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(54) Tape printer

(57) A tape printing apparatus (10) for printing a label has a main body (29). The main body (29) comprises a bay for receiving a supply of image receiving tapes, a printing mechanism for printing an image onto said tape to define a label, a keyboard (14) for entering data defining the image to be printed and a display (26) for displaying the entered data. The tape printing apparatus 10 further comprises a lid member (12) which is arranged to cover the keyboard (14) and dispaly (26) when in a closed position.

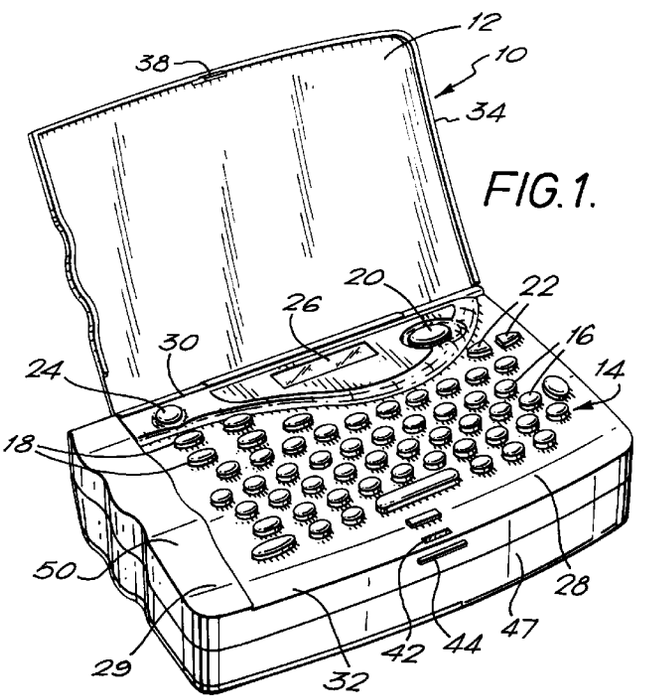

FIG.1.

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Description

The present invention relates to tape printing apparatus and is particularly but not exclusively concerned with thermal tape printing apparatus.

Tape printing apparatus of the type with which the present invention is concerned are in general small handheld, portable or desktop dedicated label printers. Printing apparatus of this type are disclosed in EP-A-322918 and EP-A-322919 (Brother Kogyo Kabushiki Kaisha) and EP-A-0267890 (Varitronics). These printers each include a printing device having a cassette receiving bay for receiving a cassette or tape holding case.

In EP-A-0267890, the tape holding case houses an ink ribbon and a substrate tape, the latter comprising an upper image receiving layer secured to a backing layer by adhesive.

In EP-A-332918 and EP-A-322919, the tape holding case houses an ink ribbon, a transparent image receiving tape and a double-sided adhesive tape which is secured at one of its adhesive-coated sides to the image tape after printing and which has a backing layer peelable from its other adhesive-coated side. With both these apparatus, the image transfer medium (ink ribbon) and image receiving tape (substrate) are in the same cassette.

Reference is also made to the applicant's earlier printing apparatus which is described in EP-A-487313, the contents of which are herein incorporated. This apparatus also uses a cassette incorporating both the ink ribbon and the image receiving tape.

The present Applicants have developed a different type of printing apparatus which is described in EP-A-578372, the contents of which are herein incorporated. In this printing apparatus, the substrate tape is similar to that described in EP-A-0267890 but is housed in its own tape holding case, while the ink ribbon is similarly housed in its own tape holding case.

In all of the above mentioned cases, the image receiving tape passes in overlap with the ink ribbon through a print zone consisting of a print head and a platen against which the print head can be pressed to cause an image to transfer from the ink ribbon to the image receiving tape. There are many ways of doing this including dry lettering or dry film impression, but the most usual way at present is by thermal printing where the print head is heated and the heat causes ink from the ink ribbon to be transferred to the image receiving tape. With the printing apparatus described in EP-A-578372 the tape holding case with the ink ribbon is placed on one side of the print zone while the tape holding case with the substrate is placed on the other side of the print zone. In these printing apparatus, the tape holding case is commonly referred to as a cassette.

Such printing devices generally have a keyboard for entering data to be printed. Additionally, these type of devices may also have a display to display the input data prior to its printing.

These label printers, particularly those designed to be carried around by the user have the problem that the keyboard is unprotected and if the tape printing apparatus is not wrapped up in suitable packaging material, the keyboard may be damaged or accidentally activate the label printer. This can be disadvantageous in that the life of the batteries can be unnecessarily reduced or any information stored in a memory of the device could be altered. If the label printer is activated accidentally and starts printing, this could cause tape wastage and may even lead to tape jamming. Additionally the display, which is relatively fragile, can be damaged.

Furthermore the keyboard and display can be vulnerable to impact damage.

Reference is made to EP 454415 (Esselte Meto International GmbH) which describes a portable bar code printer which has a first part containing a printing mechanism and a display. A second part contains a keyboard. To transport the printer, the first and second parts are closed together.

According to one aspect of the present invention, there is provided a tape printing apparatus for printing a label, said apparatus having a main body comprising a bay for receiving a supply of image receiving tape, a printing mechanism for printing an image onto said tape to define a label, a keyboard for entering data defining the image, to be printed, and a display for displaying the entered data, said tape printing apparatus further comprising a lid member which is arranged to cover said keyboard and display when in a closed position.

The lid member is able to protect the display and keyboard from accidential damage and provide some degree of protection against impact damage. Additionally, the lid member when in the closed position is able to prevent accidental actuation of any of the keys of the keyboard.

In one embodiment, the keyboard and display are on one face of the main body of the tape printing apparatus and said bay is arranged on a second face of the main body of said apparatus, said second face being opposite said first face. The first face is preferably the upper face of the main body of the apparatus, whilst the second face is preferably the lower face of the main body of the apparatus. In use the tape printing apparatus may rest on its lower face. Of course it is also possible for the bay for receiving a supply of image receiving tape to be on the same side of the main body of the tape printing apparatus as the keyboard and display.

Preferably, the lid member is arranged to cover all or a major portion of a face of the main body of the tape printing apparatus containing both the display and the keyboard. However, it would also be possible for the lid member to only cover a portion of the face of the main body of the tape printing apparatus containing the display and the keyboard, the display and the keyboard being received in that portion. In this latter embodiment, it is preferred that the keyboard and display be recessed with respect to the remaining portions of the face of the main body of the tape printing apparatus so that the lid

member, when closed, may lie generally flush with the remaining portions of the face of the main body of the tape printing apparatus. This may be advantageous in those embodiments where the tape supply receiving bay is on the same face of the main body of the tape printing apparatus as the display and the keyboard.

The lid member may be hingedly connected to an edge region of a face of the main body of the tape printing apparatus containing both the display and the keyboard. It is also possible that the lid member be hinged to any other region, not necessarily an edge region, on the face containing the display and the keyboard. The lid member of course need not be connected to the apparatus but may be completely removable. The lid member can also be connected to the main body of the tape printing apparatus by any other suitable mechanism, instead of the hinged connection discussed above.

The lid member is preferably arranged so as to define, in its fully open position, an obtuse angle with respect to the face of the main body of the tape printing apparatus containing both the display and the keyboard. Alternatively, the lid member can be arranged to rotate freely about its hinged connection.

The lid member and the main body of the tape printing apparatus preferably have cooperating closing means which keep the lid member closed when the lid member is in the closed position. These closing means can take the form of cooperating catch means. Alternatively or additionally, the lid member and the body of the tape printing apparatus can be arranged to have an interference fit with respect to each other.

Preferably, the lid member has a downwardly extending lip around at least part of its edge region so that the lid member, when in the closed position, does not contact the display or the keyboard. Alternatively or additionally, the body of the tape printing apparatus may have an upwardly extending lip which achieves the same effect.

The tape printing apparatus embodying the present invention is preferably hand held.

For a better understanding of the present invention and as to how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings in which:-

Figure I shows a perspective view of a label printing device, with its lid in the open position;

Figure 2 shows a perspective view of the label printing device of Figure I with its lid in the closed position;

Figure 3a shows a cross-sectional view of a closing mechanism for the lid;

Figure 3b shows a view from above of a portion of the tape printing device, with part of the tape printing device cut away to show the closing mechanism;

Figure 4 shows a schematic view of part of a first lower face of the label printing device of Figure I, with a cassette receiving bay exposed; and

Figure 5 shows a schematic view of part of an alternative lower face of the label printing device of Figure I, with the cassette receiving bay exposed.

Figure I shows a perspective view of a tape printing device I0 with its lid I2 in an open position. The tape printing apparatus 10 is designed so as to be hand held. The tape printing device I0 comprises a keyboard I4. The keyboard I4 comprises a plurality of numbered, lettered and punctuation keys I6 for inputting data to be printed as a label as well as function keys I8 for editing input data. These function keys I8 for example change the size or font of the input data. The keyboard also comprises a print key 20 which is operated when it is desired that a label be printed as well as tape feeding keys 22. Finally, the keyboard also comprises an on/off key 24 for switching the device 10 on and off.

The tape printing device I0 also has a liquid crystal display (LCD) 26 which displays the data as it is entered. The display 26 allows the user to view all or part of the label to be printed which facilitates in the editing of the label prior to its printing. Additionally, the display 26 can also display messages to the user, for example error messages or an indication that the print button should be pressed. The display 26 is driven by a display driver (not shown).

The keyboard I4 and the display 26 are both contained on the upper face 28 of the tape printing device 10 with the keyboard I4 being arranged below the display 26. The letters etc. on the keys 16 and as displayed on the display 26 are arranged so that their upper portions are closer to top edge 30 of the upper face 28 whilst their lower portions are closer to lower edge 32 of the upper face 28. The lid I2 is hingedly connected along top edge 30 of the upper face 28 of the main body 29 of the tape printing device 10. The lid I2 is movable between an open position, shown in Figure I, and a closed position, as shown in Figure 2. The lid I2 is arranged so that when it is in the closed position, the keyboard 14 and display 26 are completely covered by the lid I2. The lid I2 is hingedly connected to top edge 30 in such a way that when it is fully opened it forms an obtuse angle to upper face 28, as can be seen from Figure 1.

The lid 12 has a lip portion 34 which extends around the edge of the lid 12 and which, when the lid 12 is in the closed position, is in contact with upper face 28 of the main body 29 of the tape printing device 10. The lip portion 34 ensures that when the lid 12 is in the closed position the lid 12 does not come into contact with any of the keys 16,18,20 or 22 of the keyboard 14 or the display 26.

In order to keep the lid 12 in a closed position, the

lid 12 and tape printing device 10 have a cooperating catch mechanism 36 which can be seen in Figures 3a and 3b. The cooperating catch mechanism 36 has a protrusion 38 which extends downwardly from the lid 12. The protrusion has a first stem-like part 37 and an inwardly extending portion 40 arranged at the base of the stem-like part 37. The inwardly extending portion 40 is generally triangular such that the protrusion 38 generally narrows to a point at its lower end. The protrusion 38 is arranged to be received in an aperture 42 of the tape printing device 10. The protrusion 38 also has a longitudinally extending rib 45 which serves to reinforce the protrusion 38. This rib 45 is arranged in the central region of the protrusion 38. The protrusion 38 is made of a substantially rigid material such as, for example, a suitable plastics material.

The cooperating catch member 36 further comprises a cooperating member 48 which is mounted in the main body 29 of the tape printing device 10, generally below the aperture 42. The cooperating member 48 has two arms 41 by which the cooperating member 48 is mounted to the tape printing device 10. These arms 41 permit the cooperating member 48 to be moved inwardly in the direction of arrow A. However, these arms 41 are biased so as to urge the cooperating member back to its normal position shown in Figures 3a and 3b.

The cooperating member 48 has an aperture 43 into which protrusion 38 is inserted. An aperture 44 is also provided in the side wall 47 of the tape printing device 10 through which part of the cooperating member 48 extends when in the position as shown in Figures 3a and 3b. When the cooperating member 48 is in its normal, unbiased position, the aperture 43 of the cooperating member 48 and the aperture 42 of the tape printing device 10 are not completely aligned as can be seen from Figures 3a and 3b. Rather, part 39 of the cooperating member 48 extends across part of the aperture 42 when the cooperating member 48 is in the normal position. As can be seen from Figures 3a and 3b, the part 39 covers a portion of the aperture 42 further from the side wall 47 of the tape printing device 10.

It should be noted that the uncovered part of the aperture 42 of the tape printing device 10 has a size generally corresponding to that of the stem-like part 37, when the cooperating member 48 is in the normal position.

The thickness of the wall defining the aperture 42 plus the thickness of the part 39 of the cooperating member 48 is arranged to be slightly less than the distance l between the top of the inwardly extending portion 40 of the protrusion 38 and the top of the stem-like part 37.

The cooperating member 48 is generally box-shaped with a groove 49 extending along the wall of the cooperating member 48 further from the side wall 47 of the tape printing device 10. This groove 49 is arranged below part 39. The groove 49 has a height generally corresponding to that of the inwardly extending portion 40 of the protrusion 38.

Finally, the aperture 43 of the cooperating member 48 is generally rectangular but has a outwardly extending portion 51 which, in use, accommodates the reinforcing rib 45 of the protrusion 38.

In use, when the lid 12 is closed, the protrusion 38 is pushed through the aperture 42 of the tape printing device 10. The outwardly extending portion 40 and, in particular its downwardly sloping side, encounters the part 39 of the cooperating member 48 and, as the protrusion 38 is pushed downwardly, the cooperating member 48 is moved inwardly against the action of arms 41. Once the inwardly extending portion 40 of the protrusion 38 has passed the part 39 of the cooperating member 48, the cooperating member 48 is able to move back to the position shown in Figures 3a and 3b under the action of its biased arms 41. The stem-like part 37 of the protrusion 38 is thus accommodated in the aperture 42 of the tape printing device and rests against the side of part 39. The inwardly extending portion 40 is accommodated below part 39 in the groove 49. In this way, the lid 12 is maintained in a closed position.

In order to open the lid 12 again, the cooperating member 48 is pushed inwardly through aperture 44 by the user. This causes the aperture 43 of the cooperating member 48 to be aligned with the aperture 42 of the tape printing device 10. Thus, the inwardly extending portion 40 is no longer in the groove 49 of the cooperating member 48 and can be withdrawn through aperture 42 of the tape printing device. In this way, the lid 12 can be disengaged from the main body 29 of the tape printing device 10. When inward pressure applied to the cooperating member 48 by the user is released, the arms 41 urge the cooperating member 48 back into the position shown in Figures 3a and 3b.

As can be seen from Figures 1 and 2, the upper face 28 of the tape printing device 10 has an upstanding edge portion 50 which extends above the plane containing the keyboard 14 and the display 26. The cutter (not shown) may be housed below this edge portion 50. The upstanding edge portion 50 is slightly raised as compared to the lid 12, when in the closed position. This may reduce any impact damage to the tape printing device 10 as the main impact may be borne by the edge portion 50 and not the lid 12. If the lid 12 is damaged, it is more likely that it be separated from the main body 29 of the tape printing apparatus and thus lead to damage to the keyboard 14 and display 26.

Reference will now be made to Figure 4 which shows a first embodiment of the underside of the main body 29 of the tape printing device l0. As can be seen, the lower face of the tape printing device l0 has a cassette receiving bay ll3 with two cassettes arranged therein. The first cassette l02 contains a supply of image receiving tape l04 which passes through a print zone l03 of the tape printing device l0 to an outlet l05 of the device l0. The image receiving tape l04 comprises an upper layer for receiving a printed image on one of its surfaces, its other surface being coated with an adhe-

sive layer to which is secured a releasable backing layer. The first cassette l02 has a recess l06 for accommodating a platen l08 of the tape printing device. The platen 108 is mounted for rotation on a pin. As an alternative, the platen 108 could be mounted for rotation within a cage moulding.

The second cassette l07 comprises an ink ribbon ll2 which extends from a supply spool to a take up spool within the second cassette l07. The ink ribbon ll2 extends through the print zone in overlap with the image receiving tape l04. The second cassette l07 has a recess ll7 for receiving a print head ll6 of the printing device l0. The print head is movable between an operative position in which it is in contact with the platen l08 and holds the thermal transfer ribbon ll2 and the image receiving tape l04 in overlap between the print head ll6 and the platen l08 and an inoperative position (shown in Figure 4) in which it is held away from the platen l08 to release the thermal transfer ribbon 112 and the image receiving tape 104.

The cassette receiving bay 113 has a lid ll5 which is hingedly mounted to the main body 29 and which can be pivoted between an open position and a closed position.

Figure 5 shows a plan view of an alternative embodiment of the lower face of the printing device l0. In this embodiment, only a single cassette is used. This single cassette 210 has a supply spool 212 of image receiving tape 214 which comprises an image receiving layer secured to a backing layer by a layer of adhesive. The image receiving tape 214 is guided by a guide mechanism through the cassette out of the cassette through an outlet O. The cassette 210 also has an ink ribbon supply spool 216 and an ink ribbon take up spool 218. The ink ribbon 220 is guided from the ink ribbon supply spool 216 through the print location P and taken up on the ink ribbon take up spool 2l8. The image receiving tape 214 passes in overlap with the ink ribbon 220 through the print location P with its image receiving layer in contact with the ink ribbon. The platen 206 and thermal print head 204 operate in a similar manner to that described in relation to the first embodiment.

In both embodiments, a cutting location C is provided. A blade 52 is arranged to cut into a slot 54 in order to cut the image receiving tape. Actuation of the blade 52 is caused by depression of the print key 20.

It should be appreciated that although the cassette receiving bay 113 has been described as being located on the lower face of the tape printing device 10, the cassette receiving bay 113 can alternatively be accessed from the upper face 28 of the tape printing device. In those circumstances, the lid 115 of the cassette receiving bay 113 and the lid 12 covering the keyboard 14 and display 26 could be arranged so as to lie substantially flush with each other when both lids 12 and 115 are in the closed position. Alternatively, the cassette receiving bay 113 could be provided with a lid 115 and the printing device lid l2 could be arranged to cover not only the keyboard 14 and display 26 but also the cassette receiving bay 113 and its own lid 115.

Alternatively, the cassette receiving bay 113 may be arranged under the keyboard 14 and/or display 26 and be accessed by lifting up the keyboard 14 and/or display 26.

Whilst the lid l2 has been described as being hinged by mounted to one edge 30 of the keyboard 14, it can also be attached to the body 28 of the tape printing device 10 in any other suitable manner. The lid 12 could also be completely removable. The lid 12 can be maintained in the closed position in a number of different ways other than that described in relation to the specific embodiment. For example, the lid could be arranged to make an interference fit with the body 29 of the tape printing device 10. Various other catch and closing mechanisms can also be used to retain the lid in the closed position.

The specific embodiments shown have used cassettes of tape. However, it will be appreciated that any suitable supply of tape can be used with the present invention.

Claims

1. A tape printing apparatus for printing a label, said apparatus having a main body comprising a bay for receiving a supply of image receiving tape, a printing mechanism for printing an image onto said tape to define a label, a keyboard for entering data defining the image, to be printed, and a display for displaying the entered data, said tape printing apparatus further comprising a lid member which is arranged to cover said keyboard and display when in a closed position.

2. A tape printing apparatus as claimed in claim l, wherein said keyboard and display are on one face of said main body of the tape printing apparatus and said bay is arranged on a second face of said main body of said apparatus, said second face being opposite said first face.

3. A tape printing apparatus as claimed in claim l or 2, wherein said lid member is arranged to cover all or a major portion of a face of the main body of said tape printing apparatus containing both the display and the keyboard.

4. A tape printing apparatus as claimed in any preceding claim, wherein said lid member is hingedly connected to an edge region of a face of the main body of the tape printing apparatus containing both the display and the keyboard.

5. A tape printing apparatus as claimed in claim 4, wherein said lid member, when in its fully open position, defines an obtuse angle with respect to the face of the main body of the tape printing apparatus containing the display and the keyboard.

6. A tape printing apparatus as claimed in any preceding claim, wherein the lid member and main body of the tape printing apparatus have cooperating closing means which keep the lid member closed when the lid member is in the closed position.

7. A tape printing apparatus as claimed in claim 6, wherein said closing means comprises catch means.

8. A tape printing apparatus as claimed in any preceding claim wherein the lid member has a downwardly extending lip around its edge region whereby the lid member does not contact the keyboard or display when in the closed position.

9. A tape printing apparatus as claimed in any preceding claim, wherein said tape printing apparatus is sized so as to be a hand held apparatus.

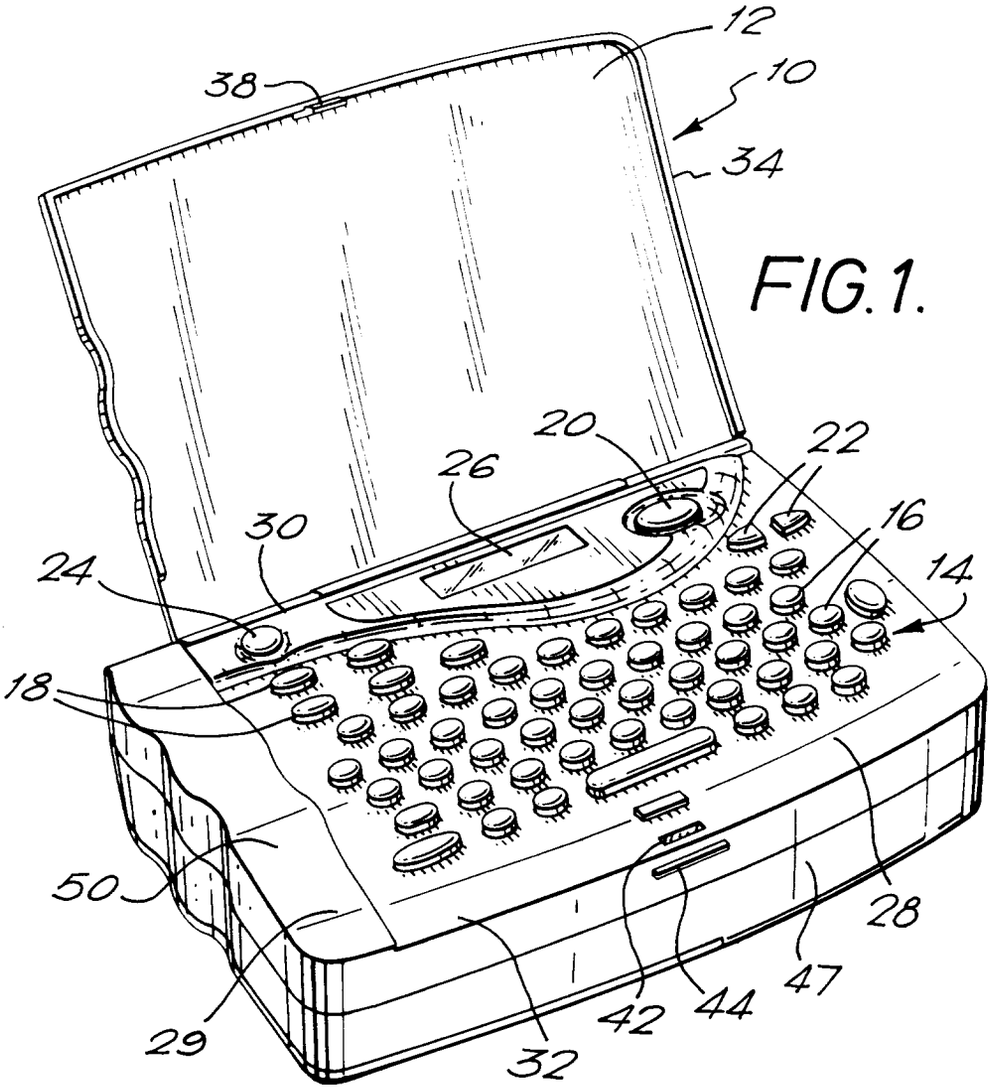


FIG. 1.

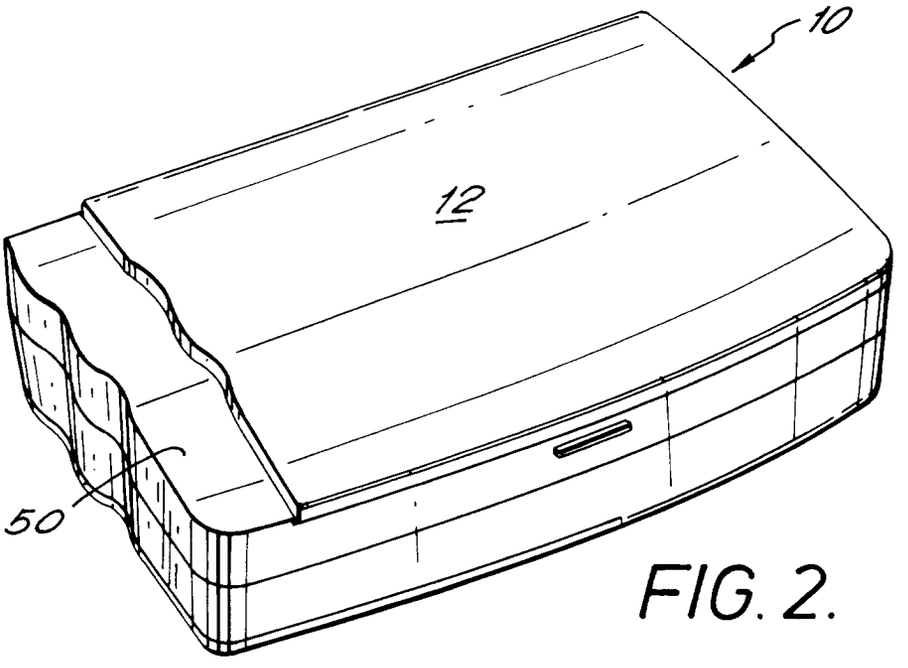
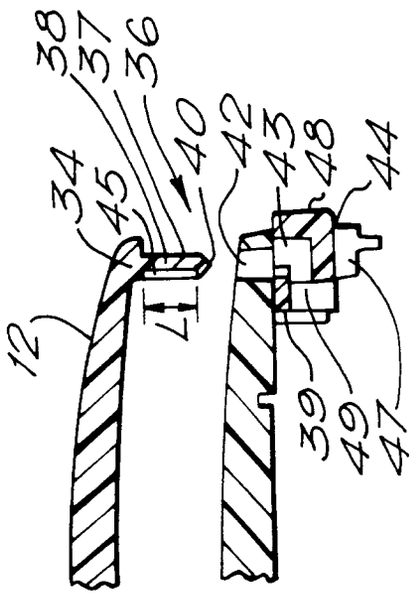


FIG. 2.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36
34
45
40
42
43
48
44
12
L
39
49
47

FIG. 3a.

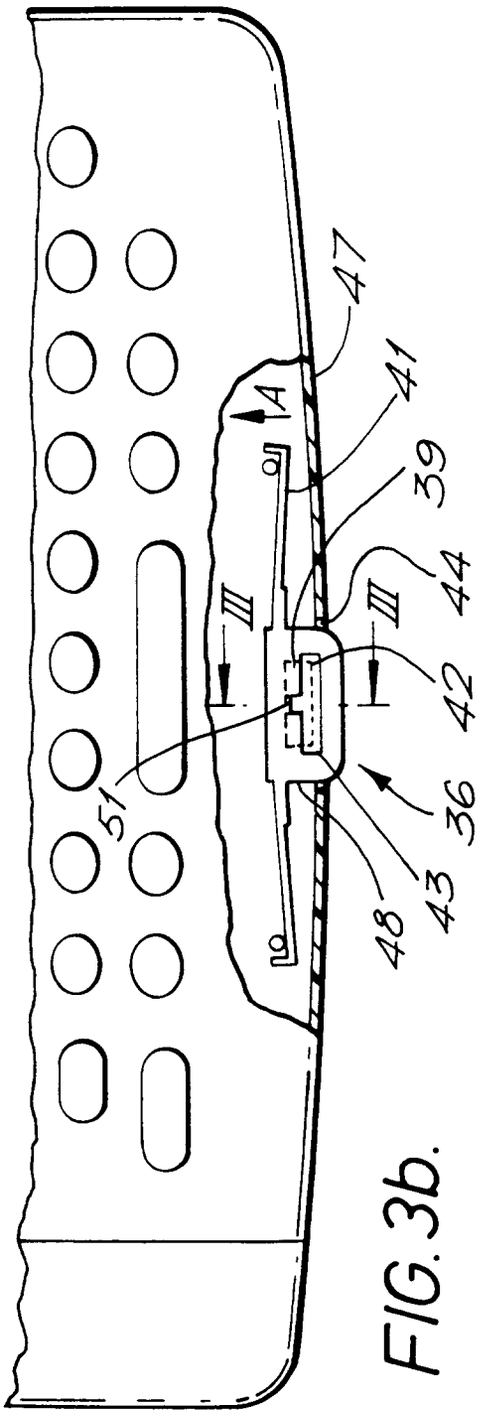
47
41
A
39
III
III
44
42
51
36
48
43

FIG. 3b.

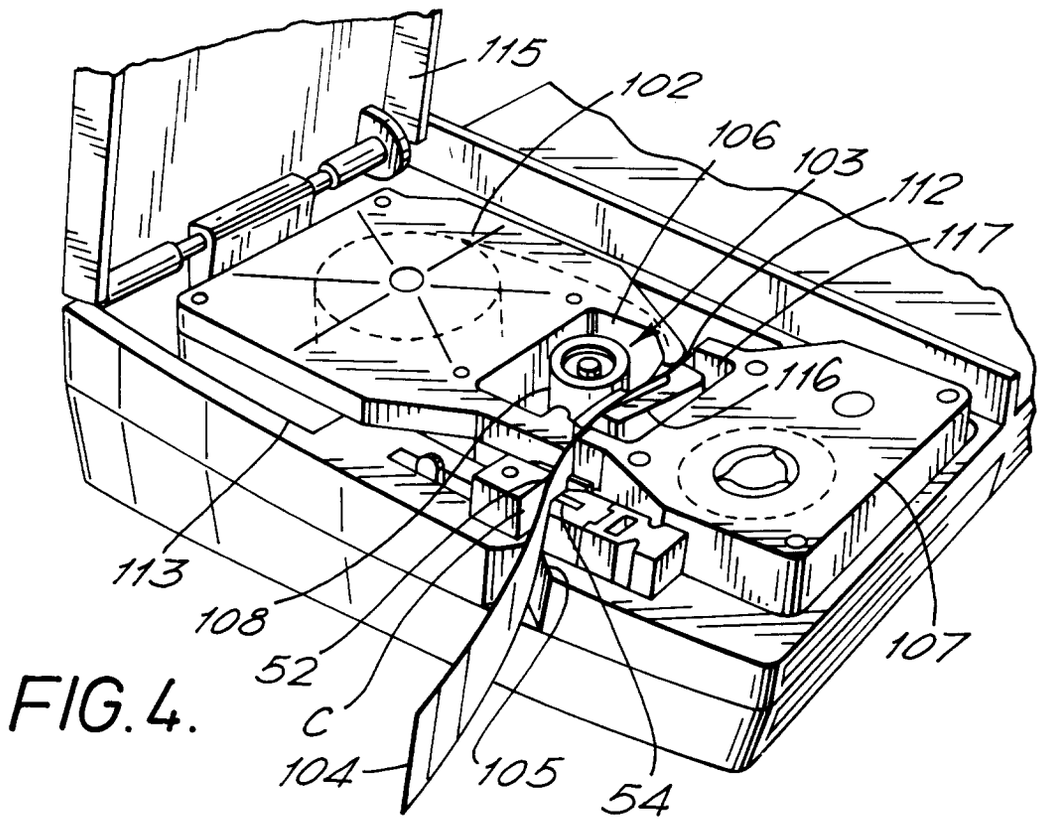
115
102
106
103
112
117
116
113
108
52
C
104
105
54
107

FIG. 4.

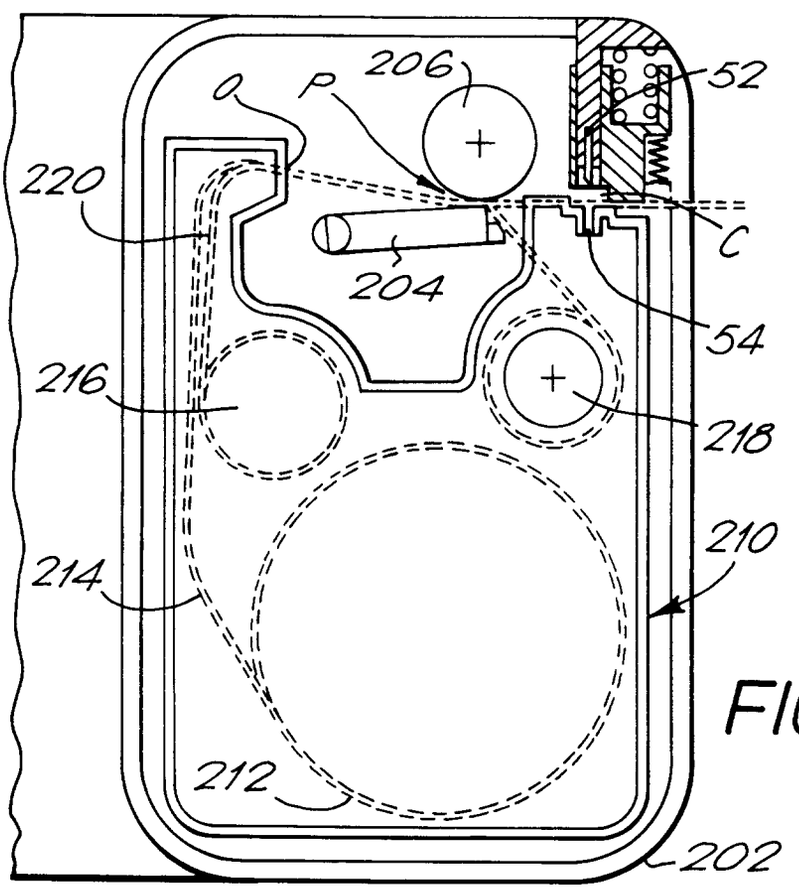
O
P
206
52
220
C
204
54
216
218
210
214
212
202

FIG. 5.