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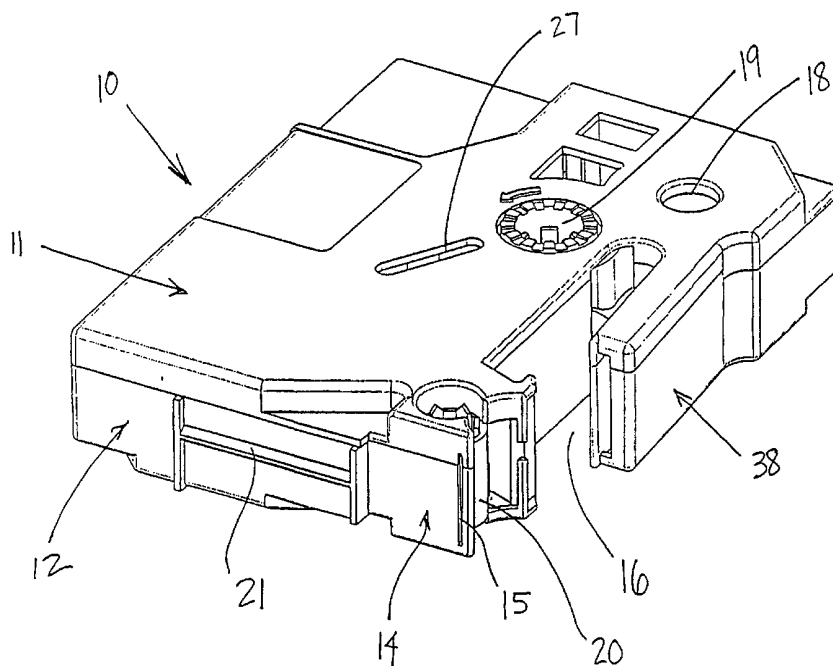
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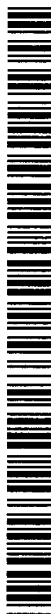
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(54) Title: TAPE SUPPLY CARTRIDGE



(57) Abstract: A tape supply cartridge (10) for use in a printer of the type having a fixed print head (7), a movable platen roller (8) and a pair of tape advancement rollers (20, 9), one in the cartridge and one in the printer.



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1 Title: **Tape Supply Cartridge**

BACKGROUND OF THE INVENTION

1. Field of the Invention

6 The present invention relates generally to a tape supply cartridge and more specifically to a tape supply cartridge for use in a labeler for printing indicia on such tape for selective application to a desired medium. Still more specifically, the present invention relates to a tape supply cartridge of the type commonly referred to as a non-laminated, thermal transfer tape supply cartridge.

2. Description of the Prior Art

11 A great number of prior art tape supply cartridges and patents exist for use in connection with label or strip printers or the like. These cartridges provide a supply of wound printing tape to a print head for printing indicia on the tape for subsequent selective application to a desired medium. Some of these cartridges are exemplified by and disclosed in U.S. Patent Nos. 5,188,469; 5,350,243; 5,653,542; 5,813,773; 4,927,278; 4,983,058
16 and 5,419,648, among others. These cartridges are designed to be used in labeling machines or printers which have a cartridge receiving cavity for receiving the cartridge in an operative position, a thermal print head and an associated platen roller which is selectively moveable toward and away from the print head, with the tape positioned therebetween, for the purpose of forming an image on, or transferring an image to, the tape. Such labeling machines or
21 printers also include a means for advancing the tape past the print head and for advancing the various other spooled components through apparatus.

1 Although the cartridges of the prior art function satisfactorily for their particular
application, there is a continuing need for improvement of such cartridges. Particular features
for which there is a continuing need for improvement include the ability of the cartridge to
accommodate different sizes and widths of tape relative to a transfer ribbon, the ability of the
cartridge to guide the tape through the cartridge while ensuring that proper tape resistance is
6 achieved and the ability of the cartridge to minimize jamming of the tape at the cutting station,
among others. Accordingly, there is a need for an improved tape supply cartridge for use in a
tape printer as described above and a tape for use in such a cartridge.

SUMMARY OF THE INVENTION

11 The present invention relates to a tape supply cartridge for use in a labeling machine
or other printer. More specifically, the tape supply cartridge of the present invention includes
a spool of printing tape for receiving a printed image for subsequent selective application to a
desired medium and a spool of transfer ribbon for transferring the image to the tape. In the
preferred embodiment, the tape supply cartridge is designed for use with a labeling apparatus
16 or other printer having a cartridge receiving cavity and a print station comprised of a fixed
print head and a moveable platen roller designed for movement toward and away from the
print head between a print and a non-print position, respectively. Such a printer also includes
means for advancing the tape supply through the cartridge. One feature of the present
invention includes an improved guide means for guiding the tape and the transfer ribbon
21 through a guide arm and toward the print station along separate paths to avoid undesirable
contact between the tape and ribbon prior to reaching the print station. Such feature is

1 applicable to a cartridge in which the tape and ribbon are of the same width as well as a
cartridge in which such widths are different.

A further feature of the present invention includes an improved means for guiding the
printing tape from the printing tape spool past the print station and outwardly from the
cartridge. In the preferred embodiment, this guide means includes a guide surface positioned
6 adjacent to the tape supply spool and a pair of guide posts with guide rollers mounted
thereon. A tape path barrier positioned between the rollers is also provided for preventing
the tape from being inadvertently routed along an undesired path, such as a path between the
rollers. Combined with this feature is a means in the form of one or more tack discs for
providing resistance to rotation of the tape supply spool and a tape of specified stiffness and
11 consistency to provide optimal movement of the tape through the cartridge.

A further feature of the present invention is to provide a tape exit end of the cartridge
which is provided with a cartridge wall portion with a substantially flush outer surface and
with no overhanging or protruding portion. This wall portion is further provided with an
angled exit slot for guiding the printed tape toward a cut means in such a way as to prevent
16 the tape from catching on the cutter blade and thereby jamming the printer.

A still further feature of the present invention is to provide a tape supply cartridge
with a particular tape supply and density which eliminates discoloration when exposed to
extreme heat conditions. More specifically, the tape supply in accordance with the present
invention has coloring which is not chemically enhanced by using chemical whitening agents or
21 the like. Instead, the tape used in the tape supply of the present invention is an acrylic tape

1 having a specific gravity greater than about 1.2 and including titanium dioxide (TiO₂) as the whitening or color agent.

Accordingly, it is an object of the present invention to provide an improved tape supply cartridge for a labeling apparatus or printer.

6 Another object of the present invention is to provide an improved tape guide means for such a cartridge.

A still further object of the present invention is to provide an improved tape supply and guide mechanism in combination with tape parameters to ensure optimal movement of tape through the cartridge, while at the same time preventing the tape supply spool from free wheeling.

11 A still further object of the present invention is to provide an improved means at the tape exit end of the cartridge for limiting or eliminating jamming problems resulting from the interface between the printed tape and the tape cut mechanism.

A still further object of the present invention is to provide an improved tape supply cartridge of the non-laminated, thermal transfer type.

16 These and other objects of the present invention will become apparent with reference to the drawings, the description of the preferred embodiment and the appended claims.

DESCRIPTION OF THE DRAWINGS

21 Figure 1 is an isometric view of the tape supply cartridge in accordance with the present invention.

1 Figure 2 is an isometric, exploded view of the tape supply cartridge of the present invention.

 Figure 3 is an elevational plan view of the inside of the cartridge bottom with the tape supply spool, the ribbon supply and rewind spools and various other components removed.

 Figure 4 is an elevational plan view of the inside of the cartridge top.

6 Figure 5 is a elevational bottom view of the assembled cartridge.

 Figure 6 is an elevational view of the inside of the cartridge bottom, similar to Figure 3, showing the tape and ribbon pathways.

 Figure 7 is a fragmentary view, partially in section, showing the tape exit end of the cartridge in combination with a tape cutting means.

11 Figure 8 is an elevational, front fragmentary view of the tape exit end of the cartridge.

 Figure 9 is a view similar to that of Figure 6 in combination with a second embodiment of a tape cutting means.

16 Figure 10 is a view, partially in section, as viewed along the section line 10-10 of Figure 3.

 Figure 11a is a view, partially in section, as viewed along the section line 11-11 of Figure 10.

 Figure 11b is a view similar to that of Figure 11a, but with the cartridge top and bottom in assembled form.

21 Figure 12 is a view, partially in section, similar to that of Figure 10 of an alternate embodiment.

1 Figure 13a is a view, partially in section, as viewed along the section line 13-13 of
Figure 12.

 Figure 13b is a view similar to that of Figure 13a, but with the cartridge top and
bottom
in assembled form.

6 Figure 14 is a view, partially in section, of a portion of the tape supply cartridge
showing the tape supply mounted between the cartridge halves.

 Figure 15 is a view, partially in section, as viewed along the section line 15-15 of
Figure 3.

 Figure 16 is a cross-sectional view showing the tape structure.

11

DESCRIPTION OF THE PREFERRED EMBODIMENT

 The present invention relates to a tape supply cartridge and more specifically to what
is commonly referred to as a non-laminated tape supply cartridge. Tape supply cartridges of
this type are designed for use in labelers or printers which include a cartridge receiving cavity,
16 a print head 7 (Figure 6), a platen roller 8 moveable toward and away from the print head 7
to define printing and non-printing positions, a means for advancing the tape and ribbon
through the cartridge and past the print station and a means for selectively cutting the tape
after printing.

 In describing the preferred embodiment of the present invention, reference is first
21 made to Figures 1 and 2 showing the cartridge in its fully assembled form and in an exploded
form. In general, the cartridge 10 includes a cartridge top 11 and a cartridge bottom 12.

1 When assembled, the top 11 and bottom 12 are secured together to form the cartridge 10
which house the tape supply 13, a ribbon supply spool 23 and a ribbon take-up spool 17.
The cartridge also includes a tape exit end 14, a tape exit slot 15 provided at the exit end 14
and a print head cavity or recessed area 16 to accommodate a print head when the cartridge
is inserted into the printer. The print head cavity is defined on one side by a tape/ribbon
6 guide arm 38 for guiding the tape and ribbon to the print station. The areas 18 and 19 in the
cartridge top 11 and bottom 12 define areas to accommodate the ink ribbon supply spool 23
and the ink ribbon take-up spool 17, respectively. A tape advance roller 20 is provided at
the tape exit end of the cartridge. In the preferred embodiment, the roller 20 is a driven feed
roller having internal splines, ribs or other means for mating with a drive shaft of the printer.

11 A latching rib 21 is provided on one side of the cartridge for engagement by a latch
member (not shown) on the printer to secure the cartridge within the printer when the
cartridge is inserted into the cartridge cavity. A second latching rib 22 (Figure 3) is provided
on the opposite side of the cartridge bottom 12 for engagement with a second printer latch
member (not shown).

16 The interior of the cartridge bottom 12 is illustrated best with reference to Figures 2
and 3. As shown, the cartridge bottom 12 includes a bottom wall 25 and a side wall 24
extending upwardly from the bottom wall 25 at substantially right angles and extending around
a substantial portion of the cartridge. Integrally formed with the bottom wall 25 is a tape
supply hub 26 and a plurality of tape support ribs 28 extending radially outwardly from the
21 hub 26. The hub 26 is a generally cylindrical structure which extends outwardly from the
bottom wall 25 at substantially right angles and functions to rotatably support the hub 84 of

1 the ribbon supply spool 13. A pair of tape containment wall sections 29,29 are provided to
contain the tape supply spool 13 in a generally circular configuration. An elongated tape
guide wall 30 extends from an inner portion of the side wall 24 to a tape passage slot 31
between the pair of spaced wall sections 32,32. The guide wall 30 extends upwardly from
the bottom wall 25 at substantially right angles and ensures that the tape from the tape supply
6 13 is properly and accurately guided from the tape spool 13 to the tape passage 31.

1 A pair of tape guide/posts 34,34 are integrally formed with the bottom wall 25 and
extend upwardly therefrom at right angles. The tape guide/posts 34,34 support corresponding
rollers 35,35 for guiding the tape around the ribbon supply spool 23 which is rotatably
mounted on the support post 36. In the preferred embodiment, the rollers 35,35 have a
generally cylindrical configuration and a cylindrical interior opening slightly greater than the
6 exterior dimension of the posts 34,34. This enables the tape to be freely pulled and
advanced around the posts 34,34 by the tape advancement means. In the preferred
embodiment, a barrier member 33 is positioned between the rollers 35,35 to prevent the tape
from being inadvertently or intentionally routed between the rollers 35,35. Thus, the member
33 forces the tape to have only a single pathway around the outside of the rollers 35,35.
11 Preferably, as shown best in Figure 15, the barrier is provided with a generally trapezoidal
cross-sectional configuration.

 The portion of the cartridge bottom 12 defining the tape/ribbon guide arm 38 includes
an outer side wall 39 and an inner side wall 40 which are substantially parallel to one another.
Each of the walls 39 and 40 are of approximately equal height measured from the bottom
16 wall 25 and are taller than the major portion of the side wall 24 extending around the
periphery of the cartridge bottom. Positioned approximately midway between the walls 39
and 40 is a tape/ribbon separation wall or barrier defined by a pair of posts 41,41 and a wall
section 42 integrally joined with the posts 41,41 and extending therebetween. As shown best
in Figure 10, posts 41,41 are taller than the wall sections 39 and 40 and the wall section 42 is
21 significantly shorter than either the posts 41,41 or the walls 39, 40. The upper ends of the
posts 41,41 are provided with a recessed portion 44 which is designed to accommodate an

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1 upper tape guide member 45 integrally formed with a corresponding portion of the cartridge
top 11 defining the tape/ribbon guide arm 38. This portion of the cartridge top 11 includes a
pair of short wall sections 46 and 47 designed to mate with the wall sections 46 and 47
designed to mate with the wall sections 39 and 40 when the cartridge is assembled.

6 The bottom wall 25, in the area of the tape/ribbon guide arm 38 is provided with a
pair of bottom tape/ribbon guide edges 48 and 49, respectively for guiding the lower edges of
the tape and the ribbon at the same height through the guide arm 38. In contrast, the ribbon
side of the barrier between the wall section 42 and the wall 40 is provided with a pair of
guide edges for guiding the tape edge of the ribbon only. The tape side of the barrier
between the wall section 42 and the wall 39 is provided with a pair of spaced tape guide
11 members 45 for guiding the tap edge of the tape only.

When the cartridge top 11 and bottom 12 are assembled as shown in Figure 11b, the
tape/ribbon guide arm 38 defines a guide passage 50 for the ribbon and a guide passage 51
for the tape. As shown, this particular embodiment illustrated in Figures 10, 11a and 11b is
designed for a cartridge in which the ribbon is wider than the tape and in which the bottom
16 edges of the tape and the ribbon are guided by a common guide edge at the same level. In
the embodiment of Figures 11a and 11b, the tape guide edges 49 guide the bottom edges of
both the tape and ribbon, while the guide edge 52 guides the top edge of the ribbon and the
guide member 45 guides the top edge of the tape.

An alternate embodiment for the tape arm is illustrated in Figures 12, 13a and 13b.
21 The embodiment of Figures 12, 13a and 13b is similar to that of Figures 10, 11a and 11b
except that it is designed for a supply cartridge in which the tape and the ribbon are of equal

1 width. When assembled as shown in Figure 13b, this embodiment of the tape/ribbon guide
arm defines a ribbon passageway 50 and tape passageway 51 which are of equal height
dimensions. As shown, when the tape/ribbon guide arm 38 is assembled, the arm 38 defines
a ribbon passageway 50 and a tape passageway 51 of the same height. In this embodiment,
both passageways 50 and 51 are defined on their bottoms by the guide edge 49 and on their
6 tops by the guide edge 52.

The cartridge bottom further includes a plurality of connection holes 55 positioned
throughout the cartridge bottom for mating with corresponding connection posts 56 from the
cartridge top to retain the cartridge top 11 and bottom 12 together when the cartridge is
assembled.

11 After the tape and ribbon leave the guide arm 38, they pass the print station as shown
in Figure 6. From there, the ribbon is guided around the walls defining the print head recess
16 and the tape is guided past the tape advancement or feed roller 20. In the preferred
embodiment, the guide ribs 58 and 59 are not only at the same level, but are also at the same
level as the guide edges 48 and 49 in the guide arm 38.

16 The print head recessed area 16 as shown best in Figures 1-6 is defined on one side
by the inner wall sections 40 and 68 of the cartridge bottom and tops and on the opposite
sides by the wall sections 86, 88 and 89. The walls sections 86, 88 and 89 are integrally
formed with the bottom wall 25 and extend upwardly therefrom at substantially right angles.
The wall sections 86, 88 and 89 are joined to one another at their side edges and form a
21 generally continuous wall which, together with the wall section 40, defines the cavity 16. The
ends of the wall sections 86 40 are spaced from one another as shown to provide an opening

1 through which the platen roller 8 (Figure 6) may move relative to the print head 7 to define
the print station. The wall sections 86, 88 and 89 together form a guide for the ribbon
following the printing operation at the print station. As shown, the juncture between the wall
sections 86 and 88 and between the wall sections 88 and 89 are provided with rounded
edges 90 and 91 to provide a smooth, low friction surface for advancement of the ribbon to
6 the ribbon rewind spool 17.

The cartridge top 11 as shown in Figure 4, includes a top wall 64 and a side wall 65
extending around a substantial portion of the periphery of the cartridge top 11. A portion of
the cartridge top corresponds to the tape/ribbon guide arm 38. This portion includes an
outer edge 66 and an inner edge 68 substantially parallel to one another and corresponding to
11 the edges 39 and 40, respectively, of the cartridge bottom 12. In the preferred embodiment,
the wall portions 66 and 68 are shorter than the remainder of the side wall 65.

The inside of the cartridge top 11 comprises elements corresponding to various
elements in the cartridge bottom 12 including a plurality of connection posts 56 positioned
throughout the top wall 64. These connection posts 56 are designed for insertion into the
16 corresponding connection holes 55 in the cartridge bottom to fix the top 11 to the bottom 12.
The cartridge top also includes a generally circular rib 60 and a plurality of ribs 61 extending
radially outwardly from the rib 60. The circular rib 60 is aligned with the hub 26 (Figure 3)
and has an internal circular dimension approximating the outer circular dimension of the hub
26 so that when the cartridge is assembled, the upper edge of the hub 26 seats within the
21 circular rib 60. The ribs 61, like the ribs 28 in the cartridge bottom, function to support the
spool of tape 11 in a vertical direction relative to the cartridge top and bottom. The cartridge

1 top 11 also includes a pair of post receiving holes 62,62 having an interior circular dimension designed to receive the upper ends of the guide posts 34,34 as shown in Figure 15.

The bottom side of the cartridge, as illustrated best in Figure 5, includes an opening 69 aligned with the internal hub 26 and a recessed area 70 in a corner of the cartridge bottom to accommodate a plurality of cartridge detecting holes 71. The holes 71 are aligned with
6 one or more plunger switches associated with the printer for the purpose of providing the printer with information regarding the characteristics of the tape within the cartridge such as tape width, whether it is laminated or non-laminated, etc. The cartridge bottom also includes an opening 72 through which a ribbon rewind shaft from the printer extends to interface with and rotate the ribbon rewind spool 17. A tape advance opening 74 is provided near the tape
11 exit end of the cartridge and is designed to provide an interface between a tape advancement shaft in the printer and the tape advancement spool 20.

As illustrated best in Figures 7 and 8, the tape exit end 14 includes a generally planar surface 75, the shoulder portion 76 and the tape exit slot or opening 15. Preferably, the planar surface 75 extends from the shoulder 76, past the slot 15 and to the uppermost end of
16 the cartridge. In the preferred embodiment, the substantially planar surface 75 and the shoulder 76 form a recessed area to accommodate one embodiment of a stationary tape cutoff member 78 of the printer. As shown, the member 78 extends inwardly from an outer surface portion of the cartridge side wall and latching rib. Associated with the cutoff member 78 is a second cutoff member 79 which is designed for movement toward and away the
21 member 78 as shown. In the embodiment of Figure 7, the cutoff means is a scissors mechanism in which the member 78 houses one half of the scissors, while the member 79

1 comprises the other half of the scissors. To assist in preventing the tape from getting hung up or caught on the cutting member 79 during the cutting operation, the tape exit slot 15 is angled upwardly in the direction of tape travel through the wall section 80. Preferably the magnitude of the angle at which the slot 15 is sloped is greater than about 5° and more preferably between about 5° and 60°.

6 Although the requirement of a sloped outlet slot 15 is less of a requirement with a scissors cutoff mechanism such as that shown in Figure 7, it is particularly desirable when used with a cutoff mechanism such as that illustrated in Figure 9 which is a blunt cut mechanism. Specifically, this mechanism comprises the stationary backing member 81 and the knife member 82. In this type of cutting mechanism, the knife member 82 is moveable
11 into cutting engagement with the backing member 81 along an arc relative to a pivot point. The angled slot 15 when used with this type of cutoff mechanism enables the knife section 82 to move away from the backing member 81 without carrying the tape along with it. Without the sloping or angled exit opening 15, the tendency of the cutting knife 82 to catch on the end of the tape, and thus jam the printer, is significantly increased.

16 As shown best in Figures 2 and 14, the tape spool 13 includes a central support hub 84 which is designed to fit over the hub 26. When the spool of tape 13 is assembled within the cartridge, a tack disk 85 is positioned on each side of the tape spool 13. The tack disk includes one surface (the inner surface) which is tacky or includes a light adhesive and an opposite surface (the outer surface) which is relatively smooth and friction free. The tack
21 disks 85,85 perform two primary functions. First, they prevent the spool of tape 13 from free wheeling or unwinding when the cartridge is not in use and is being handled. Without the

1 disks 85,85, any movement of the cartridge could cause the spool of tape 13 to unwind.
Secondly, the tack disks 85,85 provide a controlled amount of drag on the tape spool 13.
This drag, in combination with the specific type and stiffness of the tape and the amount of
force needed to advance or pull the tape around the rollers 35,35 must be such as to ensure
that the tape is properly advanced through the cartridge. Specifically, the tape should have
6 sufficient drag as it travels through the cartridge and past the print head so that it will not
freewheel or sag. On the other hand, the drag must be sufficiently small so that the tape
advancement mechanism positively advances the tape through the system. Further, this
controlled drag must be consistent both at the start of the spool 13 and at the end of the
spool 13. Still further, the tape should be stiff enough to prevent it from catching on the tape
11 cutoff mechanism and jamming the printer.

The tape 13 to be used in the cartridge of the present invention is intended to be a
so-called non-laminated tape which includes a print receiving tape layer and a release layer.
Specifically, as shown best in Figure 16, the print receiving tape layer comprises the base film
92 and the coating 93 applied thereto. In the preferred embodiment, the base film 92 is a
16 polyethylene-terephthalate (PET) film. Preferably, the base film 92 is provided with an inert
filler such as titanium dioxide (TiO_2) to provide the film with a white color. Because of the
presence of this TiO_2 , the specific gravity of the film 92 is preferably greater than about 1.1,
more preferably greater than about 1.2 and most preferably greater than about 1.3. The
presence of an inert filler such as TiO_2 is preferable to the chemical whiteners used in prior art
21 films because the inert fillers provide for dimensional stability and preclude discoloration upon
heating. Preferably the film 92 is about 2 mils (0.002 inches) thick. A film of this type

1 preferably used to make the tape 13 of the present invention is a PET film manufactured by Dupont.

A heat activatable polyester resin coating 93 is applied to the print receiving surface of the film 92. This polyester resin coating 93 is a relatively thin layer and functions primarily to receive the printed image from the transfer tape. Accordingly, the chemistry of the coating 6 92 must be compatible with that of the transfer ribbon. Further, it is preferable for both the coating 93 and the base film 92 to be compatible (i.e., both are polyesters).

An adhesive layer 94 is applied to the opposite surface of the film 92. Preferably, the adhesive is a premium, self cross linking acrylic adhesive which is resistant to UV radiation as well as a variety of chemicals and petroleum distillates.

11 The second portion of the tape 13 is the release liner which is comprised of the paper base 95, an intermediate coating 96 and an outer release coating 97. In the preferred embodiment, the paper layer 95 is a densified Kraft paper, the coating 96 is a coating of polyethylene and the coating 97 is a coating of silicon.

In the preferred embodiment, the entire thickness of the tape 13 is approximately 7 16 mils (0.007 inches), with the print receiving tape portion (comprised of the film 92 and the layers 93 and 94) being thinner than the release liner portion) comprised of the paper layer 95 and the coatings 96 and 97).

The ribbon which is provided on the ribbon supply spool 23 is what is referred to as a thermal transfer or heat activatable ribbon. In other words, the ribbon is effective to 21 transfer an image from the ribbon to the print receiving surface of the tape. It is preferred that

1 the tape and the ribbon in the cartridge of the present invention be compatible with one another.

It is also important for the cartridge of the present invention that the tape have sufficient stiffness so that when it exits the exit slot 15 and is cut by the cutting mechanism, it is stiff enough to resist moving along with the retraction of the moveable cutting member. In the preferred embodiment, such stiffness is provided by the thickness of the paper base layer 95 which, together with the coatings 96 and 97, is thicker than the print receiving portion of the tape.

When the cartridge is fully assembled, the tape extends from the tape spool 13 along the tape path as shown in Figure 6. Specifically, the tape extends from the spool 13 where it is guided by the guide wall 30 through the pathway 31 between the elements 32,32. From there, the tape extends around the guide rollers 35,35 and through the pathway 51 in the guide arm 38 between the posts 41,41 and the wall section 39. From there, it extends to and across the printing region between the print head 7 and the platen roller 8, past the advancement area between the roller 20 and the drive roller 9 of the printer and then outwardly through the exit slot 15. The ribbon extends from the ribbon supply spool 23, through the pathway 50 between the posts 41,41 and the wall section 40, past the printing region between the print head 7 and the platen roller 8 and then around the wall sections 86, 88 and 89 to the ribbon take up spool 17.

Although the description of the preferred embodiment has been quite specific, it is contemplated that various modifications could be made without deviating from the spirit of the

1 present invention. Accordingly, it is intended that the scope of the present invention be dictated by the appended claims rather than by the description of the preferred embodiment.

CLAIMS

1. A tape supply cartridge for a printer of the type having a cartridge receiving cavity, a fixed print head defining a print station, a platen roller movable toward and away from said print head between a print and non print position and a pair of rollers for advancing the tape between the platen roller and print head, said cartridge comprising:

a supply of printing tape;

a supply of transfer ribbon;

a guide arm having a tape pathway and a separate ribbon pathway for guiding said printing tape and said transfer ribbon along separate paths toward the print station, each of said tape pathway and said ribbon pathway including a bottom guide rib for engaging and guiding a bottom edge of said printing tape and transfer ribbon, respectively, said bottom guide ribs of said tape and ribbon pathways being at the same level wherein the bottom edges of said tape and ribbon are guided and maintained at the same level from said guide arm to the print station.

2. The tape supply cartridge of claim 1 wherein said ribbon is wider than said tape.

3. The tape supply cartridge of claim 1 wherein said ribbon and said tape are the same width.

1 4. A tape supply cartridge for a printer of the type having a cartridge receiving cavity, a fixed print head defining a print station, a platen roller movable toward and away from said print head between a print and non print position and a pair of rollers for advancing the tape between the platen roller and print head and a tape cut-off mechanism, said cartridge comprising:

6 a supply of printing tape;

 a supply of transfer ribbon;

 a guide arm for guiding said tape and ribbon to the print station;

 a ribbon rewind spool;

 a ribbon guide for guiding said ribbon from the print station to said ribbon

11 rewind spool;

 a tape advancement roller for advancing said tape from the print station;

 a tape outlet end positioned downstream from said tape advancement roller, said tape outlet end including a recessed portion to accommodate said tape cut-off mechanism wherein said recessed portion includes a substantially planar surface
16 defining an exterior wall of the cartridge and a tape outlet slot extending through said exterior wall and opening to said planar surface.

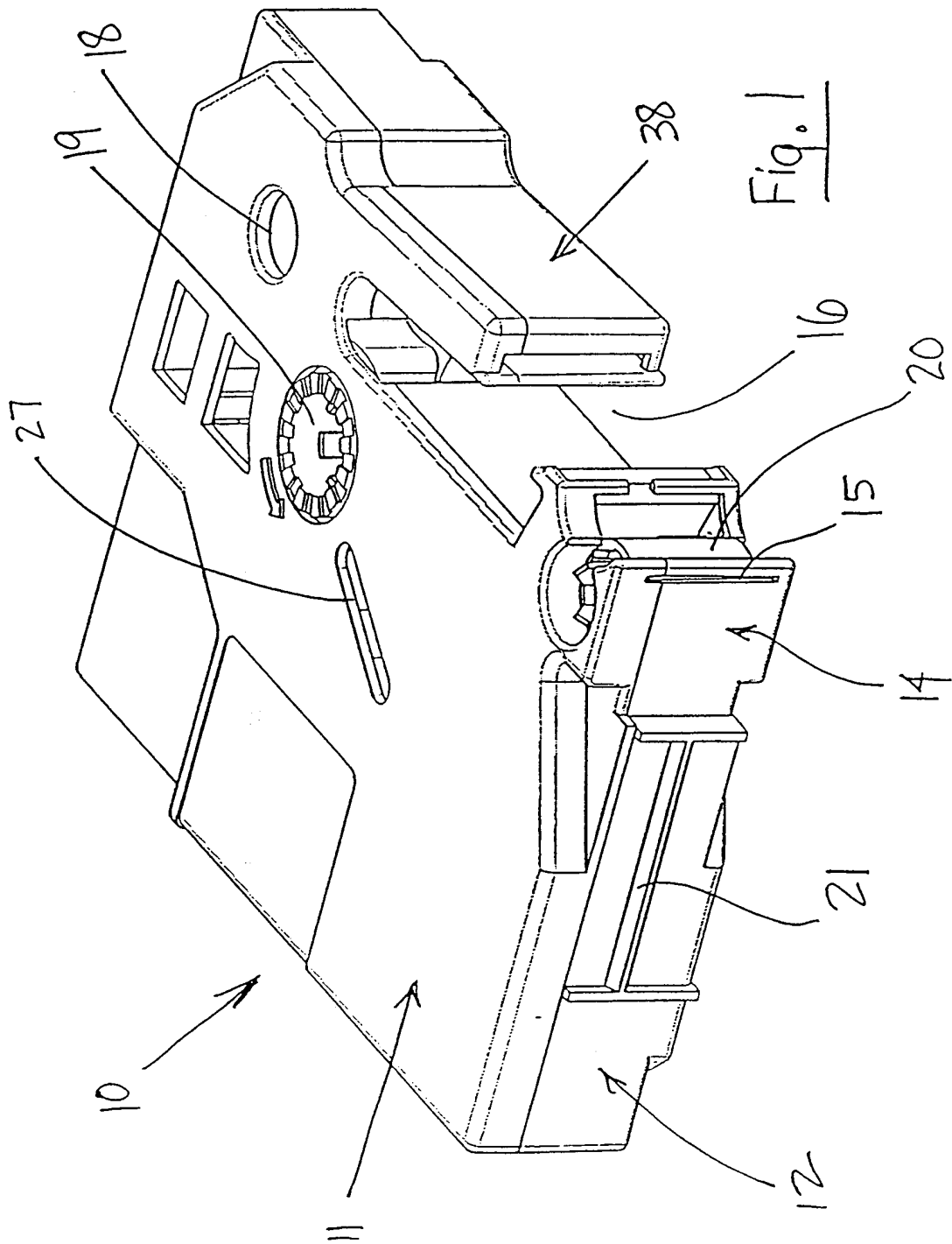
5. The tape supply cartridge of claim 4 wherein said tape outlet slot is angled upwardly in the direction of tape travel through said slot.

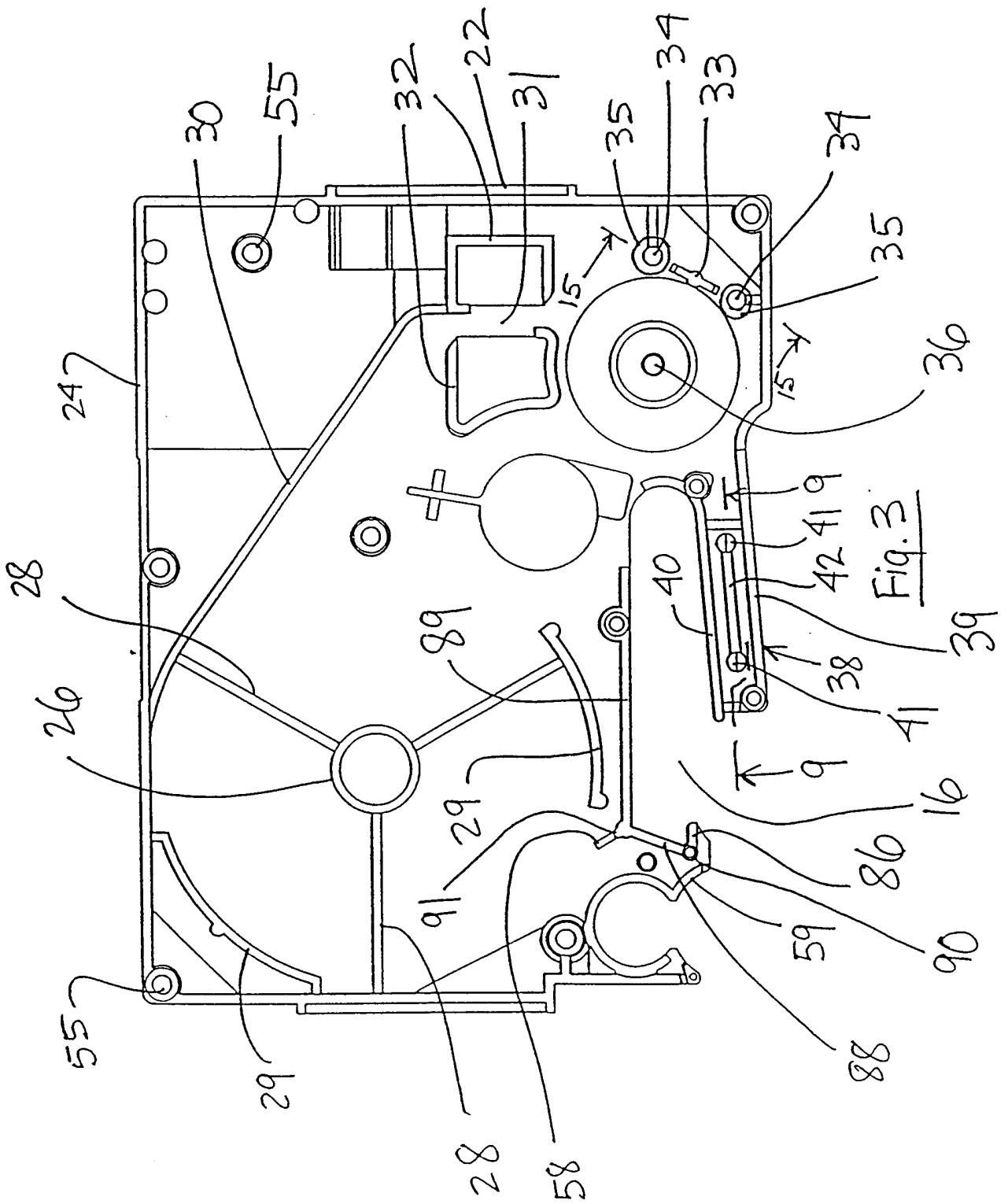
- 1 6. A tape supply cartridge for a printer of the type having a cartridge receiving cavity, a
fixed print head defining a print station, a platen roller movable toward and away from said
print head between a print and non print position and a pair of rollers for advancing the tape
between the platen roller and print head, said cartridge comprising:
- a cartridge top, a cartridge bottom and a cartridge edge wall joining said
6 cartridge top and bottom and extending substantially around said cartridge;
- a supply of printing tape housed in said cartridge on a tape supply spool
between said cartridge top and said cartridge bottom;
- a guide arm for guiding said tape toward the print station;
- a pair of tape guide posts positioned between said tape supply spool and said
11 guide arm extending between said cartridge top and said cartridge bottom; and
- a roller rotatably mounted on each of said tape guide posts wherein said tape
moves from said tape supply spool, around said rollers and to said guide arm during
movement through said cartridge.
- 16 7. The tape supply cartridge of claim 6 including a tack disc on each side of said tape
supply spool.
8. The tape supply cartridge of claim 6 including a barrier between said tape guide posts
to prevent said tape from being routed along an undesired path.
- 21 9. A tape supply cartridge for a printer of the type having a cartridge receiving cavity, a
fixed print head defining a print station, a platen roller movable toward and away from said
print head between a print and non print position and a pair of rollers, for advancing the tape
between the platen roller and print head, said cartridge comprising:

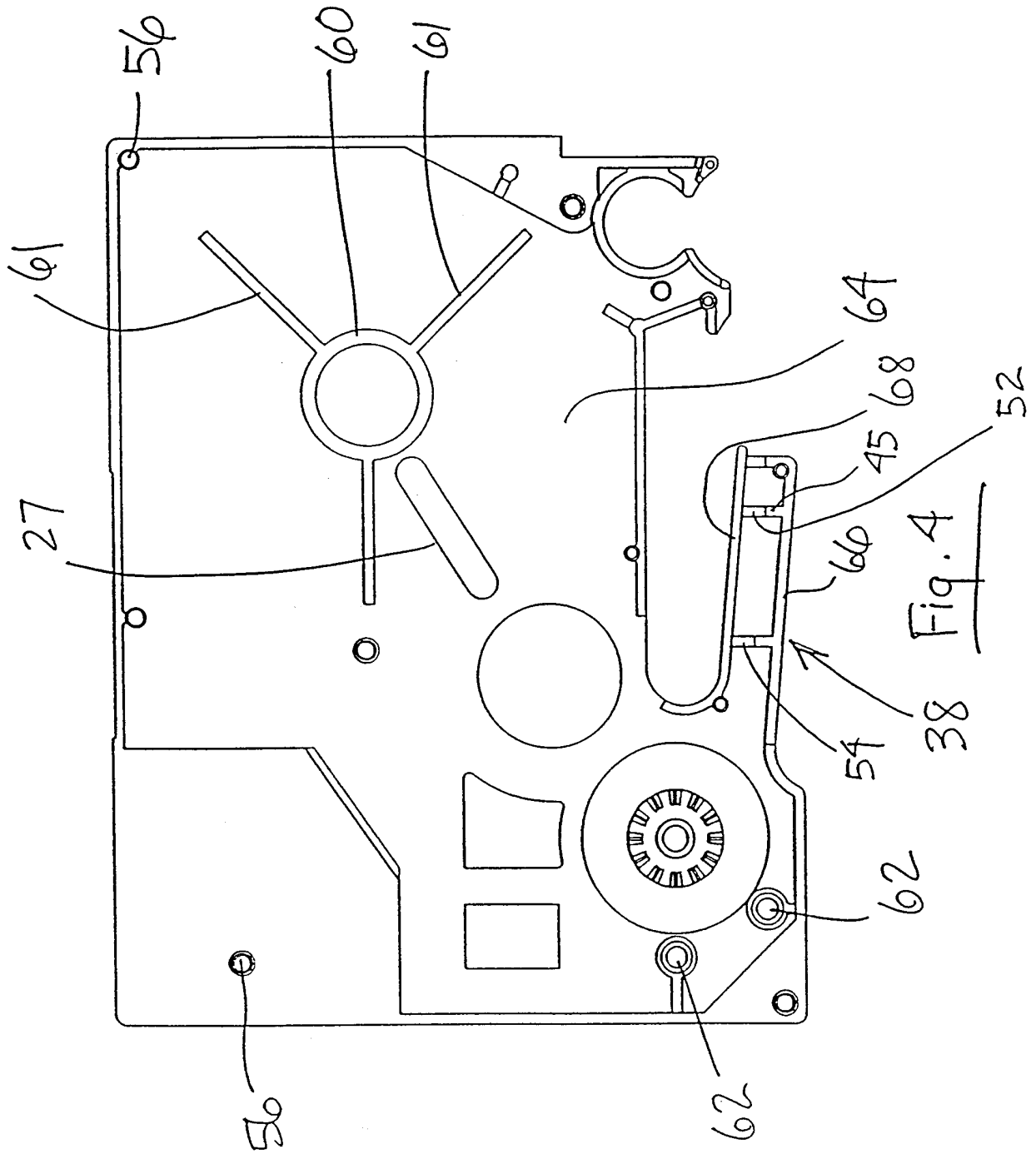
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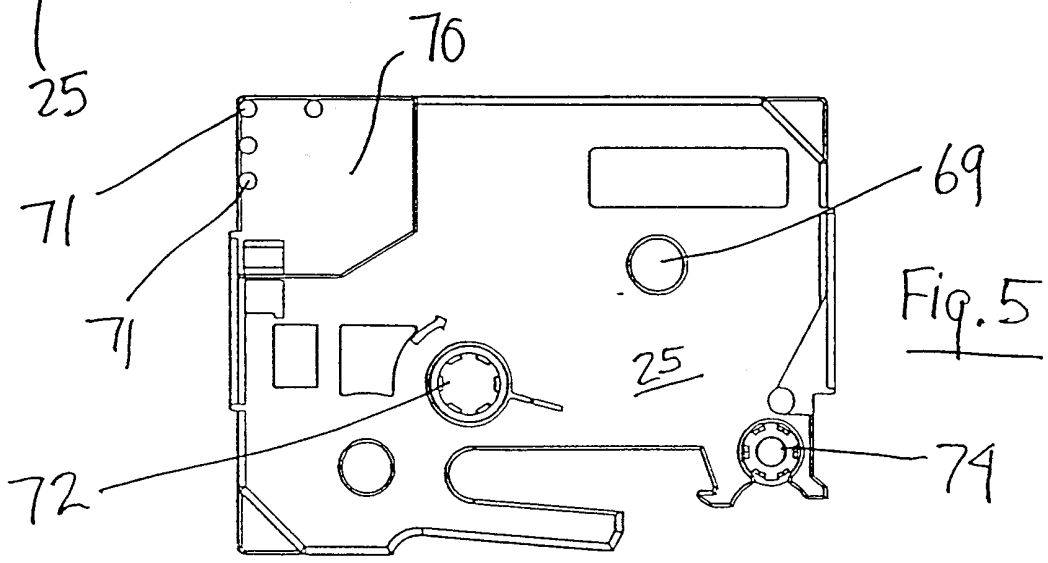
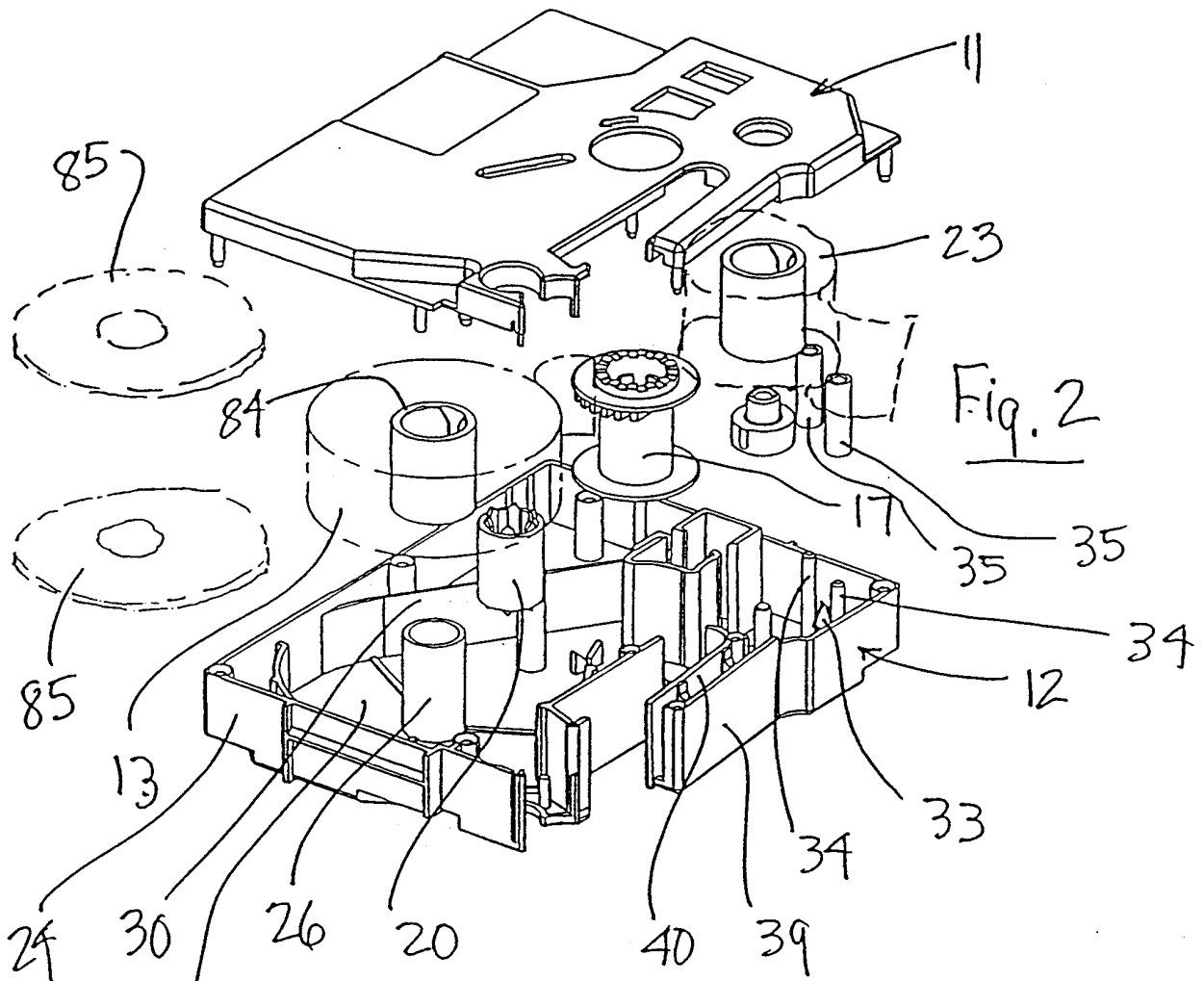
- 1 a cartridge top, a cartridge bottom and a cartridge edge wall joining said
cartridge top and bottom and extending substantially around said cartridge;
- a supply of printing tape housed in said cartridge on a tape supply spool
between said cartridge top and said cartridge bottom;
- a guide arm for guiding said tape toward the print station;
- 6 a pair of tape guide posts positioned between said tape supply spool and said
guide arm extending between said cartridge top and said cartridge bottom; and
- a barrier between said tape guide posts to prevent said tape from being
routed along an undesired path.
10. A tape supply cartridge for a printer of the type having a cartridge receiving cavity, a
11 fixed print head defining a print station, a platen roller movable toward and away from said
print head between a print and non print position and a pair of rollers for advancing the tape
between the platen roller and print head, said cartridge comprising:
- a cartridge top, a cartridge bottom and a cartridge edge wall joining said
cartridge top and bottom and extending substantially around said cartridge;
- 16 a supply of printing tape housed in said cartridge on a tape supply spool
between said cartridge top and said cartridge bottom;
- a guide arm for guiding said tape toward the print station;
- a pair of tape guide posts positioned between said tape supply spool and said
guide arm extending between said cartridge top and said cartridge bottom;

- 1 a roller rotatably mounted on each of said tape guide posts wherein said tape moves from said tape supply spool, around said rollers and to said guide arm during movement through said cartridge; and
- a barrier between said tape guide posts to prevent said tape from being routed along an undesired path;
- 6 said tape supply comprising a PET base layer provided with a filler of TiO_2 , a top coating of a heat activatable material and a bottom release layer.









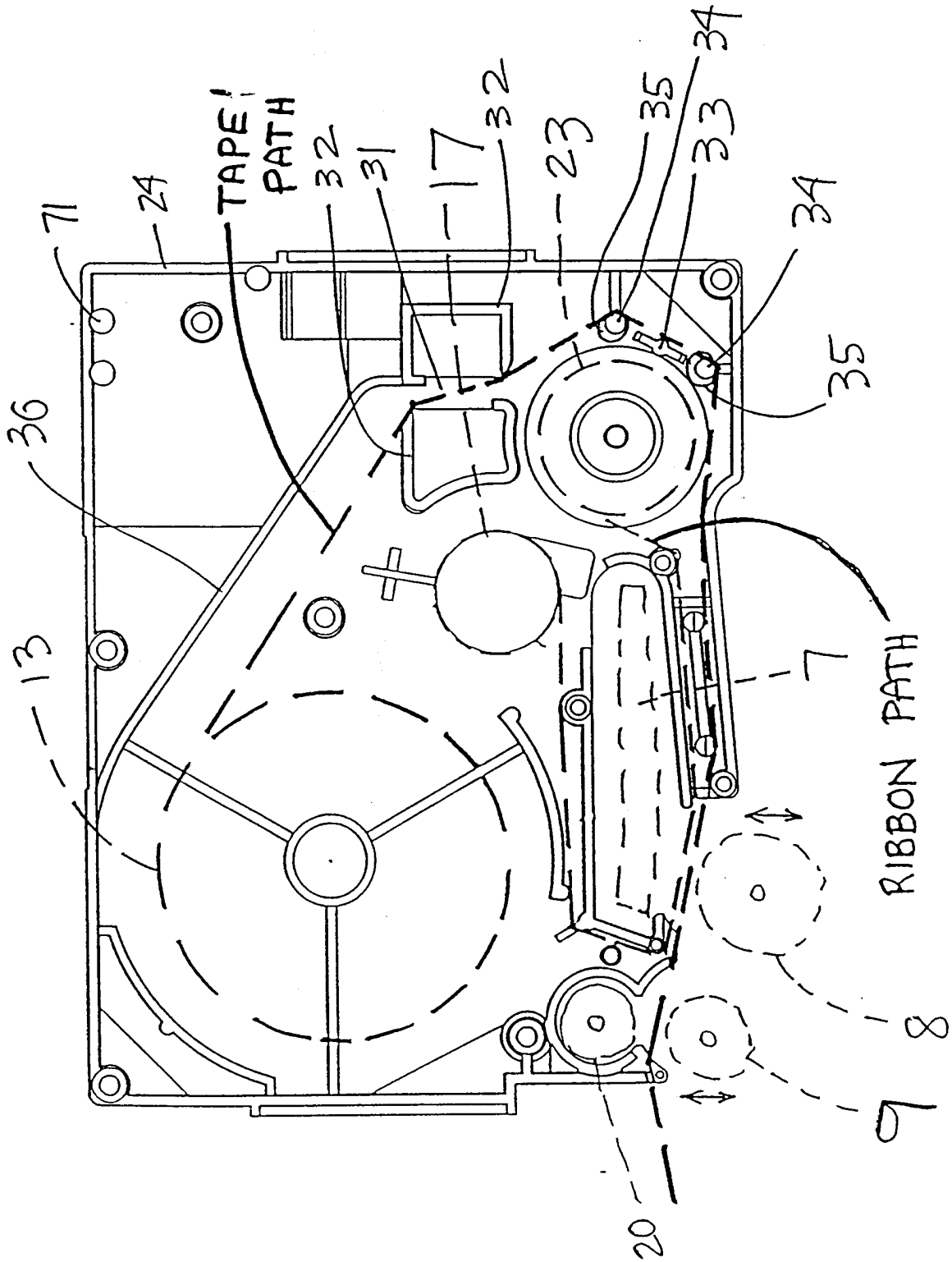
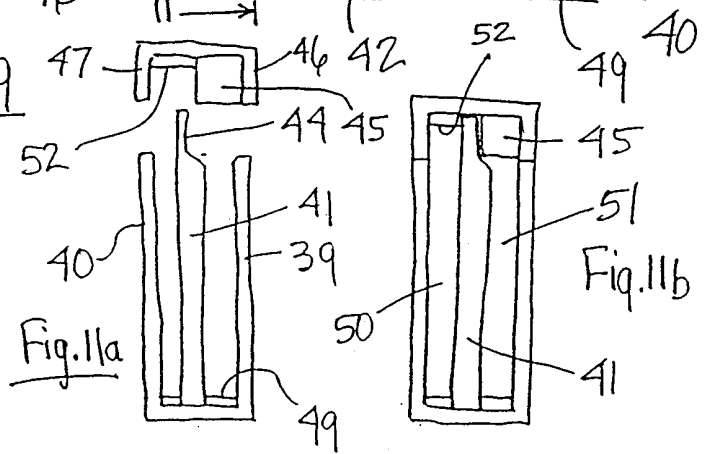
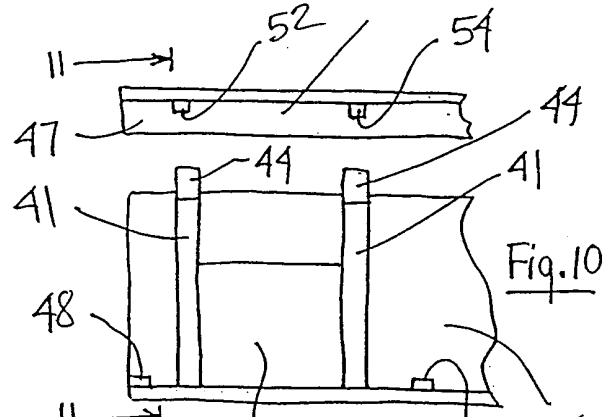
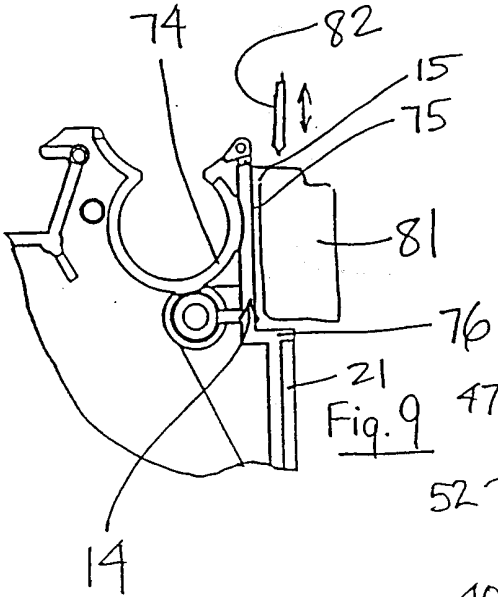
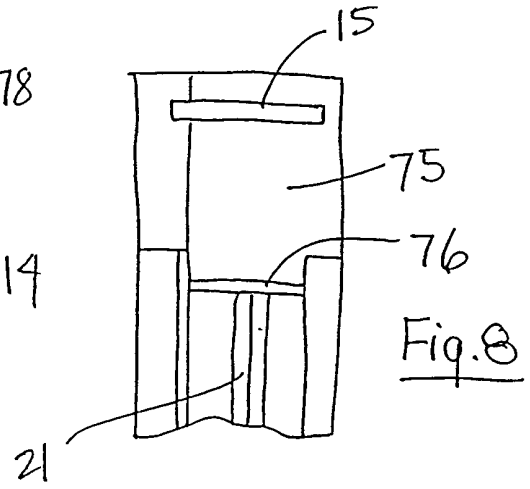
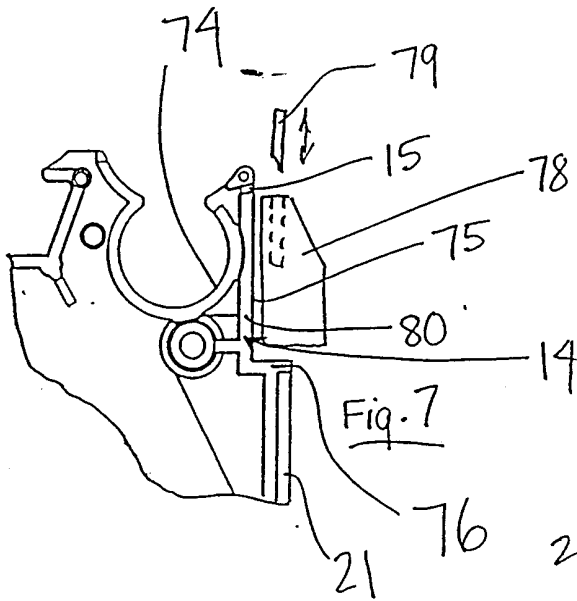
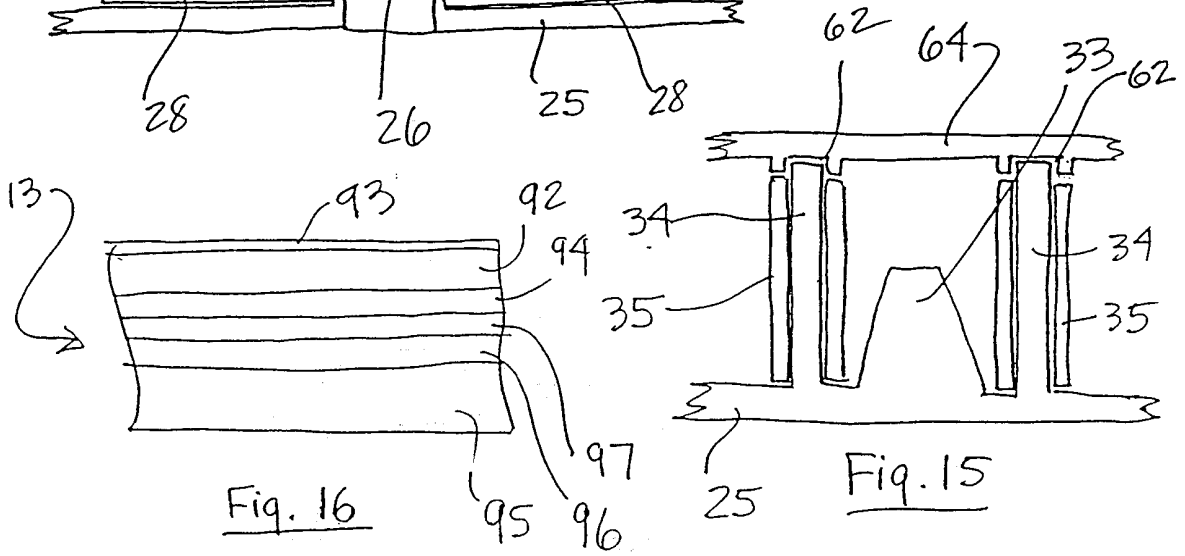
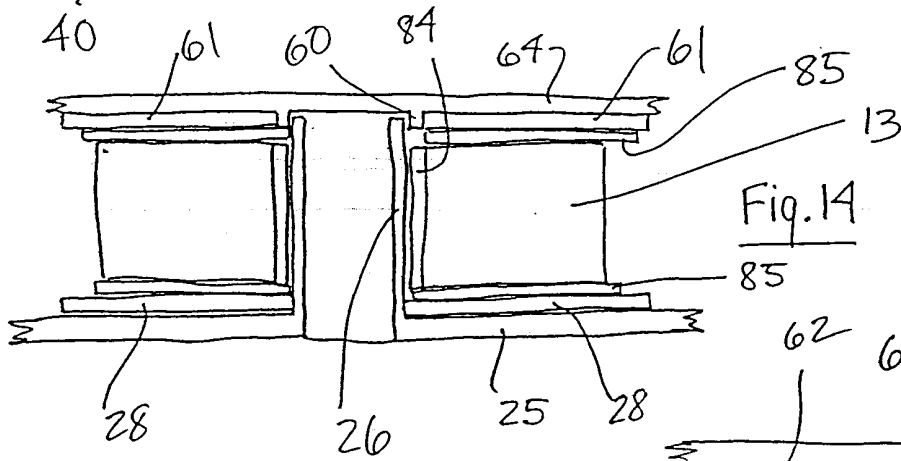
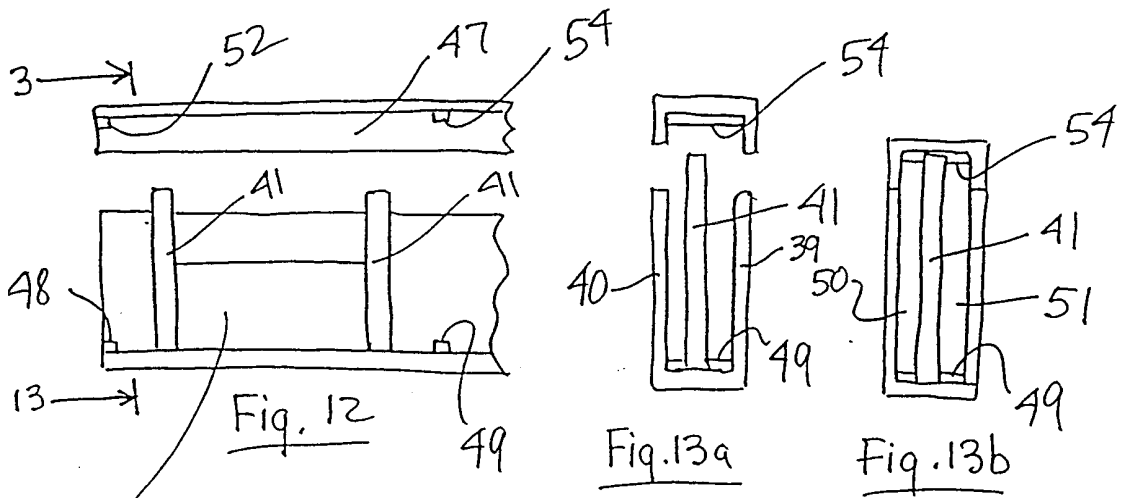


Fig. 6





INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/40541

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B41J 2/305, 35/02, 35/04, 35/28
US CL : 400/207, 208, 247, 248, 613, 621
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 400/207, 208, 247, 248, 613, 621

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	5,350,243 A (ICHINOMIYA et al) 27 September 1994 (27-09-94), the entire document.	1-10
Y	5,813,773 A (KAWAI) 29 September 1998 (29-09-98), the entire document.	1-10
Y	5,636,926 A (YAMAGUCHI) 10 June 1997 (10-06-97), the entire document.	1-10
Y	5,771,803 A (TAKAMI) 30 June 1998 (30-06-98), the entire document.	1-10
Y	5,022,771 A (PAQUE) 11 June 1991 (11-06-91), the entire document.	1-10
Y	4,815,874 A (RICHARDSON et al) 28 March 1989 (28-03-89), columns 7-8.	7-8

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

15 NOVEMBER 2000

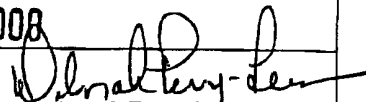
Date of mailing of the international search report

27 DEC 2008

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Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/40541

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 10-237397 A (KAZUNARI) 08 September 1998 (08-09-98), the abstract.	10
X	5,653,542 A (SUGIMOTO et al) 05 August 1997 (05-08-97), the entire document.	1-3
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Y		4-10
.	..	.
Y	5,815,874 A (RICHARDSON et al) 28 March 1989 (28-03-89), columns 7-8.	4-10