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(54) Dispenser with a braking mechanism for a paper roll

(57) Dispenser with a braking mechanism for a paper roll (2), said dispenser having a frame with two flanges (1) extending perpendicularly from a back of the dispenser and being provided with means in their outer portion for carrying a paper roll (2), said dispenser further being provided with a cutting drum (3)mounted below and spaced from said paper roll (2) and with a braking means (7) being spring loaded against the periphery of the paper roll (2) and being controllably driven by movement of the cutting drum ((3). One of said flanges (1) extends downwardly towards the cutting drum (3) and carries a connection wheel (6) being in continuous contact with the periphery of the cutting drum (3) and that the periphery of said connection wheel (6) is further in continuous contact with the braking means (7) for transferring the exact movement of the cutting drum (3) to the braking means (7) transferring it further to the paper roll (2).

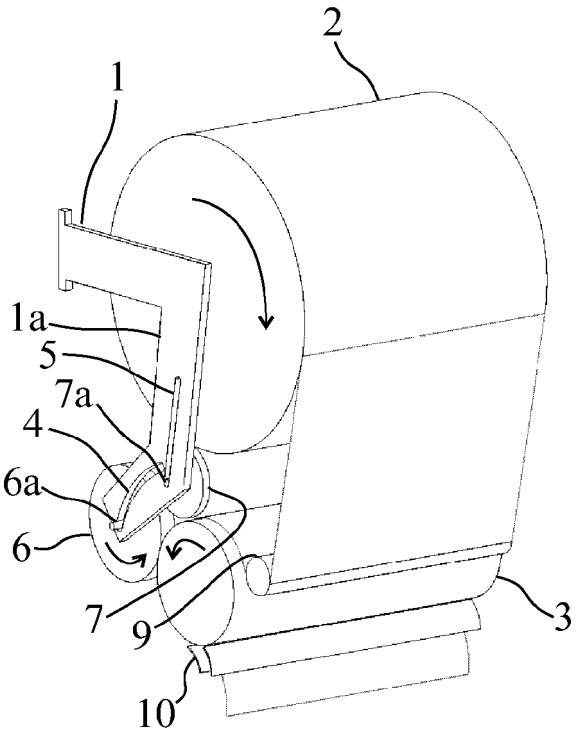

Fig. 3

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Description

[0001] The present invention concerns a dispenser with a braking mechanism for a paper roll, said dispenser having a frame with two flanges extending perpendicularly from a back of the dispenser and being provided with means in their outer portion for carrying a paper roll, said dispenser further being provided with a cutting drum mounted below and spaced from said paper roll, and with a braking means being spring loaded against the periphery of the paper roll and being controllably driven by movement of the cutting drum.

[0002] In the art there are known solutions wherein a braking means is forced to stop the rotation of a paper roll when the cutting roll has been rotated one revolution by coming into contact with one of the lateral sides of the roll.

[0003] According to EP 2364583 there is known an apparatus for dispensing a paper roll, said apparatus being provided with a braking device cooperating with a sensing means sensing the tightness of the paper between the paper roll and the dispensing device of the apparatus. In this apparatus the paper roll is allowed to rotate freely when the paper is tight and the braking device is activated when the paper is loosened. However the braking effect is not activated until the paper already has loosened.

[0004] According to US 6,196,102 B1 a dispensing apparatus is known being provided with a device for controlling the rotation of a paper roll comprising a shaped lever hinged at its base in opposition to a spring. The upper part of the lever is fitted with a support shaft supporting a pair of freely rotatable pulleys of different sizes. The smaller pulley is associated through a drive belt with a third further larger pulley at the end of the cutting drum, and the larger pulley at the end of the lever is forced into contact with the periphery of the paper roll. Because of the different sizes of the pulleys the peripheral speed of the paper roll seems to be different from the peripheral speed of the cutting drum. Because the lever is hinged in a point away from the central axis of the cutting drum the drive belt will slope when the diameter of the paper roll decreases.

[0005] The object of the present invention is to eliminate the above mentioned problems and to provide a more simple and precise construction. This is achieved with a dispensing device, characterized in that one of said flanges extends downwardly towards the cutting drum and carries a connection wheel being in continuous contact with the periphery of the cutting drum and that the periphery of said connection wheel is further in continuous contact with the braking means for transferring the exact movement of the cutting drum to the braking means transferring it further to the paper roll. By the arrangement the tightness of the paper web will continuously be constant. A considerable advantage of having a connection wheel instead of letting a drive belt run directly around the cutting drum is that there is no pressure on the bearings for the cutting drum caused by the tightness of the drive belt. Thereby the life time for the dispenser will be much longer.

[0006] According to a first embodiment of the invention said braking means is a brake wheel having a shaft arranged to slide along a straight slot in said flange and extending in radial direction towards the paper roll, said brake wheel is arranged to rest against the periphery of said connection wheel having a shaft being spring loaded to slide upwardly along an arcuate slot provided in said flange and extending concentrically to the cutting drum from one side upwardly towards bottom end of said straight slot and at a distance from the cutting drum maintaining continuous contact between the periphery of the connection wheel and the cutting drum in each position of the connection drum along said arcuate slot while forcing the brake wheel into contact with the periphery of the paper roll as long as there is any paper web left in said paper roll.

[0007] Said arcuate slot and said straight slot can be arranged in an downwardly and further substantially tangentially to the cutting drum extending branch of said flange, whereby the arcuate slot is arranged in the tangentially extending part of said branch.

[0008] In a second _embodiment of the invention an additional wheel having a shaft sliding in said straight slot is insertable either above or below said brake wheel, causing the paper roll to rotate in the same direction as the cutting drum. This may sometimes be a benefit if the paper in the roll is provided with prints on the paper or embossing/pattern in the paper.

[0009] According to a preferred embodiment the connection wheel is shaped as a teeth wheel being in tooth contact with a gear ring at the periphery of the cutting drum 3 or with a corresponding teeth wheel attached to said cutting drum. Hereby the resistance against the cutting drum will decrease. Due to the lower resistance the wear of the mechanism is much lower, so it will last longer.

[0010] In a further embodiment of the invention the braking means is an O-ring or a belt arranged to run around the connection wheel and around two stationary mounted pulleys on said flange, a first pulley above the paper roll in such a position that said O-ring or belt will always be in contact with the periphery of the paper roll at a portion between the connection wheel and said first pulley independently of the diameter of the paper roll and a second pulley close to the back of the dispenser at same level as the central axis of the paper roll, said flange further being provided with a straight slot between said two pulleys extending substantially radially away from the paper roll, said slot guiding a shaft of a further wheel being in contact with said O-ring or belt and being spring loaded in direction away from the paper roll in order to keep the O-ring or belt tight.

[0011] In the following the invention will be described more in detail with reference to the enclosed drawing, wherein

Fig. 1 shows a schematic side view of one embodi-

ment of a dispenser according to the invention provided with a full paper roll;
Fig. 2 shows the dispenser according to Fig. 1 when most of the paper in the roll has been dispensed;
Fig. 3 shows a perspective view of the dispenser in the situation according to Fig. 1,
Fig 4 shows a perspective view of the dispenser in the situation according to Fig. 2, Fig. 5 shows another embodiment of the dispenser,
Fig. 6 shows a schematic side view of a further embodiment of the dispenser according to the invention being provided with a full paper roll, and
Fig. 7 shows the dispenser of fig. 6 when most of the paper of the paper roll has been dispensed.

[0012] The dispenser shown in figures 1 to 4 comprises a frame with two flanges 1 extending perpendicularly from a back of the dispenser. The flanges 1 are provided with means for carrying a paper roll 2 in their upper portion. Below and spaced from the paper roll 2 a cutting drum 3 is mounted into the dispenser. The cutting drum 3 is provided with a longitudinally extending knife (not shown) reciprocating between an inner retracted position and an outer extracted position during each revolution of the cutting drum 3. One of said flanges 1 extends downwardly towards the cutting drum 3. Said flange 1 is provided with an arcuate slot 4 extending concentrically to the cutting drum 3 from one side of the cutting drum 3 upwardly. In the shown embodiment the arcuate slot 4 extends from rear side of the cutting drum 3 upwardly. Further the flange 1 is provided with a straight slot 5 extending from vicinity of upper end of said arcuate slot 4 in radial direction towards the central axis of the paper roll 2. A connecting wheel 6 has a shaft 6a arranged to slide along the arcuate slot 4 and being spring loaded towards upper end of said arcuate slot 4. The connecting wheel 6 is dimensioned to be continuously in contact with periphery of the cutting drum 3 in each of its positions along the arcuate slot 4. A brake wheel 7 having a shaft 7a sliding along the straight slot 5 is resting with its periphery against the periphery of said connection wheel 6. The spring loaded connection wheel 6 forces the brake wheel 7 into contact with the periphery of the paper roll 2 causing the paper roll 2 to exactly and simultaneously follow each movement of the cutting drum 3.

[0013] In the shown embodiment the arcuate slot 4 and the straight slot 5 are arranged in a downwardly and further backwardly and substantially tangentially to the cutting drum 3 extending branch 1a of said flange 1. This is the case when the connection wheel 6 is arranged at the rear side of cutting drum 3.

[0014] In fig. 5 another embodiment of the invention is shown. In this embodiment an additional wheel 8 is provided having a shaft 8a sliding in said straight slot 5 either above or below said brake wheel 7. The periphery of said additional wheel 8 is either in contact with the periphery of the brake wheel 7 and the paper roll 2 or with the periphery of the connection wheel 6 and the brake wheel 7. By this arrangement the paper roll 2 can be turned around 180° compared to the embodiment according to fig. 1 to 4, whereby the roll will be unrolled counter clockwise on dispensing a paper sheet and the surface of the paper facing outward in the roll will be in contact with the cutting drum, which sometimes is a benefit due to prints on the paper or embossing/pattern in the paper.

[0015] In the dispenser according to the invention the paper is led from the paper roll 2 around a press roll 9 being in contact with the cutting drum 3 and then around the cutting roll 3 out through the dispensing opening 10 of the dispenser. When a user pulls the end of the paper hanging out of the dispenser opening 10 the cutting drum 3 will rotate counterclockwise one revolution, as indicated with arrow a, whereby a sheet of predetermined size is cut from the paper roll 2 When the cutting roll 3 stops a equally long end of paper will hang out of the dispenser opening 10. Due to the cooperation of the cutting drum 3 the connection wheel 6, the brake wheel 7and the paper roll 2 in the embodiment according to fig. 1 to 4 (as shown by arrows), said paper roll 2 will rotate exactly so much that a length of one sheet of paper is unrolled from the paper roll 2 and will stop immediately when the cutting drum 3 stops. In the embodiment according to fig. 5 also the additional wheel 8 will cooperate to start and stop the rotation of the paper roll 2 exactly in conformity with the cutting roll 3 maintaining a constant tension in the paper web led through the dispenser.

[0016] In the embodiment shown in figures 6 and 7 the braking means 7 is an O-ring or a belt arranged to run around the connection wheel 6 and around two stationary mounted pulleys 11, 12 on said flange 1. A first pulley 11 is mounted above the paper roll 2 in such a position that said O-ring or belt 7 will always be in contact with the periphery of the paper roll 2 at a portion between the connection wheel 6 and said first pulley 11 independently of the diameter of the paper roll 2. A second pulley 12 is mounted close to the back of the dispenser at same level as the central axis of the paper roll 2. The flange 1 is further provided with a straight slot 13 between said two pulleys 11,12, which slot 13 extends substantially radially away from the paper roll 2. Said slot 13 is intended to guid a shaft of a further wheel 14 being in contact with said O-ring or belt 7 and being spring loaded in direction away from the paper roll 2 in order to keep the O-ring or belt 7 tight.

Claims

1. Dispenser with a braking mechanism for a paper roll (2), said dispenser having a frame with two flanges (1) extending perpendicularly from a back of the dispenser and being provided with means in their outer portion for carrying a paper roll (2), said dispenser further being provided with a cutting drum (3)mounted below and spaced from said paper roll (2) and with a braking means (7) being spring loaded against

the periphery of the paper roll (2) and being controllably driven by movement of the cutting drum ((3), **characterized in that** one of said flanges (1) extends downwardly towards the cutting drum (3) and carries a connection wheel (6) being in continuous contact with the periphery of the cutting drum (3) and that the periphery of said connection wheel (6) is further in continuous contact with the braking means (7) for transferring the exact movement of the cutting drum (3) to the braking means (7) transferring it further to the paper roll (2).

2. Dispenser according to claim 1, **characterized in that** said braking means (7) is a brake wheel having a shaft (7a) arranged to slide along a straight slot (5) in said flange (1) and extending in radial direction towards the paper roll (2), said brake wheel is arranged to rest against the periphery of said connection wheel (6) having a shaft (6a) being spring loaded to slide upwardly along an arcuate slot (4) provided in said flange (1) and extending concentrically to the cutting drum (3) from one side upwardly towards bottom end of said straight slot (5) and at a distance from the cutting drum (3) maintaining continuous contact between the periphery of the connection wheel (6) and the cutting drum (3) in each position of the connection drum (6) along said arcuate slot (5) while forcing the brake wheel (7) into contact with the periphery of the paper roll (2) as long as there is any paper web left in said paper roll (2).

3. Dispenser according to claim 2, **characterized in that** said arcuate slot (4) and said straight slot (5) are arranged in an downwardly and further substantially tangentially to the cutting drum (3) extending branch (1a) of said flange (1).

4. Dispenser according to claim 2, **characterized in that** an additional wheel (8) having a shaft (8a) sliding in said straight slot (5) either above or below said brake wheel (7), causes the paper roll (2) to rotate in the same direction as the cutting drum (3).

5. Dispenser according to any of the preceding claims, **characterized in that** the connection wheel (6) is shaped as a teeth wheel being in tooth contact with a gear ring at the periphery of the cutting drum (3) or with a corresponding teeth wheel attached to the cutting drum (3).

6. Dispenser according to claim 1, **characterized in that** the braking means (7) is an O-ring or a belt arranged to run around the connection wheel (6) and around two stationary mounted pulleys (11,12) on said flange (1), a first pulley (11) above the paper roll (2) in such a position that said O-ring or belt (7) will always be in contact with the periphery of the paper roll (2) at a portion between the connection wheel (6) and said first pulley (11) independently of the diameter of the paper roll and a second pulley (12) close to the back of the dispenser at same level as the central axis of the paper roll (2), said flange (1) further being provided with a straight slot (13) between said two pulleys (11, 12) extending substantially radially away from the paper roll (2), said slot (13) guiding a shaft of a further wheel (14) being in contact with said O-ring or belt (7) and being spring loaded in direction away from the paper roll (2) in order to keep the O-ring or belt (7) tight.

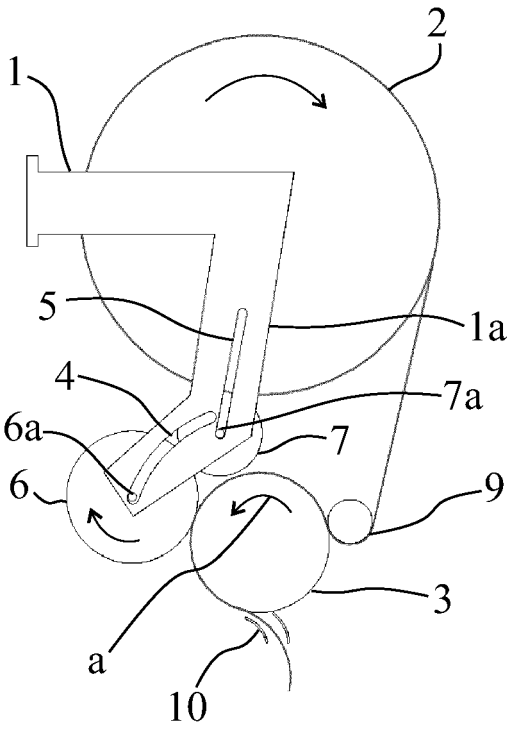

Fig. 1

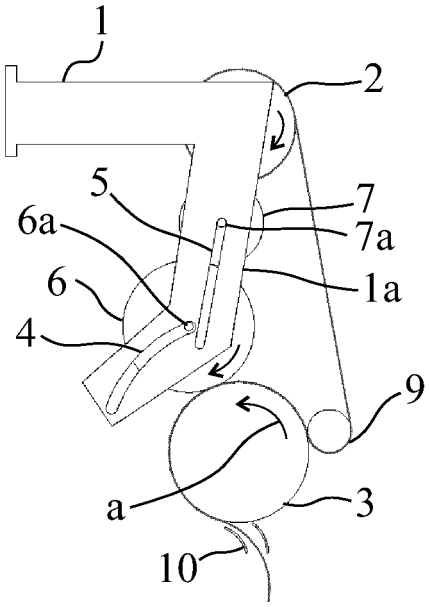

Fig. 2

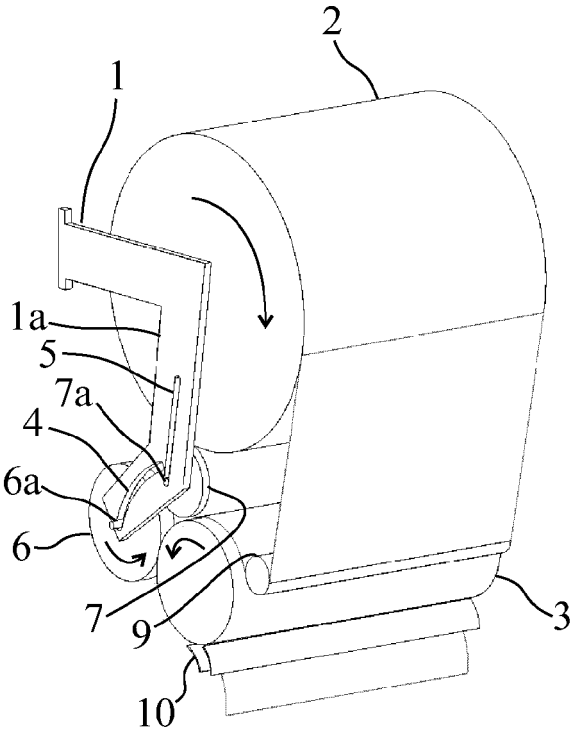

Fig. 3

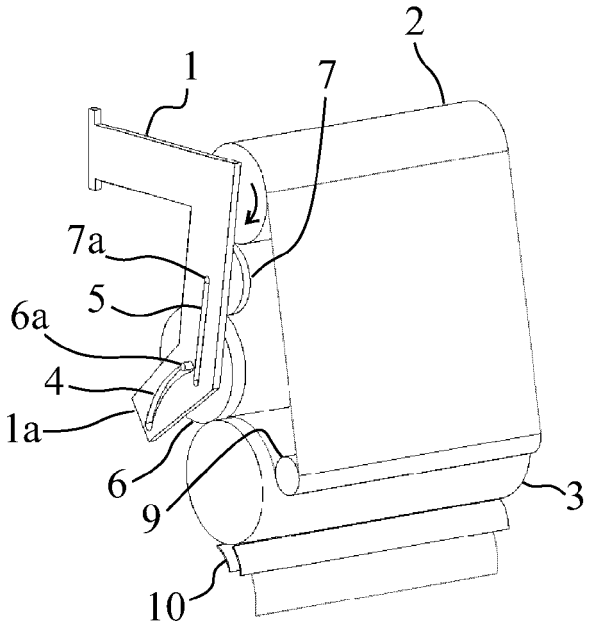

Fig. 4

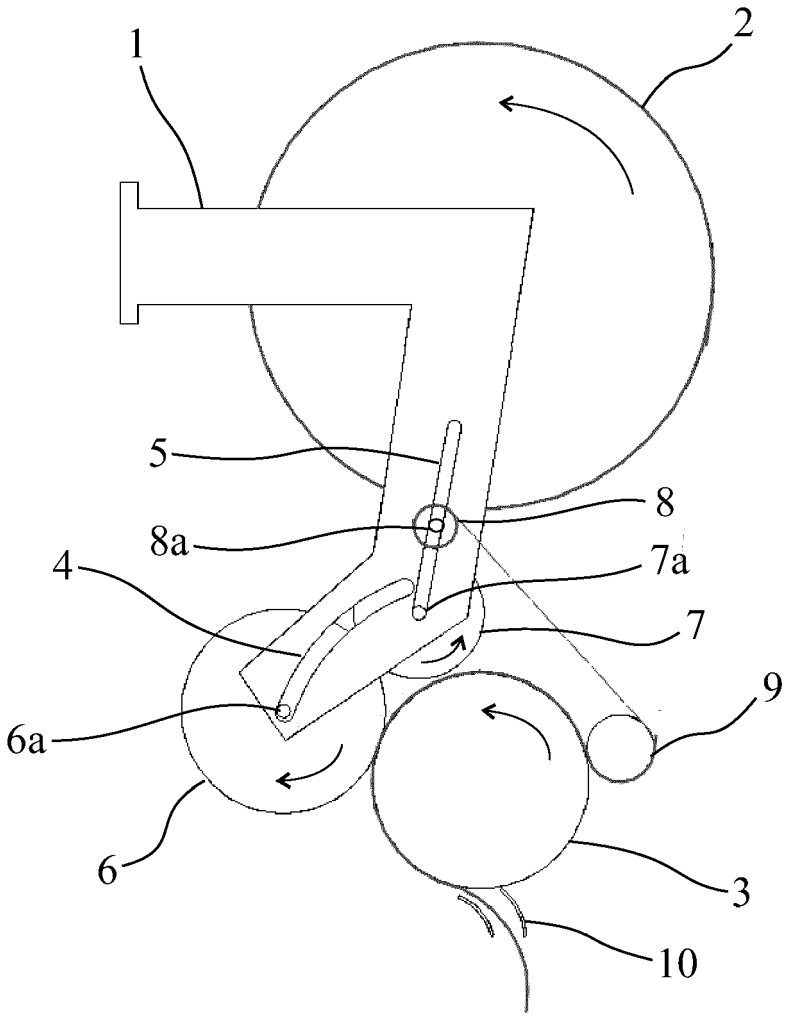

Fig. 5

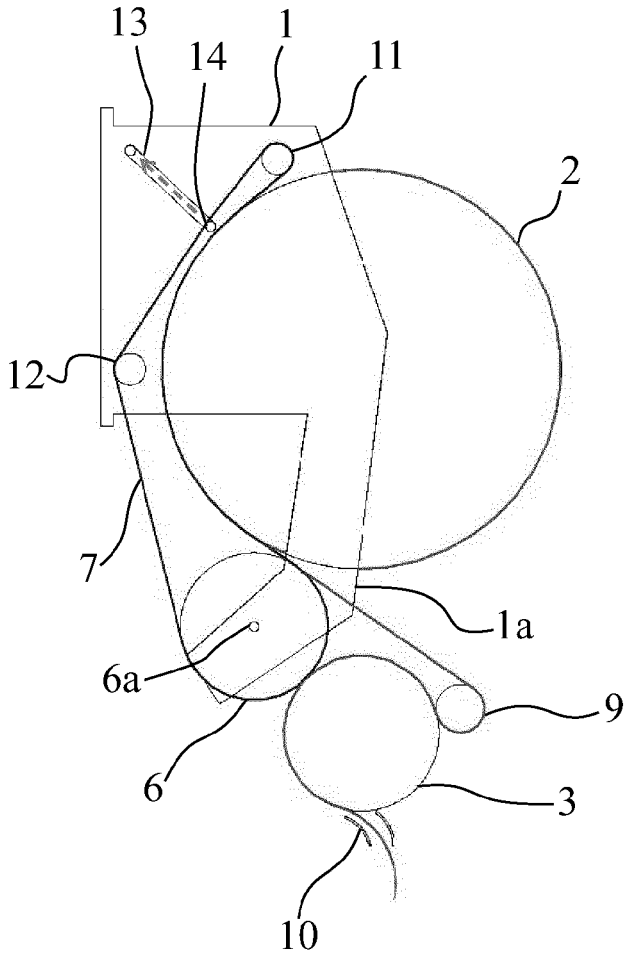

Fig. 6

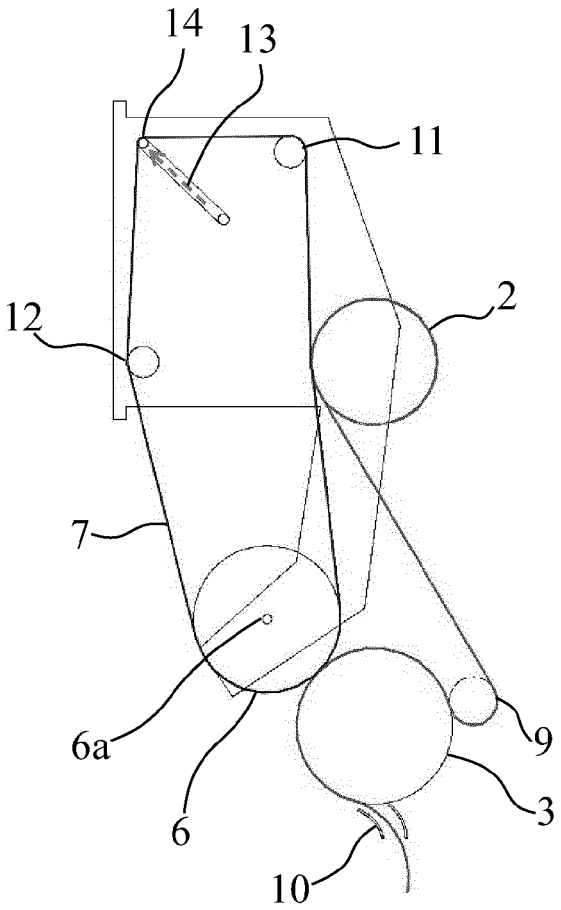

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 11 39 7529

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 870 702 A1 (GRANGER MAURICE [FR]) 2 December 2005 (2005-12-02) * page 5, paragraph 5 - page 10, paragraph 1; figure 7 * -----	1,5	INV. A47K10/36
A,D	US 6 196 102 B1 (GRANGER MAURICE [FR]) 6 March 2001 (2001-03-06) * the whole document * -----	1	
A	EP 0 762 190 A2 (NORITSU KOKI CO LTD [JP]) 12 March 1997 (1997-03-12) * column 3, line 41 - column 5, line 43; figures 3,5 * -----	1,4	

TECHNICAL FIELDS SEARCHED (IPC)

A47K

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	26 March 2012	Fordham, Alan

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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- US 6196102 B1 **[0004]**