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ROLLER-BLIND APPARATUS

(57) Described herein is a roller-blind apparatus (10), of the type comprising:

- a support (2);

- a winding roller (4) mounted on the support (2) so as to be rotatable about an axis of rotation (I);

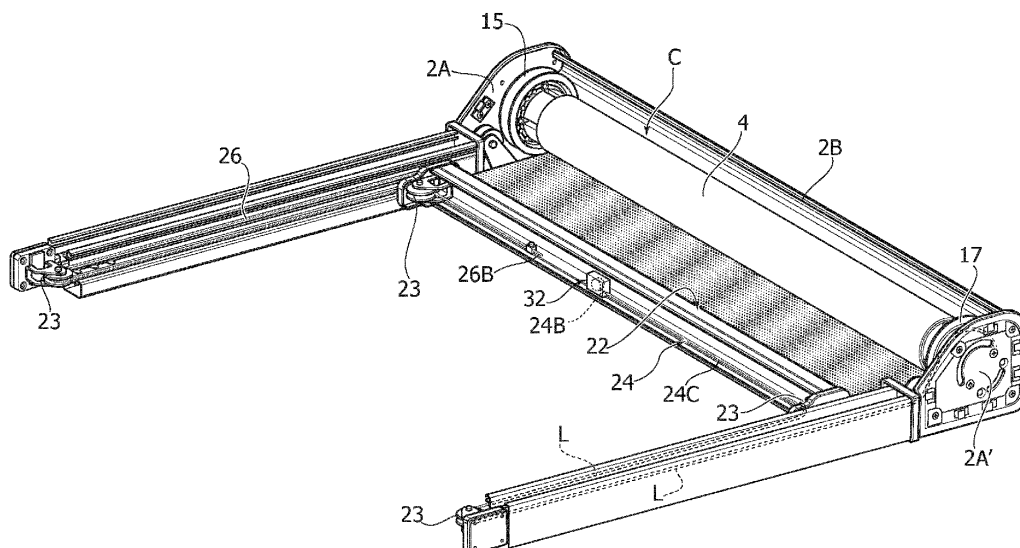
- a covering sheet (6), which is mobile between a rolled-up configuration in which it is wound on the winding roller (4) and an extended configuration in which the covering sheet (6) extends from the winding roller (4) in an unwinding direction (Y);

- a slider (22), which is mobile in the unwinding direction (Y) and to which an end edge of the covering sheet (6) is connected; and

- a pulley (17) and a tensioning cable (24) that connects the pulley (17) to the slider (22) and can be wound on or unwound off the pulley (22), according to the direction of movement of the slider (22) in the unwinding direction (Y).

The apparatus further comprises a regulating device (32) via which it is possible to regulate the elastic force that keeps said cable (24) tensioned.

FIG. 2



Description

Field of the invention

[0001] The present invention relates to a roller-blind apparatus of the type comprising:

- a support;
- a winding roller mounted on the support so as to be rotatable about an axis of rotation;
- a covering sheet, which is mobile between a rolled-up configuration in which it is wound on the winding roller and an extended configuration in which the covering sheet extends from the winding roller in an unwinding direction;
- a slider, which is mobile in the unwinding direction and to which an end edge of the covering sheet is connected;
- a pulley and a tensioning cable that connects the pulley to the slider and can be wound around the pulley; and
- a spring device that connects the pulley in rotation to the winding roller and is configured for exerting on the pulley a torque in a direction such that the cable is pulled in a direction of winding of the cable on the pulley itself;
- wherein the direction of winding of the cable on the pulley is opposite to the direction of winding of the covering sheet on the winding roller so that a movement of winding of the cable on the pulley corresponds to a movement of unwinding of the covering sheet off the winding roller, and vice versa.

[0002] In an apparatus of the type referred to above, the aforesaid spring device is configured for pulling the tensioning cable so that the covering sheet is always kept tensioned, irrespective of the position in which it is located or of the movement to which it is subjected, i.e., whether towards the rolled-up configuration or else towards the extended configuration.

[0003] To guarantee proper operation of the entire apparatus it is fundamental to provide the spring device with proper preloading, which can vary as a function of the specific model of apparatus and of the conditions of installation envisaged. For instance, for apparatuses that envisage a greater length of winding of the covering sheet a greater preloading of the spring device will be necessary, and vice versa.

[0004] However, in the apparatuses known in the art, the operation of regulation of the preloading of the spring device is very frequently rendered problematical since the spring device is housed inside the winding roller, and it is hence very complicated to intervene thereon during installation of the apparatus.

[0005] To overcome the above drawback, in some apparatuses of a known type the spring device is, instead, located within the slider so as to be more easily accessible. However, this causes a considerable complication

of the structure of the slider, which is, in fact, more cumbersome and heavier.

[0006] In this context, the object of the present invention is to provide a roller-blind apparatus that will overcome the aforementioned drawbacks.

[0007] The above object is achieved thanks to an apparatus that presents the characteristics forming the subject of claim 1. The present invention moreover regards a method for installing a roller-blind apparatus, according to claim 11.

[0008] The claims form an integral part of the teaching provided herein.

[0009] Further characteristics and advantages of the present invention will emerge clearly from the ensuing description with reference to the annexed drawings, which are provided purely by way of non-limiting example and in which:

- Figure 1 represents an example of roller-blind apparatus according to the present invention;
- Figure 2 illustrates the apparatus of Figure 1 without some of its external components to render internal parts of the apparatus visible;
- Figure 3 is an exploded view of a set of components of the apparatus of Figure 1;
- Figure 4 illustrates, according to an axonometric view, an example of regulating device used in the roller-blind apparatus according to the invention; and
- Figure 5 illustrates the regulating device of Figure 4 according to an exploded view.

[0010] In the ensuing description various specific details are illustrated aimed at enabling an in-depth understanding of the embodiments. The embodiments may be obtained without one or more of the specific details, or with other methods, components, or materials, etc. In other cases, known structures, materials, or operations are not illustrated or described in detail so that various aspects of the embodiment will not be obscured.

[0011] The references used herein are merely provided for convenience and hence do not define the sphere of protection or the scope of the embodiments.

[0012] With reference to the figures, the roller-blind apparatus described herein - designated as a whole in the figures by the reference number 10 - comprises a support 2, a winding roller 4 mounted on the support 2 so as to be rotatable about an axis of rotation I, and a covering sheet 6 that is mobile between a rolled-up configuration, where it is wound on the winding roller 4, and an extended configuration, where the covering sheet 6 extends from the winding roller 4 in an unwinding direction Y.

[0013] The support 2 is designed to be fixed to any fixed structure, for example a wall, a frame, etc., at the opening or space that will be covered by the covering sheet 6. The unwinding direction Y will correspond to the longitudinal direction of the space or opening.

[0014] The support 2 may present a wide range of configurations according to the requirements of the different

applications.

[0015] In one or more preferred embodiments, like the one illustrated, the support 2 comprises two opposed plates 2A, 2A', joined together by an end wall 2B that basically defines the overall width of the apparatus 10.

[0016] The two plates 2A, 2A' are configured to receive between them the winding roller 4 and support it rotatably about the axis of rotation I.

[0017] In one or more preferred embodiments, like the one illustrated, the apparatus 10 comprises a lid 8 removably mounted on the support 2 and shaped for closing the winding roller 4 inside an internal compartment C, leaving a slit 5, facing in the direction of unwinding Y, for passage of the covering sheet 6.

[0018] In one or more preferred embodiments, like the one illustrated, the winding roller 4 has a generic tubular conformation, such that inside it a main axial cavity 4E is provided that extends from one end to the other of the roller 4.

[0019] With reference to Figure 3, a rotary motor 12 is received in the end portion 4A of the winding roller 4, within the cavity 4E, and has a fixed part 12A, which is fixed to the plate 2A of the support 2. The mobile part 12B of the motor 12 is, instead, rendered fixed with respect to the winding roller 4, in particular via a coupling member 13 that engages, on the side of the end portion 4A, a set of axial cavities 4C, which are made within the thickness of the sleeve of the winding roller 4 and surround the main axial cavity 4E.

[0020] A first pulley 15 is fixedly connected, in rotation, to the mobile part 12B of the motor 12 so as to be able to rotate together with the winding roller 4.

[0021] A spring device 16 is received in the end portion 4B, opposite to the portion 4A, of the winding roller 4 and is fixed to the latter by way of a second coupling member 13' that itself also engages the aforesaid axial cavities 4C.

[0022] A second pulley 17 is fixed to a rotatable part (not illustrated) of the spring device 16.

[0023] The aforesaid rotatable part of the spring device 16 can be rotated with respect to the fixed part of the device itself that is fixed to the winding roller 4, against an elastic action exerted by the device itself.

[0024] The spring device 16 may be of a known type, for example a gas spring, or else a spring device comprising an elastic member set between the fixed part and the mobile part referred to above.

[0025] The apparatus 10 further comprises a slider 22, which is mobile in the unwinding direction Y, and to which an end edge of the covering sheet 4 is fixed.

[0026] Two opposed lateral guides 7 receive the slider 22 according to a sliding coupling and guide it in its movement in the unwinding direction Y.

[0027] Moreover, the apparatus 10 comprises a first cable 24, which operatively connects the pulley 17 to the slider 22 and can be wound on/off the pulley 17 according to the direction of movement of the slider 22 in the direction Y.

[0028] The apparatus 10 further comprises a second

cable 26, which, instead, operatively connects the pulley 15 to the slider 22 and can itself also be wound on/off the pulley 15 according to the direction of movement of the slider 22 in the direction Y.

[0029] Each of the two cables 24, 26 has a first end portion (not visible in the figures) fixed to the respective pulley 17, 15, and a second end portion 24B, 26B fixed to the slider 22 (as will be seen in greater detail in what follows).

[0030] The cables 24 and 26 are enclosed within the slider 22 and the lateral guides 7 so as not to be visible from outside. Preferably, within the slider 22 the two cables 24 and 26 extend along one and the same ideal line.

[0031] Transmission pulleys 23 direct the cables 24 and 26 in the predefined path from the slider 22 to the respective pulleys 17, 15.

[0032] The direction of winding of each of the two cables 24, 26 on the respective pulleys 15, 17 is opposite to the direction of winding of the covering sheet 6 on the winding roller 4 so that a movement of winding of the cables 24 and 26 on the respective pulleys 15 and 17 corresponds to a movement of unwinding of the covering sheet 6 off the winding roller 4, and vice versa.

[0033] Consequently, when the covering sheet 6 is in its rolled-up configuration, the two cables 24, 26 assume a configuration of maximum unwinding off the respective pulleys 15, 17, whereas, when the covering sheet 6 is in its extended configuration, the two cables 24, 26 assume a configuration of maximum winding on the respective pulleys 15, 17.

[0034] The spring device 16 is configured for exerting, via its mobile part, a torque on the pulley 17 in a direction such that the cable 24 is pulled in a direction of winding on the pulley 17. In turn, as a result of the above action of the spring device 16 on the pulley 17, the cable 24 pulls, through the slider 22, the covering sheet 6 in the unwinding direction Y.

[0035] In this way, the covering sheet 4 is kept tensioned in a constant way, irrespective of its position in the unwinding direction Y and irrespective of the movement to which it is subjected, i.e., whether towards the rolled-up configuration or towards the extended configuration.

[0036] The amount of the aforesaid elastic action exerted by the spring device 16 depends upon the level of preloading of the latter that is set during installation of the apparatus 10.

[0037] According to an important characteristic of the apparatus described herein, the slider 22 comprises a regulating device 32 for regulating the length L of a useful portion 24C of the cable 24 that is provided for operatively connecting the pulley 17 to the slider 22. The above useful portion may be understood as the portion of the cable 24 that extends between the point of fixing of the cable to the pulley 17 and the point of entry of the cable into the regulating device 32.

[0038] The person skilled in the sector will now understand that the variation of the length L of the aforesaid

useful portion of the cable 24 at the same time also causes a variation of the level of preloading of the spring device 16 since it brings about a rotation of the mobile part of the spring device 16 - which is in fact connected to the pulley 17 to which the cable 24 is directly connected - with respect to the fixed part of the device itself.

[0039] Thanks to the regulating device 32 it is thus possible to regulate the level of preloading of the spring device 16 simply by intervening on the cable 24, within the slider 22.

[0040] It is consequently evident that the drawbacks of the apparatuses of the prior art, discussed at the start of the present treatment, are completely overcome by the apparatus described herein.

[0041] In fact, in the apparatus described herein it is possible to intervene on the slider 22 that contains the regulating device 32 in order to regulate the preloading of the spring device 16, thus avoiding the need to gain access to the winding roller 4. Moreover, the spring device 16 remains within the winding roller 4 so that the slider 22 maintains a simple and far from cumbersome structure.

[0042] In one or more preferred embodiments, like the one illustrated, the regulating device 32 is located within the slider 22, and the latter has an outer casing 22A that can be removed to enable access to the regulating device 32.

[0043] In one or more preferred embodiments, like the one illustrated (see Figures 4 and 5), the regulating device 32 comprises a receiving roller 34 around which the end portion 24B of the cable 24 can be wound, according to a number of turns variable on the basis of the length L desired for the useful portion 24C of the cable 24.

[0044] Consequently, the length L may be varied in a controlled way by simply winding the end portion 24B of the cable 24 around the roller 34.

[0045] In one or more preferred embodiments, like the one illustrated, the roller 34 is rotatable about an axis of rotation I1, and associated thereto is a unidirectional-motion mechanism configured to allow the roller 34 to rotate only in a direction of winding of the cable 24 useful for increasing the level of preloading of the spring device 16, i.e., in a direction of winding of the cable 24 on the roller 34 such as to enable pulling, instead, of the cable itself in a direction of unwinding off the pulley 17.

[0046] In a preferred embodiment, the aforesaid unidirectional-motion mechanism may be constituted by a ratchet device.

[0047] With reference to the example of Figures 4 and 5, the receiving roller 34 is rotatably mounted on a base 36. This has a circular series of front teeth 36B configured for co-operating with a corresponding series of front teeth 34B, provided on the face of the roller 34 that faces the base 36.

[0048] The teeth 34B or 36B of each series have, in the circumferential direction of the respective series, two opposite surfaces, of which a first surface S1 is orthogonal to the plane in which the series of teeth is made,

and a second, opposite, surface S2 is, instead, inclined by an angle of less than 90° (considering the angle internal to the tooth).

[0049] The surfaces S1 of the two series of the teeth 34B and 36B co-operate with one another to determine blocking of rotation of the roller 34 in a first direction, whereas the surfaces S2 of the same teeth co-operate with one another to enable, instead, the roller 34 to rotate in a second direction, opposite to the first direction.

[0050] In one or more preferred embodiments, like the one illustrated, the roller 34 has a shaped central portion 34C, for example having a hexagonal shape, for engagement thereof by an appropriate tool, with the aid of which it is possible to rotate the roller 34 with respect to the base 36 in order to carry out regulation of the aforesaid length L.

[0051] In one or more preferred embodiments, like the one illustrated, the regulating device 32 further comprises a blocking element for blocking any rotation of the roller 34 about its own axis I1, after the desired length L of the useful portion 24C of the cable 24 has been set. In this way, the end portion 24B is stably fixed to the regulating device 32, leaving the length L desired for the useful portion 24C. In the example illustrated, the above blocking element is constituted by a screw 38 provided for fastening the roller 34 to the base 36.

[0052] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary, even significantly, with respect to what has been illustrated herein purely by way of non-limiting example, without thereby departing from the scope of the present invention, as defined by the annexed claims. For instance, the apparatus described herein may comprise a single cable, for example just the cable 24 of the embodiment illustrated or else a single cable deriving from joining of the two cables 24 and 26.

Claims

1. A roller-blind apparatus (10), of the type comprising:

- a support (2);
- a winding roller (4) mounted on the support (2) so as to be rotatable about an axis of rotation (I);
- a covering sheet (6), which is mobile between a rolled-up configuration in which it is wound on the winding roller (4) and an extended configuration in which the covering sheet (6) extends from the winding roller (4) in an unwinding direction (Y);
- a slider (22), which is mobile in the unwinding direction (Y) and to which an end edge of the covering sheet (6) is connected;
- a pulley (17) and a tensioning cable (24), which connects the pulley (17) to the slider (22) and can be wound on or unwound off the pulley (22), as a function of the direction of movement of the

- slider (22) in the unwinding direction (Y);
 - a spring device (16), which connects the pulley (17) in rotation to the winding roller (4) and is configured for exerting on the pulley (17) a torque in a direction such that the cable (24) is pulled in a direction of winding on the pulley (17); wherein the direction of winding of the cable (24) on the pulley (17) is opposite to the direction of winding of the covering sheet (6) on the winding roller (4) so that a movement of winding of the cable (24) on the pulley (17) corresponds to a movement of unwinding of the covering sheet (6) off the winding roller (4), and vice versa; wherein said slider (22) comprises a regulating device (32) for regulating the length (L) of a useful portion (24C) of the cable (24) that is provided for operatively connecting the pulley (17) to the slider (22) so as to obtain a predefined level of preloading of said spring device (16).
2. The apparatus according to claim 1, wherein said regulating device (32) comprises a receiving roller (34) about which an end portion (24B) of the cable can be wound according to a variable number of turns on the basis of a given length (L) of said useful portion (24C) of the cable (24) that is such as to determine said predefined level of preloading.
 3. The apparatus according to claim 2, wherein said receiving roller (34) is rotatable about an axis of rotation (I1), and a unidirectional-motion mechanism is associated to said receiving roller (34) so as to enable said receiving roller (34) to rotate only in a direction of winding of said cable (24) such as to pull, instead, said cable in a direction of unwinding of said cable (24) from said pulley (17).
 4. The apparatus according to claim 3, wherein said regulating device (32) comprises a blocking element (38) for blocking any rotation of said receiving roller (34) about said axis of rotation (I1).
 5. The apparatus according to claim 3 or claim 4, wherein said unidirectional-motion mechanism comprises a ratchet device.
 6. The apparatus according to claim 5, wherein said receiving roller (34) is rotatably mounted on a base (36), which has a first circular series of front teeth (36B) configured for co-operating with a corresponding second series of front teeth (34B), provided on the face of said receiving roller (34) facing said base (36).
 7. The apparatus according to claim 6, wherein the teeth (34B, 36B) of each of said first and second series have respective opposite surfaces (S1, S2), of which a first surface (S1) is orthogonal to the plane in which the corresponding series of teeth is made and a second, opposite, surface (S2) is, instead, inclined with respect to said plane according to an angle of less than 90° in such a way that the first surfaces (S1) of said first and second series of teeth (34B, 36B) co-operate with one another to bring about blocking of rotation of said receiving roller (34) in a first direction, whereas the second surfaces (S2) of said first and second series of teeth (34B, 36B) co-operate with one another to enable the receiving roller (34) to rotate in a second direction, opposite to the first direction.
 8. The apparatus according to any one of the preceding claims, comprising:
 - a second pulley (15), fixedly connected, in rotation, to said winding roller (4), and a second cable (26) that connects said second pulley (15) to the slider (22) and can be wound on or unwound off the pulley (22), according to the direction of movement of the slider (22) in the unwinding direction (Y).
 9. The apparatus according to any one of the preceding claims, comprising an electric motor (12) for driving said winding roller (4) in rotation about said axis of rotation (I).
 10. The apparatus according to any one of the preceding claims, comprising two opposed lateral guides (7) that receive the slider (22) according to a sliding coupling and guide it in its movement in the unwinding direction (Y).
 11. A method for installing a roller-blind apparatus (10), comprising the steps of:
 - providing a support (2) and fixing said support to a fixed structure at an opening or space to be covered with said roller-blind apparatus (10);
 - providing a winding roller (4) mounted on the support (2) so as to be rotatable about an axis of rotation (I);
 - providing a covering sheet (6), which is mobile between a rolled-up configuration in which it is wound on the winding roller (4), and an extended configuration in which the covering sheet (6) extends from the winding roller (4) in an unwinding direction (Y);
 - providing a slider (22), which is mobile in the unwinding direction (Y) and to which an end edge of the covering sheet (6) is connected;
 - providing a pulley (17) and providing a tensioning cable (24) that connects the pulley (17) to the slider (22) and can be wound on or unwound off the pulley (22), according to the direction of movement of the slider (22) in the unwinding direction (Y).

rection (Y); and

- providing a spring device (16), which connects the pulley (17) in rotation to the winding roller (4) and is configured for exerting on the pulley (17) a torque in a direction such that the cable (24) is pulled in a direction of winding on the pulley (17);

wherein the direction of winding of the cable (24) on the pulley (17) is opposite to the direction of winding of the covering sheet (6) on the winding roller (4) so that a movement of winding of the cable (24) on the pulley (17) corresponds to a movement of unwinding of the covering sheet (6) off the winding roller (4), and vice versa; said method further comprising the step of: regulating, by means of a regulating device (32) provided in said slider (22), the length (L) of a useful portion (24C) of the cable (24) that is provided for operatively connecting the pulley (17) to the slider (22), until a predefined level of preloading of said spring device (16) is achieved.

12. The method according to claim 11, wherein said step of regulating the length (L) of said useful portion (24C) of the cable (24) includes rotating a receiving roller (34) of said regulating device (32) so as to wind an end portion (24B) of said cable (24) according to a variable number of turns as a function of said predefined level of preloading.

FIG. 1

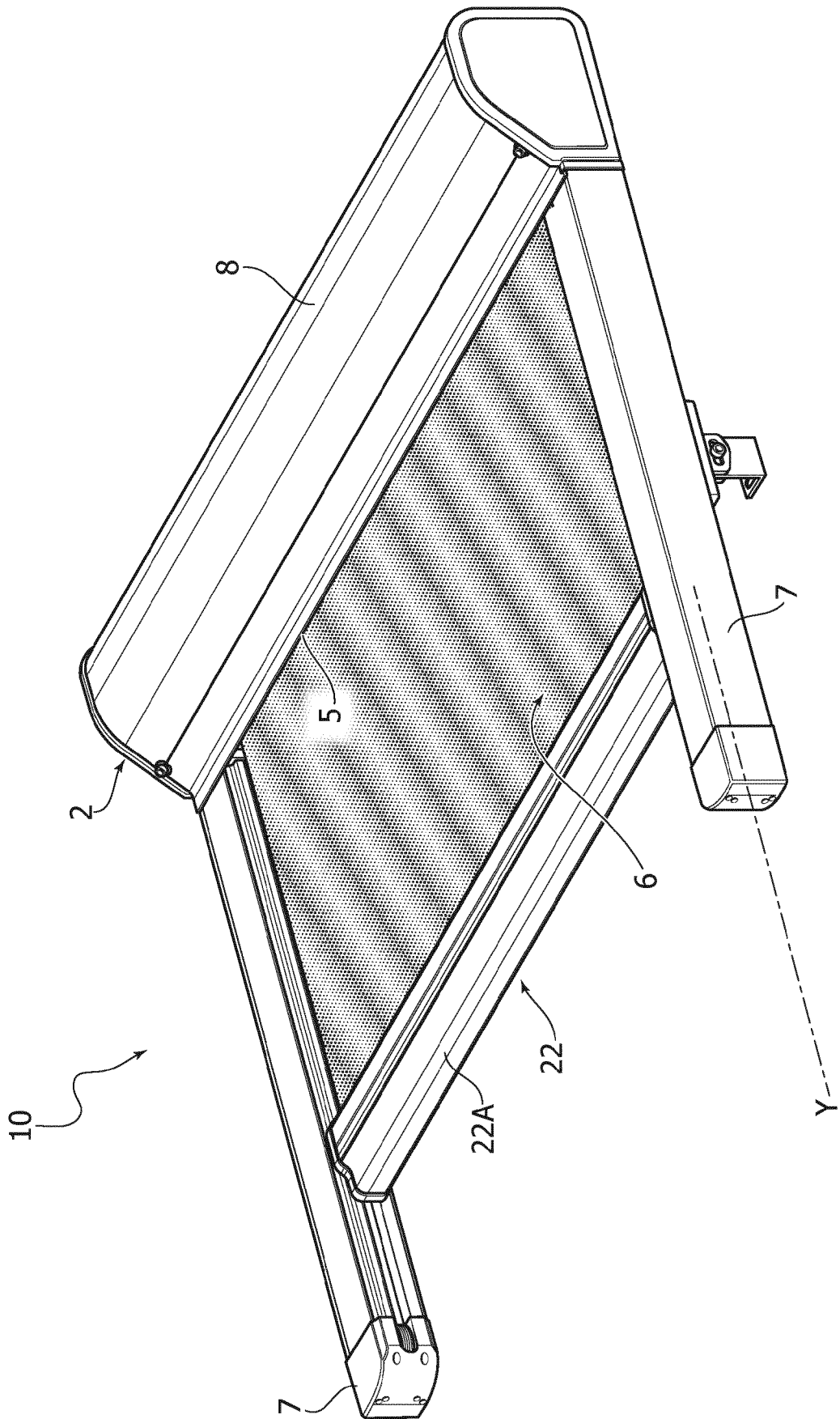


FIG. 2

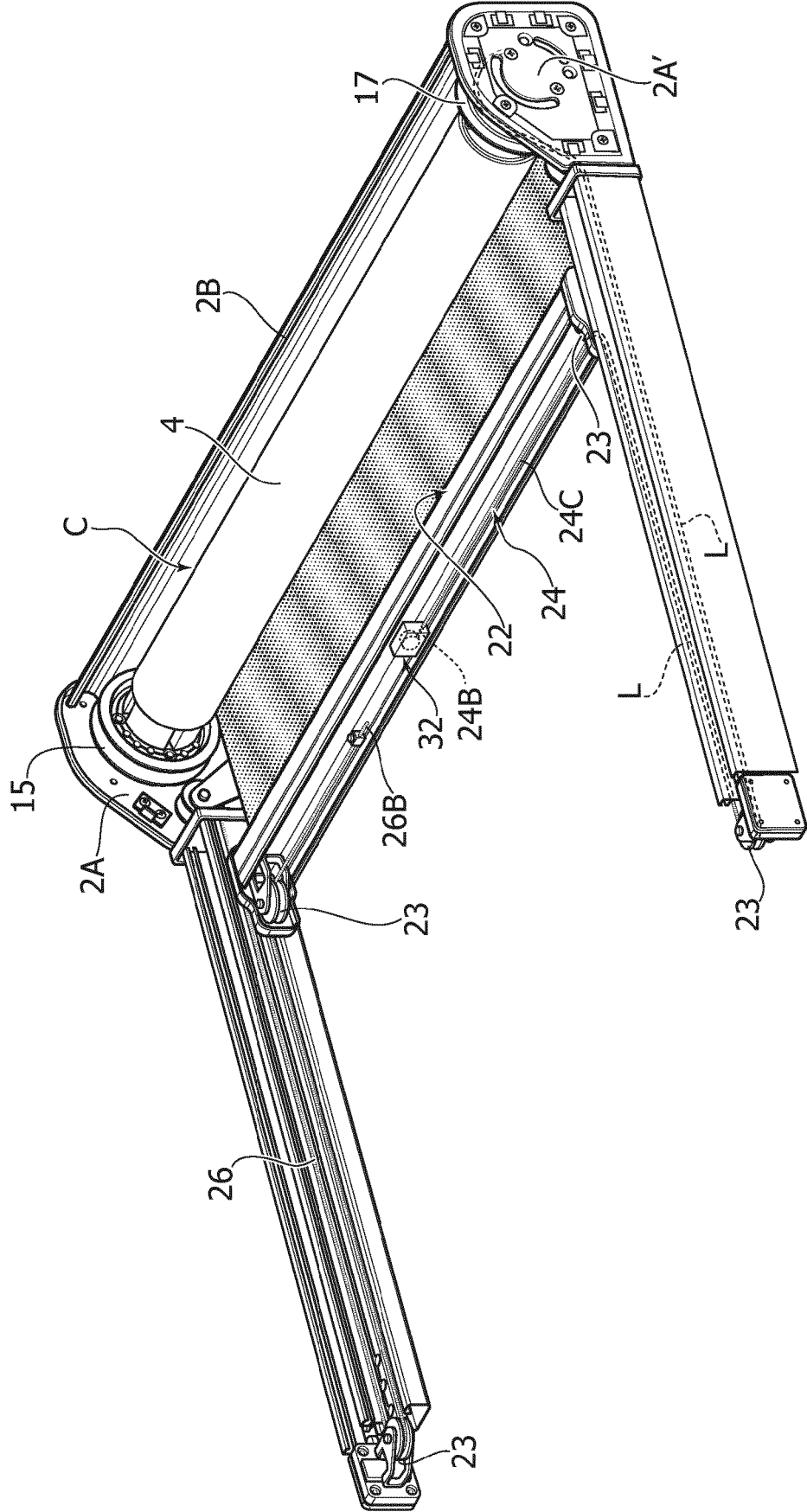


FIG. 3

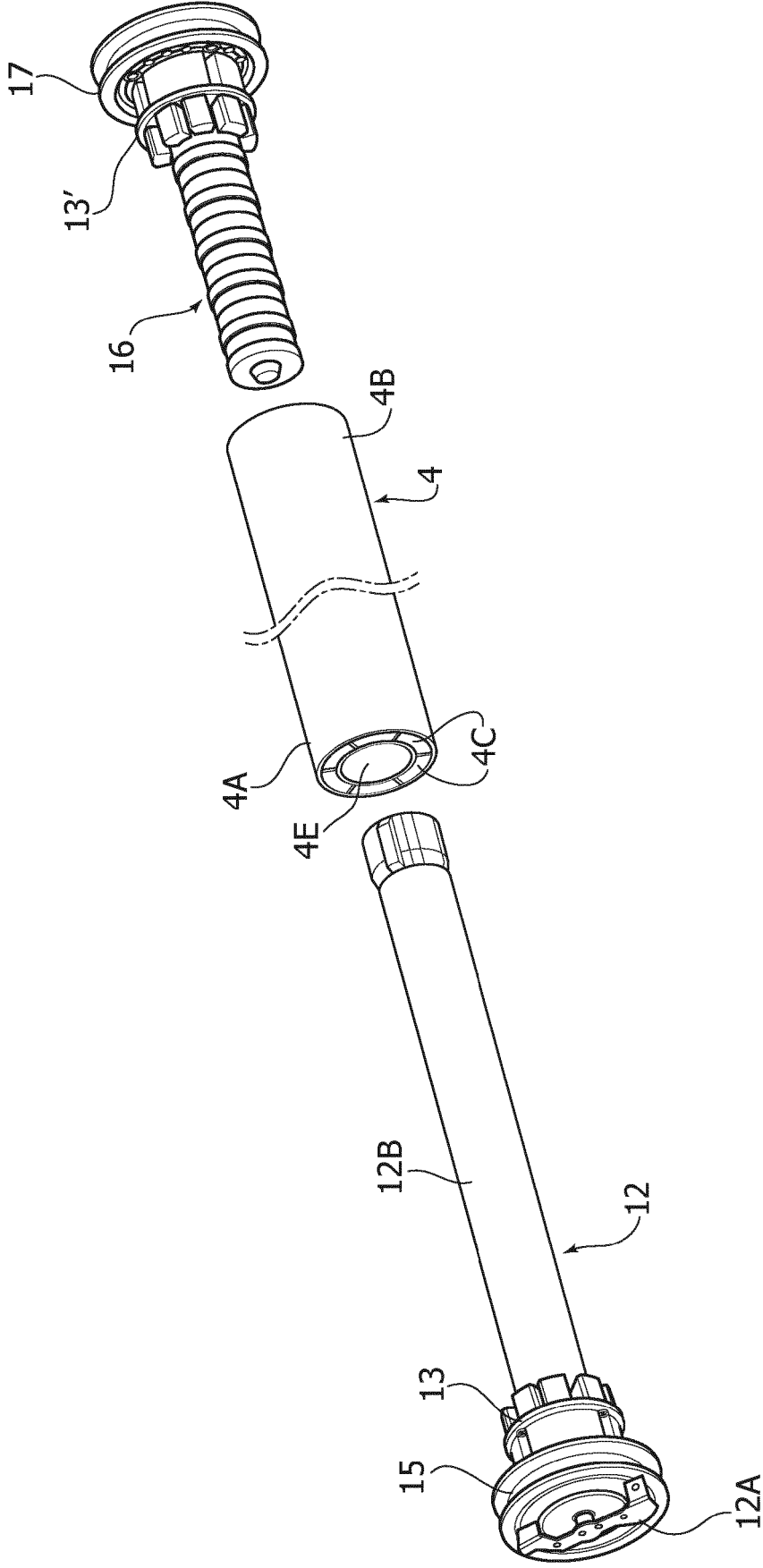


FIG. 4

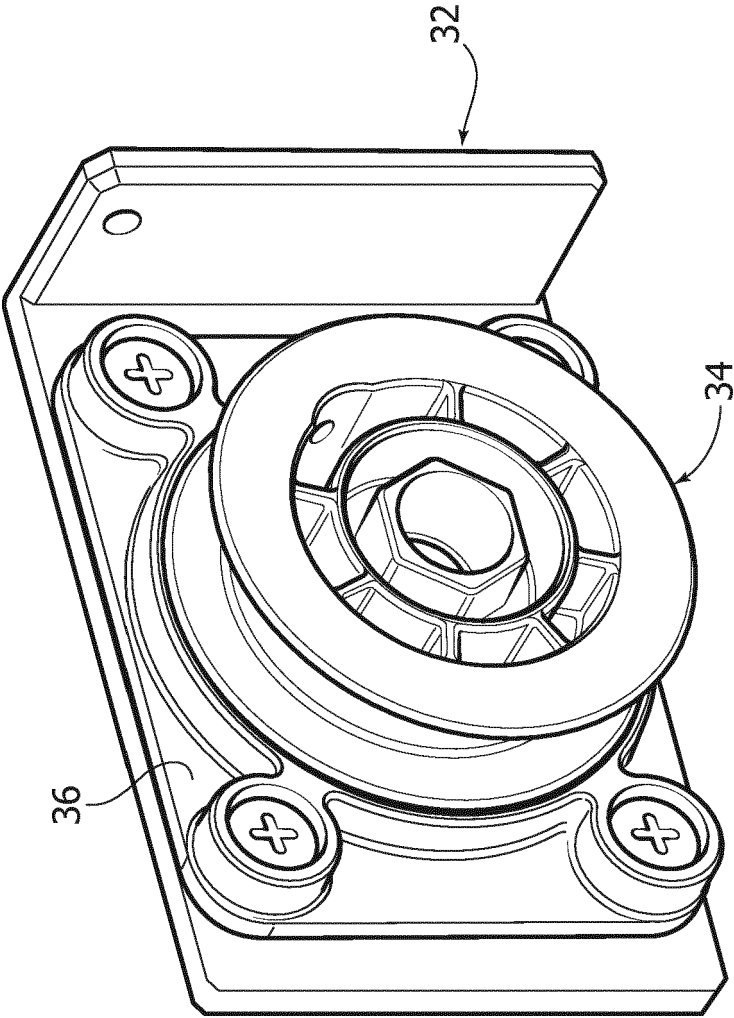
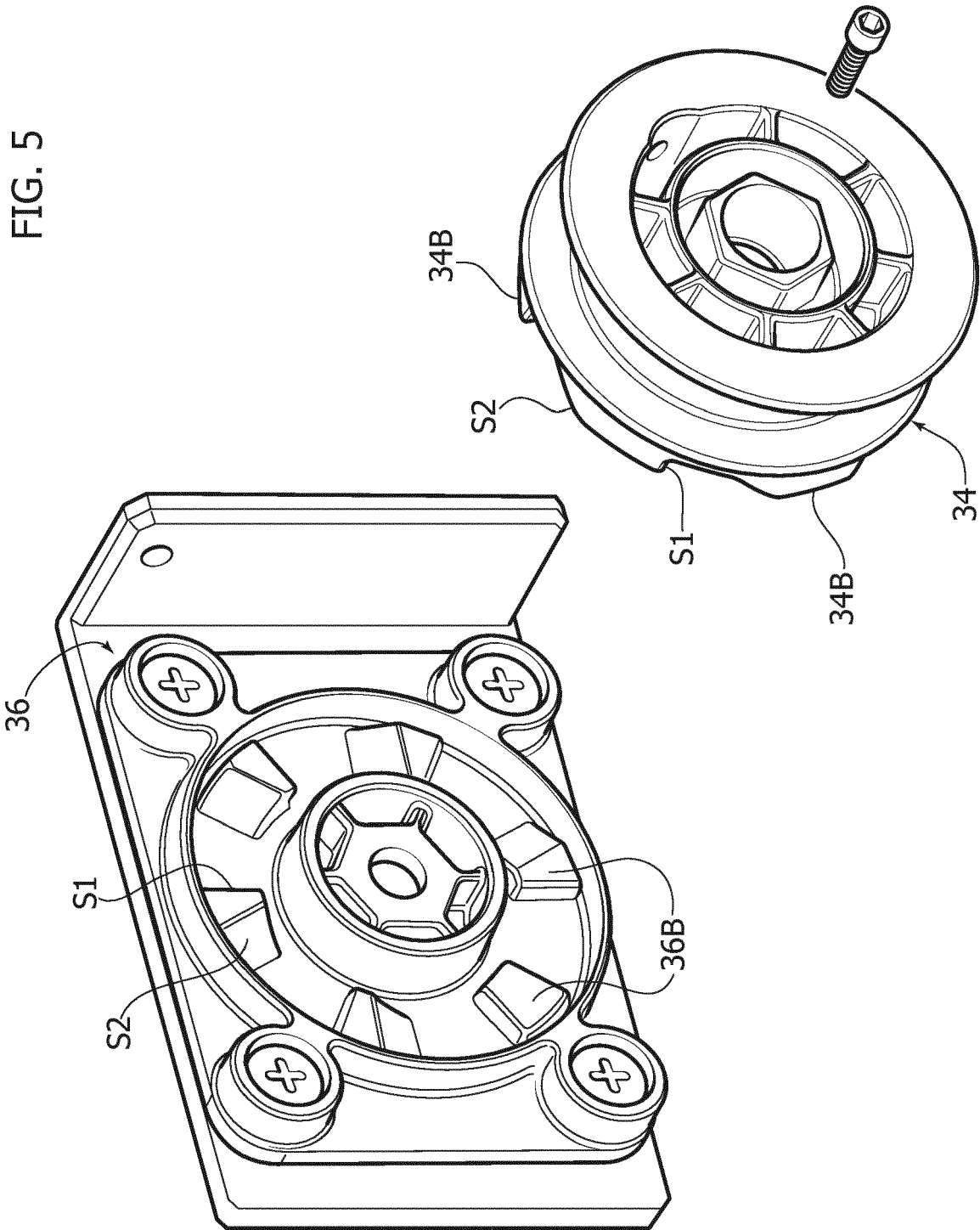


FIG. 5





EUROPEAN SEARCH REPORT

Application Number

EP 23 20 4258

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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	EP 0 289 076 A2 (WINSOL, NAAMLOZE VENNOTSHAP) 2 November 1988 (1988-11-02)	1, 8, 10, 11	INV.
Y	* column 6, lines 2-23; figures 1-4 *	9	E06B9/17 E06B9/42 E06B9/58
Y	FR 2 604 203 A2 (FRANCIAFLEX [FR]) 25 March 1988 (1988-03-25) * page 2, line 29 - page 3, line 25; figures 1, 3 *	9	E06B9/62 E04F10/06 E06B9/72
A	WO 96/29498 A1 (SILVESTRI NICOLA [IT]) 26 September 1996 (1996-09-26) * page 3, line 44 - page 5, line 89; figures 1, 2 *	1-12	
A	FR 2 957 114 A1 (ALUROY [FR]) 9 September 2011 (2011-09-09) * page 4, lines 3-22; figures 2, 5-6 *	1-12	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B E04F
The present search report has been drawn up for all claims			

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EPO FORM 1503 03.82 (P04C01)

Place of search

Munich

Date of completion of the search

4 March 2024

Examiner

Kofoed, Peter

CATEGORY OF CITED DOCUMENTS

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EP 23 20 4258

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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04-03-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0289076 A2	02-11-1988	BE 1000507 A7	03-01-1989
		EP 0289076 A2	02-11-1988
FR 2604203 A2	25-03-1988	NONE	
WO 9629498 A1	26-09-1996	AU 5118996 A	08-10-1996
		EP 0760894 A1	12-03-1997
		IT 1278057 B1	17-11-1997
		WO 9629498 A1	26-09-1996
FR 2957114 A1	09-09-2011	NONE	