally engage the tape in the guide.

7. A tool as defined in claim 6, in which the brake is a leaf spring secured at one end to the tool body and resting with its free end against the tape to permit movement of the same in both directions when overcoming the frictional resistance effected by the brake.

8. A tool as defined in claim 1, in which a cover plate is secured to the tool body and the two die discs are located close to the underside of the cover plate, the

cover plate being provided with a viewing window in the region above the tape path close after the embossing station seen in the feeding direction for inspecting the most recently embossed character, the die disc facing the cover plate being provided with an aperture which in a predetermined position of the discs registers with said viewing window to permit said inspection.

9. In a tool for embossing characters on a plastic tape and having a main body, cooperating die members for embossing said characters at an embossing station and a pair of spring-biased pivoted handles for actuating said die members at said embossing station to emboss said tape when said handles are squeezed together, one of said handles being rigidly connected to the main body of said tool and the other being pivoted with respect thereto, and means for advancing and guiding said tape in response to the relative movement of said handles, the combination which comprises a first tape guide disposed on said main body of said tool, means for effecting a predetermined braking action on said tape adjacent said first tape guide, a second tape guide disposed on said other pivoted handle, a spring-biased knife edge member disposed adjacent said second tape guide and resiliently engaging said plastic tape at an oblique angle permitting relative sliding movement of said knife edge along said plastic tape when said handles are moved together and said tape is locked by said braking means, means for moving said knife edge into positive gripping engagement with said plastic tape when said handles are allowed to move apart following an embossing operation for advancing said tape against the action of said braking means for a subsequent embossing operation at said embossing station, said spring-biased knife edge member including a leaf spring secured at one end to said pivot handle and having the opposite end thereof forming said knife edge, a stop member disposed on said main body of said tool for cooperation with said leaf spring to move the latter into a position away from the path of said tape when said handles are moved together in an embossing operation, and a gap in at least one of said die members permitting extended movement of said handles together after an embossing operation.

10. A tool as defined in claim 9, in which the portion of the pivotal handle supporting the leaf spring is formed with a nose above the knife edge of the leaf spring, said nose being provided to cover the knife edge of the leaf spring when the same is forced to a retracted position by said stop member, whereby the knife edge is safely prevented from engagement with the tape.

11. In a tool for embossing characters on a plastic tape and having a main body, cooperating die members for embossing said characters at an embossing station and a pair of spring-biased pivoted handles for actuating said die members at said embossing station to emboss said tape when said handles are squeezed together, one of said handles being rigidly connected to the main body of said tool and the other being pivoted with respect thereto, and means for advancing and guiding said tape in response to the relative movement of said handles, the combination which comprises resiliently cooperating snap locking means on said pivoted handle and said main body of said tool for defining two different positions of said handles to create a click sound when the handles are moved to each of said positions, the first position corresponding to a position of said handles just before movement thereof forcing said die members into an embossing operation, and the second said position corresponding to the position of said handles when an embossing operation by said die members on said plastic tape is completed.

12. A tool as defined in claim 11, in which a projection is formed at the outer end of the jaw, provided to snap into two spaced recesses in the tool body to define said two positions.

13. In a tool for embossing characters on a plastic tape and having a main body, cooperating die members for

embossing said characters at an embossing station and a pair of spring-biased pivoted handles for actuating said die members at said embossing station to emboss said tape when said handles are squeezed together, one of said handles being rigidly connected to the main body of said tool and the other being pivoted with respect thereto, and means for advancing and guiding said tape in response to the relative movement of said handles, the combination which comprises a cover plate mounted on said main body of said tool and overlying said die members and defining at said embossing station a portion of said main body of said tool against which said die members are pressed during an embossing operation, a radially extending aperture on the one of said die members facing said cover plate, which aperture is divided by a central rib member into two side slots, and a channel member clamped into said slots with the intermediate portion thereof flush with the surface of said die member adjacent said cover plate, at least one of the sides of the channel member extending beyond the underside of said die member providing a cutting knife edge, means on the other said die member cooperating with said cutting knife edge effecting cutting off a length of said plastic tape when said cooperating portion of said other die member is positioned for a cut-off operation with said cutting knife edge.

14. In a tool for embossing characters on a plastic tape and having a main body, cooperating die members having an axis for embossing said characters at an embossing station and a pair of spring-biased pivoted handles for actuating said die members at said embossing station to emboss said tape when said handles are squeezed together, one of said handles being rigidly connected to the main body of said tool and the other being pivoted with

respect thereto, and means for advancing and guiding said tape in response to the relative movement of said handles, the combination which comprises a cover plate secured to said main body of said tool and closely overlying one of said die members, a plurality of radial slots around the periphery of the other of said die members forming flexible fingers supporting embossing dies, said flexible fingers having a dimension in the direction of said axis which varies inversely in accordance with the width of the character represented by each said finger, and means for effecting a shorter stroke and feeding of said plastic tape when embossing a narrow character than when embossing a wider character providing substantially the same spacing between adjacent embossed characters on said tape notwithstanding variations in the width of the particular characters being embossed.

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