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(54) **Metallic wire unwinding apparatus**

(57) An unwinding apparatus for metallic wire is described, comprising a reel carrier (1) capable of supporting a coil (4) of metallic wire. The reel carrier (1) has a vertical axis (A) and the unwinding apparatus comprises

a wire pusher (2,50) directly connected to the reel carrier, and means (3) for driving said wire pusher; the wire pusher (2,50) is suitable for unwinding the metallic wire coming from said coil (4) at the exit from the unwinding apparatus.

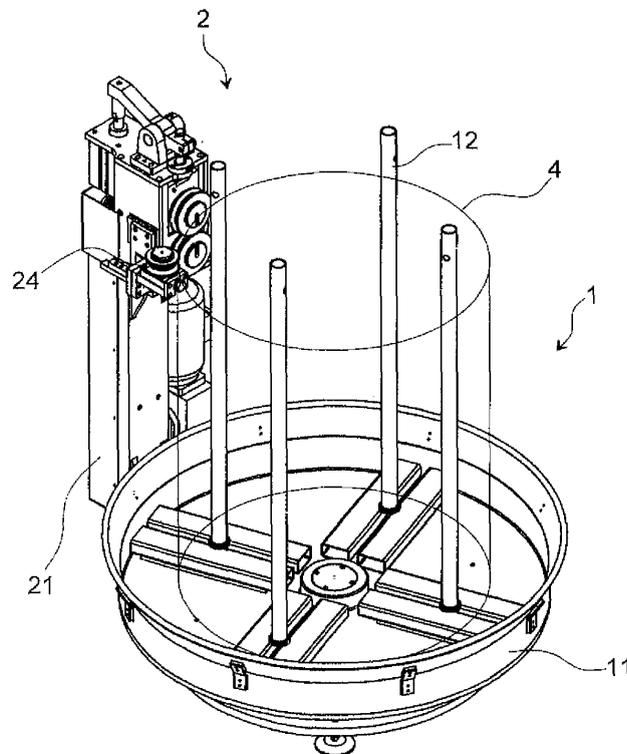


Fig.1

EP 1 914 018 A1

Description

[0001] The present invention concerns a metallic wire unwinding apparatus.

[0002] In industrial production, unwinding apparatuses for coils of metallic wire are generally known and used in stamping presses and welders and in other applications. Normally, coils of wire holding about 1500 kg or more of material are used, which are difficult to locate manually on the reel carrier every time the coil which is being unwound comes to an end.

[0003] In fact, in addition to locating the coil on the reel carrier, it is necessary to locate the end of the wire in suitable straighteners for metallic wire which take the wire to the stamping presses or other machines for use; for this reason at least two operators are necessary, acting on the unwinding apparatus with wires of diameters from 14 mm to 33 mm. Replacing the coil of wire therefore becomes onerous and wasteful in terms of time, to the extent that the time taken for replacing the coil can impact substantially on the overall time for unwinding the metallic wire.

[0004] In view of the state of the art, the object of the present invention is to provide an unwinding apparatus for metallic wire in which changing the coil of metallic wire is less wasteful than in known unwinding apparatuses.

[0005] According to the present invention, said object is achieved by means of an unwinding apparatus for metallic wire comprising a reel carrier capable of supporting a coil of metallic wire, characterised in that said reel carrier has a vertical axis and by comprising a wire pusher connected directly to the reel carrier, and driving means for said wire pusher, said wire pusher being suitable for unwinding the metallic wire coming from said coil at the exit from the unwinding apparatus.

[0006] The characteristics and advantages of the present invention will become more evident from the following description of a practical embodiment, which is illustrated by way of a non-limiting example in the attached drawings, in which:

figure 1 is a perspective view of the unwinding apparatus for metallic wire according to a first embodiment of the present invention;

figure 2 is a schematic lateral view, partially sectioned, of the unwinding apparatus shown in figure 1;

figure 3 is a top view of the unwinding apparatus shown in figure 1;

figure 4 is another schematic lateral view of the unwinding apparatus shown in figure 1;

figure 5 is a perspective view of the wire pusher for the unwinding apparatus shown in figure 1;

figure 6 is a frontal view of the wire pusher shown in figure 5;

figure 7 is a schematic lateral view, partially sectioned, of the wire pusher shown in figure 5;

figure 8 is a perspective view of an unwinding appa-

ratus for metallic wire according to a second embodiment of the present invention;

figures 9-12 are perspective views of the unwinding apparatus for metallic wire in various operating positions according to the second embodiment of the present invention;

figures 13 and 14 are views in vertical section of the unwinding apparatus shown in figure 8 with the wire pusher raised (figure 13) or lowered (figure 14).

[0007] With reference to figures 1-4, an unwinding apparatus for metallic wire is described according to the present invention. The unwinding apparatus comprises a reel carrier 1 and a wire pusher 2 driven by a single electric motor 3. The reel carrier 1 comprises a rotatable plate 11 with vertical axis A on which is arranged a coil of metallic wire 4 and elements 12 for supporting the coil in a vertical position.

[0008] The wire pusher 2, more clearly visible in figures 5-7, is located on a column 21 in such a way that the height of the wire pusher corresponds substantially to the height of the coil of metallic wire 4; in this way it is possible to insert the metallic wire more easily into the wire pusher 2. The metallic wire on the coil 4 is located manually between two rollers 22 and 23 for gripping and unwinding the metallic wire, which have axes of rotation P1 and P2 perpendicular to the axis of rotation A of the rotatable plate 11. The wire pusher also comprises a direction roller 24, located downstream of rollers 22 and 23 on the route for unwinding the metallic wire and capable of directing the wire towards the exit of the unwinding apparatus, i.e. towards the machine using the metallic wire; roller 24 has its axis of rotation parallel to the axis of rotation A of the rotatable plate 11. Rollers 22 and 23 are driven in synchronised manner by electric motor 3 by means of suitable gears 26.

[0009] Column 21 is connected to reel carrier 1 and to electric motor 3 and has a check pin 27 which locks column 21 in the position in figure 3 while the unwinding apparatus is in operation.

[0010] To introduce a new coil of metallic wire into the reel carrier, check pin 27 is removed so that column 21 can be manually moved away from the reel carrier 1 by means of an eccentric fulcrum and more space can be obtained for loading the new coil of metallic wire.

[0011] The coil is loaded by means of a forklift truck or an overhead crane onto the rotatable plate 11 and then column 21 is relocated manually in the starting position and the check pin 27 is inserted.

[0012] Next, one end of the metallic wire on the coil 4 is taken and moved about 100-120 mm horizontally; it is arranged between the two rollers 22 and 23, where it is locked by means of a pneumatic control. Rollers 22 and 23 can in fact slide vertically by means of a pneumatic mechanism 28 which allows them to be moved apart or closer together; the pneumatic mechanism is controlled by a lever 29 which is operated manually. Rollers 22 and 23 are moved away from each other to allow the manual

introduction of the metallic wire; once the metallic wire is introduced, the wire itself is locked by rollers 22 and 23 by moving them closer together.

[0013] The metallic wire is then advanced by the action of rotating rollers 22 and 23 and is manually accompanied as far as the using machine. Once the wire is fed onto the using machine, it is unwound by the combined rotating action of rollers 22 and 23 and of the rotatable plate 11.

[0014] Preferably said unwinding apparatus is suitable for coils of metallic wire with diameters between 14 and 33 mm.

[0015] The operations of introducing the coil onto the rotatable plate of the reel carrier and introducing the end of the metallic wire between the gripping rollers of the wire pusher require only one person.

[0016] The unwinding apparatus shown in figures 1-4 takes up less space than known unwinding apparatuses.

[0017] In figures 8-14, an unwinding apparatus for metallic wire is shown according to a second embodiment of the present invention. The unwinding apparatus in said second embodiment of the invention differs from the first embodiment because of the different wire pusher 50; said wire pusher 50 is located on a column 51 in such a way as to be vertically movable by using means 60. The wire pusher 50 comprises two rollers 52, 53 for gripping and unwinding the metallic wire on coil 4, which have vertical axes of rotation Q1 and Q2 parallel to the axis of rotation A of the rotatable plate 11 of reel carrier 1. The wire pusher also comprises at least one direction roller 54, but preferably a plurality of rollers, located downstream of rollers 52 and 53 on the route for unwinding the metallic wire and capable of directing the wire towards the exit of the unwinding apparatus, i.e. towards the machine using the metallic wire; rollers 54 have their axes of rotation parallel to the axis of rotation A of the rotatable plate 11. Rollers 52 and 53 are moved in synchronised manner by the electric motor 3 by means of suitable gears 56 similar to gears 26 of figures 1-4.

[0018] Column 51 is connected to reel carrier 1 and to electric motor 3, and wire pusher 50 is rotatably pivoted on column 51 at 61; to introduce a new coil of metallic wire onto the reel carrier, it is necessary to act manually on wire pusher 50 to rotate it into position I in figure 8.

[0019] The coil is loaded by means of a forklift truck or an overhead crane onto rotatable plate 11. The wire pusher 50 is moved manually from the rest position I shown in figure 8 to the starting position II of the working phase, shown in figure 9; more precisely, the wire pusher is rotated from position I to position II.

[0020] Subsequently wire pusher 50 is lowered, using means 60 (more clearly visible in figures 13 and 14) which allow it to slide vertically on column 51, until it reaches the height of the metallic wire on coil 4 (figure 10). One end of the metallic wire on the coil 4 is taken and moved in order to be located between the two rollers 52 and 53, where it is locked by means of a control mechanism, preferably pneumatic, in position III shown in figure 10. Roll-

ers 52 and 53 can in fact slide vertically by means of a mechanism 58, preferably pneumatic (similar to mechanism 28 shown in figures 5-7), which allows them to be moved apart or closer together; the pneumatic mechanism is controlled by a lever 59 which is operated manually. Rollers 52 and 53 are moved away from each other to allow the manual introduction of the metallic wire; once the metallic wire is introduced, the wire itself is locked by rollers 52 and 53 by moving them closer together.

[0021] The metallic wire is then advanced by the action of rotating rollers 52 and 53 (figure 11) and is manually accompanied as far as the using machine. Once the wire is fed onto the using machine, rollers 52 and 53 are moved apart by means of a suitable control on mechanism 58, and the metallic wire is released and falls by gravity. The wire unwinds through the combined action of the machine and the rotation of the rotatable plate 11; the wire pusher 50 is set in the rest position (figure 12), its action of pushing the metallic wire being no longer necessary.

[0022] The means 60 capable of allowing the wire pusher to slide vertically on column 51 of the wire pusher 50 are more clearly visible in figures 13 and 14. Said means 60 comprise a reduction motor 65 which drives in rotation an endless screw 66, which is connected to a rod element 67 which is integral with the wire pusher 50. The rod 66 is coupled by means of a component 69 to a bush 68 connected to the endless screw 66; rotation in one direction or the other causes raising of bush 68 and of wire pusher 50 (figure 13) or lowering of the said bush and of the same wire pusher (figure 14).

Claims

1. An unwinding apparatus for metallic wire comprising a reel carrier (1) capable of supporting a coil (4) of metallic wire, **characterised in that** said reel carrier (1) has a vertical axis (A) and **characterised by** comprising a wire pusher (2, 50) connected directly to the reel carrier, and driving means (3) for said wire pusher, said wire pusher (2, 50) being suitable for unwinding the metallic wire coming from said coil (4) at the exit from the unwinding apparatus.
2. An unwinding apparatus according to claim 1, **characterised by** comprising a column (21) of height substantially equal to the coil (4) of metallic wire, said column being capable of carrying said wire pusher (2).
3. An unwinding apparatus according to claim 1, **characterised in that** said wire pusher (2) comprises two rollers (22, 23) for gripping and unwinding the metallic wire interposed between them, said two rollers (22, 23) having axes of rotation (P1, P2) perpendicular to the axis (A) of the reel carrier (1).

4. An unwinding apparatus according to claim 1, **characterised in that** said reel carrier (1) comprises a rotatable plate (11) having a vertical axis of rotation (A). 5
5. An unwinding apparatus according to claim 1, **characterised in that** said wire pusher (2) comprises a further roller (24), located downstream of said two rollers (22, 23) on the route for unwinding the metallic wire and being capable of directing the metallic wire towards the exit of the unwinding apparatus. 10
6. An unwinding apparatus according to claim 1, **characterised in that** said reel carrier (1) comprises elements (12) capable of supporting the said coil (4) of metallic wire in a vertical position. 15
7. An unwinding apparatus according to claim 1, **characterised by** comprising a column (51) capable of carrying said wire pusher (50), said column (51) comprising means (60) for vertically displacing said wire pusher (50). 20
8. An unwinding apparatus according to claim 7, **characterised in that** said means (60) for the vertical displacement of the wire pusher (50) comprise a reduction motor (65) and an endless screw (66) driven by said reduction motor, said displacement means comprising an element (67) connected to said wire pusher and to a bush (68) sliding on said endless screw (66). 25 30
9. An unwinding apparatus according to claim 7, **characterised in that** said wire pusher (50) is pivoted rotatably on said column (51). 35
10. An unwinding apparatus according to claim 7, **characterised in that** said wire pusher (50) comprises two rollers (52, 53) for gripping and unwinding the metallic wire interposed between them, said two rollers (52, 53) having axes of rotation (Q1, Q2) parallel to the axis (A) of the reel carrier (1). 40
11. An unwinding apparatus according to claim 10, **characterised in that** said two rollers (52, 53) are deactivated to release the metallic wire once said metallic wire has reached a using machine. 45
12. An unwinding apparatus according to claim 7, **characterised in that** said wire pusher (50) comprises a further plurality of rollers (54), located downstream of said two rollers gripping (52, 53) on the route for unwinding the metallic wire and being capable of directing the metallic wire towards the exit of the unwinding apparatus. 50 55

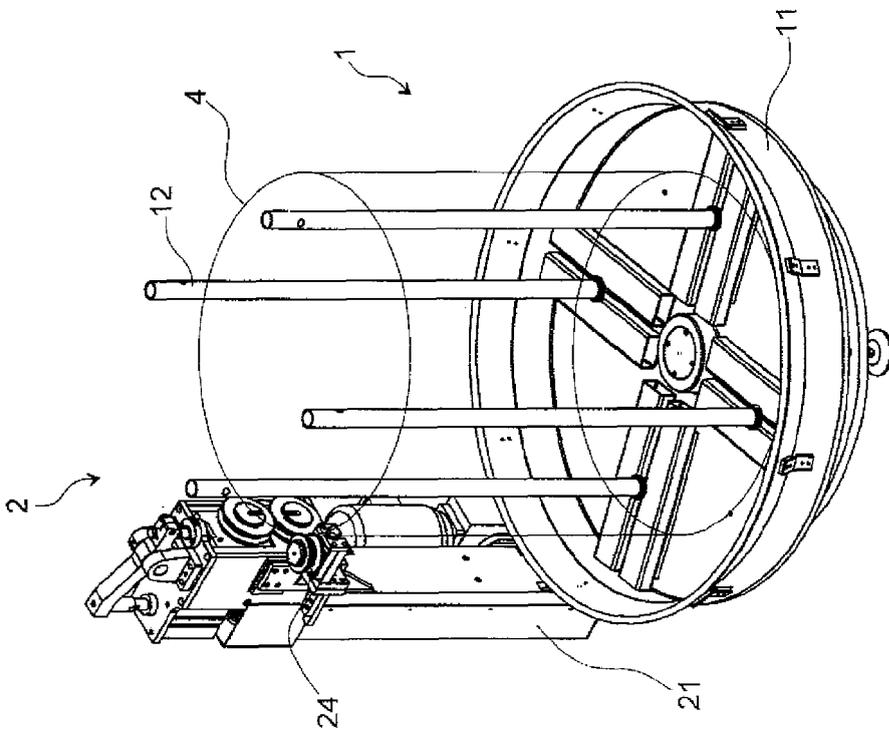
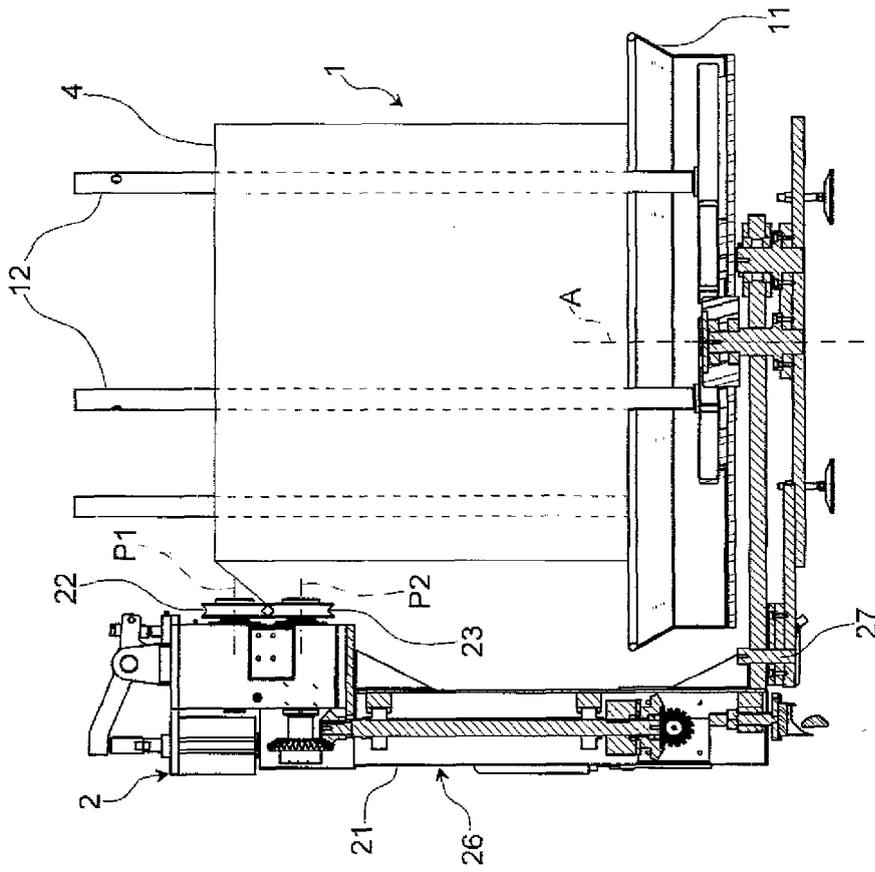


Fig. 2

Fig. 1

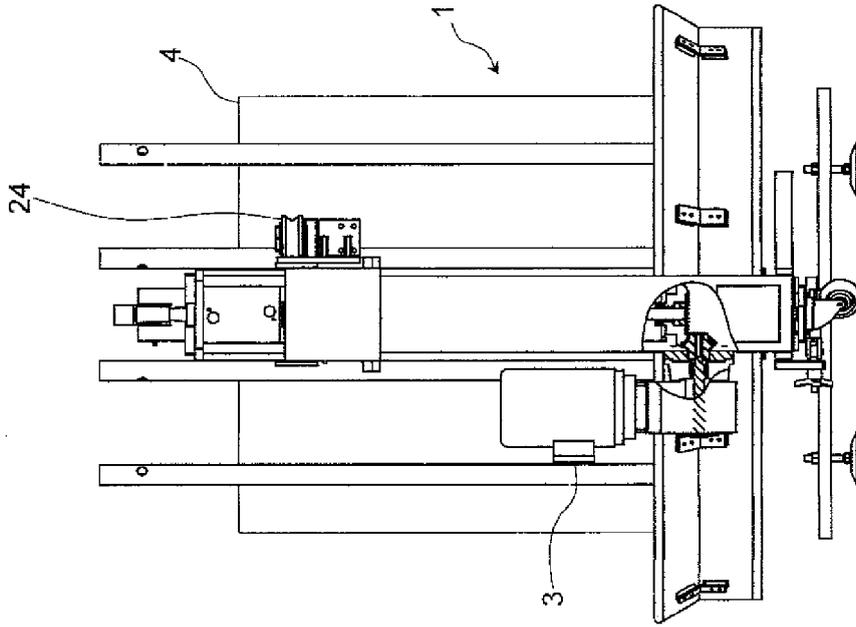


Fig. 4

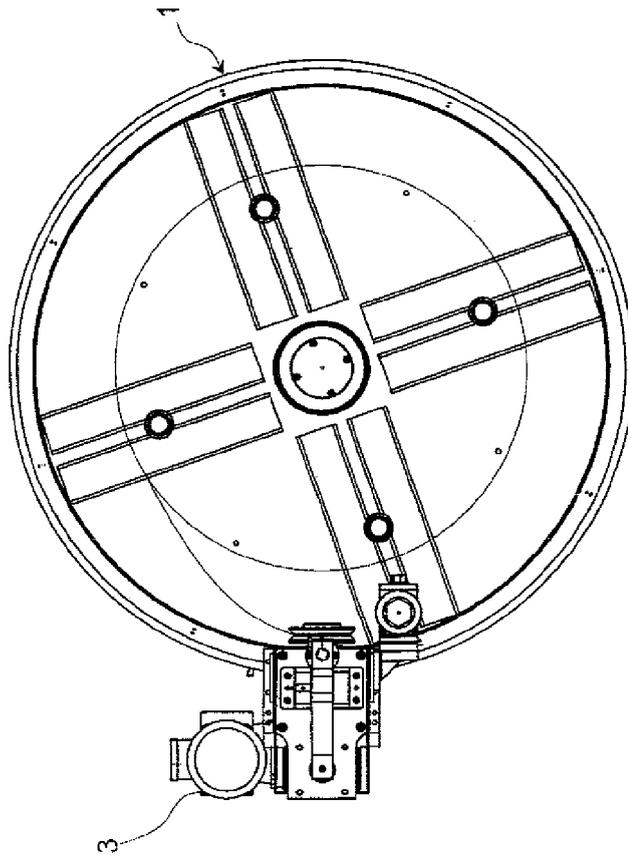


Fig. 3

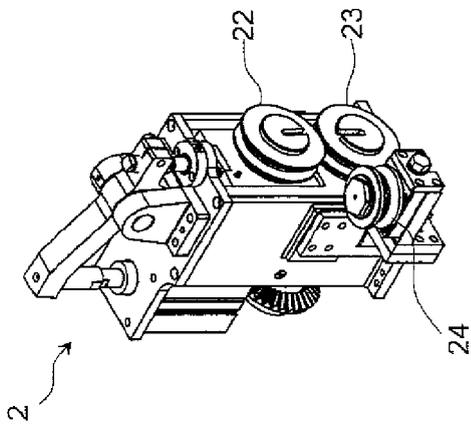


Fig. 5

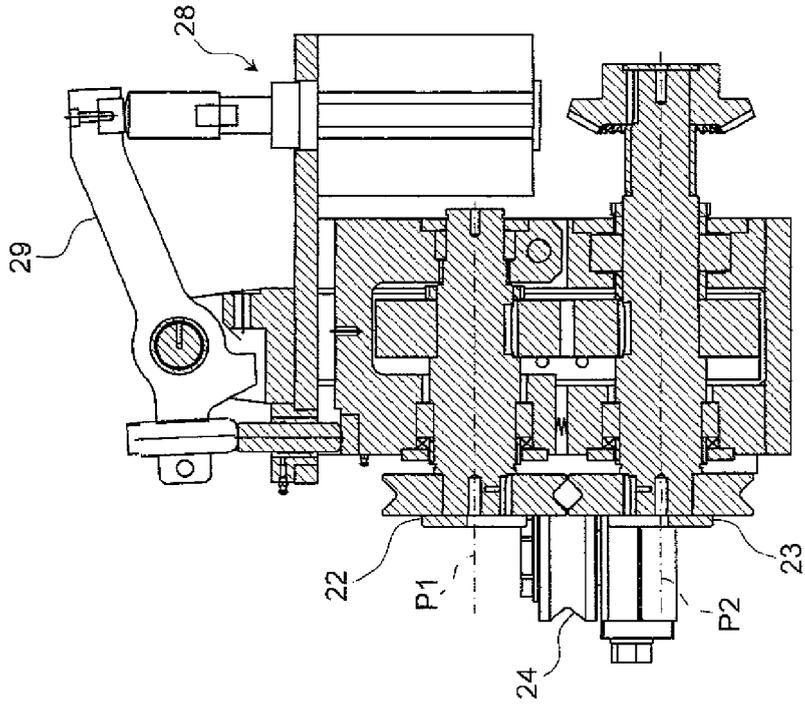


Fig. 7

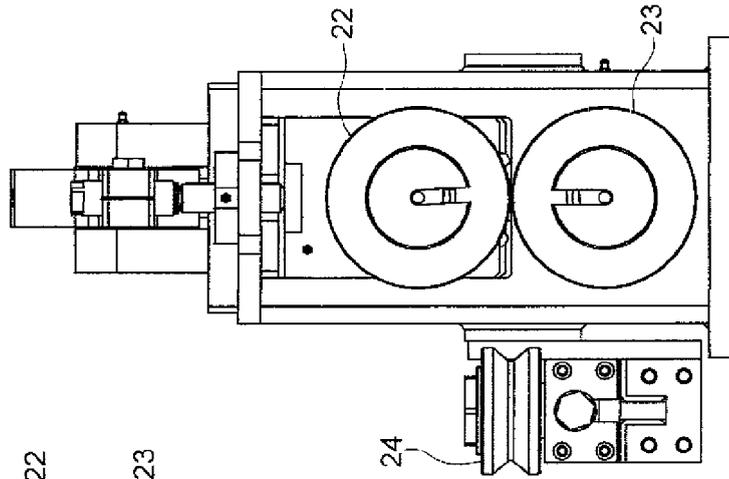


Fig. 6

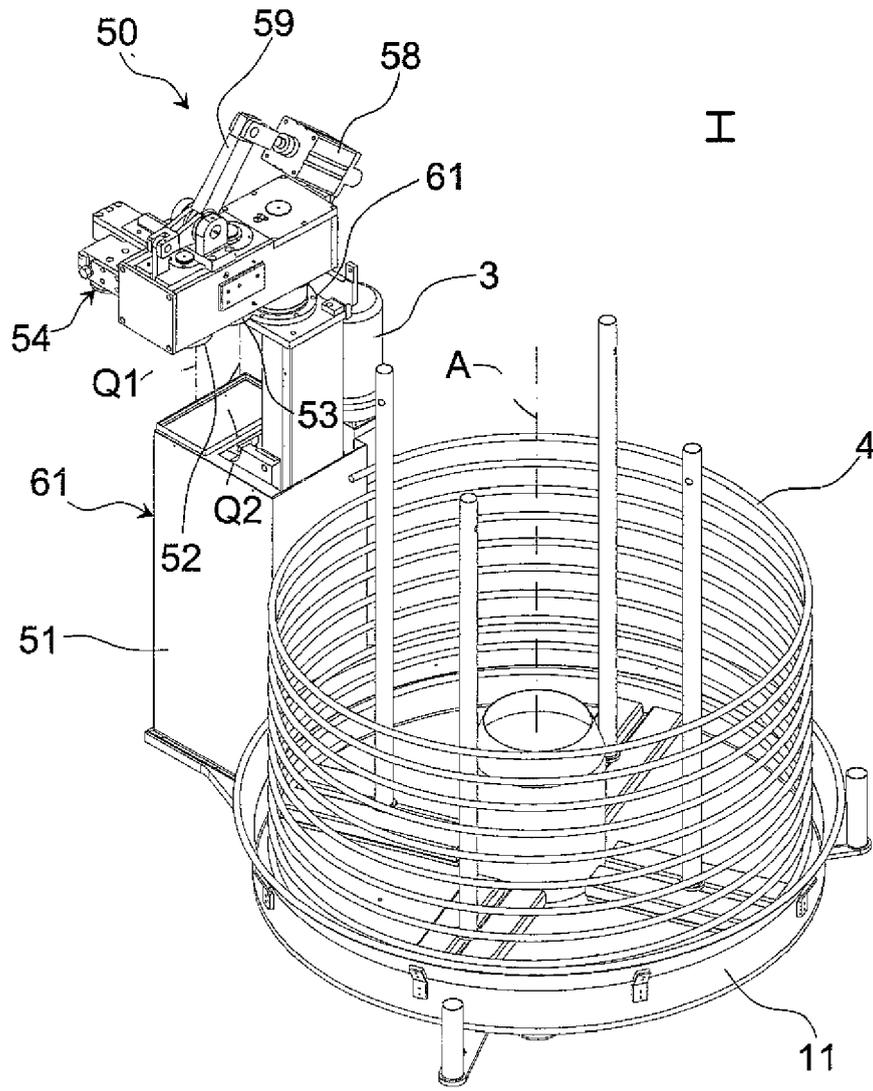


Fig.8

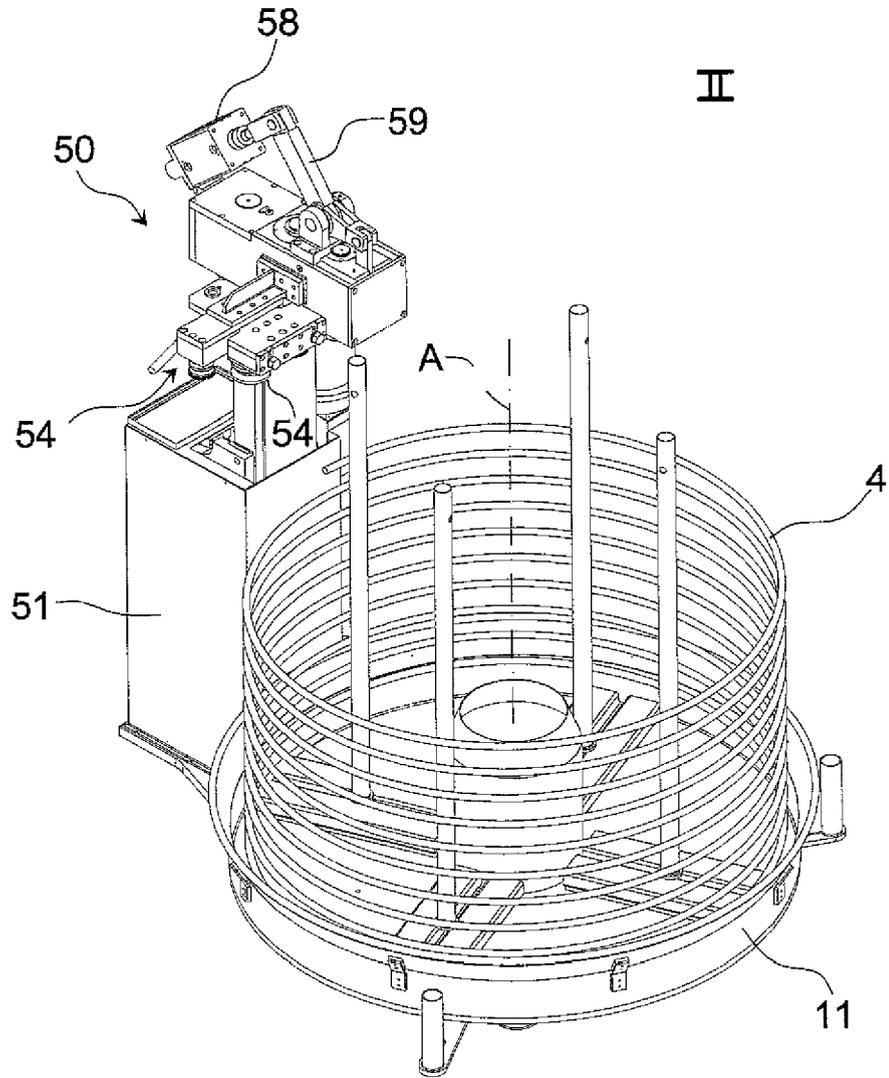


Fig.9

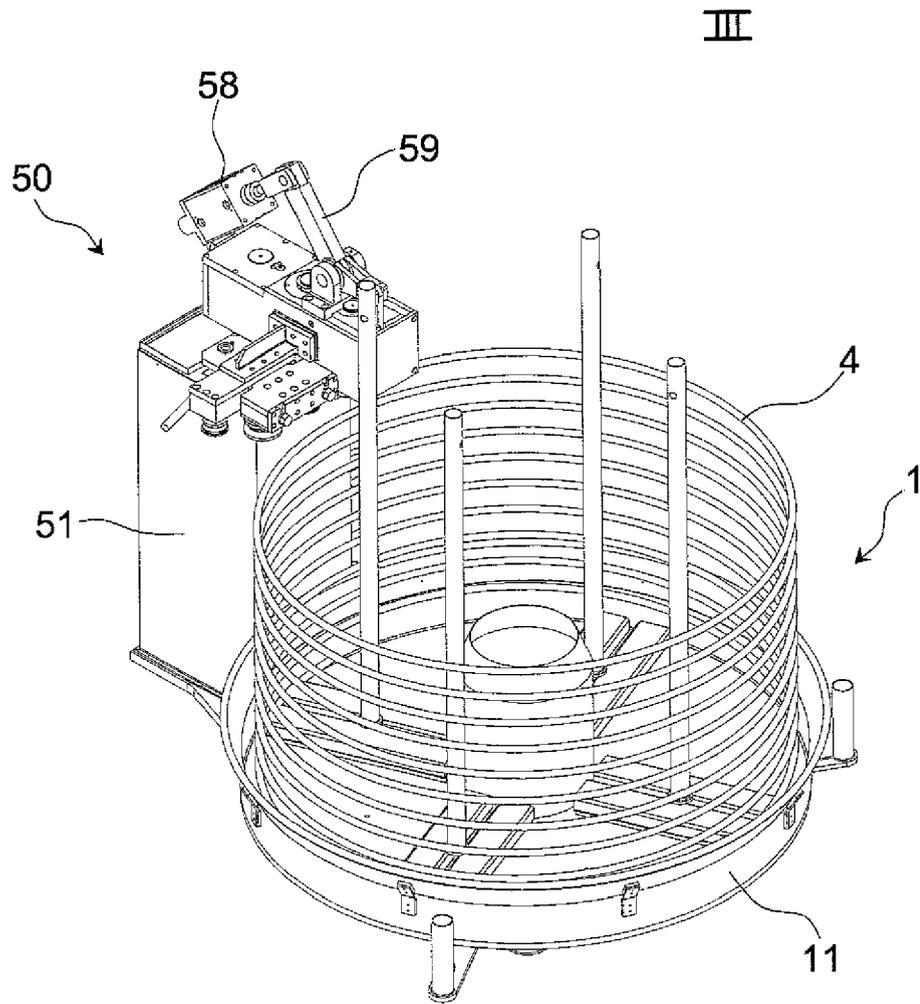


Fig.10

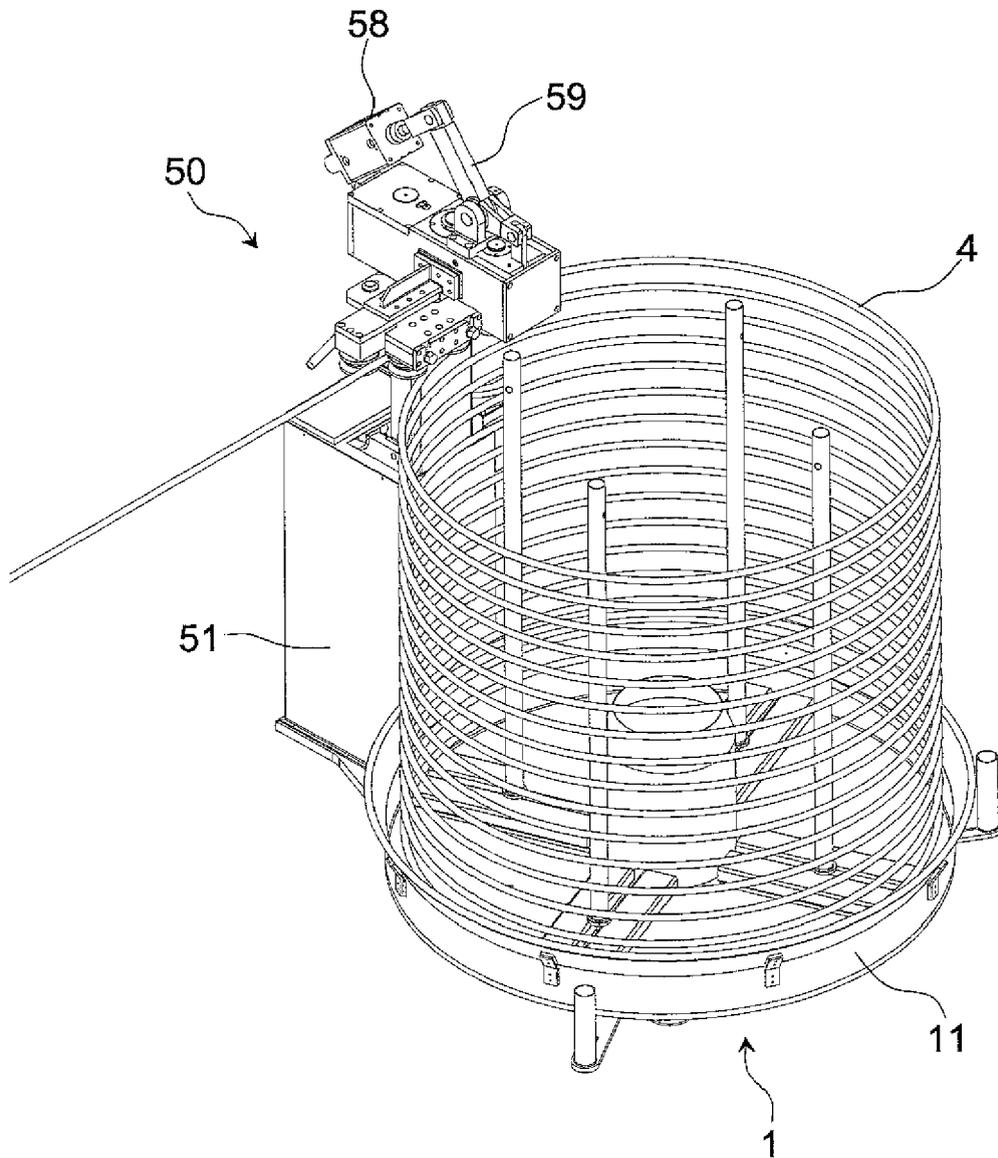


Fig.11

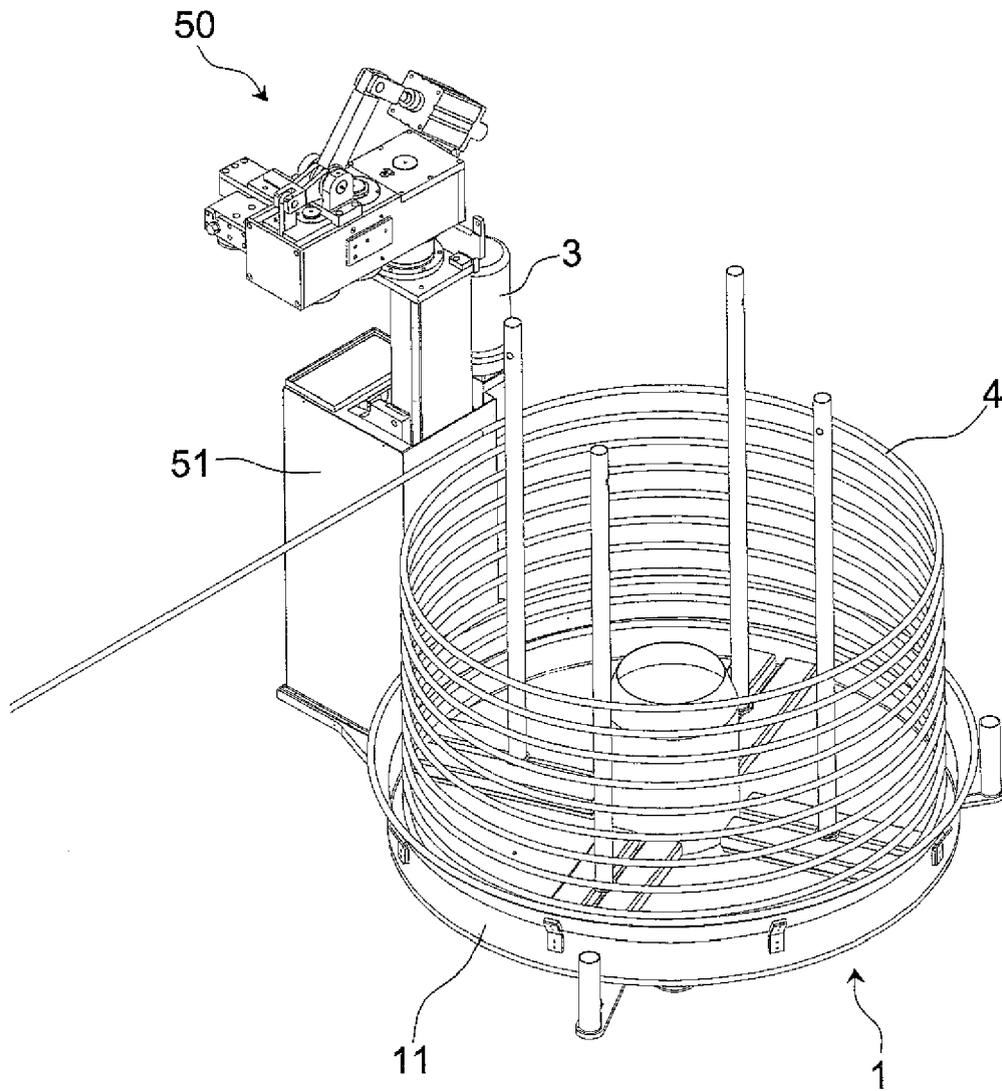


Fig.12

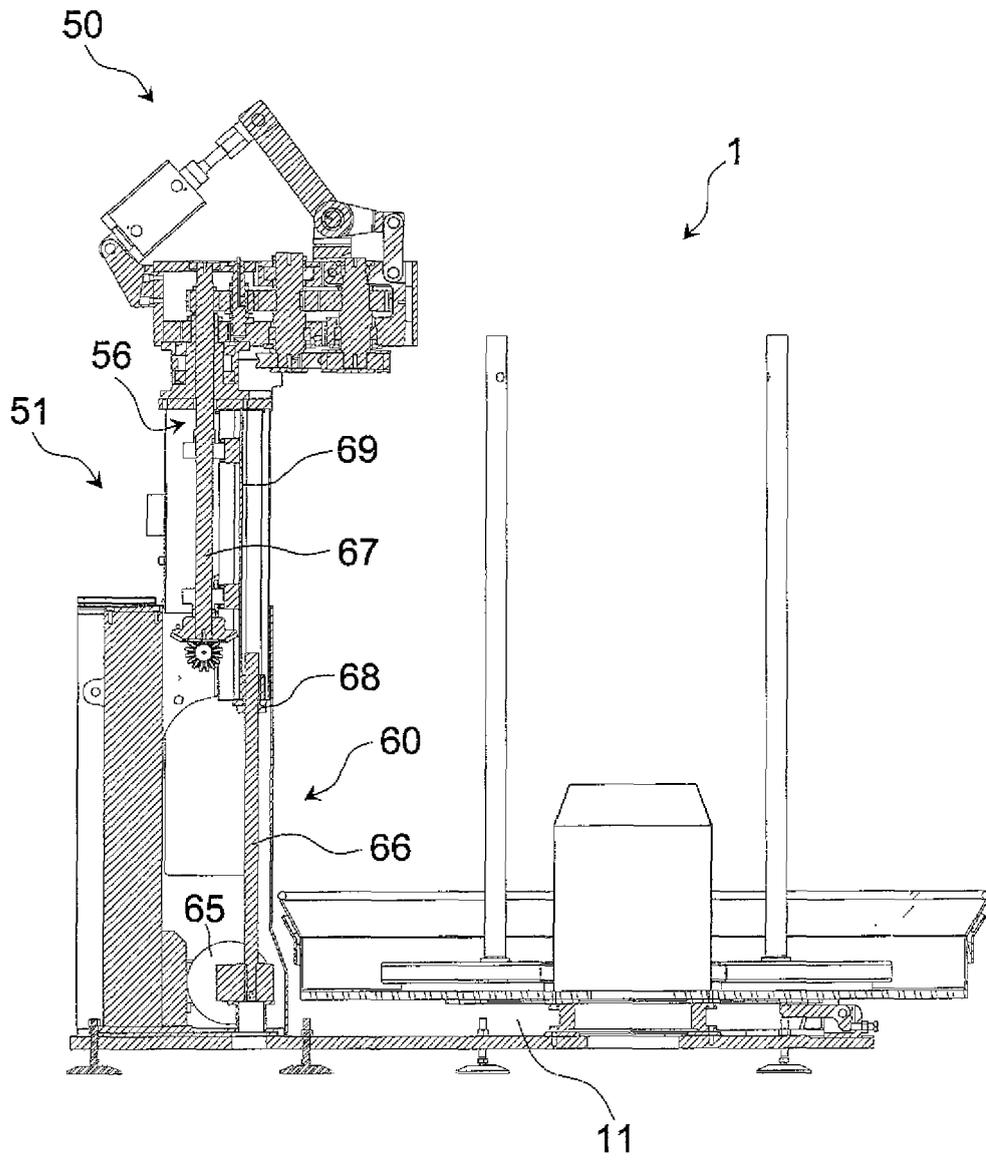


Fig.13

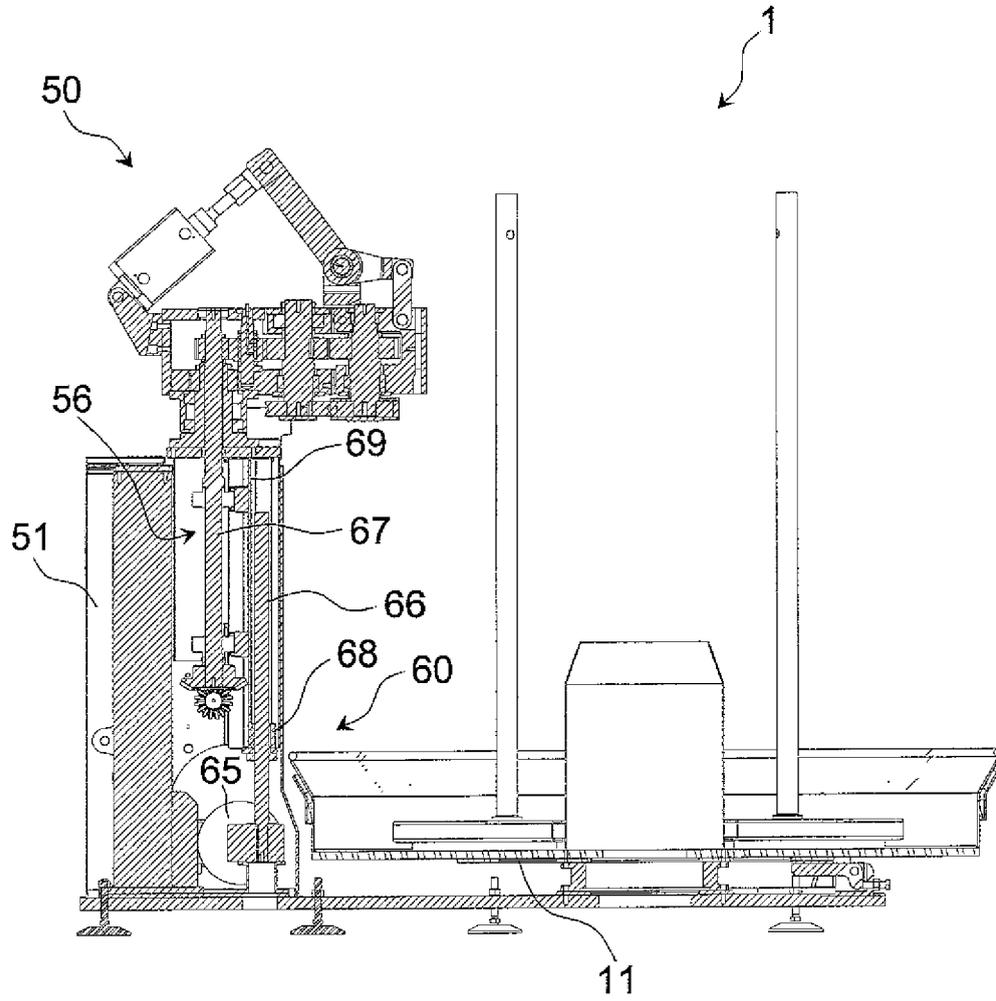


Fig.14



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	WO 2006/070430 A (SCHNELL SPA [IT]; PRIULI DANTE BRUNO [IT]) 6 July 2006 (2006-07-06) * claims 1,11; figures 1,2 * -----	1-12	INV. B21C47/18 B21C47/34
A	FR 1 348 064 A (KANTHAL AB) 4 January 1964 (1964-01-04) * figure 3 * -----	1	
A	DE 42 17 895 A1 (SCHLOEMANN SIEMAG AG [DE]) 2 December 1993 (1993-12-02) * the whole document * -----	1	
A	DE 298 22 375 U1 (VOIGT HAUKE [DE]) 20 April 2000 (2000-04-20) * the whole document * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B21C B65H
1	Place of search Munich	Date of completion of the search 15 January 2008	Examiner Ritter, Florian
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
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15-01-2008

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2006070430	A	06-07-2006	EP 1841548 A1	10-10-2007
FR 1348064	A	04-01-1964	NONE	
DE 4217895	A1	02-12-1993	NONE	
DE 29822375	U1	20-04-2000	NONE	

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