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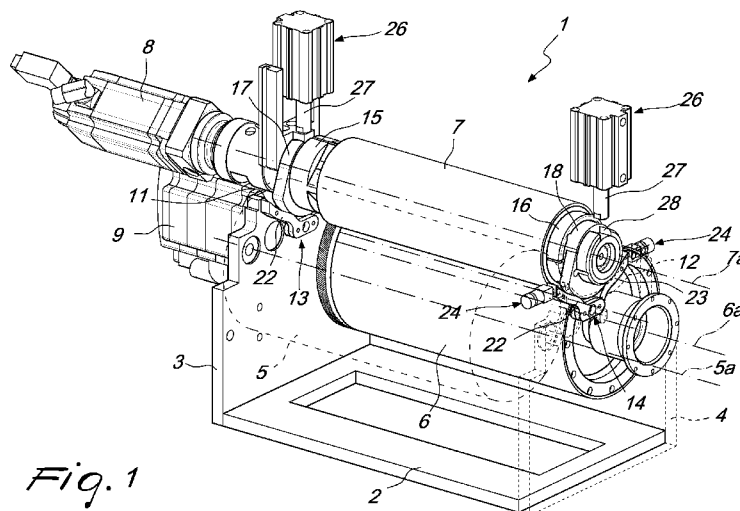


Fig. 1

(57) Abstract: A printing assembly (1), particularly for flexographic prints with removable printing roller, comprising at least two lateral uprights (3, 4) which face each other, each one defining a lateral cradle (11, 12) for supporting a motorized spindle (10) that supports a printing roller (7), each one of the lateral cradles (11, 12) comprising, at an upper portion thereof, at least one pair of supporting arms (13, 14) associable with the ends (10a, 10b) of the motorized spindle (10) protruding from the printing roller (7), for each one of the protruding ends (10a, 10b), a collar element (15, 16) being provided which is keyable onto the corresponding protruding end (10a, 10b) and associated rotatably with a flanged element (17, 18) that can be arranged to rest on a respective pair of supporting arms (13, 14) and engageable with locking means (26) of the printing assembly (1) for the retention of the flanged elements (17, 18) to rest on the pairs of supporting arms (13, 14), the collar elements (15, 16) being integral with the printing roller (7) for their removal together with the printing roller (7) from the motorized spindle (10).

A PRINTING ASSEMBLY, PARTICULARLY FOR FLEXOGRAPHIC PRINTS WITH REMOVABLE PRINTING ROLLER

Technical Field

The present invention relates to an improved printing assembly,
5 particularly for flexographic prints with removable printing roller. More specifically, the invention relates to a flexographic printing assembly with a printing roller that is easy to remove from its seat and simple to lock in its seat.

Background art

10 Conventional printing assemblies, for example flexographic printing presses, are provided with a plurality of cylinders, of which a first cylinder, known as the inking cylinder, is designed to be immersed in a basin of ink (not shown), in order to take on some ink, a second cylinder around which paper is rolled onto which the printing is to be executed and a third cylinder,
15 known as the printing roller, which carries the print to be made on paper or other medium and against which both the first cylinder and the second cylinder are abutted in order to transfer the ink taken on by the first cylinder to the paper rolled around the second cylinder according to the print characters carried on the printing roller.

20 Finally, there is generally a fourth cylinder arranged downstream of the printing roller which pulls the printed paper from one printing assembly to a subsequent printing assembly, or which pulls the paper out at the end of the print cycle.

The printing roller requires frequent substitution operations in order
25 to move from one diameter to another, according to the type of printing that needs to be performed.

Changing the printing roller usually requires time, since it is necessary to release the cylinder from its seat and then remove it.

Such operations are difficult for configuring the printing assembly,
30 and when a plurality of print cylinders have to be substituted, this difficulty

means that substitution times are lengthy, for example in the case of a plurality of printing assemblies arranged in series.

Moreover, the printing roller must be adjusted in its position with respect to the cylinder on which the print characters are carried and which is
5 then positioned in abutment against the printing roller.

In order to overcome these difficulties, printing assemblies have been devised with printing rollers with simplified removal and release. Such printing assemblies are constituted by a supporting framework for print cylinders comprising a pair of outer shoulders forming an adjustable cradle
10 for supporting the printing roller, inside which a spindle is inserted that has, at at least one of its ends, a flanged element rotatably associated with the spindle and a collar element keyable onto the spindle so as to axially couple the flanged element onto the spindle supporting the cylinder.

Moreover, means for locking the printing roller are provided, which
15 consist substantially of a locking tongue protruding from one of the two lateral shoulders, in a direction parallel to the axis of the printing roller, so as to block the rotations of the flanged element.

When changing the printing roller, the two locking tongues are retracted, thus freeing the two flanged elements so as to vertically remove
20 the spindle supporting the printing roller from the printing assembly.

Subsequently, by removing each collar element and subsequently removing each flanged element from the spindle, it is possible to extract the spindle from the printing roller to be changed and insert it into a new one for a new print cycle.

25 Other printing assemblies, with printing rollers with simplified removal and release, have been devised and are also constituted by a supporting framework for print cylinders comprising a pair of outer shoulders forming an adjustable cradle for supporting the printing roller, inside which a spindle is inserted.

30 More specifically, a collar is rotatably fitted onto the spindle and rests

on the adjustable cradle at at least one of the ends of the spindle. Moreover, a C-shaped element is placed above the spindle at the collar so as to lock the spindle in place.

In this manner, when changing the printing roller, the C-shaped
5 element is taken away from the adjustable cradle and, by vertically lifting the spindle supporting the printing roller, the printing roller can be changed.

Such conventional printing assemblies are not devoid of drawbacks, among which the fact that the operations necessary for configuring the printing assembly comprise moving the entire spindle supporting the
10 printing roller and, since the spindle is considerably large and therefore considerably heavy, this makes the format-changing operations difficult and requires lengthy substitution times.

Disclosure of the invention

The aim of the present invention is to provide an improved printing
15 assembly, particularly for flexographic prints with removable printing roller, that is easy to remove and similarly easy to lock in its operational position.

Within this aim, an object of the present invention is to provide an improved printing assembly in which the printing roller can be released and, therefore, removed with a single, simple operation, without having to
20 dismantle fixed parts of the printing assembly.

Another object of the present invention is to provide an improved printing assembly in which the printing roller can be adjusted in its position with respect to the other cylinders present in the printing assembly, and specifically both vertically and horizontally.

25 Another object of the present invention is to provide an improved printing assembly in which the printing roller is easy to remove, is highly reliable, relatively easy to implement and at low cost.

This aim and these and other objects which will become better apparent hereinafter, are achieved by a printing assembly, particularly for
30 flexographic prints with removable printing roller, comprising at least two

lateral uprights which face each other, each one defining a lateral cradle for supporting a motorized spindle that supports a printing roller, each one of said lateral cradles comprising, at an upper portion thereof, at least one pair of supporting arms associable with the protruding ends of said motorized
5 spindle by said printing roller, for each one of said protruding ends a collar element being provided, which is keyable onto said protruding end and associated rotatably with a flanged element that can be arranged to rest on a respective one of said pairs of supporting arms and engageable with locking means of said printing assembly for the retention of said flanged elements to
10 rest on said pairs of supporting arms, characterized in that said collar elements are integral with said printing roller for their removal together with said printing roller from said motorized spindle.

Brief description of the drawings

Further characteristics and advantages of the invention will become
15 better apparent from the description of a preferred, but not exclusive, embodiment of an improved printing assembly, particularly for flexographic prints with removable printing roller, according to the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figures 1 and 3 are two perspective views of an embodiment of an
20 improved printing assembly, particularly for flexographic prints with removable printing roller, according to the invention;

Figure 2 is an enlarged-scale view of a detail of the view of the improved printing assembly shown in Figure 1;

Figure 4 is a cross-sectional, side elevation view of the improved
25 printing assembly shown in Figures 1 and 3;

Figure 5 is an enlarged-scale view of a detail of the view of the improved printing assembly shown in Figure 4.

Ways of carrying out the invention

With reference to the figures, the improved printing assembly,
30 particularly for flexographic prints with removable printing roller, generally

designated with the reference numeral 1, comprises a footing 2 that is integral with at least two lateral uprights 3 and 4 which face each other and which support a plurality of cylinders with mutually parallel axes.

In more detail, a first cylinder 5, known as the inking cylinder, is provided which is designed to be immersed in a basin of ink (not shown), in order to take on some ink, a second cylinder 6, around which the paper is rolled onto which the printing is to be executed and a third cylinder 7, known as the printing roller, which carries the print to be made on paper or other medium and against which both the first cylinder 5 and the second cylinder 6 are abutted in order to transfer the ink taken on by the first cylinder 5 to the paper rolled around the second cylinder 6 according to the print characters carried on the printing roller 7.

Both the second cylinder 6 and the third cylinder 7 are provided with drive means 8 and 9 which are adapted to make them rotate, respectively, about their axes of rotation 6a and 7a so as to control the tensioning of the paper rolled around the second cylinder 6 during the printing process.

Differently, the first cylinder 5, since it only has to perform the function of transferring the ink from the collection basin to the third cylinder 7, is idle about its axis of rotation 5a and its rotation is caused by friction from the motion of the third cylinder 7 with which it is tangential.

The first cylinder 5 and the second cylinder 6, since they do not need to be substituted when the type of print format varies, are rotatably supported by the lateral uprights 3 and 4 so as to have their axes of rotation 5a and 6a mutually parallel and located in positions that are preset and unique, even when the type of print format varies.

Differently, when the type of print format varies, the printing roller 7 needs to be continually changed so as to move from one diameter to another according to the type of print format that is to be worked with.

With this necessity, the printing roller 7 is removably fitted onto a motorized spindle 10 that is supported by two lateral cradles 11 and 12

which are defined, respectively, by the two lateral uprights 3 and 4.

In more detail, each one of the lateral cradles 3 and 4 comprises, at an upper portion thereof, at least one pair of supporting arms 13 and 14 which are associable with the ends 10a and 10b of the motorized spindle 10 protruding from the printing roller 7.

For each one of the protruding ends 10a and 10b, of which the first is functionally connected to the drive means 9, a collar element 15 or 16 is provided which is keyable onto a respective protruding end 10a or 10b and rotatably associated with a respective flanged element 17 or 18 that can be arranged to rest on the respective pair of supporting arms 13 or 14.

According to the invention, the collar elements 15 and 16 are integral with the printing roller 7 for their removal, together with the printing roller 7, from the motorized spindle 10.

In more detail, each collar element 15 and 16 defines a groove 19 on its radially inner surface, which is adapted to engage with a radially outer tongue 20 defined by the respective flanged element 17 or 18.

In this manner, the flanged element 17 or 18 is free to rotate with respect to the respective collar element 15 or 16 while remaining axially coupled thereto in translational movements.

More precisely, each flanged element 17 or 18 comprises a portion that is radially enlarged with respect to the respective collar element 15 or 16, and is designed to rest on a respective resting surface defined by the respective pair of supporting arms 13 or 14.

Advantageously, each pair of supporting arms 13 or 14 comprises a first arm 22 and a second arm 23 which are pivoted respectively to the respective lateral upright 3 or 4.

In more detail, the first arm 22 and the second arm 23 are mutually coupled at two ends thereof that are opposite with respect to the point of pivoting to the respective lateral upright 3 or 4 and they define the resting surface upon which the respective flanged element 17 or 18 rests.

Both the first arm 22 and the second arm 23 are provided with adjustment means 24 comprising, for each arm 22 and 23, at least one adjustment screw 25 which is adapted to orientate the respective arm 22 or 23 about its axis of pivoting 22a or 23a to the respective lateral upright 3 or 4.

In this manner, the two arms 22 and 23 rotate about their axes of pivoting 22a and 23a so as to be able to move, both horizontally and vertically, the printing roller 7 which, by means of the flanged elements 17 and 18, is resting on the arms 22 and 23.

Advantageously, the flanged elements 17 and 18 are engageable with locking means 26 of the printing assembly 1, for the retention of the flanged elements 17 and 18 to rest on the pairs of supporting arms 13 and 14.

The locking means 26 comprise, for each flanged element 17 and 18, a slider 27 which can be engaged in at least one radial seat 28 defined by the respective flanged element 17 or 18 substantially on the opposite side with respect to the radially enlarged portion designed to rest on the respective pair of supporting arms 13 and 14.

More specifically, each slider 27 is moveable from a position of engagement in the radial seat 28, in which the respective flanged element 17 or 18 is coupled to rest on the pair of supporting arms 13 or 14, to a position of disengagement from the radial seat 28, in which the motorized spindle 10 is removable from the printing assembly 1, and vice versa.

Operation of the improved printing assembly 1, particularly for flexographic prints with removable printing roller, is clear and evident from the foregoing description.

In particular, when the print format is changed, the printing roller 7, complete with collar elements 15 and 16 and with flanged elements 17 and 18, is first lifted from the pairs of supporting arms 13 or 14, then removed from the rotating spindle 10 at the end thereof opposite with respect to the drive means 9, and then substituted by another printing roller 7 fitted with

new collar elements 15 and 16 and with new flanged elements 17 and 18, these last items having dimensions corresponding to the diameter of the new printing roller 7 so as to enable its abutment with the other two cylinders 5 and 6.

5 In practice it has been found that the improved printing assembly, particularly for flexographic prints with removable printing roller, according to the present invention, fully achieves the intended aim and objects in that it makes it possible to perform the change in print format simply by removing only the printing roller from the motorized spindle and thus
10 leaving the motorized spindle in the printing assembly.

Another advantage of the improved printing assembly, according to the present invention, consists in that, thanks to the presence of means for adjusting and locking the printing roller, it enables simplified access to the printing roller in order to be able to remove it and subsequently reposition
15 it, with a very rapid operation, without any changes being necessary to the adjustment of the relative position thereof with respect to the remaining cylinders, independently of the diameter of the printing roller.

The improved printing assembly, particularly for flexographic prints with removable printing roller, thus conceived, is susceptible of numerous
20 modifications and variations, all of which are within the scope of the appended claims.

In addition, all the details may be replaced by other, technically equivalent elements.

In practice the materials employed, provided they are compatible with
25 the specific use, and the dimensions and the contingent shapes, may be any according to requirements and to the state of the art.

The disclosures in Italian Patent Application No. MI2010A001471 from which this application claims priority are incorporated herein by reference.

30 Where technical features mentioned in any claim are followed by

reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

CLAIMS

1. A printing assembly (1), particularly for flexographic prints with removable printing roller, comprising at least two lateral uprights (3, 4) which face each other, each one defining a lateral cradle (11, 12) for supporting a motorized spindle (10) that supports a printing roller (7), each one of said lateral cradles (11, 12) comprising, at an upper portion thereof, at least one pair of supporting arms (13, 14) associable with the ends (10a, 10b) of said motorized spindle (10) protruding from said printing roller (7), for each one of said protruding ends (10a, 10b) a collar element (15, 16) being provided which is keyable onto said protruding end (10a, 10b) and associated rotatably with a flanged element (17, 18) that can be arranged to rest on a respective one of said pairs of supporting arms (13, 14) and engageable with locking means (26) of said printing assembly (1) for the retention of said flanged elements (17, 18) to rest on said pairs of supporting arms (13, 14), characterized in that said collar elements (15, 16) are integral with said printing roller (7) for their removal together with said printing roller (7) from said motorized spindle (10).

2. The printing assembly (1) according to claim 1, characterized in that each one of said flanged elements (17, 18) comprises at least one radial seat (28) which is defined substantially on the opposite side with respect to the portion of said flanged element (17, 18) that is designed to rest on the respective one of said pairs of supporting arms (13, 14) and in that said locking means (26) comprise, for each one of said flanged elements (17, 18), at least one slider (27) moveable from a position of engagement in said radial seat (28), in which said flanged element (17, 18) is coupled to rest on said pair of supporting arms (13, 14), to a position of disengagement from said radial seat (28), in which said motorized spindle (10) is removable from said printing assembly (1), and vice versa.

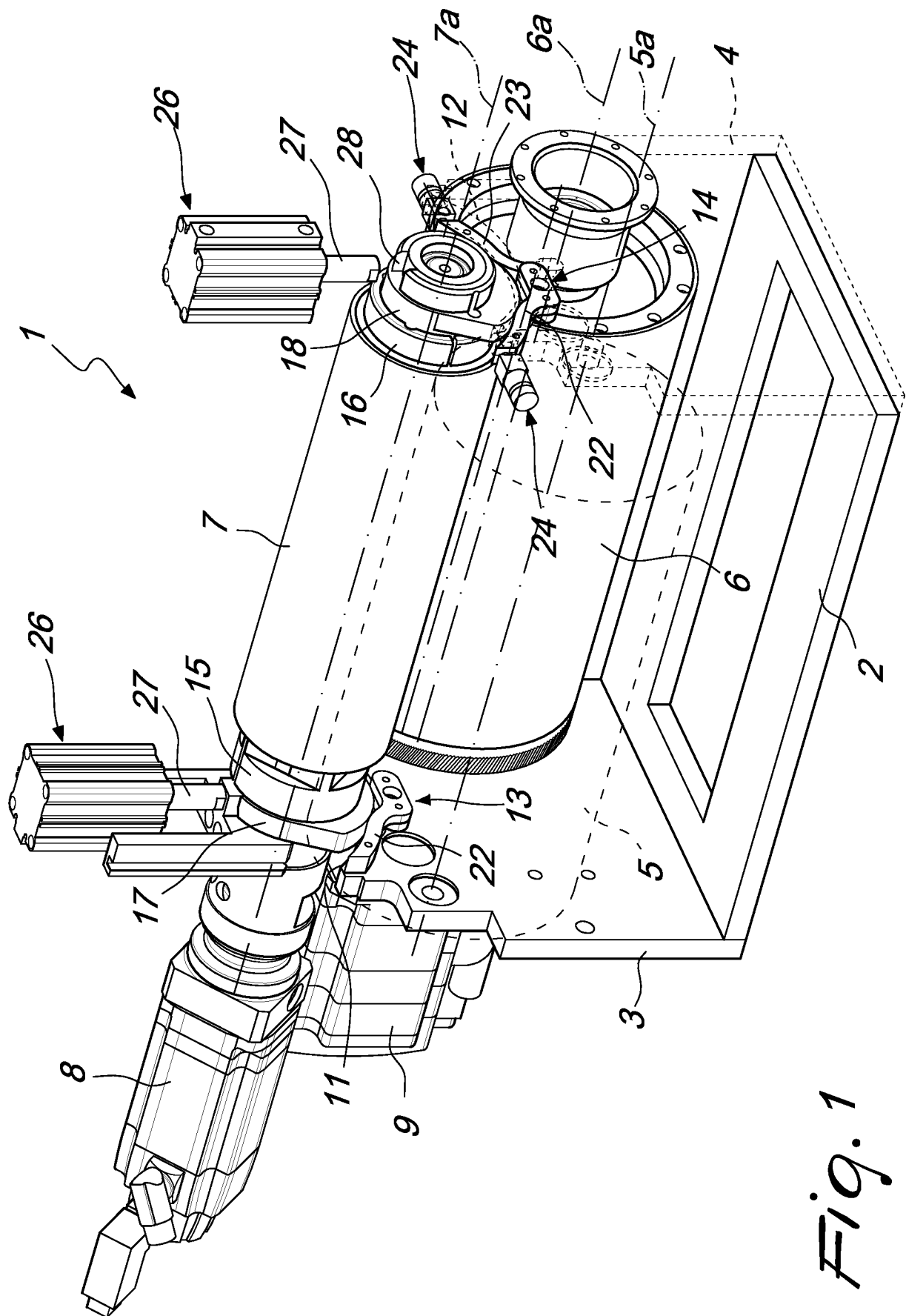
3. The printing assembly (1) according to one or more of the preceding claims, characterized in that each one of said pairs of supporting

arms (13, 14) comprises a first arm (22) and a second arm (23), which are pivoted respectively to the respective one of said lateral uprights (3, 4), said first arm (22) and said second arm (23) being mutually coupled at two ends thereof that are opposite with respect to the point of pivoting to said lateral
5 upright (3, 4) and thus defining a resting surface for one of said flanged elements (17, 18).

4. The printing assembly (1) according to one or more of the preceding claims, characterized in that said first arm (22) and said second arm (23) are provided with means (24) for adjusting their orientation about
10 their axis (22a, 23a) of pivoting to the respective one of said lateral uprights (3, 4).

5. The printing assembly (1) according to one or more of the preceding claims, characterized in that said adjustment means (24) comprise, for each one of said arms (22, 23), at least one adjustment screw
15 (25).

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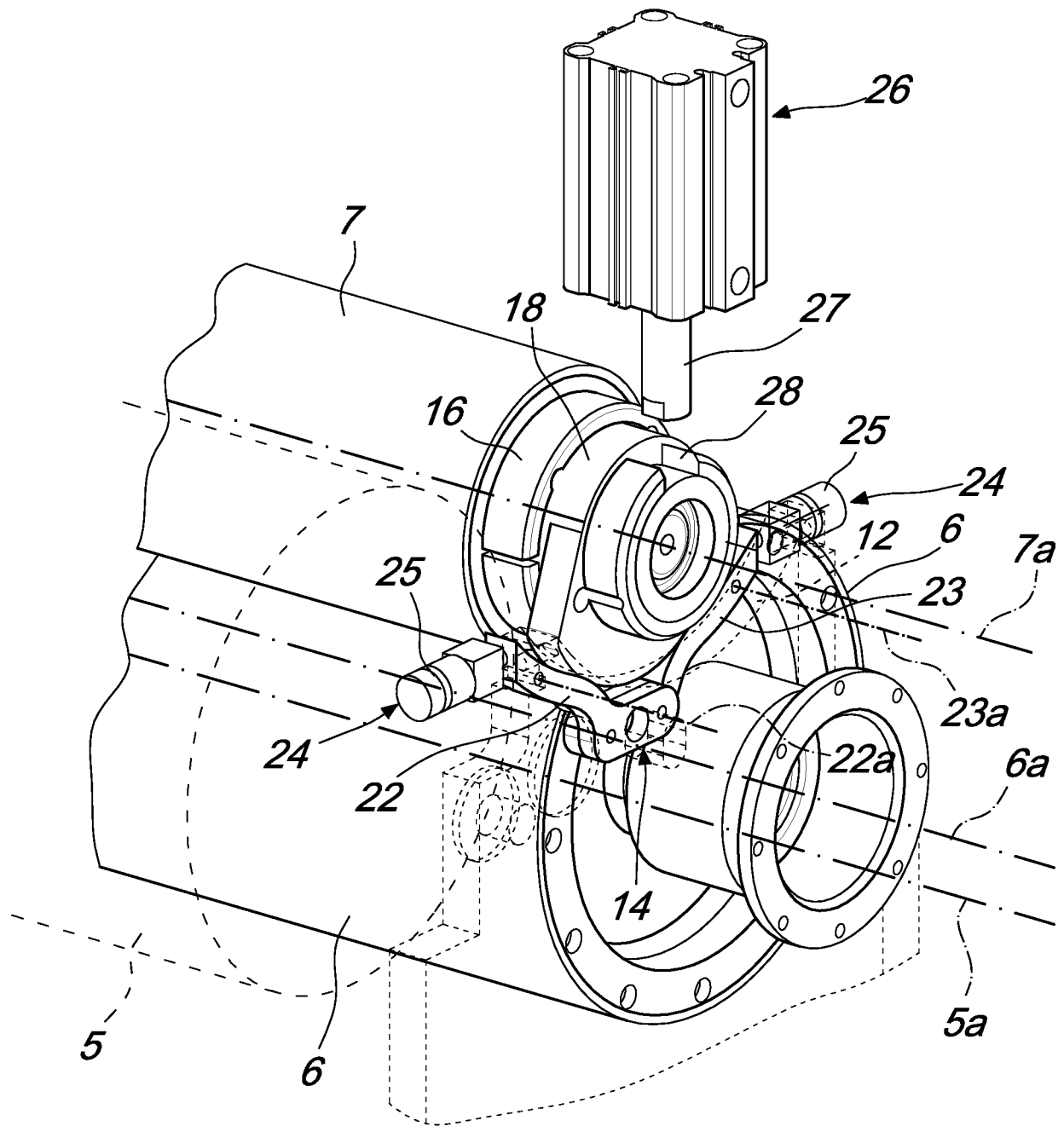


Fig. 2

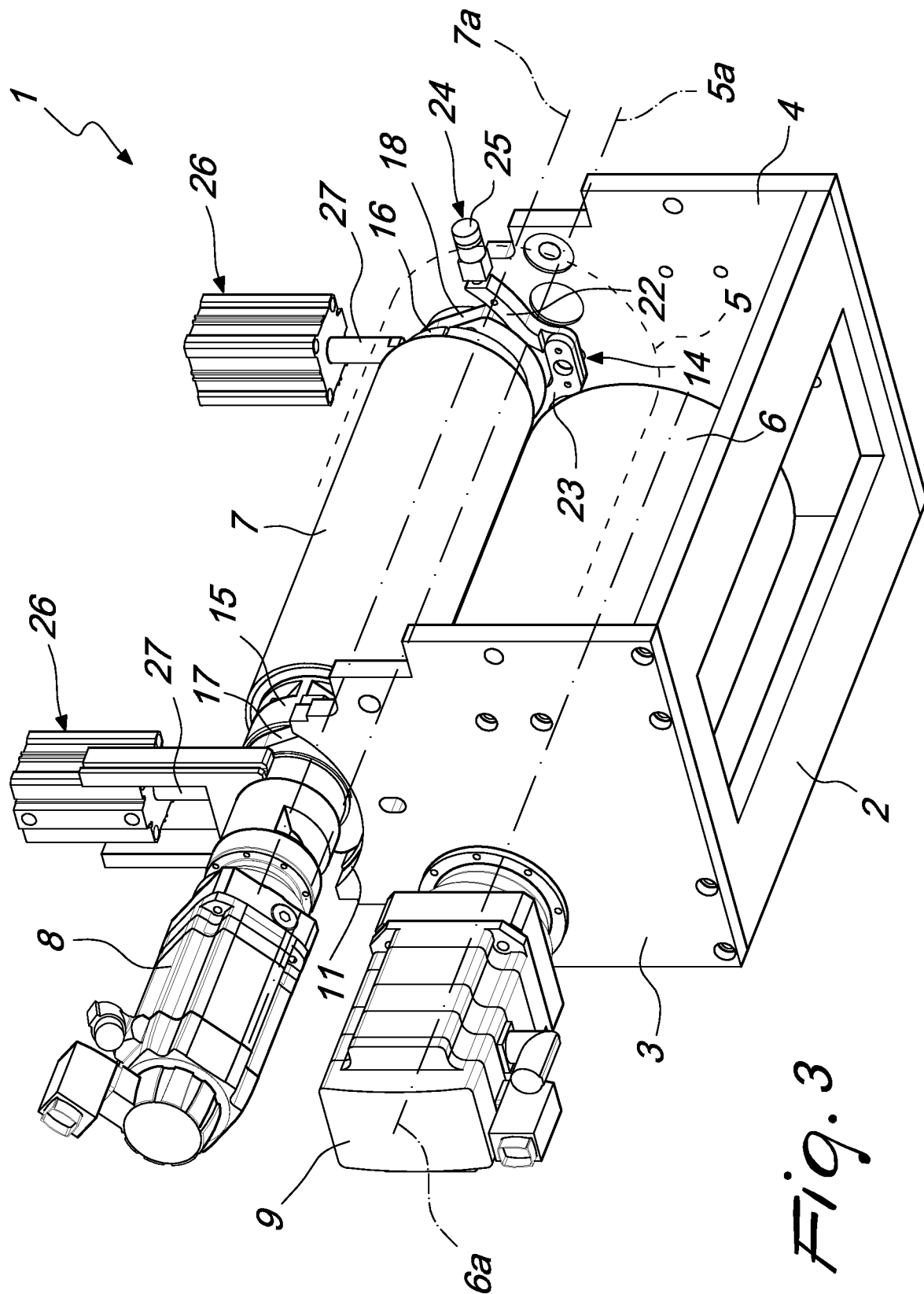
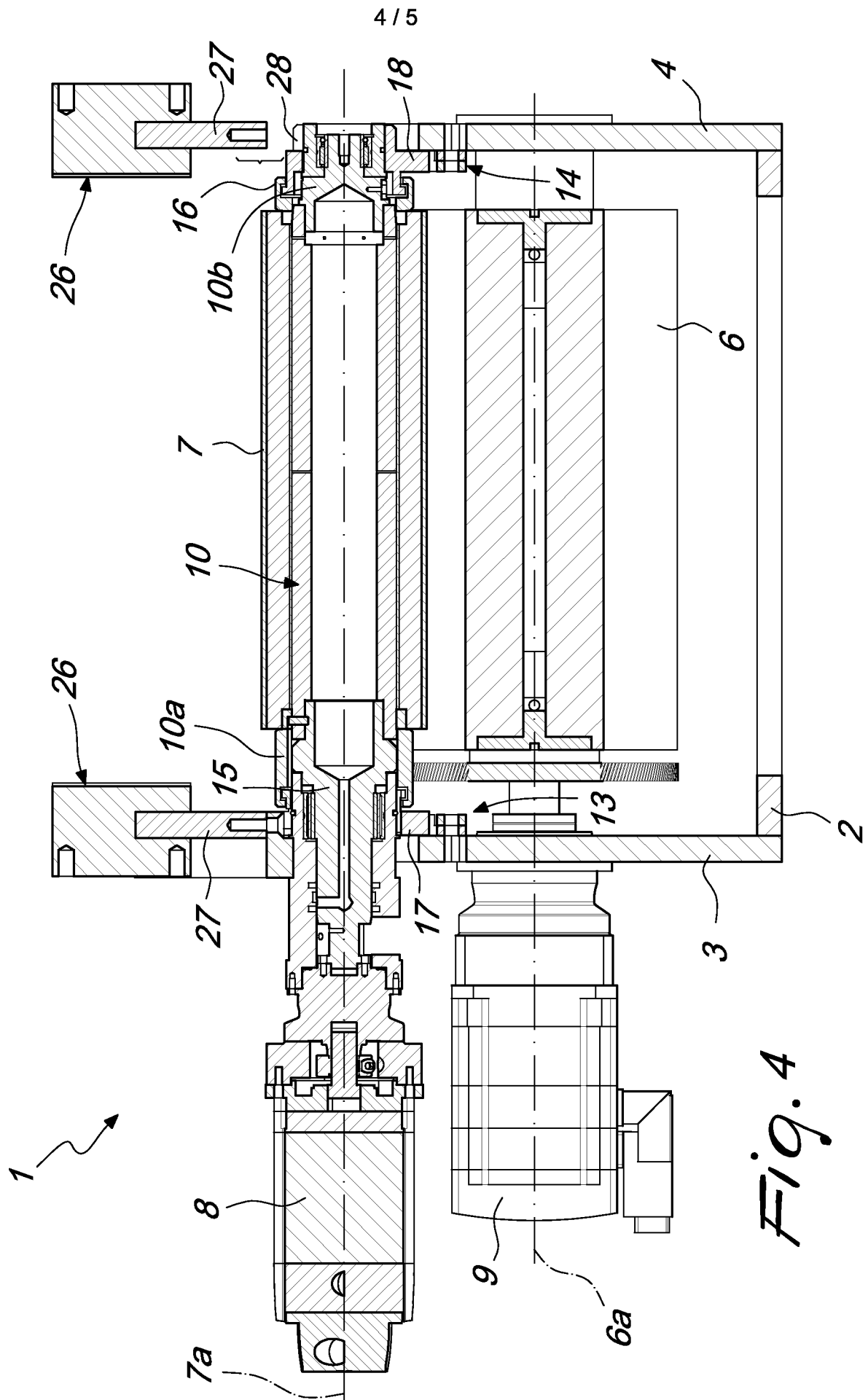
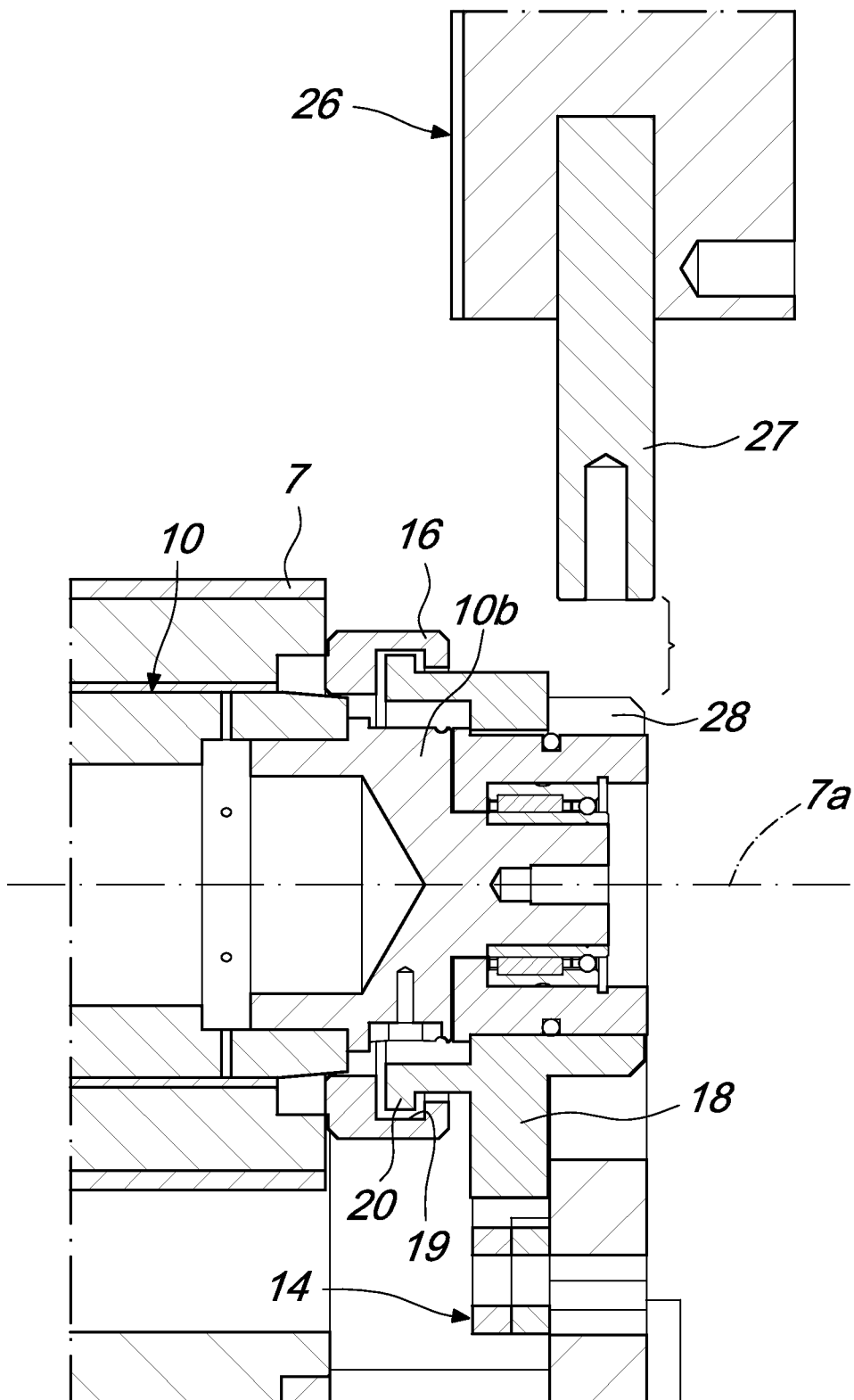


Fig. 3



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*Fig. 5*

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2011/060607

A. CLASSIFICATION OF SUBJECT MATTER INV. B41F5/24 B41F13/008 B41F13/10 B41F13/20 B41F13/36 ADD.		
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) B41F		
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 practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 285 753 A1 (FIN OMET S R L [IT]) 26 February 2003 (2003-02-26) abstract paragraphs [0001], [0007] - [0008], [0022], [0027], [0031], [0039] - [0058], [0061], [0079] figures 1-5, 8-13 -----	1-5
Y	US 5 370 047 A (COMPTON CRAIG T [US]) 6 December 1994 (1994-12-06) abstract column 1 column 2, lines 1-4 column 2, line 52 - column 4, line 13 figures 1-5 ----- -/--	1-5
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "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) "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 "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 "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 "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. "&" document member of the same patent family		
Date of the actual completion of the international search 15 July 2011		Date of mailing of the international search report 29/07/2011
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Bellofiore, Vincenzo

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2011/060607

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 092 536 A1 (GI DUE S R L [IT] GIDUE S P A [IT]) 18 April 2001 (2001-04-18) abstract paragraphs [0007] - [0008], [0 16] - [0036] figures 1-6 -----	3-5
A	EP 0 911 158 A2 (VALMET ROTOMEC SPA [IT]) 28 April 1999 (1999-04-28) the whole document -----	1-5
A	WO 2009/060274 A2 (OMET SRL [IT]; MANZINI AMERIGO [IT]; BARTESAGHI ANGELO [IT]) 14 May 2009 (2009-05-14) abstract page 1, line 23 - page 2, line 19 page 3, lines 9-13 page 5, line 8 - page 6, line 21 page 7, lines 16-24 figures 1-7 -----	1-5

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2011/060607

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1285753	A1	26-02-2003	AT 367923 T 15-08-2007
		DE 60221326 T2 10-04-2008	
		DK 1285753 T3 26-11-2007	
		ES 2291390 T3 01-03-2008	
		IT MI20011737 A1 07-02-2003	
		PT 1285753 E 29-10-2007	
US 5370047	A	06-12-1994	CA 2134298 A1 02-06-1995
		DE 69410218 D1 18-06-1998	
		DE 69410218 T2 03-09-1998	
		EP 0656259 A1 07-06-1995	
		ES 2115136 T3 16-06-1998	
		JP 3402808 B2 06-05-2003	
		JP 7195655 A 01-08-1995	
EP 1092536	A1	18-04-2001	AT 254537 T 15-12-2003
		BR 0005603 A 12-06-2001	
		CN 1292325 A 25-04-2001	
		DE 69912955 D1 24-12-2003	
		DK 1092536 T3 29-03-2004	
		US 6408756 B1 25-06-2002	
EP 0911158	A2	28-04-1999	BR 9805274 A 08-03-2000
		IT VR970097 A1 21-04-1999	
WO 2009060274	A2	14-05-2009	EP 2217442 A2 18-08-2010