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(54) Device for grounding a printer film

(57) Device for grounding a printer film (1) or the like which extends from an unwinding roller (2) to a winding roller (3) and is wound at least partially on the unwinding roller (2) and/or the winding roller (3), whereby the unwinding roller (2) and/or the winding roller (3) can be connected at least to an electrically conducting flange (4) which contacts the printer film (1) and whereby the electrically conducting flange (4) can be brought into engagement with a grounded pick-up element (6).

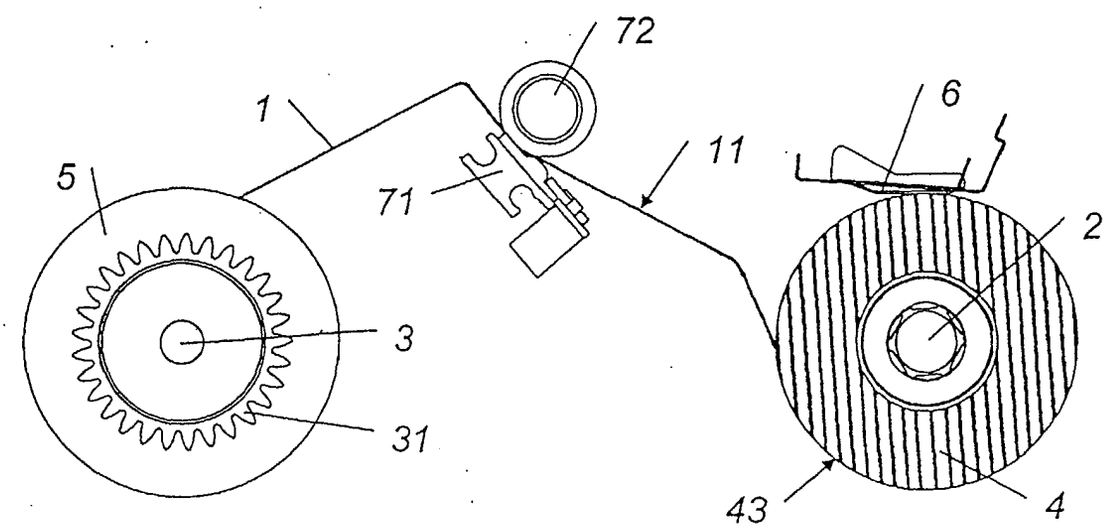

Fig. 2

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Description

[0001] This invention relates to a device for grounding a printer film or the like which extends from an unwinding roller to a winding roller and is wound at least partially on the unwinding roller and/or the winding roller.

[0002] Printer films may be used in fax machines, printers or the like, where the printer film comes in contact with paper to be printed in a printing operation and then is separated from this paper. In this separation of the paper from the printer film, a separation of charges often occurs, causing the printer film to become charged. To prevent the development of a high voltage and unwanted sparking, which could destroy circuits and the like, the printer film may be grounded so that charges are balanced.

[0003] In the case of such known devices for grounding a printer film, it is known that grounded brushes or the like may be arranged in the area of a print head. These brushes have the disadvantage that their bristles may be ripped out because of wear and/or they may clump together, thus having a negative effect on the electric contact between the bristles and the printer film and may result in inadequate grounding and a buildup of charge on the printer film. The brushes are usually situated on the side of the printer film which is opposite the side where the charge separation occurs. Therefore, the entire printer film must be electrically conducting. Another disadvantage is that the brushes can scrape off part of a coating on the printer film, which thus results in soiling of the machine. Therefore, complex service and/or maintenance work may be required.

[0004] The object of the present invention is therefore to provide a device for grounding of the type defined in the preamble whereby the known disadvantages are avoided and reliable and long-lasting grounding of the printer film is ensured. Another object of this invention is to provide a device for grounding which has a simple design and can be manufactured inexpensively.

[0005] According to this invention, this is achieved by the fact that the unwinding roller and/or the winding roller is/are connectable at least to an electrically conducting flange which contacts the printer film, and the electrically conducting flange may be brought into engagement with a grounded pick-up element.

[0006] This yields the advantage that the device according to this invention for grounding at the point of contact with the printer film may be designed to be stationary relative to it, thereby effectively preventing any abrasion of the coating. In addition, the pick-up element may be connected to the unwinding roller and may also function as a braking device at the same time.

[0007] In a refinement of this invention it is possible for the unwinding roller and/or the winding roller to have an essentially tubular design, having a slotted recess in the longitudinal direction on at least one end so that a projection or the like of the electrically conducting flange may engage in the slotted recess. Therefore, a rotationally fixed connection between the electrically conducting flange and the printer film wound onto the roller can be achieved in a simple way.

[0008] According to another embodiment of this invention, the electrically conducting flange may contact a coated side of the printer film. It is therefore sufficient if the coating on the printer film is electrically conducting. The coating also contacts the paper to be printed so that the charge separation occurs on the coating. In this embodiment it is not necessary for the backing film of the printer film, which carries the coating to be electrically conducting.

[0009] In another embodiment of this invention, it is possible for the electrically conducting flange to include a disk element and for the pick-up element to be designed so that it can be brought into engagement with the outer edge of the disk element. The force acting between the pick-up element and the flange acts essentially perpendicular to the axial direction of the roller. When the direction of force is in the axial direction, a support must be provided. This pick-up element may also be used to position the roller.

[0010] According to another embodiment of this invention it is possible to provide for the pick-up element to be designed as a braking device for the unwinding roller. Therefore a minimum tension may be ensured in the printer film between the unwinding roller and the winding roller without any additional components.

[0011] In another embodiment of this invention, the electrically conducting flange may be made of plastic. This constitutes a simple embodiment of the electrically conducting flange, which is inexpensive to manufacture.

[0012] This invention will now be described in greater detail with reference to the accompanying drawings, which illustrate exemplary embodiments. They show:

Fig. 1 a schematic side view of a device known from the state of the art for grounding a printer film with brushes;

Fig. 2 shows a schematic side view of an exemplary embodiment of a device according to this invention for grounding a printer film or the like;

Fig. 3 shows a partially cutaway oblique view of an electrically conducting flange; and

Fig. 4 shows an oblique view of an unwinding roller.

[0013] Fig. 1 shows a device for grounding a printer film 1. Such printer films 1 may be used in fax machines, printers or the like, where the printer film 1 comes in contact with paper to be printed between the print head 71 and the printer roller 72 and the printing operation and then the printer film is separated from this paper. In this separation of the paper from the printer film 1, a charge separation often occurs so that the printer film 1 develops a charge. To avoid the development of high voltages

and unwanted sparking so that circuits or the like may be destroyed in particular, the printer film 1 may be grounded to ensure a balancing of the charge. The printer film 1 extends partially from an unwinding roller 2 to a winding roller 3 and is partially wound on the unwinding roller 2 and/or the winding roller 3. Between the unwinding roller 2 and the winding roller 3 there is a print head 71 and a printer roller 72. Grounded brushes 8 which prevent a charge from building up on the printer film 1 are situated in the direction of movement of the printer film 1 downstream from the print head 71.

[0014] Fig. 2 shows schematically one embodiment of a device according to this invention for grounding a printer film 1 or the like, where the printer film 1 extends partially from the unwinding roller 2 to the winding roller 3 and is partially wound on the unwinding roller 2 and/or the winding roller 3. The print head 71 and the printer roller 72 are situated between the unwinding roller 2 and the winding roller 3.

[0015] In addition, an electrically conducting flange 4 is provided, this flange being connectable to the unwinding roller 2 and/or the winding roller 3 and contacting printer film 1. The electrically conducting flange 4 can be brought into engagement with a grounded pick-up element 6. The electrically conducting flange 4 may be connected to the unwinding roller 2 and/or the winding roller 3, and it is also possible to provide two or more electrically conducting flanges 4. Therefore, a charge balancing of the printer film can be ensured and the development of high voltages may be reliably prevented. Additional flanges 5 may be designed to be electrically conducting or electrically insulating.

[0016] As shown in Fig. 2, at least one of flanges 4, 5 of the winding roller 3 may have a rotationally fixed connection to a drive wheel 31 so that winding roller 3 can be driven.

[0017] Fig. 4 shows the unwinding roller 2 schematically, showing that it has an essentially tubular base body 21, which is designed with a slotted recess 22 in the longitudinal direction of the base body 21. The winding roller 3 may have a similar design.

[0018] Fig. 3 shows an embodiment of the electrically conducting flange 4, which has a projection 21 that engages in the slotted recess 22 and contacts the printer film 1 which is wound around the base body 21.

[0019] The electrically conducting flange 4 may included a disk element 42. It seems expedient if the pick-up element 6 can be brought into engagement with the outer edge 43 of the disk element 42. If the pick-up element 6 presses on a side of the electrically conducting flange 4, then a supporting element is to be provided in the axial direction of the base body 21. This is not necessary with an essentially radial load, so that the support of the unwinding roller 2 can absorb these forces. If the pick-up element 6 has lateral guides or something similar, an alignment of the unwinding roller 2 by means of the pick-up element 6 may also be achieved.

[0020] Due to the grinding abrasion of the pick-up element 6 with the electrically conducting flange 4 in rotation of the electrically conducting flange 4, the latter is decelerated. If the pick-up element 6 is designed as a braking device for the unwinding roller 2, a minimum voltage may be ensured in the printer film 1 between the unwinding roller 2 and the winding roller 3, in particular between the unwinding roller 2 and the printer roller 72.

[0021] The electrically conducting flange 4 can be manufactured easily and inexpensively if it is made of plastic.

[0022] The charge balancing of the printer film 1 may be achieved if the electrically conducting flange is connected to the unwinding roller 2 and/or the winding roller 3. The printer film 1 is preferably wound up so that the coated side 11 comes to lie on the inside. Therefore, contacting of the projection 41 with the coated side 11 of the printer film 1 can be ensured in a simple way. Usually the coated side 11 of the printer film is arranged on the inside on the unwinding roller 2.

Claims

1. A device for grounding a printer film (1) or the like which extends from an unwinding roller (2) to a winding roller (3) and is wound at least partially on the unwinding roller (2) and/or the winding roller (3), **characterized in that** the unwinding (2) and/or the winding roller (3) can be brought into contact at least with an electrically conducting flange (4) which contacts the printer film (1), and the electrically conducting flange (4) can be brought into engagement with the grounded pick-up element (6).

2. The device according to Claim 1, **characterized in that** the unwinding roller (2) and/or the winding roller (3) is/are designed to be essentially tubular and to have a slotted recess (22) running in the longitudinal direction on at least one end so that a projection (41) or the like on the electrically conducting flange (4) engages in this slotted recess.

3. The device according to Claim 1 or 2, **characterized in that** the electrically conducting flange (4) contacts a coated side (11) of the printer film (1).

4. The device according to Claim 1, 2 or 3, **characterized in that** the electrically conducting flange (4) includes a disk element (42) and the pick-up element (6) can be brought into engagement with the edge (43) of the disk element (42) situated on the outside.

5. The device according to one of Claims 1 through 4, **characterized in that** the pick-up element (6) is designed as a braking device for the unwinding roller (2) .

6. The device according to one of Claims 1 through 5,

characterized in that the electrically conducting flange (4) is made of plastic.

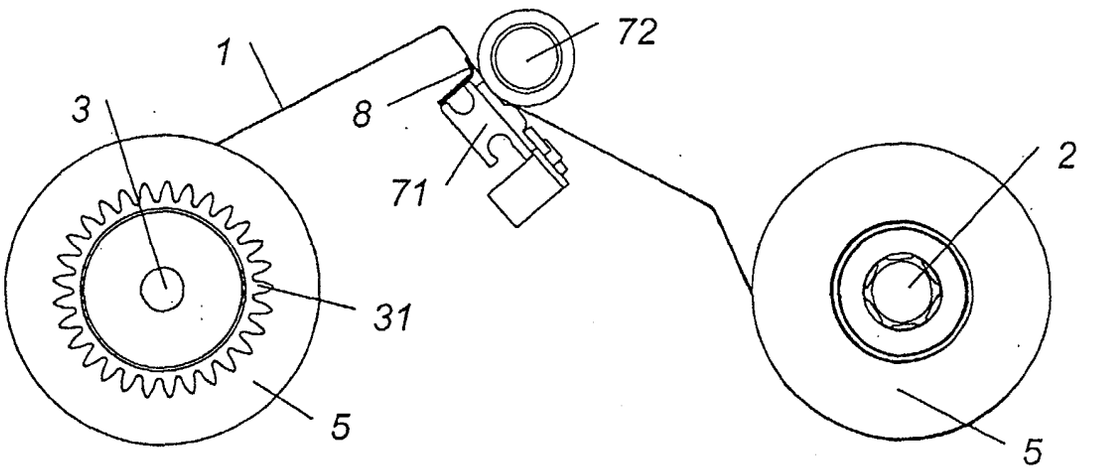

Fig. 1
Stand der Technik

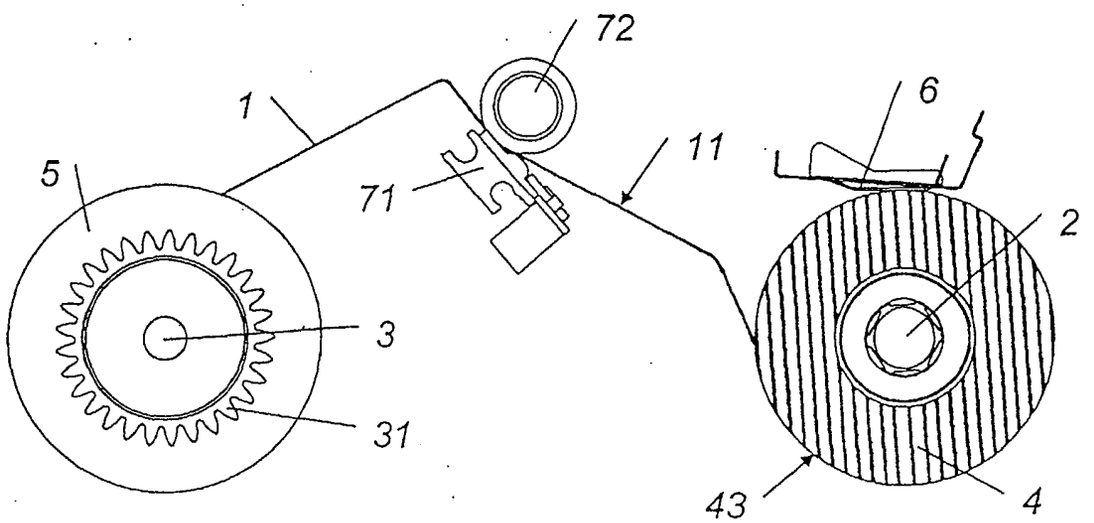

Fig. 2

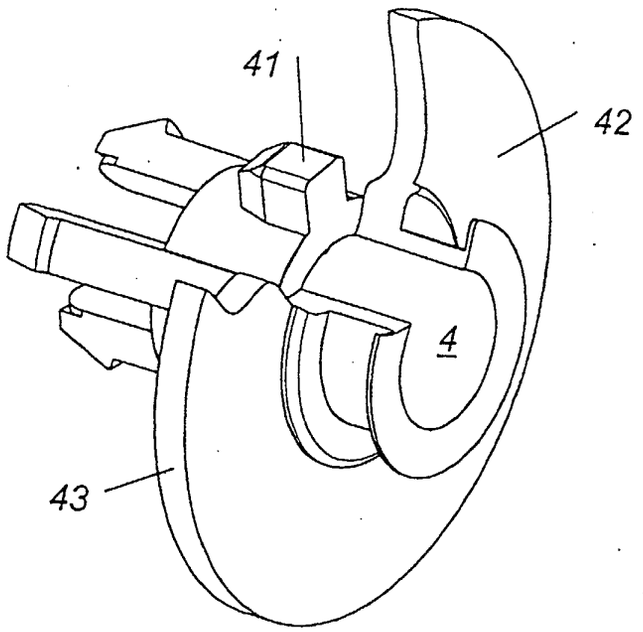

Fig. 3

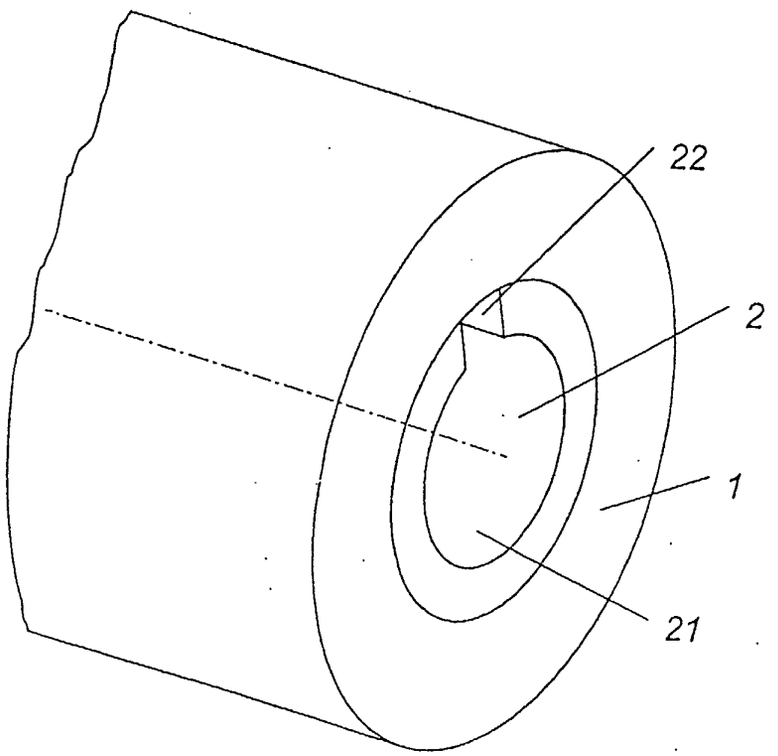

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 04 29 0642

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 0103, no. 57 (M-540), 2 December 1986 (1986-12-02) & JP 61 154964 A (VICTOR CO OF JAPAN LTD), 14 July 1986 (1986-07-14) * abstract *	1-6	B41J17/00 B41J33/00
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A	US 5 169 247 A (ASANO SHINYA ET AL) 8 December 1992 (1992-12-08) * column 9, line 5 - line 18 * * column 10, line 44 - column 11, line 2 * * figures 9,10 *	1-6	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B41J
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 June 2004	Bridge, S

CATEGORY OF CITED DOCUMENTS

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