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PATENTS

Our Ref: 62645

AUSTRALIA
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PATENT REQUEST: STANDARD PATENT

We, ESSELTE NV being the person(s) identified below as the Applicant, request the grant of a standard patent to the person identified below as the Nominated Person, for an invention described in the accompanying complete specification.

Full application details follow.

Applicant and Nominated Person:	ESSELTE NV a company incorporated in Belgium
Address:	Industriepark-Noord 30, PO Box 85, B-2700 St Niklaas Belgium
Invention Title:	Tape printing apparatus
Name(s) of Actual Inventor(s):	Andrew Richard Buchanan HALKET; Dr Charles Robert SIMS; Richard William WARE
Address for Service in Australia: Attorney Code: RI	F B RICE & CO 28A Montague St BALMAIN NSW 2041

BASIC CONVENTION APPLICATION(S) DETAILS

Application No	Country	Country Code	Date of Application
9300586.6	United Kingdom	GB	13 January 1993

Dated this thirteenth day of August 1996

ESSELTE NV

By: _____
FRED SCHILLING
Registered Patent Attorney

GRB/dkc/h13

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NOTICE OF ENTITLEMENT

I ~~(We)~~ Frederick Lyle SCHILLING

authorised by ESSELTE DYMO N.V.

of Industriepark-Noord 30, PO Box 85, B-2700 St. Niklaas, BELGIUM

the applicant and nominated person in respect of an application for a patent for an invention entitled "Tape printing apparatus"

filed under Australian Application No. ....., state the following:

PART 1 – *Must be completed for all applications.*

The person~~(s)~~ nominated for the grant of the patent

☐ ~~is (are) the actual inventor(s)~~

or

☒ has, for the following reasons, gained entitlement from the actual inventor~~(s)~~

Technology Partnership Limited is a person who would if a patent were granted upon an application made my the actual inventor(s) be entitled to have the patent assigned to is and by virtue of an agreement with Technology Partnership Limited, Esselte Dymo N.V. is entitled to the invention

PART 2 – *Must be completed if the application is a Convention application.*

The person~~(s)~~ nominated for the grant of the patent is ~~(are)~~:

☒ the applicant~~(s)~~ of the basic application~~(s)~~ listed on the patent request form

or

☐ ~~entitled to rely on the basic application(s) listed on the patent request form by reason of the following:~~

The basic application~~(s)~~ listed on the request form is ~~(are)~~ the first application~~(s)~~ made in a Convention country in respect of the invention.

PART 3 – *Must be completed if the application was made under the PCT and claims priority.*

The person(s) nominated for the grant of the patent is (are):

☐ the applicant(s) of the application(s) listed in the declaration under Article 8 of the PCT

or

☐ entitled to rely on the application(s) listed in the declaration under Article 8 of the PCT by reason of the following:

The basic application(s) listed in the declaration made under Article 8 of the PCT is (are) the first application(s) made in a Convention country in respect of the invention.

Dated this 12 day of JANUARY 19 94

Signed ..... Status Patent Attorney

Signatory's Name Frederick Lyle SCHILLING

F.B. RICE & CO PATENT ATTORNEYS

FBR/9-93/P1

AU9453158

(12) PATENT ABRIDGMENT (11) Document No. AU-B-53158/94
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 673024

(54) Title
TAPE PRINTING APPARATUS

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9300586	**13.01.93**	**GB UNITED KINGDOM**

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(71) Applicant(s)
ESSELTE NV

(72) Inventor(s)
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(74) Attorney or Agent
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(56) Prior Art Documents
US 5193919
EP 487313
GB 2229676

(57) Claim

1. A tape printing apparatus comprising;

a cassette receiving bay being arranged to receive a cassette of printing tape therein;

a cover member for covering the cassette receiving bay; and

a switching mechanism including;

first and second switching terminals, having a first position in which said first and second switching terminals are in contact and a second position in which said first and second switching terminals are spaced apart;

first switch actuating means actuated by the cover member and associated with said first switching terminal whereby the position of the cover member influences the position of the first switching terminal; and

second switch actuating means having a protrusion arranged to engage a cassette, when inserted and thereby cause movement of said second switch actuating means, whereby one of the first and second positions of the switching terminals is only attained when said cover member covers the cassette receiving bay and a cassette is in the cassette receiving bay, said printing apparatus only operating when said switching terminals are in said one position.

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Esselte NV
~~Esselte Dymo N.V.~~

ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title:

"Tape printing apparatus"

The following statement is a full description of this invention including the best method of performing it known to us:-

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TAPE PRINTING APPARATUS

The invention relates generally to tape printing apparatus and in particular to apparatus which is capable of receiving a cassette containing a printing tape.

Printing apparatus of the type with which the present invention is concerned include thermal printers of the type 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-322918 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.

The present applicants have developed a different type of printing apparatus which is described for example in copending British Application No. 9212423.9, the contents of which are herein incorporated by reference.

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 these 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 GB 9212423.9, 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.

The printing apparatus of GB 9212423.9 and of EP 322919 have a lid or cover member which covers a cassette receiving bay arranged to receive the cassette. It is one object of the present invention to inhibit operation of the printer unless the lid or cover member is in its correct position.

If an attempt is made to operate the thermal printing apparatus without a cassette inserted therein, a situation can arise where the print head contacts the platen directly, without the interposition of tape and/or ink ribbon. In this case, heat at the thermal print head could cause melting or damage to the platen and leave deposits on the print head. It is also thus desirable to determine when a tape holding case is in place and to allow operation of the printing apparatus only in these circumstances. Where only one cassette is required, detection of the presence of this cassette is desirable. Where two cassettes are required, it is desirable to ascertain that at least one cassette is present.

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According to the present invention there is provided a tape printing apparatus comprising;

a cassette receiving bay being arranged to receive a cassette of printing tape therein;

a cover member for covering the cassette receiving bay; and

a switching mechanism including;

first and second switching terminals, having a first position in which said first and second switching terminals are in contact and a second position in which said first and second switching terminals are spaced apart;

first switch actuating means actuated by the cover member and associated with said first switching terminal whereby the position of the cover member influences the position of the first switching terminal; and

second switch actuating means having a protrusion arranged to engage a cassette, when inserted and thereby cause movement of said second switch actuating means, whereby one of the first and second positions of the switching terminals is only attained when said cover member covers the cassette receiving bay and a cassette is in the cassette receiving bay, said printing apparatus only operating when said switching terminals are in said one position.

Preferably, the second switch actuating means is pivotally mounted for pivotal movement in response to said protrusion being engaged by said cassette.

In a preferred embodiment said cassette receiving bay has a base, said switching mechanism is located below said base and said protrusion extends above said base, said protrusion thereby being arranged to engage said cassette.

Preferably, the second switch actuating means is associated with said second switching terminal, and the pivotal movement of said second switch actuating means influences the position of the second switching terminal.

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The invention also provides a tape printing apparatus comprising:

a cassette receiving bay, said cassette receiving bay having a base and being arranged to receive a cassette of printing tape therein;

a cover member for covering the cassette receiving bay; and

a switching mechanism located below the base of the cassette receiving bay and including:

first and second switching terminals, having a first position in which said first and second switching terminals are in contact and a second position in which said first and second switching terminals are spaced apart;

first switch actuating means actuated by the cover member and associated with said first switching terminal whereby the position of the cover member influences the position of the first switching terminal; and

pivotally mounted second switch actuating means associated with said second switching terminal, the second switch actuating means having a protrusion which extends above the base of the cassette receiving bay, said protrusion arranged to engage in a slot of a cassette, when inserted, and thereby cause pivotal movement of said second switch actuation means to influence the position of the second switching terminal, whereby one of the first and second positions of the switching terminals is only attained when said cover member covers the cassette receiving bay and a cassette is in the cassette receiving bay, said printing apparatus only operating when said switching terminals are in said one position.

Where the apparatus has a keyboard for entering data to be printed, the cassette receiving bay is adjacent the keyboard with the cover member comprising a lid hinged to a main body of the printing apparatus to open upwardly.

Conveniently, the cassette is an ink ribbon cassette.

The apparatus may comprise printing means in the form of a print head and platen at a print zone of the printing apparatus.

Conveniently the movement of the lid automatically causes the print head to come into contact with the platen so that the "lid closed" position is synonymous a "print ready" state at the print zone.

Preferably, the first switch actuating means comprises a first switching member movable with the cover member to cause the first and second terminals to be in said first position when the cassette receiving bay is uncovered.

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In a preferred embodiment, the second switch actuating means comprises a second switching member biased in a direction such that the first and second terminals are in said first position when the cassette receiving bay is empty, regardless of the position of the first switch actuating means, the second switching member being movable in response to insertion of a cassette to cause the second switch actuating means to pivot against said biased direction, whereby the switching terminals are in said second position when said cover member covers the cassette receiving bay.

The invention also provides in combination:

a tape printing apparatus as described above; and

a cassette in said receiving bay, said cassette having a surface which actuates said second switch actuating means.

Preferably, the cassette has a surface which, when the cassette is inserted in the cassette receiving bay, engages the protrusion of the second switch actuating means of the tape printing apparatus to cause pivotal movement of said second switch actuating means.

The cassette may further comprise first and second opposed surfaces, wherein the first surface contacts a base of the cassette receiving bay when inserted therein and said first surface of the cassette has a slot for providing said surface which engages the protrusion of the second switch actuating means.

The invention also provides in combination:

a tape printing apparatus as described above; and

a cassette in said cassette receiving bay, said cassette having a slot which actuates said second switch actuating means.

Conveniently the cassette has first and second opposed surfaces, the first surface contacting the base of the cassette receiving bay when inserted therein, said first surface of the cassette having a slot which, when the cassette is inserted in the cassette receiving bay, engages the protrusion of the second switch actuating means of the tape printing apparatus to cause pivotal movement of said second switch actuating means.

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

Figure 1 is a perspective view showing two cassettes inserted into a printing device;

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Figures 2 to 5 show in plan the switching mechanism of the printing device in each of its four states as follows:

Figure 2 - lid open, no cassette

Figure 3 - lid closed, no cassette

Figure 4 - lid open, cassette in

Figure 5 - lid closed, cassette in;

Figure 6 is a side view of the switching block;

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Figures 7a to 7e are different elevations of the switching block; and

Figure 8 is a perspective view of the switching block.

Figure 1 shows in plan view part of the main body 1 of a printing device with two cassettes arranged in a cassette receiving bay 13. The upper cassette 2 contains a supply of image receiving tape 4 which passes through a print zone 3 of the printer to an outlet 5 of the printer. The image receiving tape 4 comprises an upper layer for receiving a printed image on one of its surfaces and having its other surface coated with an adhesive layer to which is secured a releaseable backing layer. The upper cassette 2 has a recess 6 for accommodating a platen 8 of the printer. The platen is mounted for rotation on a pin. As an alternative, the platen could be mounted for rotation within a cage moulding.

The lower cassette 7 contains an ink ribbon 12 which extends from a supply spool to a take-up spool within the lower cassette 7. The ink ribbon 12 extends through the print zone in overlap with the image receiving tape 4. The lower cassette 7 has a recess 17 for receiving a print head 16 of the printer. The print head is movable between an operative position in which it is in contact with the platen 8 and holds the thermal transfer ribbon 12 and the image receiving tape 4 in overlap between the print head 16 and the platen 8 and an inoperative position (shown in Figure 1) in which it is held away from the platen 8 to release the thermal transfer ribbon 12 and image receiving tape 4.

The main body 1 carries a keyboard (not shown), display (shown partially at D) and other usual features of the printing apparatus. The cassette receiving bay 13 has a lid 15 which is hingedly mounted to the main body and which can be pivoted between an open position (shown in Figure 1) and a closed position. The print head 16 is connected to the lid through a mechanical linkage (24 in Figure 2) so that when the lid is

opened the print head is automatically brought into its inoperative position and when the lid is closed it is brought into its operative position. This can be accomplished as described in Application EP-A-0487313.

Figure 2 shows a switching mechanism for detecting whether or not the lid is closed and whether or not the lower cassette 7 is in place. The switching mechanism comprises a microswitch 20 which is mounted under the floor of the cassette receiving bay for the lower cassette. The microswitch 20 has upper and lower terminals 20a,20b mounted on respective leaf springs and which when in contact prohibit operation of the printing apparatus. The print head 16 (not shown in Figure 2) is supported on a print head arm 22 which moves with the mechanical linkage 24 coupled to the lid. The print head arm 22 carries a print head arm switching member 26 which, with the lid open and the print head in the inoperative position, bears on a contact 28 which depresses the upper terminal 20a into contact with the lower terminal 20b.

The switching mechanism also comprises a switching block 32 which is pivotably mounted on a pin 34 and which is also located under the floor of the cassette receiving bay. The switching block 32 is biased upwardly in the Figures (rearwardly in an actual printing apparatus) by means of a spring 36 acting against a pin 38.

The switching block 32 carries a switching piece 33 which defines, still under the floor of the cassette receiving bay, an abutment surface 30 which lies under the leaf springs and which serves to prevent the print head arm switching member 26 from pushing the terminal 20a too far downwards. The switching piece 33 also has, extending through the floor of the cassette receiving bay, an angled block 40. As can be seen most clearly in Figure 6, the angled block has a sloping surface 44 which slopes downwardly (forwardly in an actual printing apparatus). The switching block 32 also has a

switching surface 35 located under the floor of the cassette receiving bay, to cooperate with the lower switching terminal 20b. Figures 7a to 7e show different elevations of the switching block to show its construction more clearly. In particular, the abutment surface 30 which serves to prevent the switching member from pushing the terminal 20a too far downwards, the switching surface 35 which serves to cooperate with the lower switching terminal 20b and the angle block 40 which serves to be received by a slot 50 of the lower cassette 7.

As can be seen in Figure 2, with the lid open, the action of the print head arm switching member 26 on the contact 28 causes the terminal 20a to be in contact with the terminal 20b. The action of the switching member 26 on the abutment surface 30 pushes the switching block downwardly in the Figure against the action of the spring 36. As shown in Figure 3, with the lid closed and no lower cassette present, the switching block 32 is biased rearwardly in the printing apparatus (that is, towards the rear of the cassette receiving bay) to bring the switching surface 35 into contact with the leaf spring carrying the contact terminal 20b so that this is pushed up into contact with the terminal 20a. In this case, the abutment surface 30 eventually abuts the switching member 26 and so prevents the switching block from forcing the leaf springs too far in the rearward direction.

Referring now to Figures 4 and 5, the lower cassette 7 for use with this switching mechanism has a slot 50 sized to receive the angled block 40. As a cassette is inserted, the rearward edge 50a of the slot slides over the sloping surface 44 and causes the angled block and thus the switching block 32 to be pulled forward against the action of the spring 36. In this position as can be seen in Figure 5, the switching surface 35 no longer contacts the leaf spring carrying the lower terminal 20b. Thus, when the cassette is in place, actuation of the switch depends on the state of the lid. When the lid is open,

as shown in Figure 4, the switch is closed as described with reference to Figure 2. With the switch closed, an inhibit signal is passed to a controller so that operation of the printing apparatus is inhibited. When the lid is closed, as shown in Figure 5, the switch is open since there is now no pressure on the contact 28 nor on the leaf spring carrying the lower terminal 20b. With the switch in the open position, a permit signal is passed to a controller of the printing apparatus indicating that the apparatus is ready to function properly.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A tape printing apparatus comprising;

a cassette receiving bay being arranged to receive a cassette of printing tape therein;

a cover member for covering the cassette receiving bay; and

a switching mechanism including;

first and second switching terminals, having a first position in which said first and second switching terminals are in contact and a second position in which said first and second switching terminals are spaced apart;

first switch actuating means actuated by the cover member and associated with said first switching terminal whereby the position of the cover member influences the position of the first switching terminal; and

second switch actuating means having a protrusion arranged to engage a cassette, when inserted and thereby cause movement of said second switch actuating means, whereby one of the first and second positions of the switching terminals is only attained when said cover member covers the cassette receiving bay and a cassette is in the cassette receiving bay, said printing apparatus only operating when said switching terminals are in said one position.

2. A printing apparatus according to claim 1, wherein said second switch actuating means is pivotally mounted for pivotal movement in response to said protrusion being engaged by said cassette.

3. A printing apparatus according to any preceding claim, wherein said cassette receiving bay has a base, said switching mechanism is located below said base and said protrusion extends above said base, said protrusion thereby being arranged to engage said cassette.

4. A printing apparatus according to any preceding claim, wherein said second switch actuating means is associated with said second switching terminal, and the pivotal movement of said second switch actuating means influences the position of the second switching terminal.

5. A tape printing apparatus comprising:

a cassette receiving bay, said cassette receiving bay having a base and being arranged to receive a cassette of printing tape therein;

a cover member for covering the cassette receiving bay; and

a switching mechanism located below the base of the cassette receiving bay and including:

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first and second switching terminals, having a first position in which said first and second switching terminals are in contact and a second position in which said first and second switching terminals are spaced apart;

first switch actuating means actuated by the cover member and associated with said first switching terminal whereby the position of the cover member influences the position of the first switching terminal; and

pivotally mounted second switch actuating means associated with said second switching terminal, the second switch actuating means having a protrusion which extends above the base of the cassette receiving bay, said protrusion arranged to engage in a slot of a cassette, when inserted, and thereby cause pivotal movement of said second switch actuation means to influence the position of the second switching terminal, whereby one of the first and second positions of the switching terminals is only attained when said cover member covers the cassette receiving bay and a cassette is in the cassette receiving bay, said printing apparatus only operating when said switching terminals are in said one position.

6. A printing apparatus according to any preceding claim comprising a keyboard for entering data to be printed, wherein the cassette receiving bay is adjacent the keyboard with the cover member comprising a lid hinged to a main body of the printing apparatus to open upwardly.

7. A printing apparatus according to any preceding claim, wherein the cassette is an ink ribbon cassette.

8. A printing apparatus according to any preceding claim which comprises printing means in the form of a print head and platen at a print zone of the printing apparatus.

9. A printing apparatus according to claim 8, wherein the movement of the lid automatically causes the print head to come into contact with the platen so that the "lid closed" position is synonymous a "print ready" state at the print zone.

10. A printing apparatus according to any preceding claim, wherein the first switch actuating means comprises a first switching member movable with the cover member to cause the first and second terminals to be in said first position when the cassette receiving bay is uncovered.

11. A printing apparatus according to any preceding claim, wherein the second switch actuating means comprises a second switching member biased in a direction such that the first and second terminals are in said first

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position when the cassette receiving bay is empty, regardless of the position of the first switch actuating means, the second switching member being movable in response to insertion of a cassette to cause the second switch actuating means to pivot against said biased direction, whereby the switching terminals are in said second position when said cover member covers the cassette receiving bay.

12. In combination:

a tape printing apparatus as claimed in any preceding claim; and

a cassette in said receiving bay, said cassette having a surface which actuates said second switch actuating means.

13. In combination a tape printing apparatus as claimed in any one of claims 1 to 11; and a cassette having a surface which, when the cassette is inserted in the cassette receiving bay, engages the protrusion of the second switch actuating means of the tape printing apparatus to cause pivotal movement of said second switch actuating means.

14. A combination as claimed in claim 13, wherein said cassette of printing tape further comprises:

first and second opposed surfaces, wherein the first surface contacts a base of the cassette receiving bay when inserted therein and said first surface of the cassette has a slot for providing said surface which engages the protrusion of the second switch actuating means.

15. In combination:

a tape printing apparatus as claimed in any of claims 1 to 11; and

a cassette in said cassette receiving bay, said cassette having a slot which actuates said second switch actuating means.

16. In combination a tape printing apparatus as claimed in any one of claims 1 to 11; and a cassette having first and second opposed surfaces, the first surface contacting the base of the cassette receiving bay when inserted therein, said first surface of the cassette having a slot which, when the cassette is inserted in the cassette receiving bay, engages the protrusion of the second switch actuating means of the tape printing apparatus to cause pivotal movement of said second switch actuating means.

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17. A tape printing apparatus substantially as hereinbefore described with reference to and as shown in Figures 1 to 8 of the drawings.

DATED this eighteenth day of June 1996

ESSELTE DYMO NV
Patent Attorneys for the Applicant:

F.B. RICE & CO.

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ABSTRACT

TAPE PRINTING APPARATUS

There is described a printing apparatus, particularly a label printer, which includes a switching mechanism operable in response to movement of the lid to permit operation of the printing apparatus only when the lid is closed. This can be combined with detection of the presence or absence of a cassette in a cassette receiving bay of the apparatus so that operation of the printing apparatus is permitted only in the presence of a cassette and with the lid in the closed position.

Figure 1.

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FIG.1

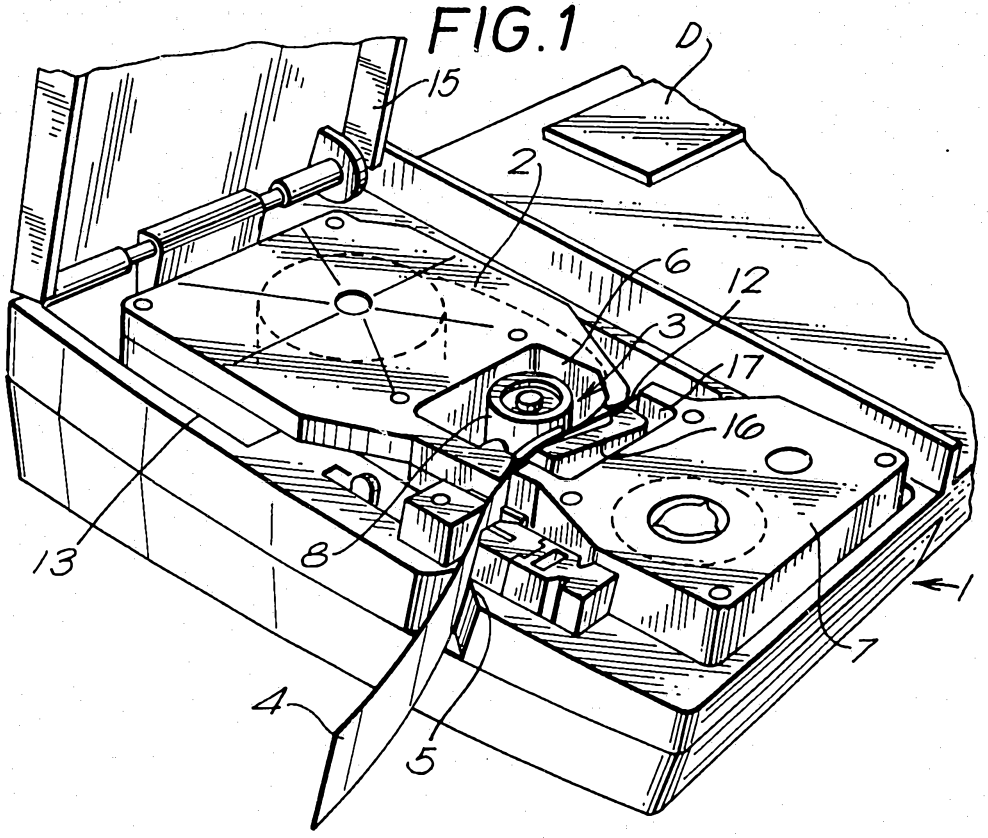


FIG.8

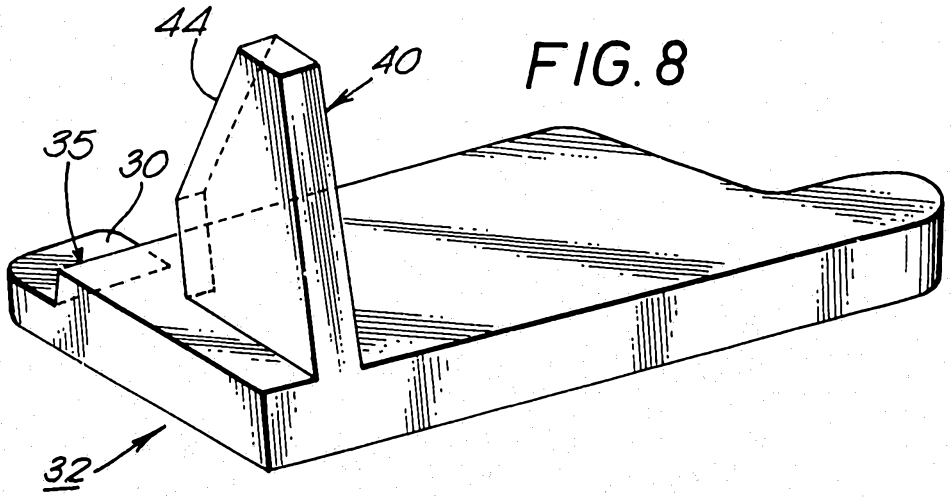


FIG. 2

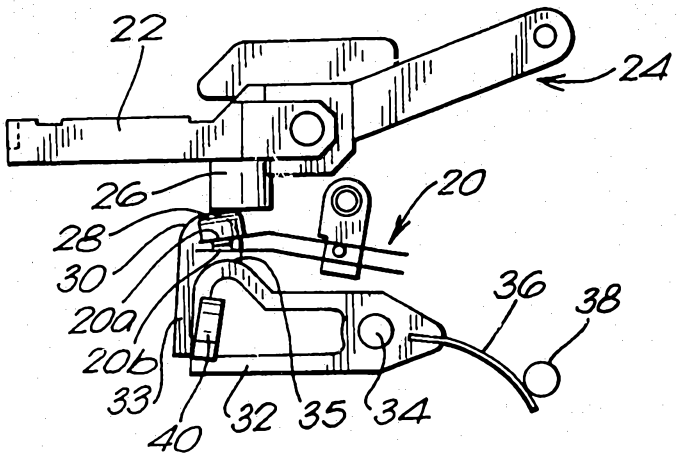


FIG. 3

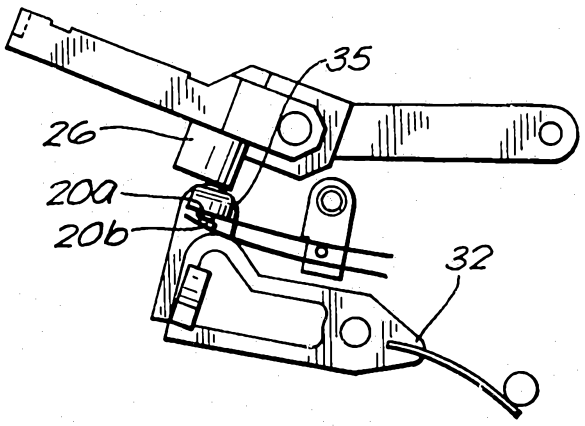
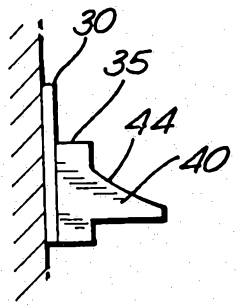


FIG. 6



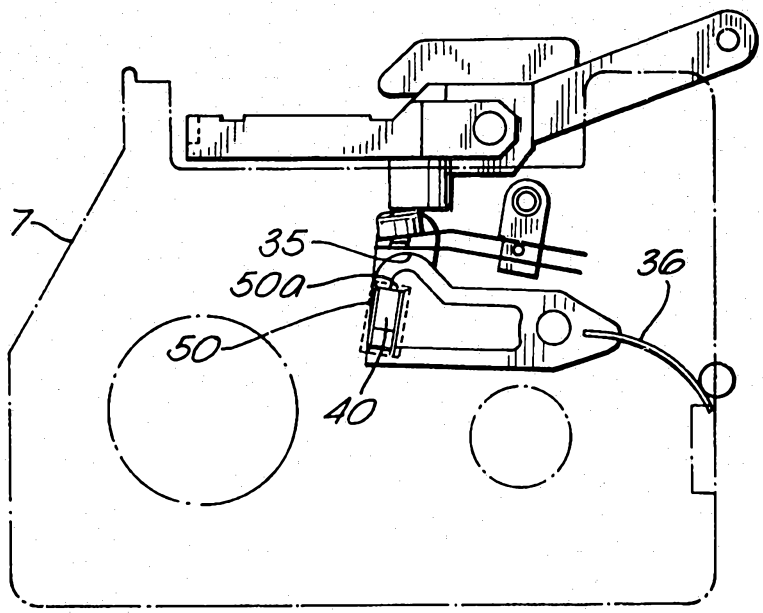


FIG. 4

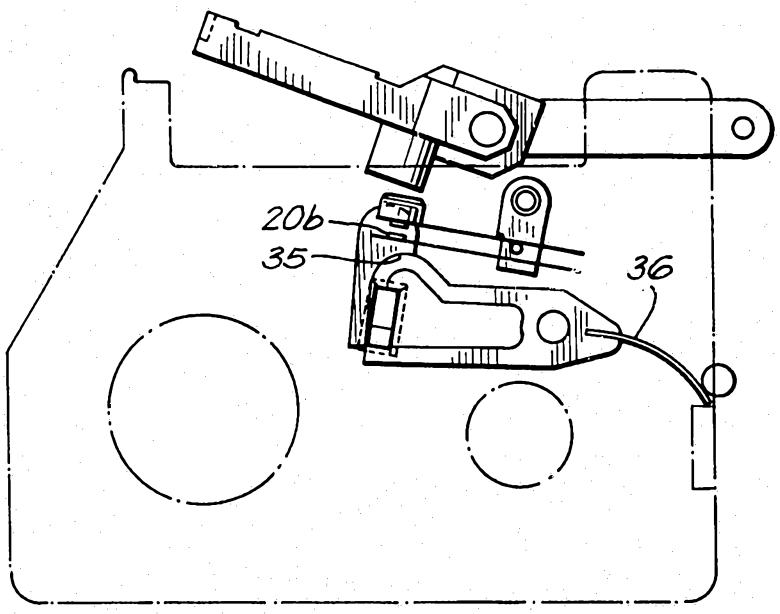


FIG. 5

FIG. 7a

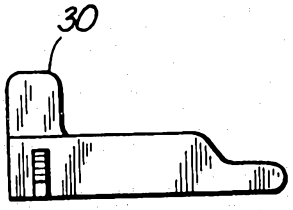


FIG. 7b

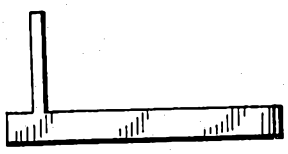


FIG. 7c

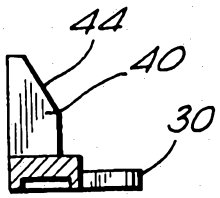


FIG. 7d

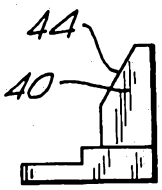


FIG. 7e

