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(54) **CANOPY ASSEMBLY FOR A SUNSHADE AND PREFERABLY A SAIL SUNSHADE**

(57) Canopy assembly (1) for a sunshade (10) and sunshade, comprising: at least one frame (2), suitable to connect said canopy assembly (1) to a wall or to a support structure (3); at least one canopy sheet (4); at least one winder roller (5), suitable to form a winding support to wind at least partially said canopy sheet (4), said winder roller (5) comprising a roller body (6) directly or indirectly joined rotatably to said frame (2) so as to be able to rotate with respect to said frame (2) around a roller axis (X-X); at least one device for tensioning the sheet, suitable to unfurl at least partially said at least one canopy sheet (4); said winder roller (5) and said at least one sheet tensioning device cooperating to alternatively roll up and unfurl

at least partially said canopy sheet (4); wherein said at least one canopy sheet (4) comprising at least a first sheet portion (11) fixed to said tensioning device of the sheet and at least one opposing second sheet portion (12) fixed to said roller (5); said roller body (6) delimiting at least partially a roller body inner cavity (8); said sheet tensioning device comprising at least one elastic device (9) that elastically biases said first sheet portion (11) away from said winder roller (6), pre-loading in traction said canopy sheet (4); characterized in that said roller body (6) receives at least partially said at least one elastic device (9) housed in said roller body inner cavity (8), concealing it from view.

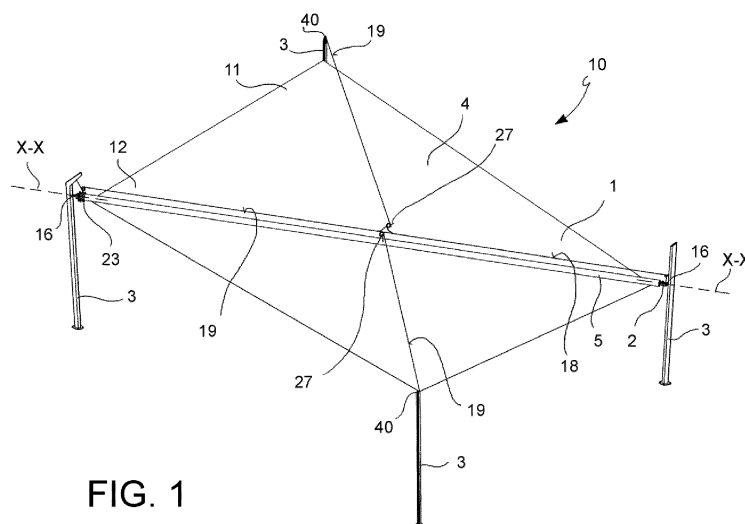


FIG. 1

DescriptionField of the invention

5 **[0001]** The object of the present invention is a canopy assembly for a sunshade.
[0002] The present invention also refers to a sunshade comprising said canopy assembly.
[0003] A canopy assembly according to the present invention comprises a tensioning device for the canopy sheet.

State of the art

10 **[0004]** Roll-up shading sail installations to provide an extensible and temporary canopy to protect or shield the users of an outdoor area from the weather are generally known. Such installations of a known type generally comprise a roller free to rotate, around which at least one sail or awning is wound, supporting uprights anchored to the ground to keep the roller suspended off the ground, the covering element, i.e. the same sail or awning, and a circuit for the unfurling and winding of the sail or awning.

15 **[0005]** This unfurling and winding circuit of the sail usually provides for a cord stretched between the sail and a rotating spool, sometimes motorized, so that the rotating spool advantageously causes the cord to roll up, pulling the sail so as to unwind it progressively from the roller and unfurl it. In a dual manner, the sail is wound around the roller by rotating the roller in the opposite direction, which consequently progressively reels off the cord from the spool.

20 **[0006]** Known solutions generally comprise a pair of sails associated with the same roller and suitable to unfurl in sync and extend in opposite directions. However, the known installations of the types mentioned above are not without their drawbacks. In effect, such known circuits for unfurling and winding, although satisfactory in some respects, are intrinsically designed to provide a sail frequently loose both during the steps of moving the sail, and with the roller stopped when the sail is at least partially, but also totally, unfurled.

25 **[0007]** In particular, during the step of unfurling the sail or awning by the rotating roller, while the radius of the roller decreases with each roller turn in a constant manner and equal to the thickness of the sail or awning, the cord coils onto the spool randomly due to its filiform extension. Likewise, during the winding step, the sail coils around the roller, increasing the radius thereof in a constant and progressive way, while the cord reels off from the spool in an irregular or random way. This imbalance imparts a variable tensioning of the sail or awning, which necessarily means that at least portions of the sail or awning are loose or slack.

30 **[0008]** A loose sail or awning is subject to significant instability when hit by air currents and at the same time prevents adequate drainage of liquids, such as rainwater, which accumulate in pockets. In addition, it should be noted that a loose sail or awning hit by air currents overstrains the anchors of the uprights of the installation on the ground. These effects are undesirable as they compromise the safety of the installation as well as the integrity of the sail itself.

35 **[0009]** Therefore, the need is strongly felt to provide a suitable solution to keep the sail or awning taut in every step of use of the sunshade.

[0010] For example, document US-6012505 shows a device adapted to tension the sail canopy of a sail sunshade. This device comprises a system of coil springs arranged in a cross shape joined to portions of the cord stretched between the spool and one of the edges of the sail canopy. The cross-shaped spring is placed in such a position as to overhang the space usable by the sail canopy in any configuration of use of the sunshade, in other words, these cross-shaped springs remain in the same position both when the sail canopy is unfurled and when the sail canopy is wrapped around the winder roller.

[0011] Although advantageous in exerting a substantially balanced elastic action of tensioning on the sail canopy, this solution is not without its drawbacks.

45 **[0012]** In particular, the provision of such a system of coil springs arranged in a cross that overhangs the sunshade results in constant exposure to the weather, both when the sail canopy is unfurled and when the sail canopy is wound around the winder roller. Such a continuous and lasting exposure to the weather, whether it be sunlight, rainwater or other precipitation, necessarily entails a short operating life for such a spring system, requiring frequent replacement and maintenance.

50 **[0013]** Moreover, this system of metal springs arranged in a cross may undergo early rust as a result of precipitation with the risk of staining with rust, by dripping, the sail canopy when it is unfurled, as well as the furniture or users in the underlying area on the ground when the canopy is closed or rolled up.

[0014] At the same time, such a configuration of the coil spring system arranged in a cross overhanging the sunshade is extremely unpleasant to the eye and therefore totally unsuitable, for example, for designer sunshades or sunshades with a minimalist appearance.

55 **[0015]** In addition, the size of such springs calculated in the longitudinal direction, but also in the transverse direction, is necessarily limited to a fraction of the size of the sail for reasons of size and weight, as well as aesthetics, alternatively requiring the use of very hard, and thus expensive, springs to obtain a strong tension or being satisfied with a lesser

elastic action.

[0016] It is also known, as shown in document EP-1974107, to provide torsion springs associated with the roller so as to exert a direct elastic action when the roll-up sail or awning is unfurled, to rotate the roller in the winding direction of the sail in order to keep it taut. However, the torsion springs used for this type of solution are too weak to effectively counteract the action that the weather, and particularly air currents, exert on a sail or awning, usually resulting in sunshades with loose sails or awnings and thus unstable or requiring the provision of additional elastic support elements placed in visible portions of the sunshade. Otherwise, or in addition, these torsion springs require rolling awnings or sails to be made of modest extension while being totally unsuitable for keeping large sails or awnings taut. Moreover, such torsion springs are inherently unsuitable for keeping two sails extending in opposite directions taut by a single winder.

[0017] The need is therefore strongly felt to provide a device to keep the sail or awning taut in every step of use of the sunshade, while giving the sunshade an aesthetically pleasing appearance, without thereby requiring frequent maintenance of the sunshade or the parts thereof.

[0018] At the same time, there is a need to provide a device for tensioning the sail or awning of a sunshade that is more discreet, reliable and versatile with respect to known solutions.

Solution

[0019] One of the aims of the present invention is to remedy the drawbacks of the prior art reported so far and to provide a solution to the needs mentioned with reference to the state of the art.

[0020] This and other objects are achieved with a canopy assembly according to claim 1, as well as with a sunshade according to claim 7.

[0021] Some advantageous embodiments are the subject of the dependent claims.

Figures

[0022] Further features and advantages of the assembly and the sunshade according to the invention will become apparent from the following description of its preferred examples of embodiment, given by way of indicative and non-limiting example, with reference to the accompanying figures wherein:

- Figure 1 is an axonometric view of a sunshade, According to one embodiment;
- Figure 2 is a plan view of a canopy assembly wherein a dotted line illustrates some possible configurations of the sheet tensioning device;
- Figure 3 is an axonometric view of a sunshade, according to one embodiment;
- Figures 4 and 5 are axonometric and partially cross-sectioned views of a canopy assembly, according to some embodiments;
- Figure 6 is a view of a portion of a sunshade, wherein a winder roller according to one embodiment is shown in cross-section;
- Figures 7 and 8 are cross-sectional views of a portion of a winder roller, according to some embodiments.

Description of some of the preferred embodiments

[0023] According to a general embodiment, a canopy assembly 1 for a sunshade 10 is provided.

[0024] Said canopy assembly 1 comprises at least one frame 2, at least one canopy sheet 4, at least one winder roller 5, and at least one sheet tensioning device.

[0025] Said at least one frame 2 is suitable to connect said canopy assembly 1 to a wall or a support structure 3. Preferably, said frame 2 comprises a connecting device, suitable to connect said canopy assembly 1 to said support structure 3 or to a wall.

[0026] Said at least one winder roller 5 is suitable to form a winding support to wind at least partially said canopy sheet 4.

[0027] Said winder roller 5 comprises a roller body 6 directly or indirectly joined rotatably to said frame 2 in such a way as to be able to rotate with respect to said frame 2 around a roller axis X-X.

[0028] Said sheet tensioning device is suitable to at least partially unfurl said at least one canopy sheet 4, preferably by pulling it. Preferably, said canopy assembly comprises a boom comprising said winder roller.

[0029] Said winder roller 5 and said at least one sheet tensioning device cooperate to alternately roll up and/or unfurl at least partially said canopy sheet 4.

[0030] Said at least one canopy sheet 4 comprises at least one first sheet portion 11 joined, and preferably fixed, to said sheet tensioning device and at least one opposing second sheet portion 12 joined and preferably fixed, to said winder roller 5. For example, said second sheet portion 12 is sewn or glued to the roller body 6 or is inserted into a special seat provided in the winder roller 5 forming a firm coupling, for example pinched between two edges of the body

of the winder roller.

[0031] Preferably, said canopy sheet 4 has a substantially triangular shape wherein said first sheet portion 11 is formed by a portion next to a vertex of said triangle, and said second sheet portion 12 is formed by a portion adjacent to one side of said triangle placed preferably opposite to the vertex that forms said first sheet portion 11. In other words, said first sheet portion 11 is placed on the edge of the sheet near a vertex of said triangle.

[0032] Advantageously, said roller body 6 delimits at least partially a roller body inner cavity 8.

[0033] According to a preferred embodiment, said sheet tensioning device comprises at least one elastic device 9 which elastically biases said first sheet portion 11 away from said winder roller 6, pre-loading said canopy sheet 4 in traction to keep it taut.

[0034] According to a preferred embodiment, said elastic device 9 is exclusively suitable to work axially. Preferably, an axial elastic device direction A-A coinciding with the longitudinal axis of extension of said elastic device 9 is defined, and said elastic device 9 is suitable to deform in the axial elastic device direction A-A. Preferably, said axial elastic device direction A-A is parallel to the roller axis X-X.

[0035] According to one embodiment, said elastic device comprises at least one axial spring, for example, it comprises a coil spring and/or a wire spring wound around a winding axis to form a plurality of spring coils.

[0036] According to one embodiment, said elastic device 9 is a gas piston.

[0037] Preferably, said elastic device 9 exerts an elastic bias action on said first sheet portion 11 away from said winder roller 6 when loaded in compression. In other words, said elastic device 9 is suitable to work exclusively in compression, preventing said elastic device from being suitable to work in torsion.

[0038] Advantageously, said roller body 6 receives at least partially said at least one elastic device 9 housed in said roller body inner cavity 8, concealing it from view. In other words, said elastic device 9 is housed in said roller body inner cavity 8. Preferably, said roller body 6 receives entirely said at least one elastic device 9 housed in said roller body inner cavity 8.

[0039] In this way, it is possible to conceal said elastic device 9 from view and at the same time protect it from the effects of the weather. In this way, it is possible to make said elastic device 9 larger with respect to known solutions, while resulting in an aesthetically pleasing appearance of the canopy assembly. At the same time, the walls of the cavity, wherein is housed the elastic device 9, support the elastic device by guiding it in the axial deformation thereof, consequently allowing the use of an elastic device weighing more with respect to known solutions. In other words, such a configuration prevents the elastic device 9 from deforming in bending due to its own weight.

[0040] According to one embodiment, said roller body 6 defines a roller body footprint, and said elastic device 9 is contained at least partially, preferably entirely, in said roller body footprint 6.

[0041] According to one embodiment, said canopy assembly 1 comprises a shaft 13 connected to said frame 2, wherein said shaft 13 comprises a shaft body 14.

[0042] According to one embodiment, said roller body 6 is fitted onto said shaft body 14, so as to be able to rotate with respect to said shaft body 14 around the roller axis X-X. Preferably, said canopy assembly comprises said boom comprising said winder roller and said shaft.

[0043] According to one embodiment, said shaft body 14 and said roller body 6 are coaxial to each other. Preferably, said shaft body 14 and said roller body 6 are coaxial to each other and centered on said roller axis X-X.

[0044] According to one embodiment, said roller body 6 receives at least one portion of said shaft body 14 housed in said roller body inner cavity 8. Preferably, at least one winding member 7, such as a ball or roller bearing, is placed between said roller body 6 and said shaft body 14. Preferably, between said elastic device 9 and said shaft body 14 and/or said roller body 6 are placed at least one winding member 7, such as a ball or roller bearing, and preferably a plurality of winding members 7.

[0045] According to one embodiment, said shaft body 14 delimits a shaft inner cavity 15.

[0046] According to one embodiment, said shaft body 14 receives at least partially said at least one elastic device 9 housed in said shaft body inner cavity 15. In this way, said shaft body 14 housed in said roller inner cavity 8 receives said elastic device housed in said shaft inner cavity 15. In this way, it is possible to further protect said shaft body from the weather. Preferably, said shaft body 14 receives entirely said at least one elastic device 9 housed in said shaft body inner cavity 15.

[0047] According to one embodiment, said shaft body 13 defines a shaft footprint, and said elastic device 9 is contained at least partially, preferably entirely, in said shaft footprint.

[0048] According to one embodiment, said sheet tensioning device comprises at least one tendon 19, suitable to work in traction, fixed to said first sheet portion 11.

[0049] According to one embodiment, the sheet tensioning device comprises at least one elastic tensioning cord 18, suitable to work in traction, connected to said elastic device 9 and to a portion of said tendon 19. Preferably, a first cord end 25 is connected to said elastic device 9 and a second opposing cord end 26 is connected to said tendon 19. According to one embodiment the terminology "elastic tensioning cord" does not mean that this cord must necessarily be elastically deformable, even though it may be. In other words, the terminology "elastic tensioning cord" is intended to indicate

preferably the or a transmission element of the elastic bias action on the canopy sheet.

[0050] According to one embodiment, said elastic tensioning cord 18 comprises a first cord end 25 joined to said elastic device 9, a second cord end 26 opposite to said first cord end 25 and joined to said tendon 19 by means of a return and tensioning device 27, and an intermediate cord portion that extends between said first cord end 25 and said second cord end 26.

[0051] According to one embodiment, said tendon 19 comprises a first tendon end 21 connected to said first sheet portion 11 of the canopy sheet 4.

[0052] Preferably, said at least one elastic tensioning cord 18 biases in traction said first tendon end 21 connected to said first sheet portion 11 of the canopy sheet 4.

[0053] According to one embodiment, said tendon 19 further comprises a second tendon portion 22 connected to a tendon winding spool 23, and an intermediate tendon portion 24 interposed between said first tendon end 21 and said second tendon portion 22. The provision of such a canopy assembly 1, during the movement of the canopy sheet 4, when the radius of the canopy sheet wound around the winder roller 5 increases or decreases steadily and said at least one tendon 19 reels off from the tendon winding spool 23 or winds around the tendon winding spool 23, respectively, in a random way, causing an imbalance, such imbalance is compensated by the elastic bias action of the tensioning device comprising said elastic device 9 to keep the tensioning of the canopy sheet 4 uniform also during the movement of the canopy sheet 4. According to one embodiment, said tendon winding spool 23 is joined to a motor, preferably electric.

[0054] According to a preferred embodiment, said tendon winding spool 23 is mounted on said winder roller 5, preferably coaxial to said winder roller 5. According to a preferred embodiment, said tendon winding spool 23 is mounted integral to said winder roller 5.

[0055] According to one embodiment, said canopy assembly 1 comprises a drive device, suitable to rotate at least one of said winder roller 6 or said tendon winding spool 23. According to one embodiment, said drive device is motorized and comprises at least one electric motor. According to one embodiment, said drive device rotates selectively one of said winder roller 5 or said tendon winding spool 23. According to one embodiment, said drive device comprises a control system suitable to synchronize the drive of said winder roller 5 and/or said tendon winding spool 23.

[0056] According to one embodiment, said drive device is manual. For example, said drive device comprises a crank drive.

[0057] Preferably, said at least one elastic tensioning cord 18 is connected to said intermediate tendon portion 24 and biases in traction said first tendon end 21.

[0058] According to one embodiment, said at least one elastic tensioning cord 18 is connected to said intermediate tendon portion 24 by at least one return and tensioning device 27. According to one embodiment, said return and tensioning device 27 comprises at least one pulley. According to one embodiment, said return and tensioning device 27 delimits a return seat that receives said intermediate tendon portion 24. Preferably, said return and tensioning device 27 comprises at least one carriage. According to one embodiment, said return and tensioning device 27 is suitable to slide on said intermediate tendon portion 24.

[0059] According to one embodiment, said elastic device 9, by means of said elastic tensioning cord 18, exerts an elastic bias action aimed at pulling said tendon 19 by said intermediate tendon portion 24, exerting, by means of said first tendon end 21, a pre-loading on said first sheet portion 11 that keeps said canopy sheet 4 taut.

[0060] According to one embodiment, said frame 2 comprises at least one pin 28 comprising at least one internally hollow portion that delimits a pin cavity 29. Preferably, said shaft body 14 is fitted on said pin 29. Preferably, said shaft body 14 is integral with said pin 29. According to one embodiment, said pin 29 is made in one piece with said frame 2 and/or said support structure 3 joinable to the canopy assembly 1.

[0061] According to one embodiment, said pin 28 comprises at least an abutment portion 32 facing said shaft cavity 14.

[0062] According to one embodiment, said elastic device 9 is suitable to slide within said roller cavity 8. According to one embodiment, said elastic device 9 is suitable to slide within said shaft cavity 15.

[0063] According to one embodiment, said elastic device 9 comprises at least one stop portion 33 suitable to abut against said abutment portion 32 of said pin 29. Preferably, said stop portion 33 abuts against said abutment portion 32 when said elastic tensioning cord 18 is pulled by said intermediate tendon portion exerting a traction action on said elastic device 9.

[0064] According to one embodiment, when said stop portion 33 of said elastic device 9 abuts against said abutment portion 32 of said pin 29, said elastic device 9 is elastically loaded, deforming in compression, in other words, compressing itself.

[0065] According to one embodiment, said elastic device 9 is elastically loaded when deformed in compression by the action of traction exerted by said elastic tensioning cord 18 so as to elastically bias, through the traction of said elastic tensioning cord 18, said first tendon end 11 and consequently said first canopy sheet portion 21.

[0066] According to one embodiment, said roller body 6 comprises at least one cavity wall that delimits at least partially said roller cavity 8, and said at least one roller cavity wall guides the deformation of said elastic device 9, so that said elastic device deforms in traction and/or compression along the roller axis X-X.

[0067] According to one embodiment, said shaft body 14 comprises at least one cavity wall 36 that delimits at least partially said shaft cavity 15, and said at least one cavity wall 36 guides the deformation of said elastic device 9, so that said elastic device deforms in traction and/or compression along the roller axis X-X.

[0068] According to one embodiment, said shaft inner cavity 16 is in communication with said pin cavity 29, and said elastic tensioning cord 18 crosses at least a portion of said pin cavity 29. Preferably, said pin 28 delimits a pin hole 30, suitable to connect said pin cavity 29 with a pin outer side surface 31.

[0069] According to one embodiment, said canopy assembly 1 comprises two canopy sheets 4 opposite to said winder roller 5. Preferably, said two canopy sheets 4 have an extension different from each other, forming a canopy assembly 1 not symmetrical and not mirrored with respect to said roller 5, such as, for example, shown in Figure 4.

[0070] The provision of such a device for tensioning the canopy sheet is able to keep said canopy sheets 4, 104 taut even if said canopy assembly 1 is not symmetrical or not mirrored with respect to said roller 5.

[0071] According to one embodiment, said canopy assembly 1 comprises two canopy sheets 4, 104 opposite to said winder roller 5, wherein each canopy sheet 4 or 104 of said two opposing canopy sheets 4, 104 comprises a first canopy portion 11, 111 associated with said device for tensioning the canopy sheet. Preferably, each first sheet portion 11, 111 is joined to a tendon 19, 119 by a first tendon end 21, 121, and each tendon 19, 119 is joined to a return and tensioning device 27, 127 with a single second cord end 26 of a single elastic tensioning cord 18. In this way, said second cord end 26 comprises at least two return branches, each comprising a return and tensioning device 27, 127. According to one embodiment, said second cord end 26 connects at least two return devices 27, 127, rigidly determining the spatial orientation of said at least two return devices 27, 127.

[0072] For example, in figure 5 is shown such a canopy assembly 1 having two opposing canopy sheets 4, 104, wherein one of these two opposing canopy sheets and the elements joined thereto are indicated for clarity with the numerical reference increased by 100.

[0073] Preferably, said tendons 19, 119 unite in a single second opposing tendon portion 22, forming a slot. In other words, said second opposing tendon portion 22 forks to form at least two opposing tendons 19, 119 each having a first tendon portion 21, 121.

[0074] According to a preferred embodiment, said elastic tensioning cord 18 is arranged in axis with said winder roller 5 so that a canopy assembly 1 comprises two canopy sheets opposite to said elastic tensioning cord 18. According to one embodiment, said canopy assembly comprises at least two opposing canopy sheets joined to a single elastic device 9.

[0075] Due to the provision of such a canopy assembly comprising at least two opposing canopy sheets joined directly or indirectly to a single elastic tensioning cord 18, it is possible to create a balanced canopy assembly which at the same time keeps the canopy sheets taut due to the elastic pre-loading exerted by the elastic device 9 joined to the elastic tensioning cord 18.

[0076] According to a preferred embodiment, said elastic tensioning cord 18 is joined to said elastic device 9 by means of a fixing portion 35. Preferably, said elastic device 9, for example a coil spring, is longitudinally hollow defining a spring cavity 20, and said elastic tensioning cord 18 crosses at least partially said spring cavity 20, attaching itself to a portion of said elastic device opposite to said stop portion of the elastic device 33 and unable to face said abutment portion 32 of the pin 29.

[0077] According to one embodiment, said tensioning device of the canopy sheet comprises an elastic device 9, an elastic tensioning cord 18, one or more return or tensioning devices 27, one or more tendons 19 joined to one or more canopy sheets 4.

[0078] According to one embodiment, said tendon 19, and preferably said first tendon end 21, is returned by means of at least one return element 40, 140, for example, a fixed or movable pulley, wherein said at least one return element is joined to said frame 2.

[0079] According to one embodiment, a sunshade 10 comprises at least one canopy assembly 1 according to any of the preceding claims.

[0080] According to one embodiment, said sunshade is a sail sunshade. Preferably, said sail sunshade comprises at least one roll-up canopy sheet 4.

[0081] According to a preferred embodiment, said sunshade 10 comprises a sunshade boom comprising at least said winder roller 5 and/or said shaft 13. Preferably, said sunshade boom is formed by said roller and said shaft fitted onto one another.

[0082] According to one embodiment, said sunshade 10 comprises a support structure 3, suitable to keep said canopy assembly 1 raised from the ground, wherein said canopy assembly 1 is cantilevered from said support structure 3 forming at least one root for attachment to the support structure 16 and at least one cantilevered free canopy end 17.

[0083] According to one embodiment, said root for attachment to the support structure 16 is joined to a connecting device, suitable to connect said canopy assembly 1 to a wall or to a support structure 3.

[0084] According to one embodiment, said sunshade 10 comprises a plurality of support structures 3, wherein said canopy assembly 1 forms at least two opposing roots for attachment to the support structure 16.

[0085] According to one embodiment, said sunshade 10 comprises two opposing support arms 37, 38 suitable to

support said at least one canopy sheet 4, preferably said two opposing canopy sheets. Preferably, said two opposing support arms 37, 38 are connected to said support structure 3. Preferably, said two opposing support arms each comprise said at least one return element 40, 140.

[0086] According to one embodiment, said sunshade 10 comprises two or more support poles 39 suitable to keep at least a portion of said canopy assembly 1 raised from the ground.

[0087] Due to the features described above, which are provided severally or jointly in particular embodiments, it is possible to satisfy the aforementioned requirements, at times conflicting, and to achieve the above-listed advantages, and in particular:

- the provision of such a canopy assembly 1 having said tensioning device stretched between said first portion 11 of at least one canopy sheet 4 and the tendon winding spool 23, allows the tendon winding spool 23, rotating on itself, for example around the roller axis X-X, to cause said at least one tendon 19 to be wound around it, pulling the canopy sheet 4, so as to unroll it progressively from the winder roller 5 and unfurl it at least partially;
- similarly, the winding of the canopy sheet 4 around the winder roller 5 takes place due to the rotation of the roller body 6 which progressively reels off at least one tendon 19 from the tendon winder spool 23;
- the provision of the elastic device prevents the breakage of the elastic tensioning cord 18, and the provision of at least one return and tensioning device 27 joined to a second cord end and at least one tendon 19 prevents the breakage of at least one tendon as well as portions of the canopy sheet 4 even in adverse weather conditions, such as strong winds;
- it allows a balanced canopy assembly to be made that at the same time keeps the canopy sheets that it comprises taut, even if such canopy sheets have different or non-mirrored dimensions and shapes;
- it allows the elastic device 9 to be hidden or concealed from view, so as to allow an elastic device of a larger size than in the known solutions to be used without worsening in any way the aesthetic appearance of the canopy assembly as well as the sunshade;
- at the same time, said elastic device 9 may be protected from the effects of the weather, so as to reduce the frequency of maintenance operations;
- it permits an increased variety of materials to make the elastic device, for example materials with lower resistance to corrosion, than in the known solutions, without reducing the service life thereof, resulting in a lower management cost, or in addition, materials for soft springs without reducing the effectiveness of the tensioning pre-loading that the elastic device exerts on the canopy sheet.

[0088] To the embodiments described above, one skilled in the art may, to satisfy contingent and specific needs, make numerous modifications, adaptations and replacements of elements with others that are functionally equivalent, without however departing from the scope of the following claims.

REFERENCE LIST

1	Canopy assembly
2	Frame
3	Support structure
4	Canopy sheet
5	Winder roller, or roller
6	Roller body
7	Winding members
8	Roller inner cavity, or roller cavity
9	Elastic device, or elastic element
10	Sunshade
11	First canopy sheet portion
12	Second opposing canopy sheet portion
13	Shaft
14	Shaft body
15	Shaft inner cavity, or shaft cavity

(continued)

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16	Root for attachment to the support structure of the canopy assembly
17	Cantilevered free end of the canopy assembly
18	Elastic tensioning cord, or cord
19	Tendon
20	Spring cavity
21	First tendon end
22	Second opposing tendon portion
23	Tendon winding spool
24	Intermediate tendon portion
25	First cord end
26	Second cord end
27	Return and tensioning device
28	Pin
29	Pin cavity
30	Pin hole
31	Pin outer side surface
32	Abutment portion of the pin
33	Stop portion of the elastic device
35	Fixing portion
36	Cavity wall
37	Support arm
38	Opposing support arm
39	Support pole
40	Return element
104	Opposing canopy sheet
111	Opposing first sheet portion, or first sheet portion of the opposing canopy sheet
121	Opposing first tendon end
140	Opposing return element
X-X	Roller axis
A-A	Axial elastic device direction

Claims

1. Canopy assembly (1) for a sunshade (10), comprising:

- at least one frame (2), suitable to connect said canopy assembly (1) to a wall or to at least one support structure (3);
- at least one canopy sheet (4);
- at least one winder roller (5), suitable to form a winding support to wind at least partially said canopy sheet (4), said winder roller (5) comprising a roller body (6) rotatably joined directly or indirectly to said frame (2) so as to be able to rotate relative to said frame (2) around a roller axis (X-X);
- at least one sheet tensioning device, suitable to at least partially unfurl said at least one canopy sheet (4);

said winder roller (5) and said at least one sheet tensioning device cooperating to alternately roll up and/or unfurl at least partially said canopy sheet (4);
wherein:

- said at least one canopy sheet (4) comprises at least a first sheet portion (11) joined to said sheet tensioning device and at least one opposing second sheet portion (12) joined to said winder roller (5);
- said roller body (6) delimits at least partially a roller body inner cavity (8);
- said sheet tensioning device comprises at least one elastic device (9) which elastically biases said first sheet portion (11) away from said winder roller (5), pre-loading said canopy sheet (4) in traction to keep it taut;

characterized in that

said roller body (6) receives at least partially said at least one elastic device (9) housed in said roller body inner cavity (8) concealing it from view.

2. Canopy assembly (1) according to claim 1, comprising a shaft (13) connected to said frame (2), said shaft (13) comprising a shaft body (14);
wherein:

- said roller body (6) is fitted onto said shaft body (14) so as to be able to rotate relative to said shaft body (14) around the roller axis (X-X);
- and/or wherein
- said roller body (6) receives at least a portion of said shaft body (14) housed in said roller body inner cavity (8);
- said shaft body (14) delimits a shaft inner cavity (15);
- said shaft body (14) receives at least partially said at least one elastic device (9) housed in said shaft body inner cavity (15).

3. Canopy assembly (1) according to claim 1 or 2, wherein an axial elastic device direction (A-A) is defined coinciding with the longitudinal extension axis of said elastic device (9), and said elastic device (9) is suitable to deform in the axial elastic device direction (A-A); and/or wherein
said axial elastic device direction (A-A) is parallel to the roller axis (X-X).

4. Canopy assembly (1) according to any of the preceding claims, wherein said sheet tensioning device comprises:

- at least one tendon (19), suitable to work in traction, fixed to said first sheet portion (11);
- at least one elastic tensioning cord (18), suitable to work in traction, connected to said elastic device (9) and to a portion of said tendon (19);

wherein said tendon (19) comprises a first tendon end (21) connected to said first sheet portion (11) of the canopy sheet (4);

and wherein said at least one elastic tensioning cord (18) biases in traction said first tendon end (21).
and/or wherein

said tendon (19) further comprises a second tendon portion (22) connected to a tendon winding spool (23), and an intermediate tendon portion (24) interposed between said first tendon end (21) and said second tendon portion (22);
and wherein:

said at least one elastic tensioning cord (18) is connected to said intermediate tendon portion (24) and biases in traction said first tendon end (21);

and/or wherein

said at least one elastic tensioning cord (18) is connected to said intermediate tendon portion (24) by at least one return and tensioning device (27); and/or wherein

said at least one first sheet portion (11) is attached to said sheet tensioning device; and/or said at least one opposing second sheet portion (12) is fixed to said winder roller (5).

5. Canopy assembly (1) according to any of the preceding claims, wherein said elastic device (9), by means of said elastic tensioning cord (18), exerts an elastic bias action aimed at pulling said tendon (19) from said intermediate tendon portion (24), exerting by means of said first tendon end (21) a pre-loading on said first sheet portion (11) which keeps said canopy sheet (4) taut.

6. Canopy assembly (1) according to any of the preceding claims, wherein said frame (2) comprises at least one pin (28) comprising at least one internally hollow portion that delimits a pin cavity (29); wherein:

- said shaft body (14) is fitted on said pin (28) and integral with said pin (28);
- said pin (28) comprises at least one abutment portion (32) facing said shaft cavity (14);
- said elastic device (9) comprises at least one stop portion (33), suitable to abut against said abutment portion (32) of said pin (29);

and/or wherein

when said stop portion (33) of said elastic device (9) abuts against said abutment portion (32) of said pin (29), said elastic device (9) is elastically loaded, compressing itself.

7. Canopy assembly (1) according to any of the preceding claims, wherein said canopy assembly (1) comprises two canopy sheets (4, 104) opposite to said winder roller (5); wherein said two canopy sheets (4, 104) have an extension different from each other, forming a canopy assembly (1) not symmetrical and not mirrored with respect to said roller (5).

8. Sunshade (10) comprising at least one canopy assembly (1) according to any of the preceding claims.

9. Sunshade (10) according to claim 8, wherein said sunshade is a sail sunshade.

10. Sunshade (10) according to claim 8 or 9, comprising a plurality of support structures (3), wherein said canopy assembly (1) forms at least two opposing roots for attachment to the support structure (16).

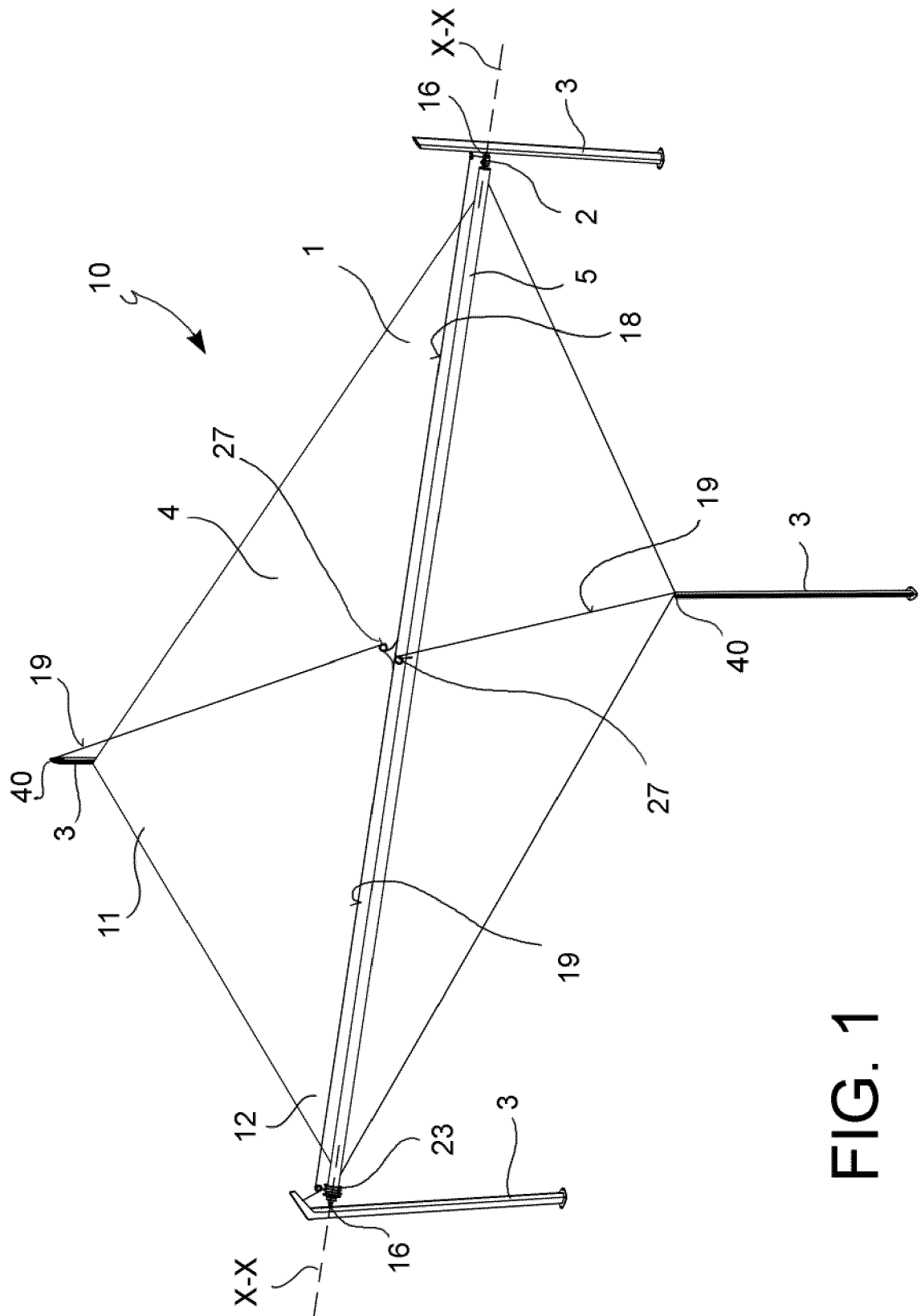


FIG. 1

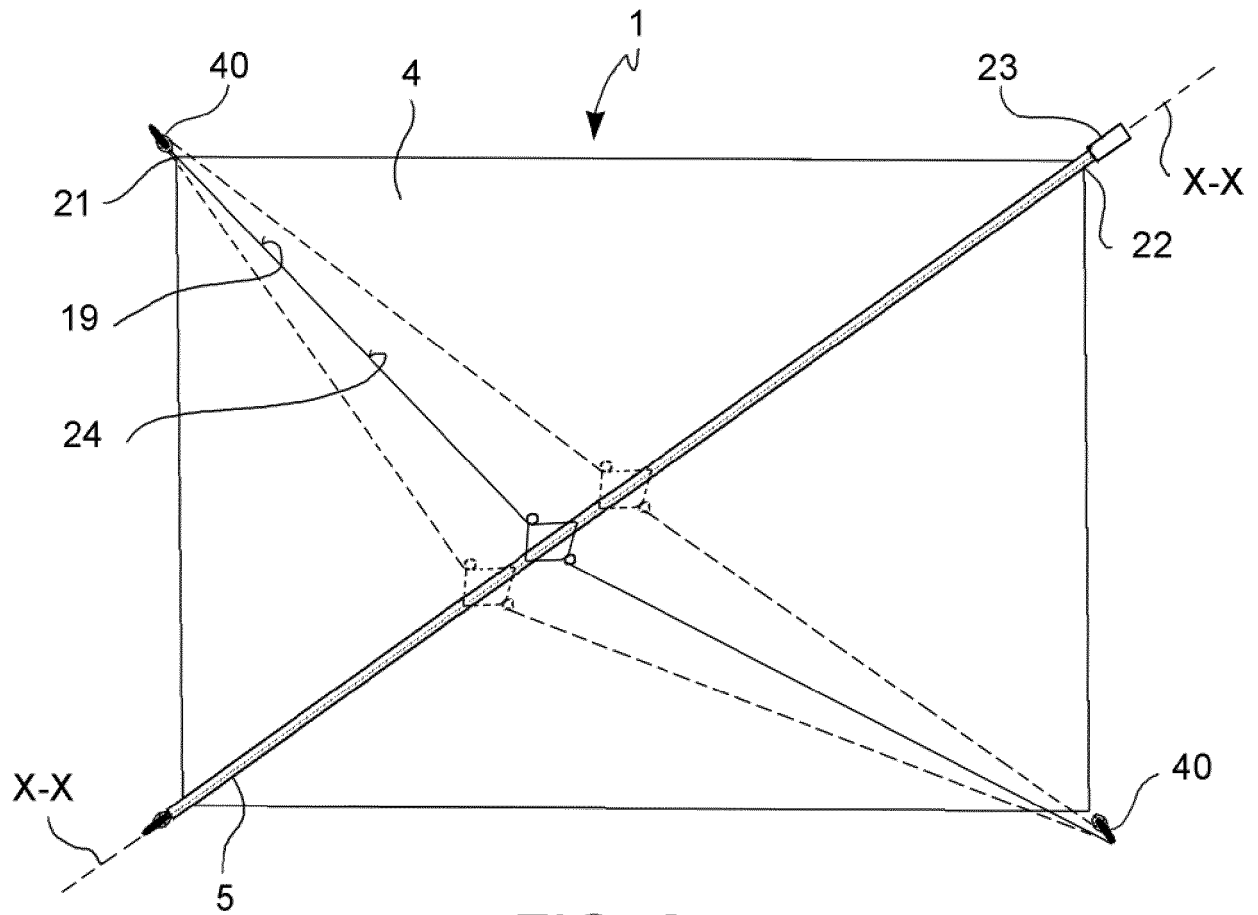


FIG. 2

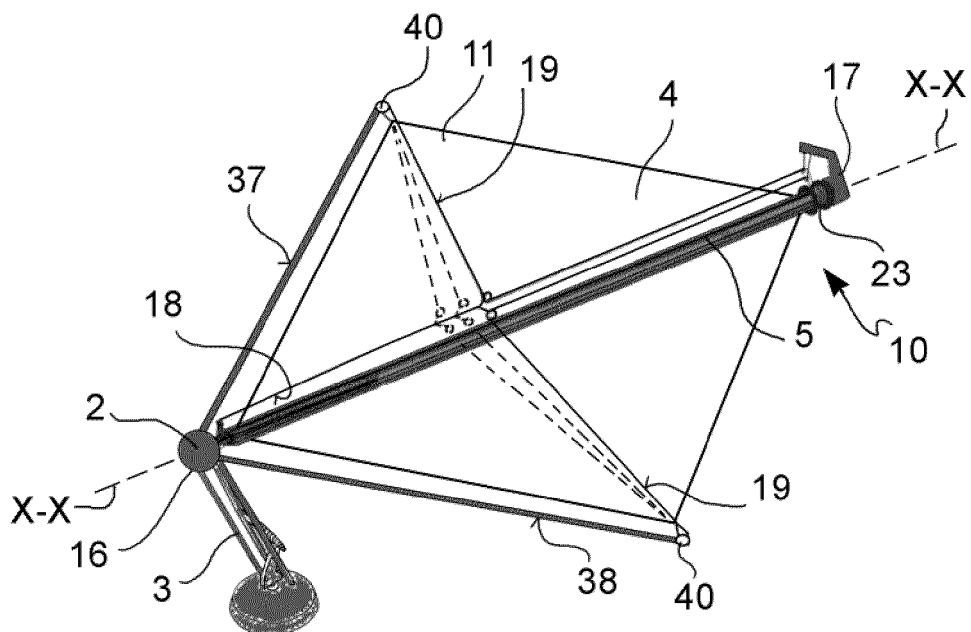


FIG. 3

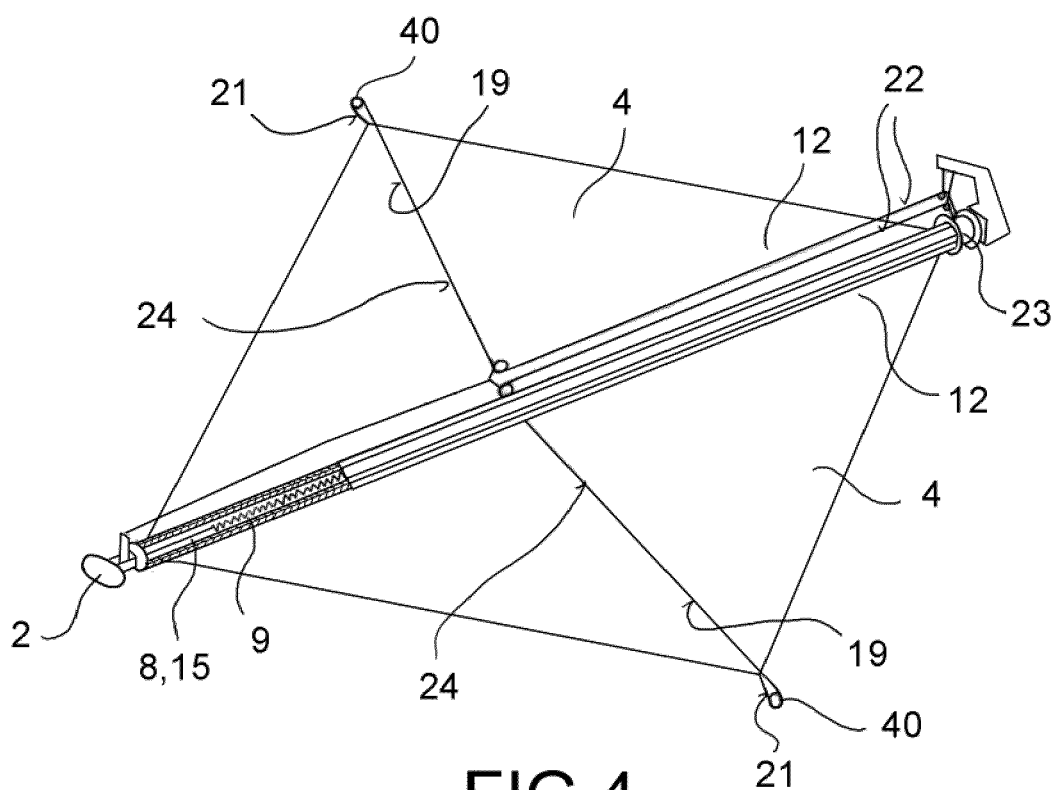


FIG. 4

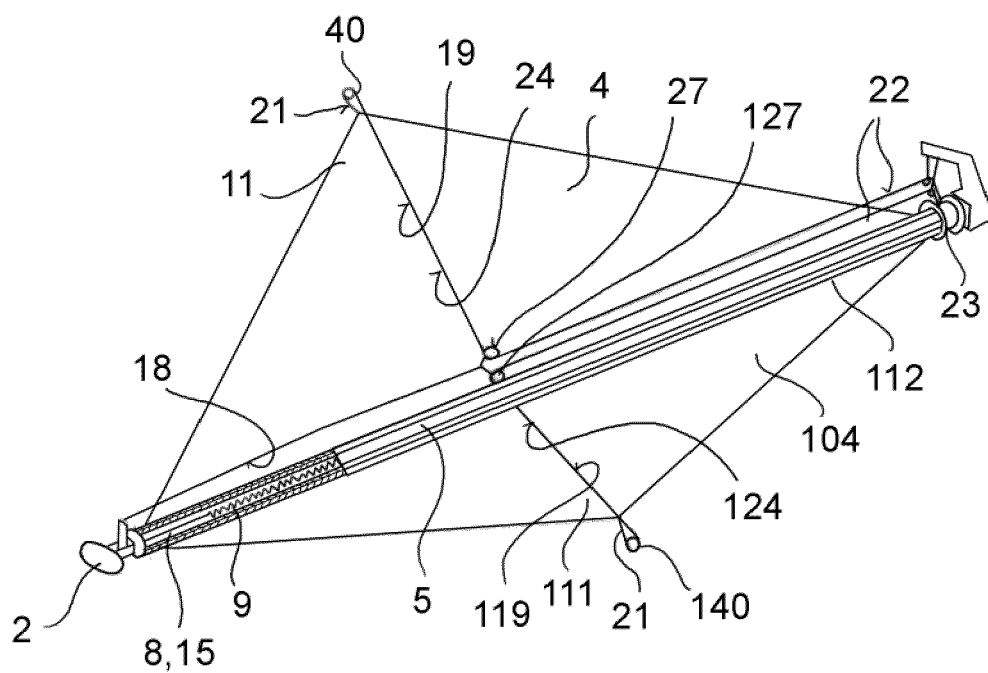


FIG. 5

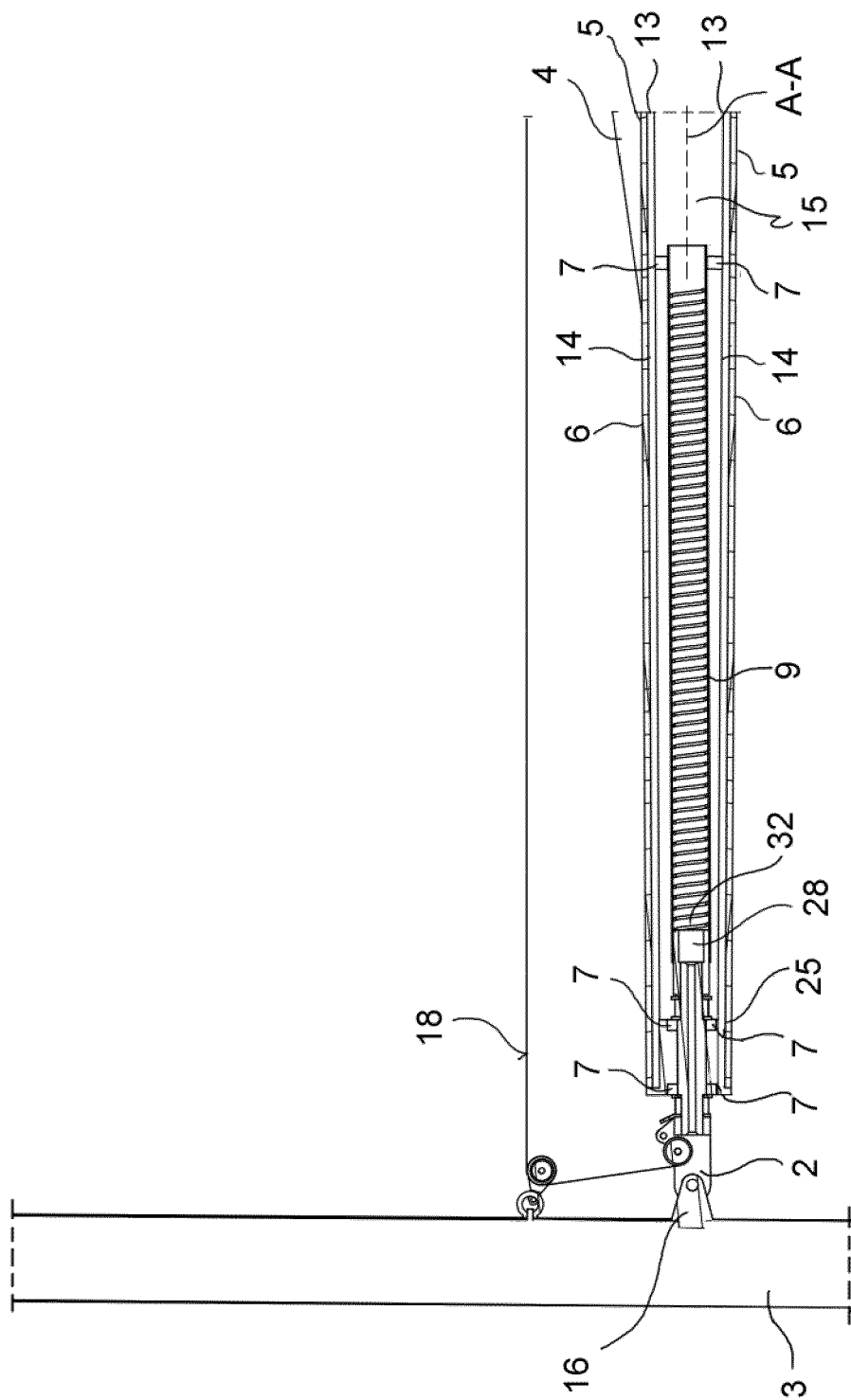


FIG. 6

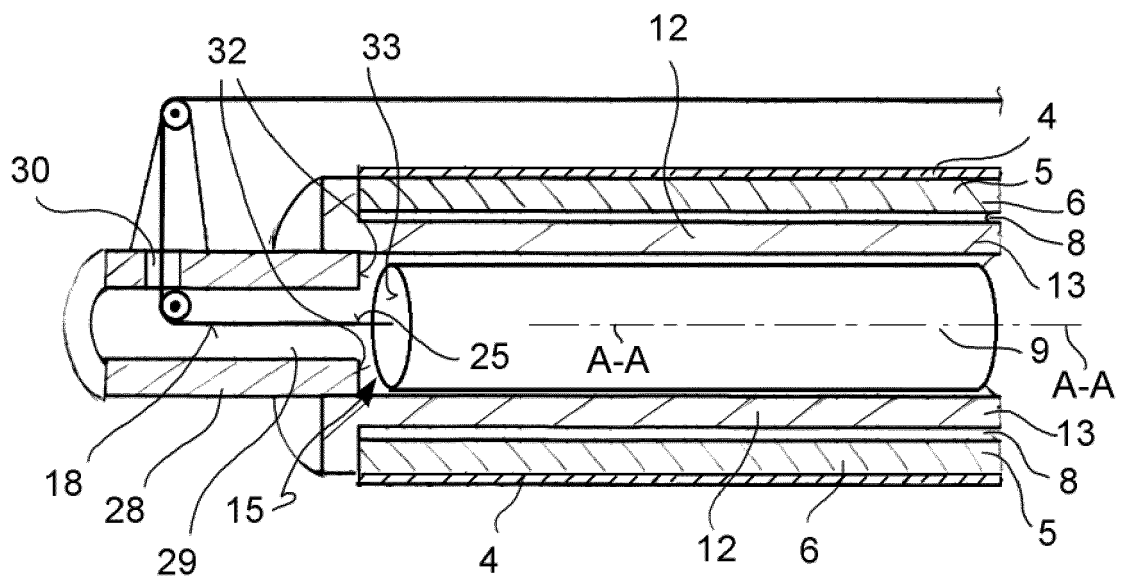


FIG. 7

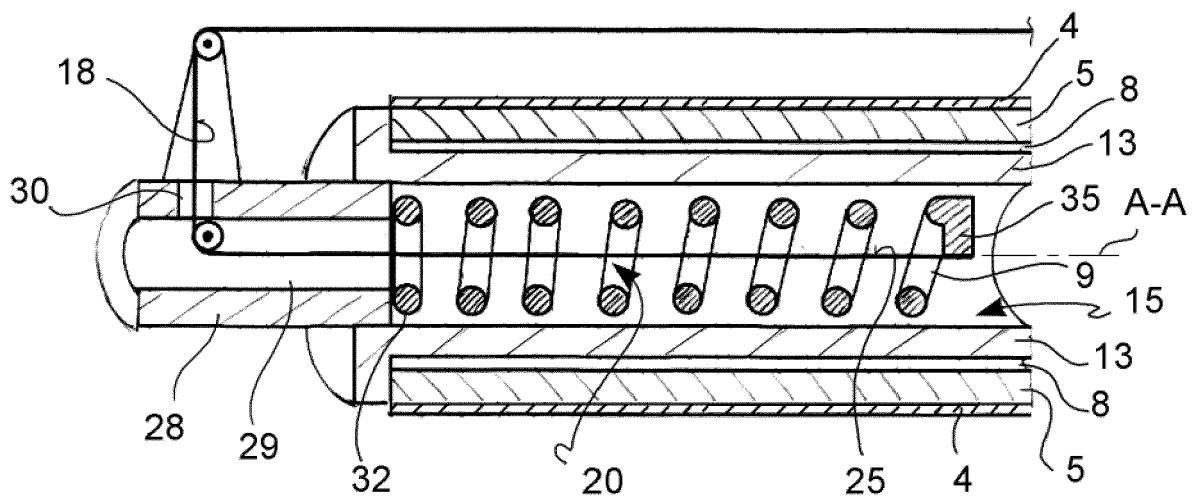


FIG. 8



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