



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
23.05.2007 Bulletin 2007/21

(51) Int Cl.:
B65H 19/12 (2006.01)

(21) Application number: **06124355.6**

(22) Date of filing: **17.11.2006**

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

(72) Inventor: **Percivalle, Domenico**
15030 Rosignano Monferrato (IT)

(74) Representative: **Jorio, Paolo et al**
Studio Torta S.r.l.
Via Viotti, 9
10121 Torino (IT)

(30) Priority: **18.11.2005 IT MI20052208**

(71) Applicant: **PERCIVALLE SPECIAL CONVERTING S.A.S. DI PERCIVALLE BARBARA E.C.**
15030 ROSIGNANO MONFERRATO (IT)

(54) **Device for changing reels on a winding or unwinding unit**

(57) A device (1) for changing reels (2) on a winding or unwinding unit (3), in particular of a printing press or a machine for transforming or processing strips of paper, plastic film, metal, etc., has a first and a second reel-carrier assembly (11, 12) having supports for supporting the reels (2) and defining respective reel support axes (A); and an actuating system (13) for alternatively moving the reel-carrier assemblies into a work position and a loading position along a predetermined path (14); the ac-

tuating system (13) is designed to translate the reel-carrier assemblies (11, 12) with respect to each other between the work position and the loading position in a translation direction (D) in one or more translation planes, and to part the reel-carrier assemblies (11, 12) in different directions, e.g. in a direction substantially perpendicular or crosswise to the translation direction (D), to prevent interference between the reel-carrier assemblies (11, 12) as they move in the translation direction (D).

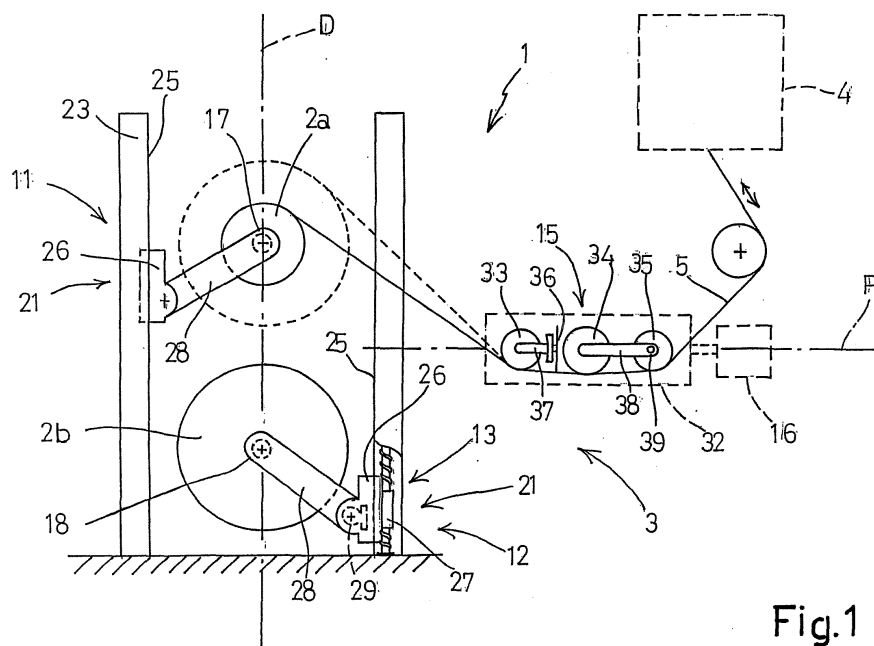


Fig.1

Description

[0001] The present invention relates to a device for changing reels on a winding or unwinding unit, in particular of a printing press or a machine for transforming or processing strips of paper, plastic film, metal, etc.

[0002] Numerous industries, such as printing, for example, are known to employ continuously-operating machines having a reel-unwinding unit, from which strip material for processing (e.g. printing) on the machine is unwound; and a winding unit, on which the strip material is rewound into reels.

[0003] To avoid shutting down the machine to change the reels, the winding and unwinding units are equipped with fast reel-change devices having reel-carrier assemblies movable between a work position and a loading position. One particular type of reel-change device (used on both winding and unwinding units) is known, in which two reel-carrier assemblies, having reel supports defining respective reel support axes, are fitted to respective rotating arms, which are rotated alternatively into a loading position and a work position about a central axis parallel to the reel support axes.

[0004] Known devices of the above type are not without drawbacks. Firstly, they are relatively bulky, on account of the space required to rotate the reel-carrier assemblies. And, secondly, they are relatively complicated to produce and operate, and not altogether satisfactory in terms of efficiency.

[0005] It is therefore an object of the present invention to provide a device for changing reels on a winding or unwinding unit, in particular of a printing press, designed to eliminate the aforementioned drawbacks of the known art. More specifically, it is an object of the invention to provide a device that is extremely compact, while at the same time being fully efficient and cheap and easy to produce and run.

[0006] According to the present invention, there is provided a device for changing reels on a winding or unwinding unit, in particular of a printing press or a machine for transforming or processing strips of paper, plastic film, metal, etc., as defined in the accompanying Claim 1 and in the dependent Claims as regards other preferred characteristics.

[0007] By virtue of the characteristics claimed, the device according to the invention is considerably more compact than known devices, and at the same time is highly efficient, provides for fast reel change, and is cheap and easy to produce and run.

[0008] A number of non-limiting embodiments of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a schematic side view of a device for changing reels on a winding or unwinding unit in accordance with the invention and shown in a first operating position;

Figure 2 shows a schematic side view of the Figure

1 device in a second operating position;

Figure 3 shows a schematic top plan view, with parts removed for clarity, of the Figure 1 device in a further operating position;

Figure 4 shows a schematic partial side view of a variation of the Figure 1 device;

Figure 5 shows a top plan view of the Figure 4 variation;

Figure 6 shows a schematic partial side view of a further variation of the Figure 1 device.

[0009] Number 1 in Figures 1 to 3 indicates as a whole a device for changing reels 2 on a winding or unwinding unit 3 of a machine 4 (known and only shown schematically in Figure 1) for continuously processing strip material 5, e.g. a printing press or a machine for transforming or processing strips of paper, plastic film, metal, etc. Though reference is made in the following description to an unwinding unit 3, i.e. in which strip material 5 is unwound off reels 2 for supply to machine 4, it is understood that device 1 also applies to an identical winding unit 3, in which strip material 5 coming off machine 4 is wound into reels 2.

[0010] Device 1 comprises at least one pair of reel-carrier assemblies 11, 12; an actuating system 13 for moving reel-carrier assemblies 11, 12 alternatively into a work position and a loading position along a predetermined path 14; a movable glue-and-cut assembly 15; and an activating system 16 for moving assembly 15 so that assembly 15 cooperates alternatively with reel-carrier assemblies 11, 12. In Figures 1 and 2, one reel 2a is in the work position to feed strip material 5 to machine 4, and one reel 2b is in the loading position, not supplying machine 4.

[0011] Reel-carrier assemblies 11, 12 comprise respective pairs of supports 17, 18 for supporting reels 2 and defining support axes A of reels 2. Supports 17, 18 are substantially known, and, in the Figure 1-3 example, are of the type supporting a shaft 19 inserted through the reel. Other types of supports 17, 18, however, may be used, e.g. comprising hubs, possibly retractable, which project from the supports to engage opposite ends of the reel. Supports 17, 18 may, obviously, support reels with or without central cores. It is understood that each reel-carrier assembly 11, 12 may have only one support 17, 18, by which reels 2 are supported and project along axes A. Supports 17, 18 are powered in known manner, not shown for the sake of simplicity, to rotate reels 2 at a desired speed about axes A.

[0012] System 13 comprises first actuating means 21 for translating reel-carrier assemblies 11, 12 with respect to each other between the work position and the loading position in a translation direction D; and second actuating means 22 for parting reel-carrier assemblies 11, 12 in a direction substantially crosswise to translation direction D, and in such a manner that supports 17 of reel-carrier assembly 11 are offset with respect to supports 17 of reel-carrier assembly 12 in translation direction D.

[0013] More specifically, system 13 comprises a supporting frame 23 having, for example, two pairs of up-rights 24 with guides 25; and reel-carrier assemblies 11, 12 comprise respective pairs of slides 26 located side by side parallel to axes A, and mounted to run along guides 25 and therefore in respective travelling planes parallel to each other. Slides 26 are moved along guides 25 by known motors, not shown, and by means of known actuating members 27 only shown schematically in Figure 1 (e.g. by means of a worm or rack system, or other known system). A movable arm 28 projects from each slide 26, is hinged to slide 26 to rotate about an axis of rotation parallel to axes A, and is activated by a known actuating member 29 fitted to slide 26 and only shown schematically in Figure 1. Supports 17, 18 are located at respective free ends of arms 28.

[0014] First actuating means 21 - comprising slides 26 moving along guides 25, and relative actuating members 27- provide for translating reel-carrier assemblies 11, 12 so that respective support axes A of reels 2 translate in one or more translation planes. In the Figure 1-3 example, reel-carrier assemblies 11, 12 being superimposed and aligned in translation direction D, axes A translate substantially in a common translation plane in translation direction D.

[0015] Second actuating means 22 - comprising arms 28 and relative actuating members 29 - provide for rotating supports 17, 18 and so withdrawing supports 17 of reel-carrier assembly 11 from supports 18 of reel-carrier assembly 12 transversely with respect to translation direction D.

[0016] Glue-and-cut assembly 15 comprises a movable structure 32 supporting a number of rollers 33, 34, 35 parallel to axes A and lying substantially in a common plane P; roller 33 supports a longitudinal knife 36 activated by a known actuator 37; and roller 34 is hinged by end arms 38 to roller 35, and is activated by a known actuator 39 so as to be positioned alternatively above and below plane P.

[0017] Activating system 16, only shown schematically in Figure 1, is of any known type for translating structure 32 and, hence, assembly 15 along plane P and in a direction substantially perpendicular to translation direction D to insert assembly 15 between reel-carrier assemblies 11, 12, along path 14 and intersecting translation direction D. More specifically, activating system 16 provides for selectively moving assembly 15 into a rest position (Figure 1), in which assembly 15 is located outwards of path 14, and a change position (Figure 2), in which assembly 15 is interposed between reel-carrier assemblies 11, 12 along path 14 and, more specifically, in translation direction D.

[0018] Device 1 operates as follows.

[0019] As shown in Figure 1, strip material 5 is unwound off reel 2a in the work position, and, guided by rollers 33, 34, 35 of assembly 15 (in the rest position), is fed to machine 4. When reel 2a is about to run out, the replacement reel 2b is set to the loading position.

[0020] Assembly 15 is moved by activating system 16 from the rest position to the change position, as shown in Figure 2. One end 41 of reel 2b has a strip of adhesive 42; and powered supports 18 rotate reel 2b synchronously with rotation of the running-out reel 2a.

[0021] Roller 34 is then lowered by actuator 39 to press the strip material 5 from the running-out reel 2a onto the replacement reel 2b and so glue together the strip materials 5 of the two reels 2; and knife 36, activated by actuator 37, cuts the strip of reel 2a.

[0022] Reel 2a is removed from supports 17 together with shaft 19. If there is no shaft 19, the reel-carrier hubs are retracted to release supports 17 and clear the space between them. In the meantime, assembly 15 is restored to the work position. By rotating arms 28 of supports 17 by means of actuating members 29, supports 17 of reel-carrier assembly 11 are withdrawn from supports 18 of reel-carrier assembly 12 (Figure 2), so that support axes A of reels 2 are offset and lie in two parallel planes, thus preventing interference between reel-carrier assemblies 11, 12 as they move in translation direction D. Reel-carrier assembly 12 then translates upwards into the work position, while reel-carrier assembly 11 translates downwards; and, finally, arms 28 of reel-carrier assembly 11 are rotated to move supports 17 into the loading position, ready to receive a new reel.

[0023] In the Figure 4-5 variation, in which details similar or identical to those already described are indicated using the same reference numbers, reel-carrier assemblies 11, 12 are again mounted on slides 26 running along guides 25 defining respective parallel planes; and first actuating means 21 therefore again provide for translating reel-carrier assemblies 11, 12 so that respective support axes A of reels 2 translate parallel to each other in translation direction D and, in particular, in a common plane or in respective parallel planes.

[0024] Second actuating means 22, on the other hand, are designed in this case to move supports 17, 18 along reel support axes A, and comprise movable carriages 45 fitted to slides 26 and which run along rails 46 formed transversely on slides 26 in a direction substantially perpendicular to guides 25 and axes A. For the sake of simplicity, the actuating members moving slides 26 and carriages 45 are not shown in Figures 4-5.

[0025] In the Figure 6 variation, second actuating means 22 provide for withdrawing supports 17 of reel-carrier assembly 11 frontally from supports 18 of reel-carrier assembly 12; in which case, supports 17, 18 are mounted on telescopic mechanisms 47 fitted to slides 26 to translate supports 17, 18 in a direction substantially perpendicular to translation direction D and axes A. For the sake of simplicity, the actuating members of telescopic mechanisms 47 are not shown.

[0026] Clearly, other changes may be made to the device as described and illustrated herein without, however, departing from the scope of the accompanying Claims.

[0027] For example, first actuating means 21 may provide for translating reel-carrier assemblies 11, 12 so that

respective support axes A of reels 2 translate in respective planes sloping with respect to each other, as opposed to a common plane or respective parallel planes.

[0028] Second actuating means 22 may be designed to move supports 17, 18 differently from the manner described, e.g. by translating or rotating the pairs of uprights 24 with respect to each other, as opposed to only translating or rotating supports 17, 18. Moreover, as opposed to being superimposed vertically, reel-carrier assemblies 11, 12 may be arranged side by side horizontally or otherwise; and all the movements described may be combined.

Claims

1. A device (1) for changing reels (2) on a winding or unwinding unit (3), comprising at least a first and a second reel-carrier assembly (11, 12) having supports for supporting the reels (2) and defining respective reel support axes (A); and an actuating system (13) for moving the reel-carrier assemblies; the device being **characterized by** comprising first actuating means (21) for moving the reel-carrier assemblies (11, 12) with respect to each other so that said axes (A) translate in a translation direction (D).
2. A device as claimed in Claim 1, **characterized by** comprising a glue-and-cut assembly (15) cooperating alternatively with the reel-carrier assemblies (11, 12) and movable for insertion between said axes (A).
3. A device as claimed in Claim 2, **characterized by** comprising an activating system (16) for activating the glue-and-cut assembly (15) and selectively interposing the glue-and-cut assembly (15) between the reel-carrier assemblies (11, 12) in the translation direction (D).
4. A device as claimed in Claim 3, **characterized in that** said activating system (16) translates the glue-and-cut assembly (15) in a direction substantially perpendicular to the translation direction (D).
5. A device as claimed in one of the foregoing Claims, **characterized in that** the actuating system (13) provides for alternatively moving the reel-carrier assemblies into a work position and a loading position along a predetermined path (14); and said first actuating means (21) provide for translating the reel-carrier assemblies (11, 12) with respect to each other between the work position and the loading position in said translation direction (D).
6. A device as claimed in one of the foregoing Claims, **characterized in that** the first actuating means (21) provide for translating the reel-carrier assemblies (11, 12) so that the respective reel support axes (A) translate in one or more translation planes.
7. A device as claimed in one of the foregoing Claims, **characterized by** comprising second actuating means (22) for parting the reel-carrier assemblies (11, 12) in a direction substantially crosswise to the translation direction (D).
8. A device as claimed in Claim 7, **characterized in that** the second actuating means (22) provide for withdrawing the supports (17) of the first reel-carrier assembly (11) from the supports (18) of the second reel-carrier assembly (12) in a direction substantially crosswise to the translation direction (D), so that the supports (17, 18) of the reel-carrier assemblies (11, 12) are offset in the translation direction (D).
9. A device as claimed in Claim 7 or 8, **characterized in that** the second actuating means (22) provide for moving the supports (17, 18) of the reel-carrier assemblies (11, 12) along the support axes (A) of the reels (2).
10. A device as claimed in Claim 7 or 8, **characterized in that** the second actuating means (22) provide for moving the supports (17, 18) of the reel-carrier assemblies (11, 12) radially with respect to the translation direction (D).
11. A device as claimed in one of the foregoing Claims, **characterized in that** the first actuating means (21) comprise respective slides (26) running in respective translation planes.
12. A device as claimed in one of the foregoing Claims, **characterized in that** the first actuating means (21) provide for translating the reel-carrier assemblies (11, 12) so that the respective support axes (A) of the reels (2) translate in a common plane, or in respective parallel planes, or in respective planes sloping with respect to each other.

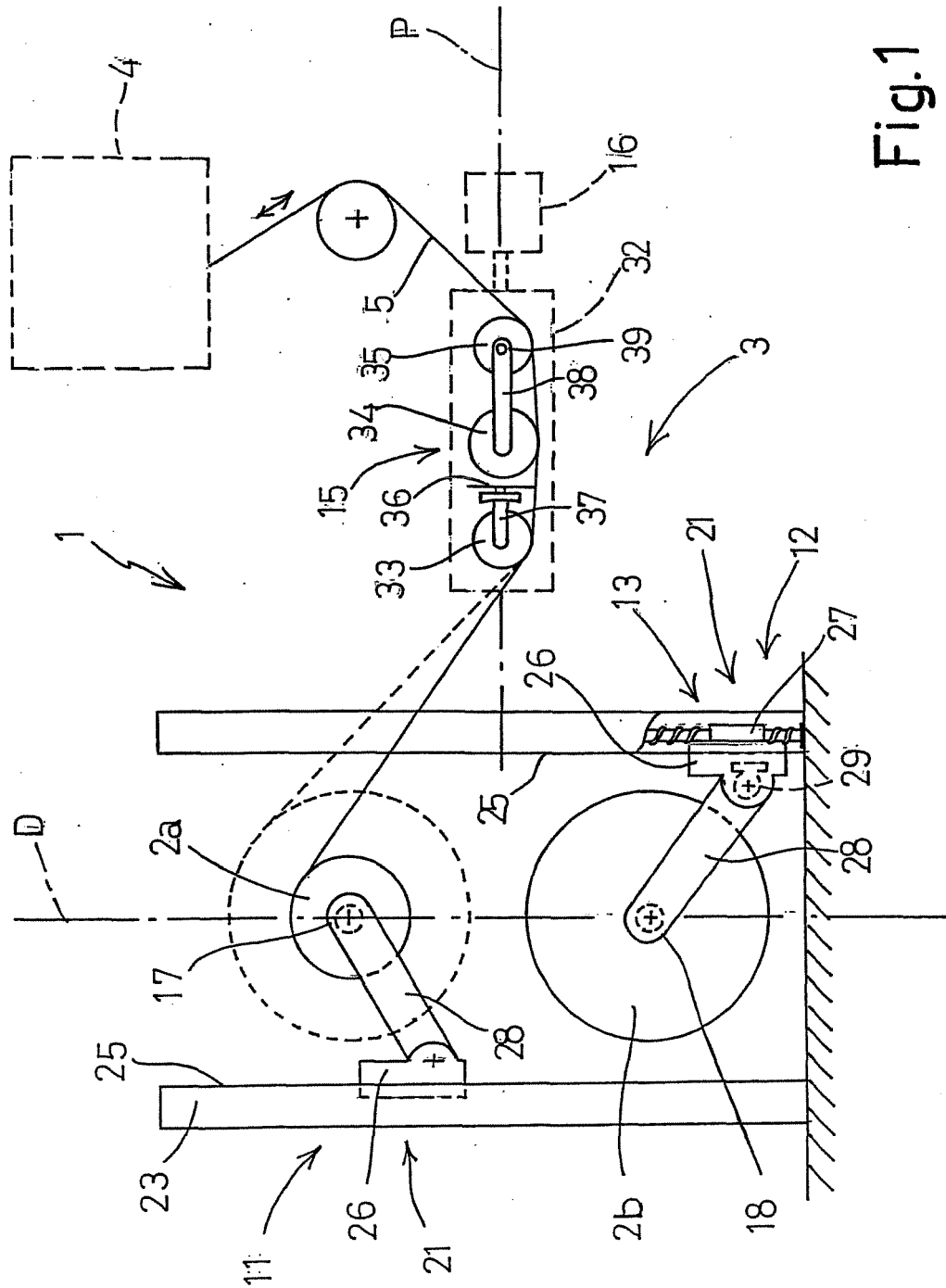


Fig.1

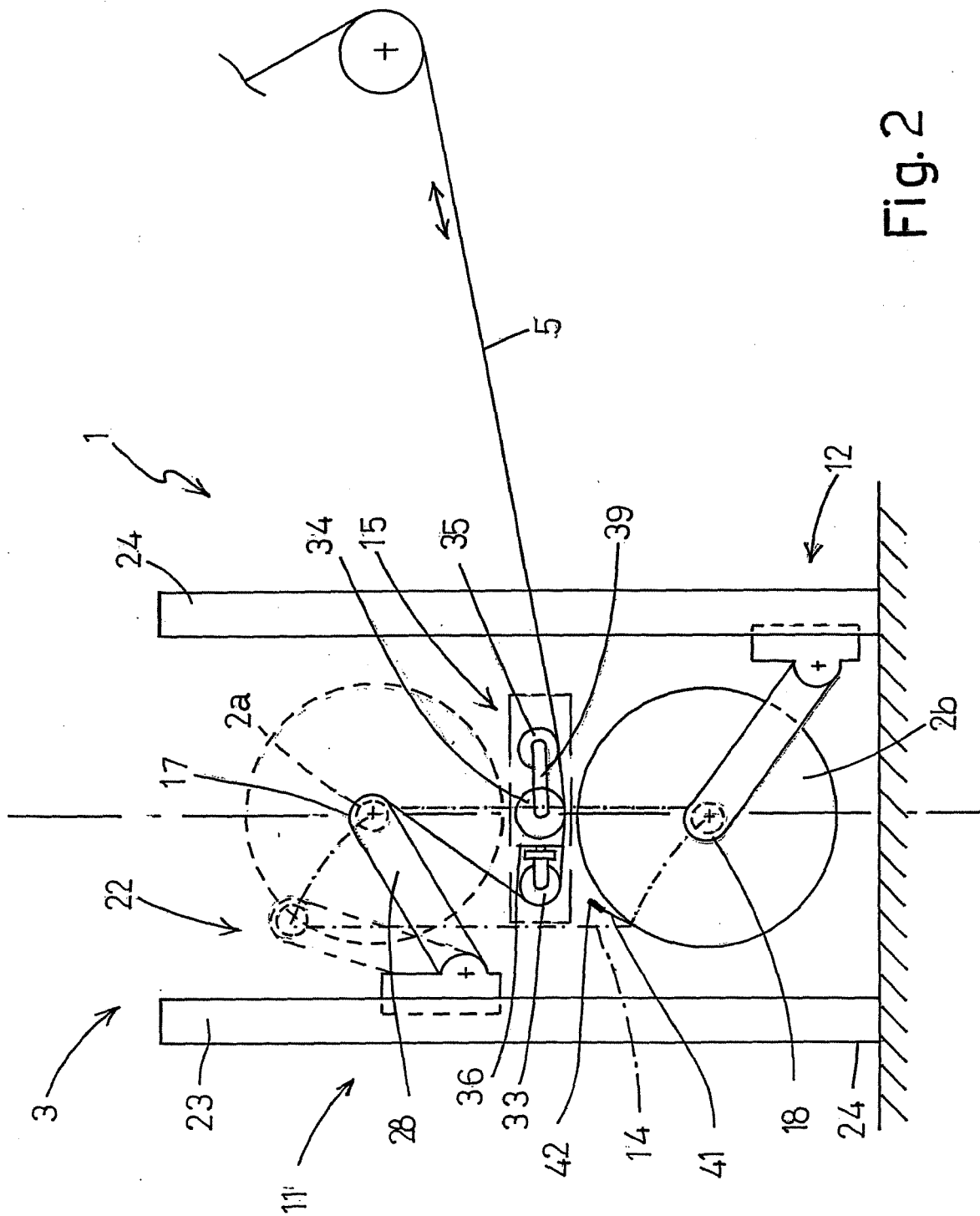


Fig. 2

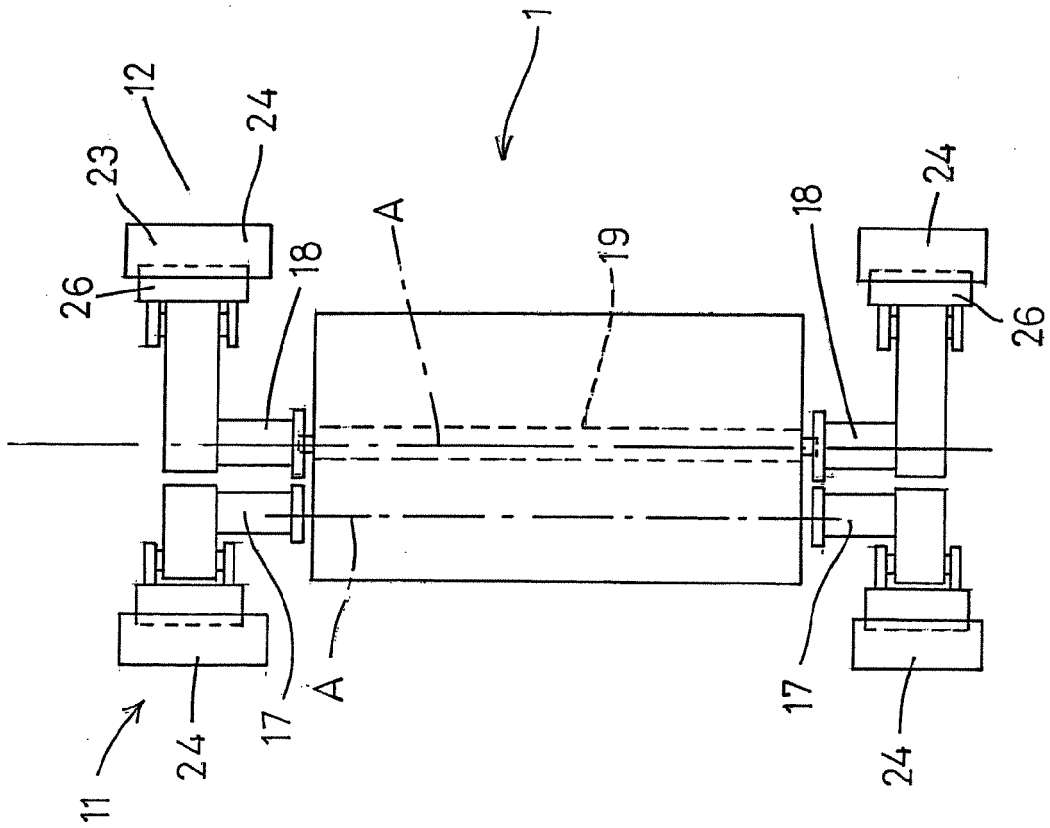


Fig. 3

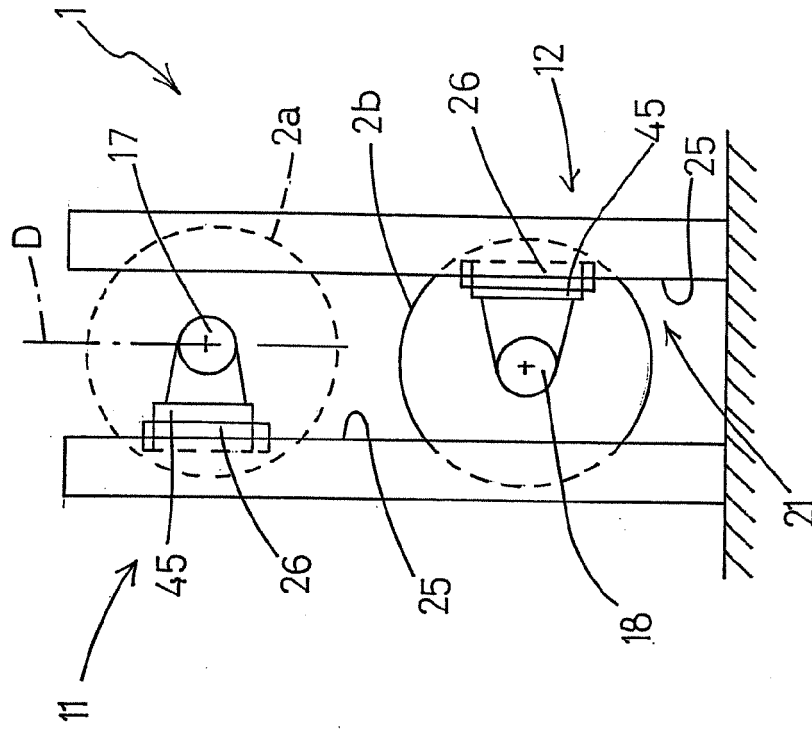
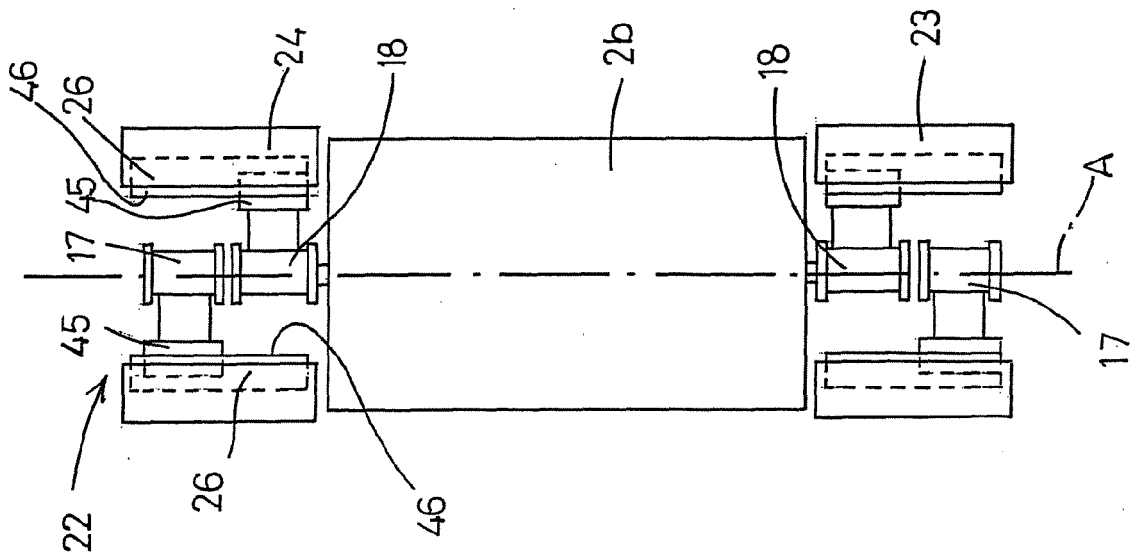
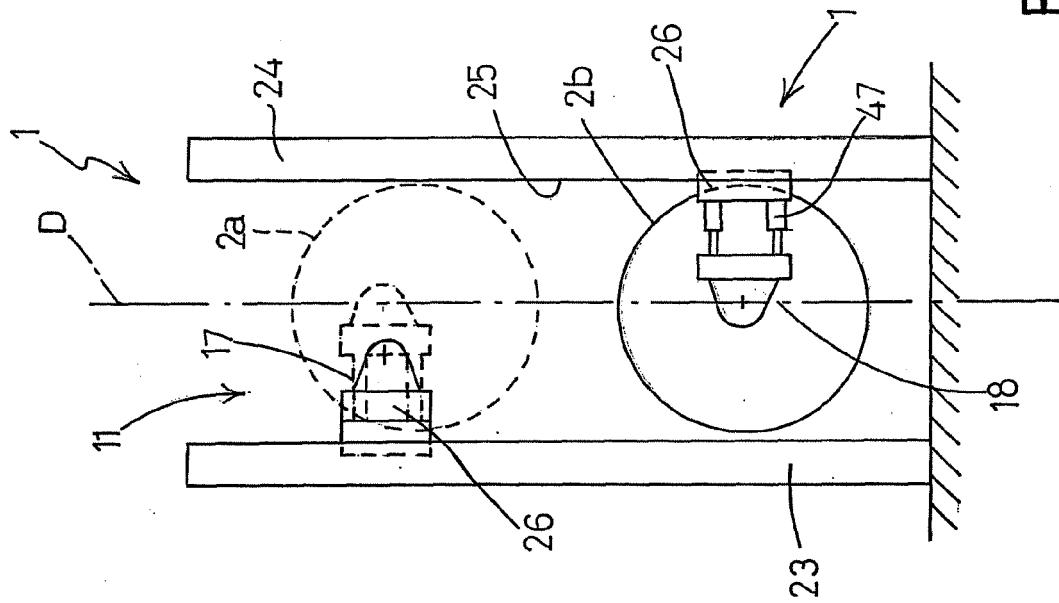


Fig. 4





DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
P,X	EP 1 647 508 A (FOSBER SPA [IT]) 19 April 2006 (2006-04-19) * paragraph [0040] - paragraph [0052]; figures 1-4 *	1,5-7, 11,12	INV. B65H19/12
X	----- EP 1 348 658 A1 (FOSBER SPA [IT]) 1 October 2003 (2003-10-01) * paragraph [0034] - paragraph [0044]; figures 1,4 *	1,5-7, 11,12	
X	----- US 5 697 575 A1 (MOORE CHESTER W [US] ET AL) 16 December 1997 (1997-12-16) * column 3, line 10 - column 7, line 27; figures 1-3 *	1,2,5,6, 11,12	
X	----- US 6 042 047 A1 (THIEVESSEN KARL [DE]) 28 March 2000 (2000-03-28) * column 2, line 41 - column 3, line 30; figures 2,3 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65H
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 21 February 2007	Examiner Fachin, Fabiano
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 12 4355

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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21-02-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1647508	A	19-04-2006	NONE
EP 1348658	A1	01-10-2003	AT 325765 T 15-06-2006 ES 2261624 T3 16-11-2006
US 5697575	A1	NONE	
US 6042047	A1	NONE	