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(11)

EP 1 645 427 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
12.04.2006 Bulletin 2006/15

(51) Int Cl.:
B41J 15/16 (2006.01)
B65H 23/16 (2006.01)
B65H 23/34 (2006.01)

B65H 23/025 (2006.01)
B65H 23/34 (2006.01)

(21) Application number: 04447223.1

(22) Date of filing: 08.10.2004

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**
Designated Extension States:
AL HR LT LV MK

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(54) Tensioning system for printing devices

(57) The present invention is related to a tensioning system for printers comprising means for applying a ten-

sion force to a printing media along a contact zone. The means for applying a tension force are capable of applying variable tension force along the contact zone.

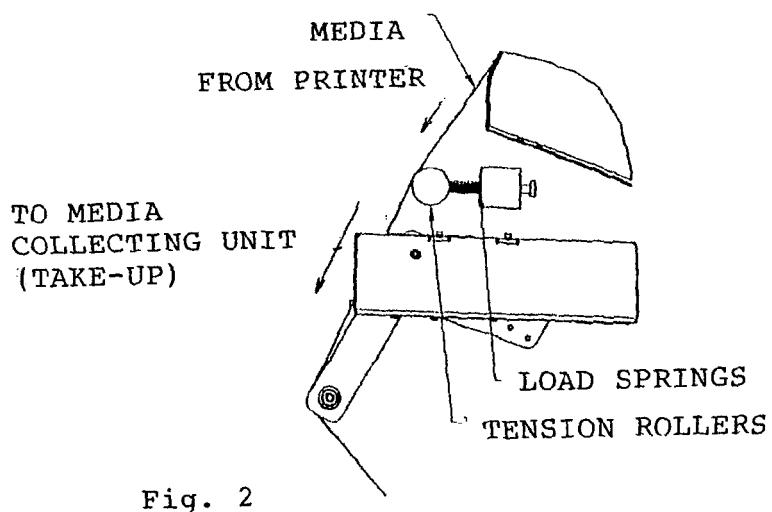


Fig. 2

Description**Field of the invention**

[0001] The invention is related to a system for tensioning printing media (paper, textile,...) on a printer, in particular on a large inkjet printer.

State of the art

[0002] Irregular expansion of the media may occur due to:

- expansion/contraction caused by a humidity or temperature change of the media,
- expansion caused by ink load,
- expansion caused by tension differences due to the media production process,

[0003] The media loop between the printer and the media collecting system is put under a certain tension, caused by the pulling force of the media collecting system (take-up system).

[0004] When using media that cannot expand, this tension will be equal over the full width of the media. When using real media that expands, irregular expansion may result in a longer loop length on the edges of the media. The loop length is the length of the media between the printing position and the media collecting system, measured in the moving direction of the media.

[0005] Such a loop length difference causes the tension force applied by the media collecting system to be concentrated in the place of the media where the loop length is shorter. This creates tension loss in the areas of the media where the loop length is longer. The loop length difference may further cause bubbles in the media at the printing area, resulting in:

- printing quality loss due to irregular distance between print head and media, and
- head strikes, when the printing head is striking media bubbles.

Aims of the invention

[0006] The present invention aims to provide a tensioning system able to compensate irregular expansion or tension of media such that the media is kept flat at the printing position.

Summary of the invention

[0007] The present invention is defined by the claims.

[0008] The tensioning system according to the invention is particularly suitable for printing on extremely thin media, such as are presently used for example in the Digital Transfer Printing technique.

Short description of the drawings

[0009] Fig. 1 represents two views of a printing device comprising a tensioning system according to the present invention.

[0010] Fig. 2 represents a detailed view of the tensioning system.

[0011] Fig. 3 represents an embodiment with three rolls.

Detailed description of the invention

[0012] Figure 1 shows two views of a printing device comprising a tensioning system according to a first embodiment of the present invention. Figure 2 shows more in detail said first embodiment of the tensioning system according to the invention. As can be seen in Fig.3 the tensioning system as in the first embodiment comprises a number of tension rollers, which are mounted next to each other. Each tension roller is independently spring loaded on both ends.

[0013] Each tension roller, except for the one in the middle, can be adjusted in the left-right direction. This adjustment can be used to fit the system to the width of the media used.

[0014] Both the left and the right outside tension roller may have a higher spring load on the outsides. This is because the effect of irregular media expansion shows up mainly on the outside edges of the media.

[0015] The total system can be withdrawn backward for media loading. It can be adjusted in the front/rear direction to adjust the offset spring force on the tension rollers.

[0016] The tension rollers can be fixed around their length axis, allowing the media to slide over, or can be mounted on bearings, allowing them to roll with the media movement.

[0017] The tension rollers of the system of the invention each give additional, independent local tension on the media area covered by the width of the tension roller. This compensates for the differences in the loop length over the width of the media. By doing so, all irregular media expansion is absorbed at the invention system, thereby keeping the media in the print area flat.

[0018] In an alternative embodiment there is only one tension roll, made of a sufficiently flexible material, that causes the roll to bend slightly due to the pressure exerted by the media onto the roll. In this way the tension roll may obtain the same shape as in the above-mentioned embodiments, thus yielding the same effect.

[0019] The system is especially advantageous for printers used to print on extremely thin media, such as printers used for Digital Transfer Printing.

Claims

1. Tensioning system for printers comprising means for

applying a tension force to a printing media along a contact zone **characterised in that** said means are capable of applying variable tension force along said contact zone.

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2. Tensioning system as in claim 1, wherein said tensioning force is highest at the ends of said contact zone.
3. Tensioning system as in claim 1 or 2, wherein said means for applying a tension force comprises a plurality of tensioning rolls placed longitudinally next to each other, each roll being independently spring loaded on each end. 10
4. Tensioning system according to claim 3 comprising three rolls, wherein the middle roll is fixed in longitudinal direction, and the other two rolls are adjustable in longitudinal direction. 15
5. Tensioning system according to claim 3, wherein said rolls are fixed around their length axis.
6. Tensioning system according to claim 3, wherein said rolls can rotate around their length axis. 20 25
7. Tensioning system according to claim 1 or 2, wherein said means consists of one roll, said roll being made of a flexible material. 30
8. Tensioning system as in claim 7, wherein said one roll is fixed around its length axis.
9. Tensioning system as in claim 7, wherein said one roll can rotate around its length axis. 35

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PRINTER ASSEMBLY
Tension rollers divide media width into
separate independent tension control
areas

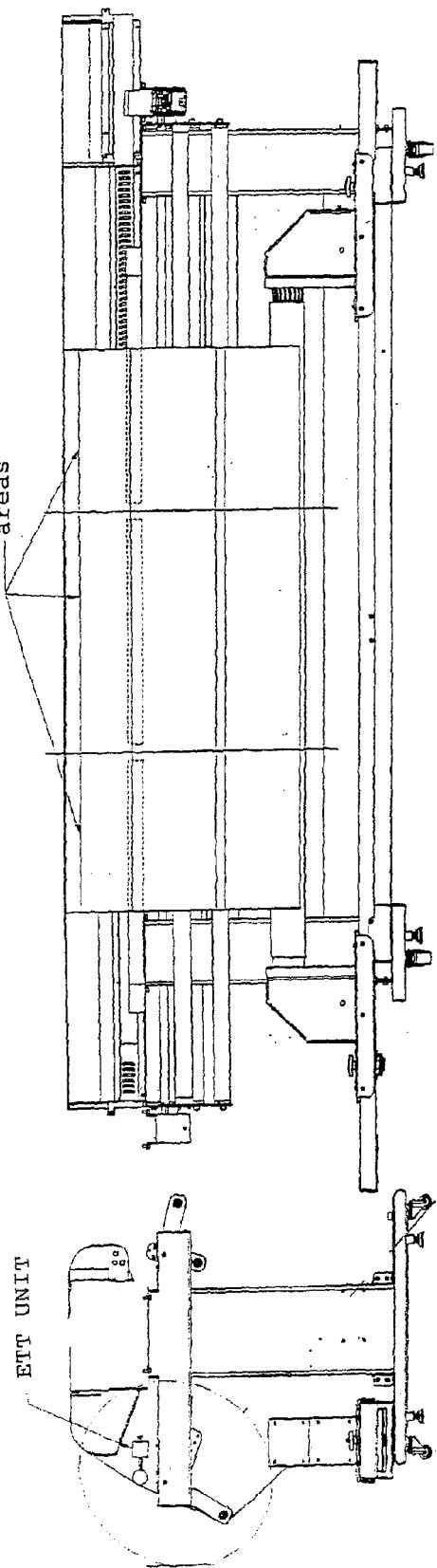


Fig. 1

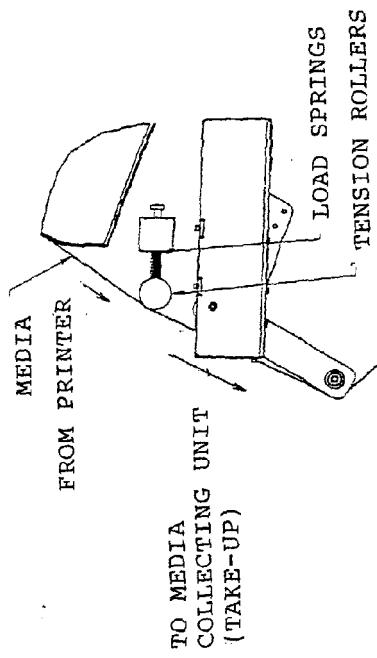


Fig. 2

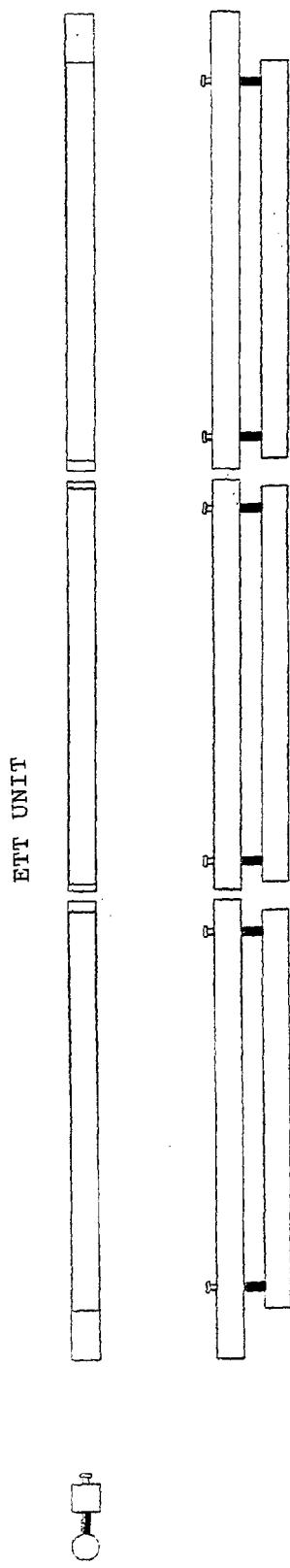
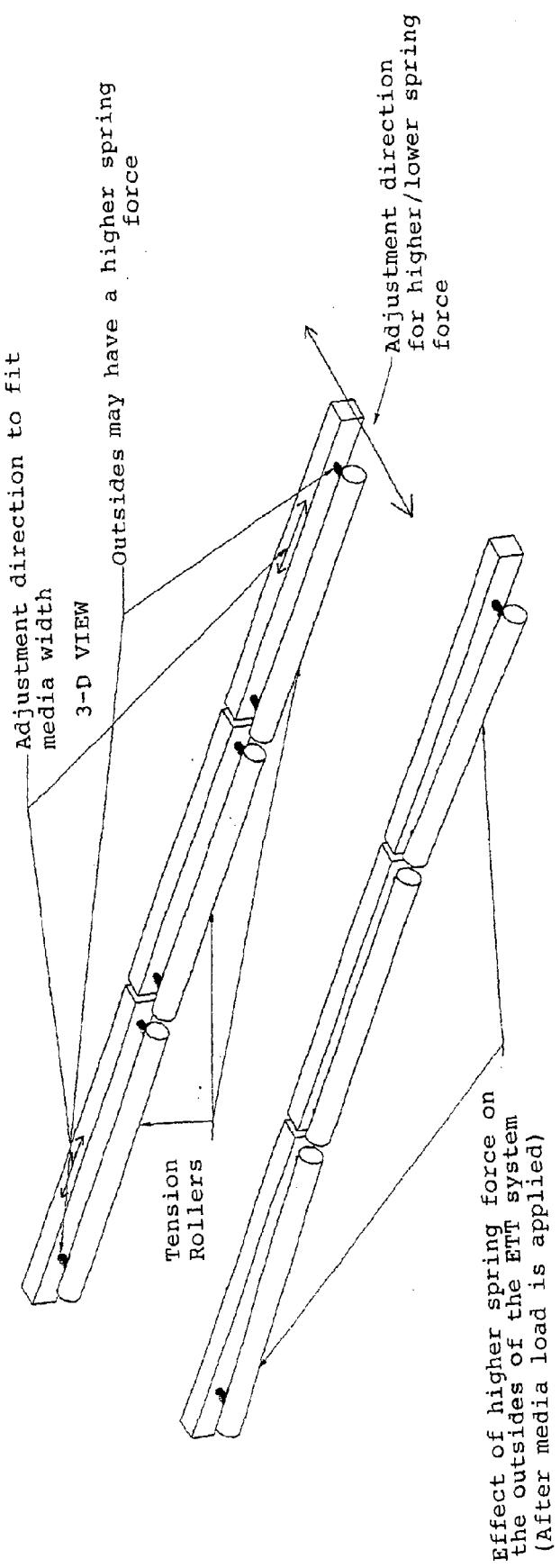


Fig. 3





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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
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The present search report has been drawn up for all claims			
2	Place of search The Hague	Date of completion of the search 28 February 2005	Examiner Joosting, T
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

ANNEX TO THE EUROPEAN SEARCH REPORT
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