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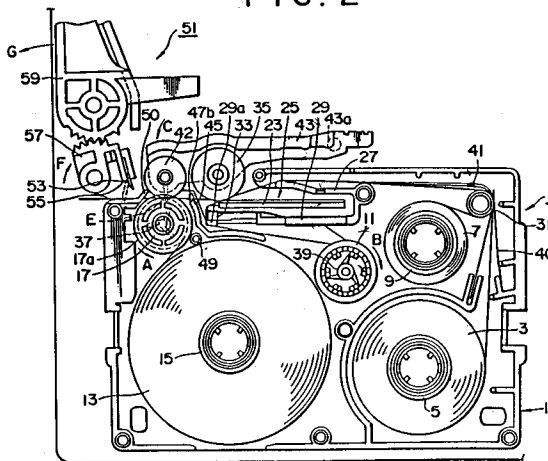
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(54) **Cassette for tape printing device.**

(57) A cassette to be detachably received in a tape printing device having a printing member (23) for printing on a surface of a tape-like recording medium (3); tape feed means (42) for feeding the recording medium along a path; and a cutting blade (53) for cutting the recording medium, said cassette comprising a case (1) containing the recording medium in a substantially wound state with an end portion of the recording medium extending from the cassette, characterised in that the cassette is provided with a cutting surface (55) adjacent the path of the end portion of the recording medium from the cassette for the cutting blade to cut against to sever the end portion of the recording medium downstream of the cutting surface in the feeding direction.

FIG. 2

The present invention relates to a tape storage cassette for use in a tape printing device.

Apparatus for printing characters on a non-adhesive side of an adhesive tape has been well-known. In this type of apparatus, although characters such as names can be printed on tapes which can be suitably adhered on the desired substrates, the printed characters are erased or become blurred because the printed surface is exposed. To solve such a problem, disclosed is an apparatus for making printed tapes where the printed surface is not exposed in Japanese Patent Application No. SHO62-294471. In this apparatus characters are reversely printed on a transparent film tape and a double-sided adhesive tape in the same width thereof is adhered thereon.

However, in this apparatus because the film tape where characters are printed and the double-sided adhesive tape which is adhered thereon are separately mounted on the apparatus, it is not easy to attach and detach the tapes. To solve this problem, it is possible to attach a cassette which cooperatively houses the tapes to the printing apparatus. However, the tapes cannot be efficiently attached to the printing apparatus only by simply housing the tapes in the cassette. Since the tapes are arranged and connected outside the cassette after characters are printed on the film tape, if both the tapes are housed in the cassette and the ends of the tapes are extended to the outside, whenever the cassette is attached to the printing apparatus, it is necessary to arrange the ends of the tapes and guide them to the connection portion, whereby the attaching operation becomes difficult.

Other proposals involve providing a cutter for the tape located downstream of the print position, and the object of the present invention is to provide an improved cassette making it easier to cut the printed tape.

According to the present invention there is provided a cassette to be detachably received in a tape printing device having a printing member for printing on a surface of a tape-like recording medium; tape feed means for feeding the recording medium along a path; and a cutting blade for cutting the recording medium, said cassette comprising a case containing the recording medium in a substantially wound state with an end portion of the recording medium extending from the cassette, characterised in that the cassette is provided with a cutting surface adjacent the path of the end portion of the recording medium from the cassette for the cutting blade to cut against to sever the end portion of the recording medium downstream of the cutting surface in the feeding direction.

In a preferred form, the cassette accommodates said tape-like recording medium, a transfer ribbon for printing onto said tape-like recording medium

and a double-sided adhesive tape arranged to be overlapped and adhered to the surface of said tape-like recording medium on which printing operations have been executed.

The invention will be better understood from the following description which is given by way of example with reference to the accompanying drawings in which:-

Fig. 1 is a perspective view of a tape storage cassette embodying the present invention.

Fig. 2 is an explanatory view showing the tape storage cassette of Fig. 1 attached to a printer unit.

Description of the Embodiment

The tape holding case incorporating the present invention is now described below with reference to the accompanying drawings.

As shown in the disassembled perspective view of Fig. 1, a tape storage cassette 1 according to this embodiment includes a film tape spool 5 ground which a transparent film tape 3 is fitted, a ribbon feed spool 9 having a thermal transfer ribbon 7 wound thereon with its inked surface facing inside, a ribbon takeup spool 11 taking up the thermal transfer ribbon 7 drawn out of the ribbon feed spool 9, a double-sided adhesive tape spool 15 on which a double-sided adhesive tape 13 narrower than the film tape 3 and having one surface covered with an exfoliative sheet is wound with this sheet covered surface facing outside, and an alignment roller 17 for alignment of the double-sided adhesive tape 13 and the film tape 3, all of which are stored in a cassette case 19. They are rotatably carried by support members S1 through S5 mounted on a cover 21 and on the bottom of the cassette case 19 opposed to the cover 21 within the cassette case 19 whose opening is covered with the cover 21.

The tape storage cassette 1 is attachably and detachably mounted on a printer unit capable of reverse -printing desired characters. Thus, the unit accomplishes reverse-printing on the film tape 3 using the thermal transfer ribbon 7. The double-sided adhesive tape 13 is then stuck to the printed surface to provide a print tape with desired characters already printed.

The tape storage cassette case 1 is formed with a recess 25 to receive a thermal head 23 mounted on the, printer unit as shown in Fig. 2. Along the inner and outer periphery of the recess 25 provided are upright extending guide plates 27 and 29 to define a space for receiving the thermal head 23. Fig. 2 represents the tape storage cassette 1 fitted in the printer unit, so that the following description will be made With reference mainly to this drawing. The film tape 3 and the thermal

transfer ribbon 7 with its inside surface coated with ink face each other and are guided together to the recess 25 by means of a guide pin 31. Guide plates 27 and 29 form a restricting path for the film tape 3 and the thermal transfer ribbon 7 sent to the recess 25 to avoid their blocking the space accommodating the thermal head 23.

The guide plate 29 extending upright from the inner periphery of the recess 25 is provided with a leaf spring 33 loading the film tape 3 and the thermal transfer ribbon 7 outward to thereby ensure a required space for receiving the thermal head 23.

When the tape storage cassette 1 is attached to the printer unit, the thermal head 23 is thus located behind the thermal transfer ribbon 7. The film tape 3 and the thermal transfer ribbon 7 are then pressed against the thermal head 23 by means of a platen roller 35 provided on the printer unit and movable into and out of engagement with the thermal head 23, whereby desired reverse characters can be printed on the film tape 3.

The thermal transfer ribbon 7 passed through the recess 25 is taken up onto the ribbon takeup spool 11 via an end 29a of the guide plate 29. At the same time, the film tape 3 is drawn out of the cassette 1 by means of the alignment roller 17. When attached to the printer unit, the alignment roller 17 and the ribbon takeup spool 11 are respectively splined to a tape feed element 37 and a ribbon takeup element 39 on the printer unit which are driven for rotation in opposite directions by a drive motor and power transmission mechanism, not shown, and are rotatably driven by these elements in the directions indicated by arrows A and B.

The thermal transfer ribbon 7 and the film tape 3 thus travel along the path consisting of guide pin 31, guide plate 27 and recess 25 by such rotary drive motion. Inertia of such rotary motion however causes an extra amount of thermal transfer ribbon 7 and film tape 3 to be drawn from the respective spools 5 and 7. This results in slack of the ribbon 7 and the tape 3 in the recess 25, making it impossible to accomplish a proper reverse-printing action on the film tape 3. To overcome this problem, the present tape storage cassette 1 is provided with a leaf spring 40 mounted near the guide pin 31, which pressingly biases the thermal transfer ribbon 7 and the film tape 3 from outside. The thermal transfer ribbon 7 and the film tape 3 are thus loaded with back tension to prevent the thermal transfer ribbon 7 and the film tape 3 from being slackened at the recess 25. Furthermore, there is provided a separator film 41 which protects the film tape 3 from ink coating on the thermal transfer ribbon 7 during traveling along the feed path between the position at which the film tape 3 is drawn from the film tape spool 5 and the recess 25. The

film tape 3 and the thermal transfer ribbon 7 are given back tension independently of each other by means of the separator film 41 and the leaf spring 40 so that, even if one of the film tape 3 and the thermal transfer ribbon 7 is drawn out for some reason, such pulling action would not affect normal feed motion of the remaining one of the tapes.

The alignment roller 17 not only brings the film tape 3 and the double-sided adhesive tape 13 into alignment but also is operatively associated with a feed roller 42 on the printer unit movable into and out of engagement with the alignment roller 17 to press the adhesive surface of the double-sided adhesive tape 13 against the print surface of the film tape 3 so as to bond both tapes together. As shown in Fig. 1, the alignment roller 17 is at its ends provided with flanges 17a and 17b mounted at right angles to the roller surface so as to restrict widthwise movement of the tapes 3 and 13. The feed roller 42 is carried by a support member 43 mounted on the printer unit for rotation about an axis 43a. With the tape storage cassette 1 attached to the printer unit, the support member 43 is biased in the direction indicated by an arrow C by means of biasing means not shown, so that the film tape 3 and the double-sided adhesive tape 13 are pressed against the roller surface of the alignment roller 17 for bonding the tapes together.

The support member 43 carrying the feed roller 42 on the printer unit also carries the platen roller 35 thereon, so that the platen roller 35, like feed roller 42, biases the support member 43 in the direction indicated by the arrow C to press the film tape 3 and the thermal transfer ribbon 13 against the thermal head 23. The platen roller 35 is like the feed roller 42 also in that it is formed by a resilient material such as rubber to avoid scratches at film tape 3 during pressing and to provide a required resistance and friction force.

In the feed path of film tape 3 from the recess 25 to the alignment roller 17 provided is a guide plate 43 for guiding the film tape 3 to a joint position E with the double-sided adhesive tape 13 on the alignment roller 17. The guide plate 45 is at both ends, i.e., at the cover 21 and the cassette case 19 shown in Fig. 1, provided with restricting elements 47a and 47b for restriction of widthwise displacement of the film tape 3. Since a length of the travel path of the film tape 3 is longer than that of the double-sided adhesive tape 13, it is considered that the film tape 3 is aligned in a width direction in advance before it is overlapped with the double-sided adhesive tape 13 by means of the feed roller 42 and the alignment roller 17.

The feed path of the double-sided adhesive tape 13 to the alignment roller 17 includes a guide roller 49 made of silicon resin to prevent the double-sided adhesive tape 13 from sticking to

other parts such as thermal transfer ribbon 7 in the cassette 1. The double-sided adhesive tape 13 passed through this path is then guided to the joint position E with the film tape 3 by the roller surface of the alignment roller 17.

The film tape 3 and the double-sided adhesive tape 13 thus joined together by the alignment roller 17 and the feed roller 42 (i.e., print tape) are guided out of the cassette 1 by way of a tape holder 50 provided at the exit. The tape travel path outside the cassette case 19 is provided with a block 55 for receiving a cutting blade 53 in a tape cutter 51 mounted on the printer unit. The print tape thus completed is then cut off by pressing the cutting blade 53 against the block 55 in operation of the tape cutter 51. The tape cutter 51 is rotatably mounted on the printer unit and consists of a cutting blade holder 57 carrying the cutting blade 53 and a rotary arm 59 for rotating the cutting blade holder 57 in the direction indicated by an arrow F. The print tape is cut off by manually moving the rotary arm 59 in the direction indicated by an arrow G.

The tape storage cassette 1 according to the present embodiment is provided with the alignment roller 17 which arranges and connects the film tape 3 and the double-sided adhesive tape 13 and with the block 55 which receives the cutting blade 53 which cuts the printed tape made by the connection therewith. When the printed tape is made by mounting the film tape 3 and the double-sided adhesive tape 13 to the printer, they are connected and cut by the cooperating operations of the alignment roller 17, the block 55, and the feed roller 42 and the tape cutter 51 provided on the printer. In the cassette case 19, the film tape 3 is guided to the connection position E by the operations of the guide pin 31, the guide plate 27, and the guide plate 45, the double-sided adhesive tape 13 being guided to the connection position E by the operations of the guide roller 49 and the roller surface of the guide roller 49, the printed tape which are connected being guided to the position of the block 55 which is the tape cutting position through the tape holder 50.

When the tape storage cassette 1 is detached from the printer and another tape storage cassette housing a different color thermal transfer ribbon is attached so as to make a different color printed tape, by separating the platen roller 35 and the feed roller 42 from the tape storage cassette 1, the tape storage cassette 1 can be directly detached in the condition that the film tape 3 and the double-sided adhesive tape 13 are guided to the connection position E. When the tape storage cassette 1 is attached to the printing apparatus again, it is not necessary to manually guide each tape to the connection position E. In addition, since the tapes

are connected from the connection position E to the cutting position, it is not necessary to arrange and connect both the tapes 3 and 13 when attaching the tape storage cassette 1 to the printer, thereby simplifying the attaching operation. Moreover, in the cassette case 19, since the film tape 3 is tensioned by the leaf spring 40 in the position of the guide pin 31, when the tape storage cassette 1 is detached from the printer, the connection portion of the film tape 3 and the double-sided adhesive tape 13 is not outwardly extended, whereby it is possible to keep the tape holding case 1 in the condition that each tape is dismounted from the printer.

Claims

1. A cassette to be detachably received in a tape printing device having a printing member (23) for printing on a surface of a tape-like recording medium (3); tape feed means (42) for feeding the recording medium along a path; and a cutting blade (53) for cutting the recording medium, said cassette comprising a case (1) containing the recording medium in a substantially wound state with an end portion of the recording medium extending from the cassette, characterised in that the cassette is provided with a cutting surface (55) adjacent the path of the end portion of the recording medium from the cassette for the cutting blade to cut against to sever the end portion of the recording medium downstream of the cutting surface in the feeding direction.
2. A cassette as claimed in claim 1, wherein the cassette case has a top surface, a bottom surface and side walls and said cutting surface is provided by a portion of one of said side walls.
3. A cassette as claimed in claim 1 or claim 2, wherein the cutting surface (55) is a generally planar surface and the end portion of the recording medium (3) extends thereacross generally parallel thereto.
4. A cassette as claimed in any of the preceding claims, wherein the cutting surface (55) is situated immediately downstream, in the feeding direction, of an opening in the side of the cassette case, inside which opening the cassette is provided with a guide roller (17) which is arranged to be contacted, in use, by a roller (42) of the printing device tape feed means.
5. A cassette as claimed in any of the preceding claims, wherein the cassette case further con-

tains a transfer ribbon (7) for use in printing on said recording medium (3).

6. A cassette as claimed in any of the preceding claims, wherein the recording medium (3) comprises a transparent film tape. 5

7. A cassette as claimed in claim 6, wherein the cassette case further contains a double-sided adhesive tape (13) arranged to be overlapped and adhered to the recording medium (3) after execution of a printing operation on the recording medium. 10

8. A cassette as claimed in claim 7, wherein the double-sided adhesive tape (13) is arranged, in use, to be adhered to the printed surface of the transparent film tape (3) after the execution on said surface of a reverse-printing operation, whereby the printing on said surface appears as normal when viewed through the tape from the opposite surface thereof. 15
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9. A cassette as claimed in claim 8, wherein a surface of the double-sided adhesive tape (13) opposite that to be adhered to the transparent film tape (3) is covered with an exfoliative sheet. 25

10. A cassette as claimed in any of claims 7 to 9, including a pair of guides (27, 29) over which the recording medium is arranged to be fed before being overlapped with the adhesive tape. 30
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11. A cassette as claimed in claim 10, wherein the guides (27, 29) are spaced so that a thermal printing head can be introduced between them.

12. A cassette as claimed in any of claims 7 to 11, including a roller member (49) of which a circumferential surface is arranged to be brought into and out of contact with an adhesive layer on the adhesive tape (13). 40
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FIG. 1

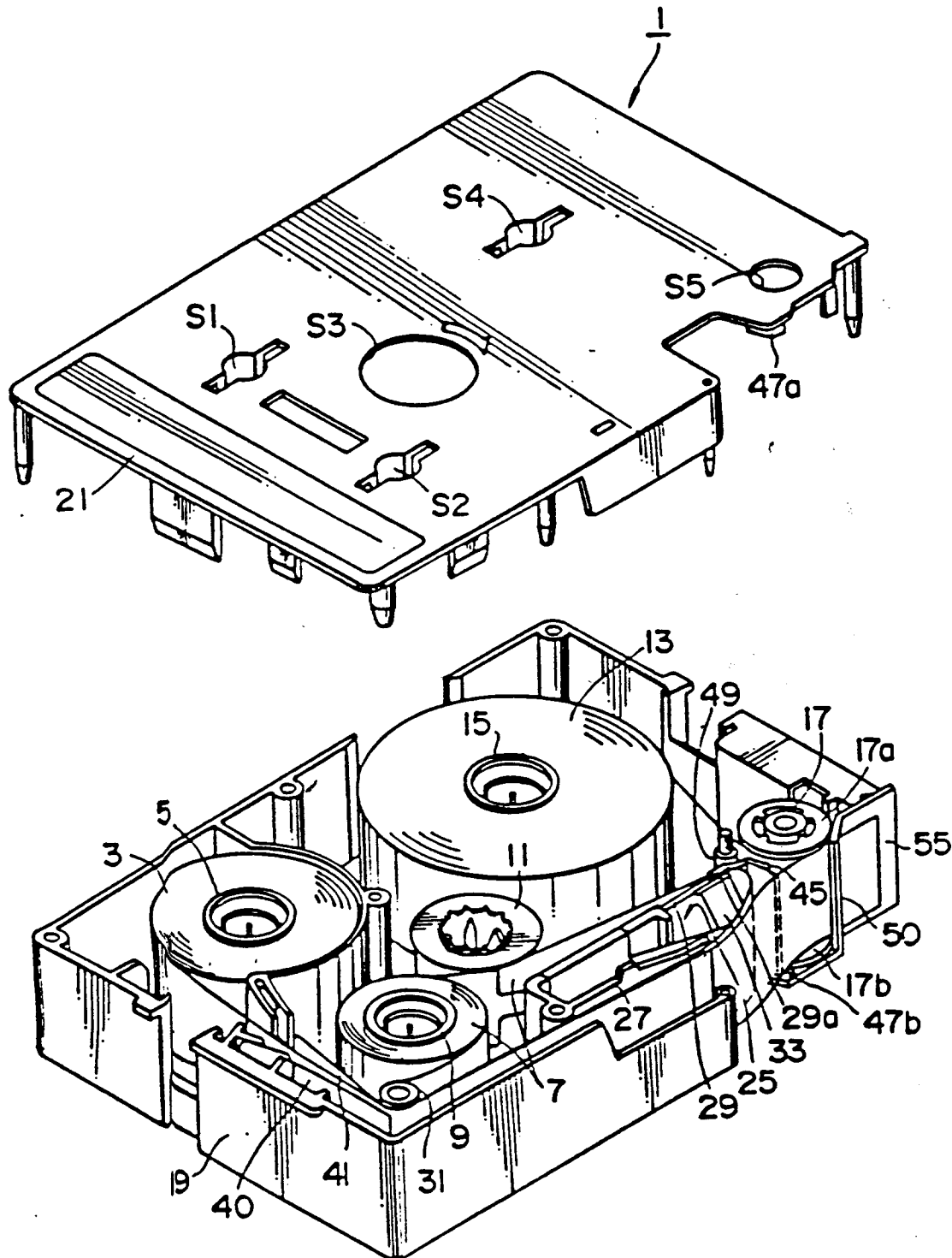


FIG. 2

