

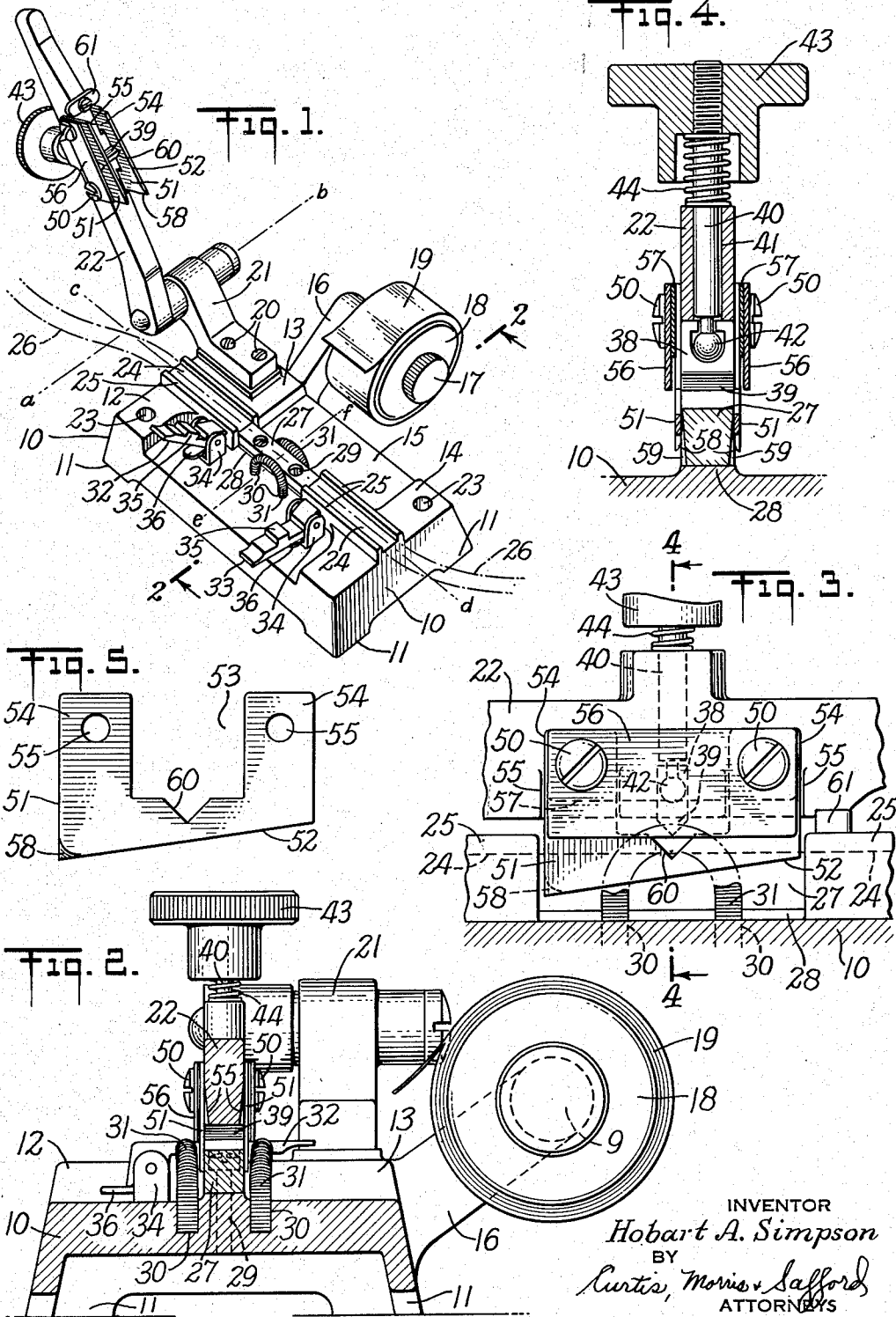
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H. A. SIMPSON

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TAPE CUTTER AND SPLICING DEVICE

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INVENTOR
Hobart A. Simpson
BY
Curtis, Morris & Safford
ATTORNEYS

UNITED STATES PATENT OFFICE

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TAPE CUTTER AND SPLICING DEVICE

Hobart A. Simpson, New York, N. Y., assignor to
Vera Alonge, New York, N. Y.

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This invention relates to apparatus for cutting and splicing tape, and, more particularly, magnetic tape of the nature used with sound recording machines to receive and retain a record.

In the use of such tape, portions may become torn, or otherwise damaged, or it may be found desirable to edit the recorded matter by the deletion of certain parts. After trimming the ends it is ordinary practice to bring them together and form a splice where the abutting ends meet, as by the application of an overlapping piece of cellulosic adhesive tape at the junction of the two aligned sections of the recording tape. For this purpose standard "Scotch" splicing tape may be employed.

One of the objects of this invention is to provide a simple and inexpensive trimming and splicing device of the character described which will be convenient and accurate in operation. Other objects will be in part obvious and in part pointed out hereinafter.

The present invention accordingly consists in the novel combinations and arrangement of parts as hereinafter set forth in the specification and shown in the drawings.

In the drawings which represent one embodiment of the invention:

Fig. 1 is a perspective view of a device showing a practical embodiment of the present invention with the cutter bar in raised position;

Fig. 2 is a transverse enlarged cross section taken on line 2—2 of Fig. 1, with the cutter bar down in operable position to cut or trim a length of magnetic recording tape;

Fig. 3 is a fragmentary front view of the closed device as seen from the left in Fig. 1 and drawn to a still larger scale;

Fig. 4 is a vertical cross section taken substantially on line 4—4 of Fig. 3 and

Fig. 5 is a front side view of one of the shear blades as shown in part in Fig. 3.

Referring to the drawings in which similar reference characters refer to similar parts throughout all of the figures, it will be seen that the apparatus or device comprises a rectangular base 10 having feet 11 formed at its four corners. At its left end the base provides two integral raised portions or pads 12 and 13, and at the right end a raised pad 14, all of substantially the same height above the lower intermediate central portion 15 of the base.

Extending rearwardly and upwardly from the pad 13 is a bracket 16 formed with a rightwardly extending arm or shaft 9 for supporting a spool 18 of adhesive tape 19 which may be of the nature

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of "Scotch tape." A thumb screw 17 holds the spool upon the shaft.

Also mounted, as by means of screws 20, upon the pad 13 and extending upwardly and leftwardly, as seen in Fig. 1, is a bracket 21, in which is pivotally supported, on an axis $a-b$ normal to the longitudinal axis $c-d$ of the base, a cutter bar 22. This bar may swing downwardly from the open position of Fig. 1 to a closed operative position (see Fig. 3) in which the cutting and splicing operations may be performed. Holes 23 extending vertically through the base, as indicated at 23, facilitate fastening the device to desk or table, if so desired.

A pair of seats 24, for supporting a length of recording tape 26, are spaced apart upon either side of a transverse axis $e-f$ of the base, which axis is at right angles to the before-mentioned axis $c-d$. These seats are raised above the surface 15 of the base and have lateral edge portions or walls 25 rising above the level of the seats. The walls 25 are spaced equally with respect to the axis $c-d$ and the distance between them is just sufficient to provide lateral guides for centering upon the seats 24, recording tape 26 of the width to be treated.

The base with its brackets and tape guide may be composed of cast metal, as iron or bronze, and the cutter bar may be made of the same material.

Reference to Fig. 1 will disclose a cutter block or anvil 27 mounted upon a seat 28 formed on the base, the block being held to the seat 28 by means of screws 29. This block, preferably made of tool steel, has a width at the top substantially the same as that of the recording tape and is of a length to effect a close fit between the tape guide seats 24. It is thus centered upon the axis $e-f$.

Also centered upon this same axis are four holes 30 which are formed in the section 15 of the base, two upon each side of the seat 28 for the block 27. Longitudinally, the holes 30 are centered in pairs astride the axis $e-f$. These holes serve as settings for the four ends of two coil springs 31, one of which springs is located upon either side of the said anvil block. The springs are of sufficient length to seat in their respective settings and form, at the same time, a U bend projecting upwardly a short distance above the block 27, as will be clear from the drawings.

Also mounted on the low portion 15 of the base are a pair of tape clamps 32 and 33. The clamps are pivotally mounted on base supported brackets 34 to swing upwardly from the open position shown in Fig. 1 to a closed position in which a

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flat projection 35 of each clamp 32 enters between the walls 25 of the seats 24 to hold the tape during a cutting or splicing operation. Suitable springs 36, not shown in detail, resiliently hold the clamps in either open or closed condition.

The cutter bar 22 supports a relatively movable knife 38 having a cutting edge 39 at its lower end, as best seen in Fig. 4. This edge is adapted to engage a piece of recording tape clamped in the device, approximately in the line of the axis *e-f* and severs the tape by pressure against the block 27. This knife, like the block, is made preferably of tool steel. The body of the knife 38, which is rectangular in cross section, is mounted at the lower end of a thrust pin 40, mounted to reciprocate in a circular passage 41 passing through the bar 22. Pin 40 has a ball and socket connection 42 at its lower end with the knife 38 and at its upper end is threaded into a knurled knob 43. Surrounding the pin 41 is a compression spring 44 interposed between the knob and the upper surface of the bar. This spring tends normally to hold the knife in a retracted position out of engagement with the anvil block 27.

When the bar is closed upon a tape and pressure is applied to the knob 43, the knife will move into contact with the anvil severing the tape cleanly, at right angles, in the device shown; or the knife may be set obliquely in the cutter bar to present its edges at an angle to the axis *c-d* and produce opposed miter edges on the tape.

Referring to Fig. 1 it will be noted that the roll of "Scotch tape" 19 has its free end in position to be drawn across the cut ends of the recording tape after the cutter bar 22 has been raised. It will further be seen that the cutter bar carries, mounted on its opposite sides, as by screws 50, a pair of blades 51 which are formed and adapted to pass closely past the upper longitudinal edges of the anvil block 27 with a shearing action, should the cutter bar be again pressed to its seat, and by such action cut and trim the "Scotch tape" closely along the lateral edges of the recording tape which was previously cut through or trimmed by the knife 38. As the adhesive tape is sheared, the short section thereof beneath the cutter bar is pressed down into adhesive engagement with the recording tape to splice the latter with its severed edges abutting and the two lengths of recording tape in substantially perfect alignment.

During the splicing operation, the bent springs 31 will prevent portions of the adhesive tape, before being sheared, from being pressed downwardly into adhesive engagement with the sides of the anvil block, as would be apt to happen should the springs be omitted. When certain kinds of adhesive tape are drawn off the roll the tape becomes highly charged with static electricity. There results therefrom a tendency on the part of the charged tape to lift slightly the abutting ends of the recording tape and thereby cause a misalignment of the said ends when spliced. This may cause exposed portions of the sticky surface of the adhesive tape to contact and stick to the next succeeding layer when the spliced recording tape is rolled.

The springs 31, which are preferably made of non-magnetic material, normally lean with their bends touching the edges of the anvil and are pushed away from the anvil by the advancing edges of the shear blades. Thus since the springs 31 overlap slightly the shearing edges of the anvil the ends of the recording tape are prevented from being disturbed by the statically charged adhesive

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tape. This is important as by the use of the springs the job of splicing is more easily, quickly and accurately accomplished.

In order to improve its shearing qualities and provide a self-sharpening characteristic, the blades 51 are formed as shown in Fig. 5 with the lower edge 52 of each slanted upwardly from left to right with respect to the upper edge of the blade. This taper provides that shearing engagement between knives and anvil block takes place progressively from left to right as the cutter bar closes. It will be seen that each blade is cut away as at 53 and that the upper portions 54 are perforated as at 55 to receive the holding screws 50, mentioned above. The said screws 50 pass first through a clamping plate 56, then a blade and a thin liner 57 of sheet metal and are then threaded into the cutter bar. At the points where the portions 54 of the blades engage the cutter bar, the bar itself is tapered as seen at 55 in Figs. 2 and 3, so that when the blades are drawn up tightly to the bar, the lower edges of the blades will converge towards one another or toe in to a slight degree so as to tend to engage the anvil slightly inwardly of its shear edges as the blades are brought into engagement therewith. However, the left lower edge of each blade at its low point is beveled on the inside of the blade, as indicated at 58 in Fig. 3, sufficiently to start spreading the blades away from the edges of the anvil, first at this point, and then progressively the length of the blade. Thus both shearing and sharpening action is ensured. To render this effect more perfect the anvil block has been given a slight taper from top to bottom, as indicated at 59 in Fig. 2, which taper provides a sharper shearing edge to the anvil and provides desirable clearance beneath that edge. It will be noted that the two blades 51 are each provided with a V notch 60 substantially at the center of and below the cutaway portion 53.

As the blades 51 lean toward one another these V notches provide clearance for the tapered portion 39 of the cutting knife 38 which may extend slightly beyond the shear edges of the anvil. They also serve as guides for the knife 38 as it is projected during operation to ensure it meeting the surface of the anvil at the proper angle.

An abutment piece 61 is provided as shown in the drawings for engagement with the upper edges of the guide walls 25 of one of the seats 24 to determine the closed position of the cutter bar.

It will thus be seen that the present invention provides a device well adapted to carry out the ends and objects hereinbefore set forth in a novel and practical manner and has other inherent advantages, such, for instance, as comprising a somewhat obtusely sharpened trimming knife for the recorder tape which cuts clearly against the surface of an ungrooved anvil and shearing blades for the adhesive tape, which are angularly disposed in relation to the tapered sides of said anvil in a manner to improve the shearing action and keep the shearing edges in a sharp condition of usefulness.

The foregoing detailed description of the present embodiment and its special use is not to be understood as an undue limitation of the invention.

What I believe is new and desire to secure and protect by Letters Patent is:

1. In apparatus of the character described, in combination, a tape supporting anvil block having a plane upper surface and a pair of parallel

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longitudinal shear edges, a cutter bar pivotally mounted in operative relation to said surface of said anvil block and movable into aligned superimposed relation thereto, a normally retracted knife movably mounted in said bar and operable into operative contact transversely of said surface when said bar is in its said superimposed position, guide means for positioning a strip of recording tape longitudinally upon said plane anvil surface for transverse severance between said anvil and said knife and manual means to impart a cutting movement to said knife.

2. In apparatus of the character described, in combination, a tape supporting anvil block having a plane upper surface and a pair of parallel longitudinal shear edges, a cutter bar pivotally mounted in operative relation to said plane surface and movable into aligned superimposed relation thereto, means for effecting the disposal of a strip of adhesive tape above and normal to the said edges of said anvil, a pair of blades carried rigidly by said bar in operable shearing relationship to the said edges of said anvil and means for moving said cutter bar into said superimposed position, thereby to effect cooperation of said knives and anvil to shear from said adhesive tape a portion having substantially the width of said anvil.

3. In apparatus of the character described, in combination, a tape supporting anvil block having a plane upper surface and a pair of parallel longitudinal edges, a cutter bar pivotally mounted in operative relation to said plane surface and movable into aligned superimposed relation thereto, a normally retracted knife movably mounted in said bar and operable into operative contact transversely of said plane surface when said bar is in its said superimposed position, guide means for positioning a strip of recording tape longitudinally upon said anvil surface for transverse severance between said anvil and said knife, manual means to impart a cutting movement to said knife, means for clamping the severed tape upon said guide means with the ends abutting in their position as cut by the knife, means for effecting the disposal of a strip of adhesive tape above said cut ends of said recording tape in a position normal to said anvil and said recording tape, a pair of blades carried by said bar in operable shearing relationship to the side edges of said anvil and means for moving said cutter bar and blades into said superimposed position, thereby to press said adhesive tape down upon the cut ends of said recording tape and cause said blades to cooperate with the anvil to shear from said adhesive tape a portion having substantially the width of said recording tape, and cooperative means on said cutter bar and anvil for pressing upon said portion of adhesive tape to securely hold the ends of said recording tape in end-abutting position.

4. In a tape cutting and splicing apparatus of the character described, a tape supporting anvil, tape guides disposed in alignment with said

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anvil, a cutter bar pivotally mounted to be brought into registry with said guides, a normally retracted reciprocable knife carried by said bar having a transversely disposed cutting edge and movable into operable relation with said anvil to sever a length of recording tape supported within said guides, means supporting a strip of adhesive tape for disposition in a rectilineal line across the severed ends of said recording tape, means on said cutter bar for pressing said tapes into adhesive contact and means on said cutter bar cooperating with the two longitudinal edges of said anvil to shear said adhesive tape substantially along the lateral edges of said recording tape.

5. Apparatus as in claim 1 in which said knife comprises a metal block tapered downwardly to a cutting edge extending at least wholly across the anvil surface in a lateral direction, actuating means reciprocably mounted in said cutter bar and means comprising a universal joint between said actuating means and said knife block to facilitate the uniform engagement of said cutting edge with the surface of said anvil along the whole length of the knife edge, and resilient means normally holding said actuating means and knife in a retracted position.

6. Apparatus as in claim 1 in which said guiding means for said tape comprises rectangularly grooved members disposed at the two ends of said anvil with the groove in alignment with said anvil and manually operable means are provided for holding the tape within said grooves.

7. Apparatus as in claim 2 in which said blades are secured to the two sides of said cutter bar and means is provided for causing the blades to toe in from a spaced distance at their tops slightly greater than the width of the anvil to a spaced distance at their lower edges slightly less than said anvil width.

8. Apparatus as in claim 7 in which the lower edges of said blades slope upwardly from the ends nearest the pivot of the cutter bar to the ends more remote therefrom.

9. In apparatus as in claim 7 in which the side walls of said anvil block taper downwardly to provide a slightly acute angle at the meeting of the side walls with the top surface of the block.

10. Apparatus as in claim 2 in which upwardly bent coil springs are mounted by their ends adjacent the longitudinal sides of said anvil block in such close relation thereto as to be forced away from said block by the shear blades as the latter are advanced to operated position.

HOBART A. SIMPSON.

References Cited in the file of this patent
UNITED STATES PATENTS

Number	Name	Date
1,396,895	Stolz	Nov. 15, 1921
2,394,317	Matson	Feb. 5, 1946
2,499,686	Selmin	Mar. 7, 1950
2,552,148	Carson	May 8, 1951