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(71) Applicant: **PROGETTOTENDA S.r.l.**
35030 Saccolongo (PD) (IT)

(72) Inventor: **Danieli, Lorenzo**
35030 Selvazzano Dentro (PD) (IT)

(74) Representative: **Gallo, Luca**
Gallo & Partners S.r.l.
Via Trieste 49
35121 Padova (IT)

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(54) **Folding awning**

(57) A folding awning (1), that comprises: at least one pair of cross-members (5, 5a, 5b) movable along a pair of horizontal guides (4) of the support structure (1 a) of the awning (1) between a first, gathered, position and a second, extended, position; a sheet (6) extending between the pair of cross-members (5, 5a, 5b) and secured thereto, and comprising at least one drainage section in which the length of the sheet (6) is greater than the distance between the cross-members (5, 5a, 5b) so as to

form a drainage channel (12); tensioning means (20) secured to the sheet (6) at at least one securing point (21) in the region of the drainage channel (12) so as to place the sheet (6) under tension at least in the second, extended, position.

Furthermore, the tensioning means (20) comprise a tensioning element (27a,b,c) extending in a transverse direction with respect to the cross-members (5, 5a, 5b), and secured at least at one point to the support structure (1 a) of the awning (1).

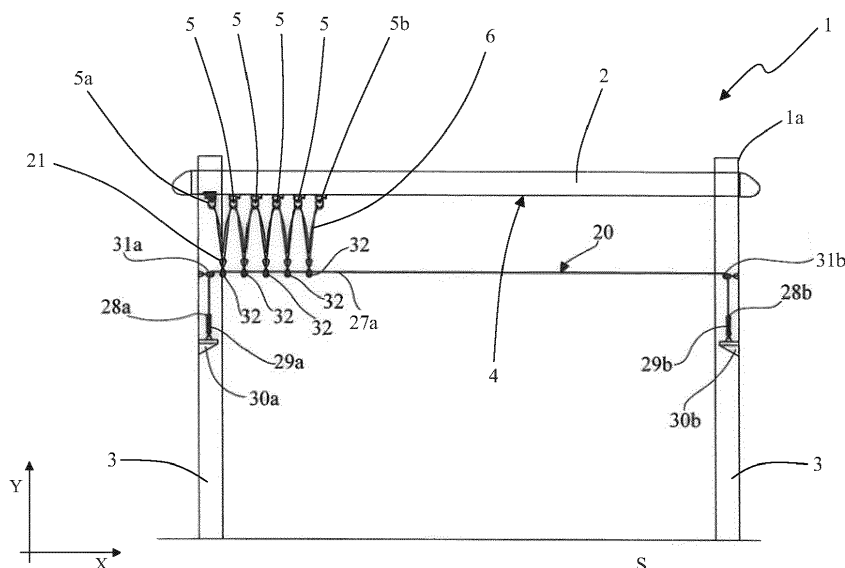


Fig. 2

Description

[0001] The subject of the present invention is an improved folding awning, of the type including the features mentioned in the preamble of the main claim.

[0002] Folding awnings are distinguished from those termed roll-up awnings in that, in the gathered position, that is, when the awning is in the non-operative position, the sheet of the awning is folded in pleats, suspended between adjacent cross-members, which are movable along a plurality of guides in order to bring the sheet from the gathered position to an extended operative position.

[0003] The present invention is particularly, although not exclusively, suitable for folding awnings provided with horizontal or approximately horizontal guides.

[0004] For such awnings with approximately horizontal guides there is in particular the problem of drainage of the water from the upper surface of the sheet.

[0005] In known embodiments, one of which is shown in Figure 1, one solution to the problem provides for the use of a sheet which, in the extended position, is taut in the region of one lateral edge thereof, parallel to the guides, and slack in the region of the opposite lateral edge. In this way, at the slack edge, the sheet, having a length greater than the distance between the cross-members, is disposed so as to form a drainage channel extending between said cross-members and inclined from the taut edge towards the slack edge.

[0006] The main drawback of such a solution lies in the fact that in the region of the slack lateral edge the sheet is subject to the action of the wind also in the extended position.

[0007] In particular, when the wind is strong, the drainage channel could be significantly deformed, so as to prejudice its drainage capacity.

[0008] Furthermore, it is known from patent US 2004/003536 a cover for greenhouses comprising a plurality of sheets, each of which is anchored at its edges to respective mobile cross-members. More in detail, each sheet has centrally fixed thereto a pipe that extends along the whole width of the sheet and is parallel to the mobile cross-members. The pipe, in consequence of its weight, pushes downwards the central portion of the sheet in order to keep the sheet taut.

[0009] The main drawback of the cover described in US 2004/003536 lies in the fact that the sheets are subject to flutter when subjected to the action of wind, and the pipes, being fixed exclusively to the corresponding sheets, are subject to move with the latter. That allows the wind to lift easily the central portion of each sheet prejudging the capacity of draining the water of the sheet.

[0010] Another drawback is due to the fact that each sheet supports the whole weight of the pipe fixed thereto and thus the sheet is easily subject to tearing and breaking, in particular in presence of strong wind.

[0011] Furthermore, it is known from patent FR 2840339 a folding awning comprising a support structure provided with a couple of longitudinal members that are

parallel and connected to each other by means of two fixed transverse members, and an extensible sheet, that is placed above the longitudinal members and is provided with more folds so as to define more drainage channels extending transversally with respect to the longitudinal members.

[0012] More in detail, the sheet has, in correspondence of one of its lateral edges, more runners sliding within a guide provided on one of the longitudinal members, and is supported on the upper side by a plurality of longitudinal cables rigidly fixed at their ends to the two fixed transverse members of the support structure, parallel to the longitudinal members and inserted in correspondent eyelets provided on the folds of the sheet.

[0013] The main problem of the awning described in FR 2840339 is due to the fact that the sheet, both in gathered position and in extended position, remains slack between the cables and the longitudinal members, since the latter are not able to exert any tensioning action on the sheet. Therefore, in presence of wind, the sheet is subject to swell and flutter involving a consequent high risk of deforming and breaking of the sheet.

[0014] The principal problem of the present invention is that of providing an awning of the aforesaid type structurally and functionally designed in such a way as to make it possible to remedy the drawbacks mentioned with reference to the prior art cited.

[0015] This problem is solved by the invention with an awning produced in accordance with the following claims.

[0016] The features and advantages of the invention will become clearer from the detailed description of an exemplary embodiment thereof, illustrated by way of non-limiting example with reference to the appended drawings, in which:

- Figure 1 is a perspective view from above of a known folding awning;
- Figures 2, 4 and 6 are three side views of three respective alternative embodiments of the awning object of the present invention in an gathered position;
- Figures 3, 5 and 7 are three side views of the awnings of Figures 2, 4 and 6, respectively, in an extended position;
- Figure 8a is a section along the line VIII-VIII of a detail of the awning in Figure 7;
- Figure 8b is a section of an alternative embodiment of the detail in Figure 8a.

[0017] In Figures 2 to 8a,b, the reference 1 indicates as a whole an awning of the folding type with a support structure 1a formed by a pair of longitudinal members 2, each of which is supported by a pair of pillars 3, which bear on an area of ground S, holding up the awning 1.

[0018] The awning 1 protects the area of ground S from the rays of the sun and from rainwater. The longitudinal members 2 are substantially parallel to the area of ground S. On the lower face of the longitudinal members 2 there is fitted or provided a respective guide 4. Supported be-

tween the guides 4 are cross-members 5, the first and the last of which, indicated respectively by 5a and 5b, respectively define a rear face and a front face of the awning 1.

[0019] The cross-member 5a is fixed, while the cross-members 5, 5b are movable along the guides 4 between a first, gathered, position (Figures 2, 4 and 6) and a second, extended, position (Figures 3, 5 and 7). The awning 1, in general, may also be used in a semi-extended intermediate position, comprised between the first and the second position.

[0020] Secured to the cross-members 5, 5a, 5b is a sheet 6 delimited by a rear face edge 7a in the region of the cross-member 5a, a front edge 7b in the region of the cross-member 5b, and two lateral edges 8 in the region of the guides 4.

[0021] The sheet 6 is divided into portions (five portions 10a,b,c,d,e in the exemplary embodiment of Figures 2-7), each of which extends between a pair of consecutive cross-members and is secured to the latter.

[0022] Each of the portions 10a,b,c,d,e comprises two drainage sections extending respectively from a central region of the sheet 6 to each of the lateral edges 8. In each drainage section the length of the sheet 6 in a plane XY transverse to the cross-members 5, 5a, 5b (plane of Figures 2-7) is greater than the distance between two consecutive cross-members 5, 5a, 5b, so as to form a drainage channel 12 between each pair of consecutive cross-members 5, 5a, 5b.

[0023] The drainage channel 12 is bounded by two folds 13a,b of each portion 10a,b,c,d,e of the sheet 6, which are joined to each other by means of stitching, or by adhesive means, or by thermowelding in the region of a bottom line 16 of the drainage channel 12. The bottom line 16 is curved, with the concavity facing towards the area of ground S, and comprises two ends 14 in the region of the lateral edges 8 and a high point, in a central area of the sheet 6, which separates the two drainage sections from each other.

[0024] Each portion 10a,b,c,d,e of the sheet 6, in the region of the bottom line 16, comprises a slot extending along said drainage channel 12 from one of the lateral edges 8 to the other. Each portion 10a,b,c,d,e of the sheet 6 comprises a rod-like elongate stiffening element for the bottom line 16, inserted into the slot.

[0025] According to an alternative embodiment of the invention, the sheet 6 comprises a single drainage section, with a drainage channel inclined from one of the lateral edges to the other, in a similar manner to the known awning 100 of Figure 1. In the latter case the bottom of the drainage channel is rectilinear.

[0026] The awning 1 comprises tensioning means 20 secured to the sheet 6 at at least one securing point 21 in the region of the drainage channel 12 so as to place the sheet 6 under tension when it is in the second, extended position or, according to an alternative embodiment of the invention, when it is any position between the semi-extended position and the extended position.

[0027] The tensioning means 20 are located in the region of both the lateral edges 8, as shown in the appended drawings, or in the region of only one of the lateral edges 8, as in the version similar to that of the awning 100 of Figure 1. Alternatively, in an alternative version which is not shown, the tensioning means 20 may be located in an intermediate position between the lateral edges 8.

[0028] According to the embodiments of Figures 2 to 8a,b, the tensioning means 20 comprise a tensioning element 27a,b,c extending in a transverse direction with respect to the cross-members 5, 5a, 5b, that is, in a direction substantially parallel to the guides 4. The tensioning element 27a,b,c is secured at least at one point to the pillars 3 of the one support structure 1 a of the awning 1.

[0029] Advantageously, the securing point 21 (wherein the tensioning element 27a,b,c is secured to the sheet 6) is located in the region of an end of the bottom line 16 of the drainage channel 12.

[0030] According to the alternative embodiment of Figures 2 and 3, the tensioning element is formed by a metal cable 27a comprising two opposed ends 28a,b secured to the structure 1a by means of two respective constraints 29a,b of resilient type, formed by a pair of springs secured to two respective pillars 3 in the region of two respective supports 30a,b. The metal cable 27a is returned in two pulleys 31 a,b respectively secured to the pillars 3 which bear the supports 30a,b and located in an intermediate position between the sheet 6 and the supports 30a,b, respectively.

[0031] The metal cable 27a is secured to the securing points 21 of each of the portions 10a,b,c,d,e of the sheet 6, passing via a plurality of pulleys 32 respectively integral with the securing points 21.

[0032] When passing from the gathered position (Figure 2) to the extended position (Figure 3), the correct tensioning of the sheet 6 is ensured by suitable selection of the length of the cable 27a and the rigidity of the constraints 29a,b.

[0033] According to an alternative embodiment of the invention which is not shown, in place of the metal cable 27a an elastic cable is used, secured to the structure 1 a by means of two respective constraints of rigid type.

[0034] According to the alternative embodiment of Figures 4 and 5, the tensioning element is formed by a metal cable 27b comprising two opposed ends 33a,b, respectively rigidly secured to a pillar 3 of the support structure 1 a, and free. The end 33b is secured to a counterweight 34.

[0035] The metal cable 27b is secured to the securing points 21 of each of the portions 10a,b,c,d,e of the sheet 6, passing via a plurality of pulleys 32 respectively integral with the securing points 21, in a similar manner to the variant of Figures 2 and 3 described above.

[0036] When passing from the gathered position (Figure 4) to the extended position (Figure 5), the correct tensioning of the sheet 6 is ensured by suitable selection of the length of the cable 27b and the counterweight 34.

[0037] According to the alternative embodiment of Figures 6 and 7, the tensioning element is formed by a rigid profile section 27c movable in a vertical direction, orthogonal to the cross-members 5, 5a, 5b, to the guides 4 and to the ground S. The rigid profile section 27c is secured to the support structure 1a in the region of its two opposed ends 35a,b by means of two respective resilient constraints 36a,b, formed by a pair of springs secured to two respective pillars 3 in the region of two respective supports 37a,b.

[0038] When passing from the gathered position (Figure 6) to the extended position (Figure 7), the correct tensioning of the sheet 6 is ensured by suitable selection of the rigidity of the resilient constraints 36a,b.

[0039] The section 38 of the rigid profile section 27c is solidly rectangular (Figure 8a) or, according to the alternative embodiment of Figure 8b, comprising a gutter profile 39, suitable for collecting the water which falls from the drainage channel 12 in the region of the lateral edges 8.

[0040] Other alternative embodiments may comprise combinations of those described above. For example, one of the variants may comprise the use of a combined system of a cable with springs (as in Figures 2 and 3) of counterweights (as in Figures 4 and 5) while another of the variants may comprise an awning with tensioning means comprising a cable and springs (as in Figures 2 and 3) and the simultaneous presence of a sheet made of elastic fabric.

[0041] The invention thus solves the problem of ensuring the correct tensioning of the sheet and in particular of the drainage channel in all operating conditions. The tensioning ensures the substantial indeformability of the sheet with respect to the action of the wind, with a consequent improvement in the efficiency of the drainage.

[0042] The aesthetic appearance of the sheet is also improved.

Claims

1. Folding awning (1) comprising:

- at least one pair of cross-members (5, 5a, 5b), at least one of said cross-members (5, 5b) being movable along at least one pair of guides (4) between a first, gathered, position and a second, extended, position,
- at least one sheet (6) extending between said pair of cross-members (5, 5a, 5b) and secured thereto, said sheet (6) comprising at least a drainage section in which the length of said sheet (6) in a plane (XY) transverse to said pair of cross-members (5, 5a, 5b) is greater than the distance between said cross-members (5, 5a, 5b) so as to form a drainage channel (12) between said cross-members (5, 5a, 5b),
- tensioning means (20) secured to said sheet

(6) at at least one securing point (21) in the region of said drainage channel (12) so as to place said sheet (6) under tension in at least said second, extended, position;

said folding awning (1) being **characterized in that** said tensioning means (20) comprise a tensioning element (27a,b,c) extending in a transverse direction with respect to said cross-members (5, 5a, 5b), said tensioning element (27a,b,c) being secured at least at one point to a support structure (1 a) for said awning (1).

2. Folding awning (1) according to claim 1, wherein said at least one securing point (21) is located in the region of an end of a bottom line (16) of said drainage channel (12).

3. Folding awning (1) according to claim 1 or 2, wherein said tensioning element is formed by a metal cable (27a) comprising two opposed ends (28a,b) secured to said structure (1a) by means of two respective constraints (29a,b), at least one of said constraints (29a,b) being of resilient type, said cable (27a) being secured to said at least one securing point (21) for said sheet (6).

4. Folding awning (1) according to claim 1 or 2, wherein said tensioning element is formed by a metal cable (27b) comprising two opposed ends (33a,b), one (33a) of said ends being rigidly secured to said support structure, and the other (33b) of said ends being secured to a counterweight (34), said cable (27b) being secured to said at least one securing point (21) for said sheet (6).

5. Folding awning (1) according to claim 1 or 2, wherein said tensioning element is formed by an elastic cable comprising two opposed ends secured to said structure (1a) by means of two respective rigid constraints, said cable being secured to said at least one securing point (21) for said sheet (6).

6. Folding awning (1) according to claim 1 or 2, wherein said tensioning element is formed by a rigid profile section (27c) movable in a vertical direction orthogonal to said cross-members (5, 5a, 5b) and to said guides (4), said rigid profile section (27c) being secured to said support structure (1a) in the region of its two opposed ends (35a,b) by means of two respective resilient constraints (36a,b), said rigid profile section (27c) being secured to said at least one securing point (21) for said sheet (6).

7. Folding awning (1) according to claim 6, wherein said rigid profile section (27c) comprises a gutter (39) suitable for collecting the water which falls from said drainage channel (12).

8. Folding awning (1) according to one or more of the preceding claims, wherein said sheet (6) comprises a slot extending along said drainage channel (12), a rod-like elongate stiffening element being inserted into said slot.

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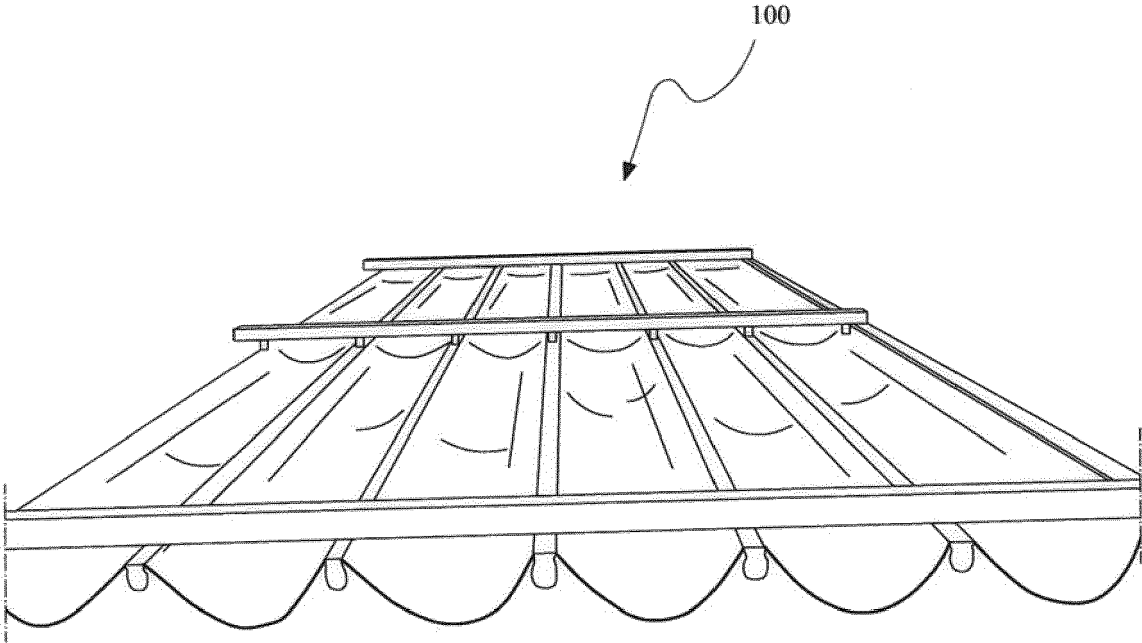


Fig. 1

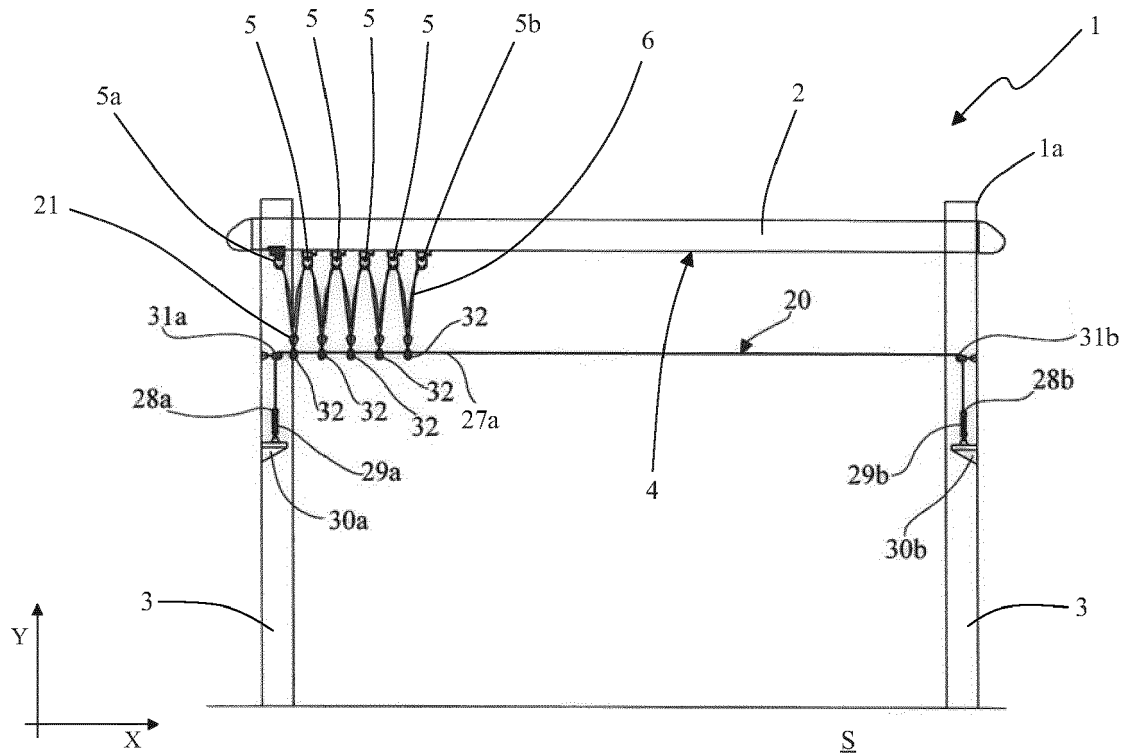


Fig. 2

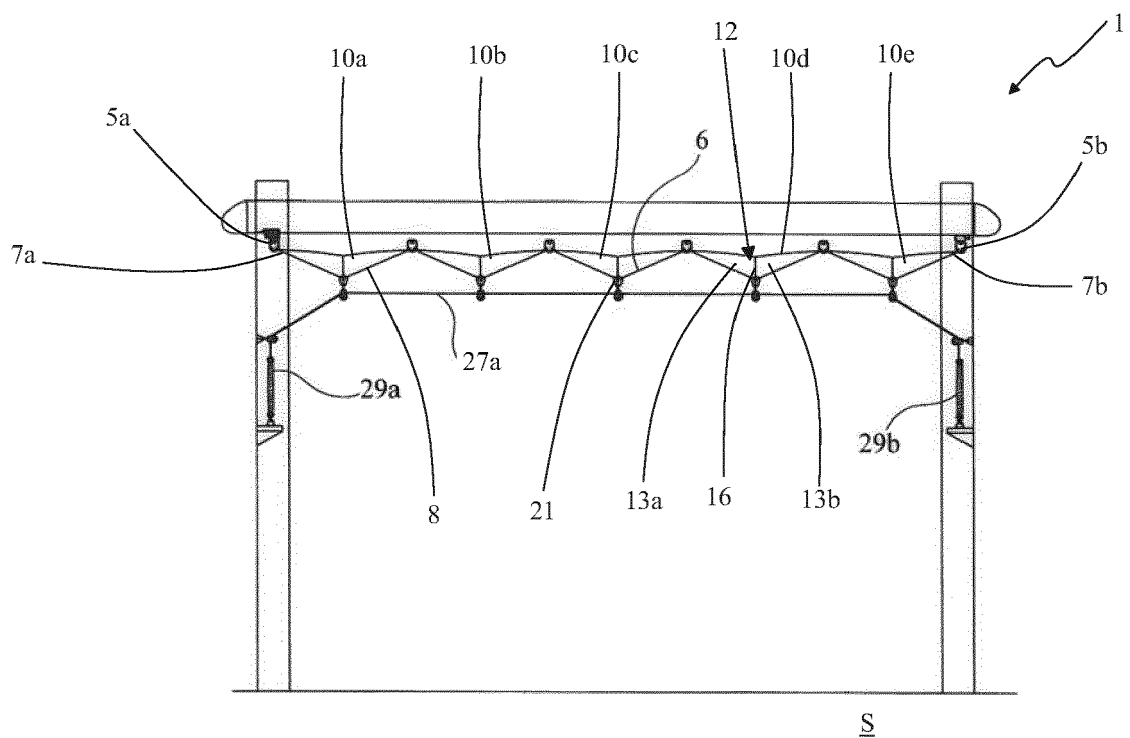


Fig. 3

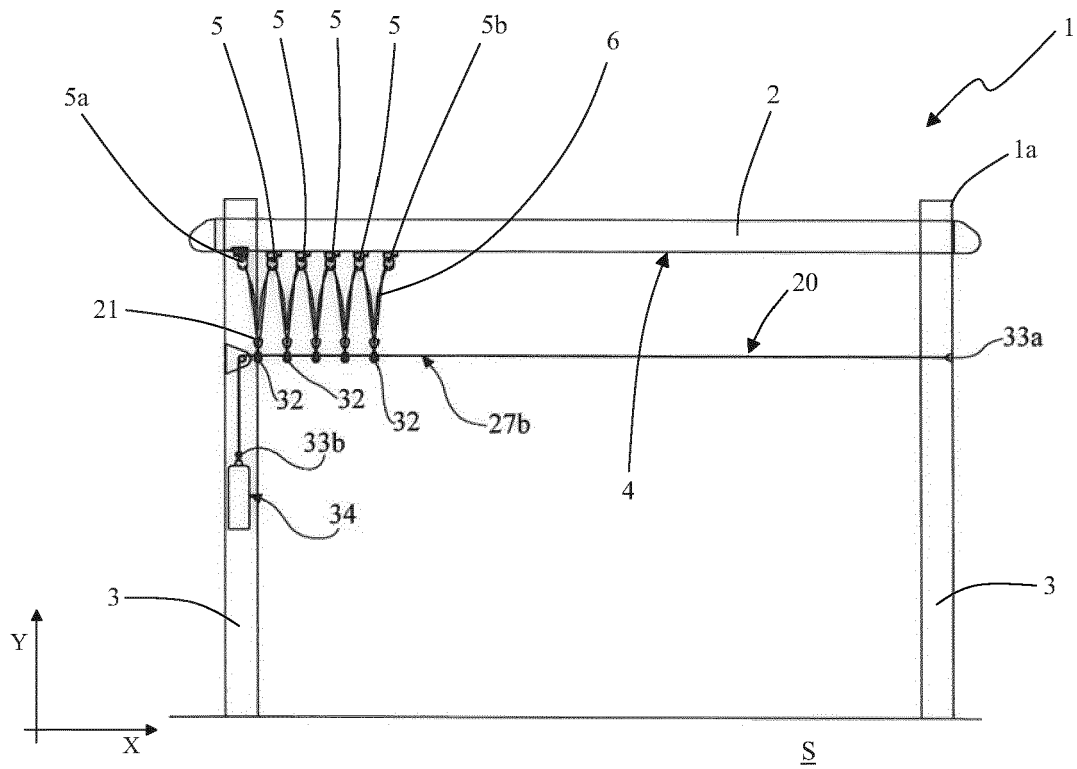


Fig. 4

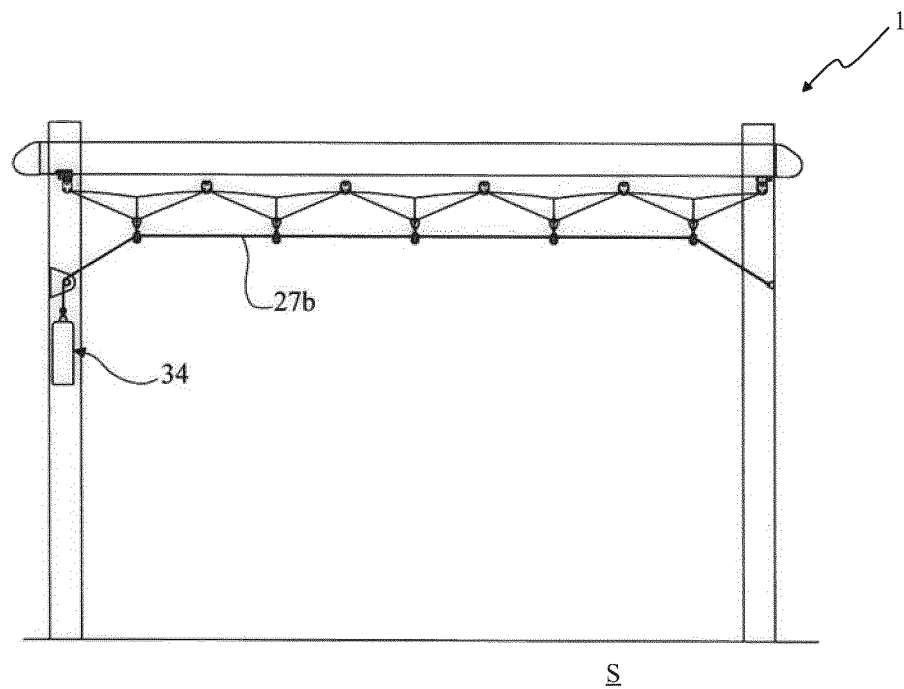


Fig. 5

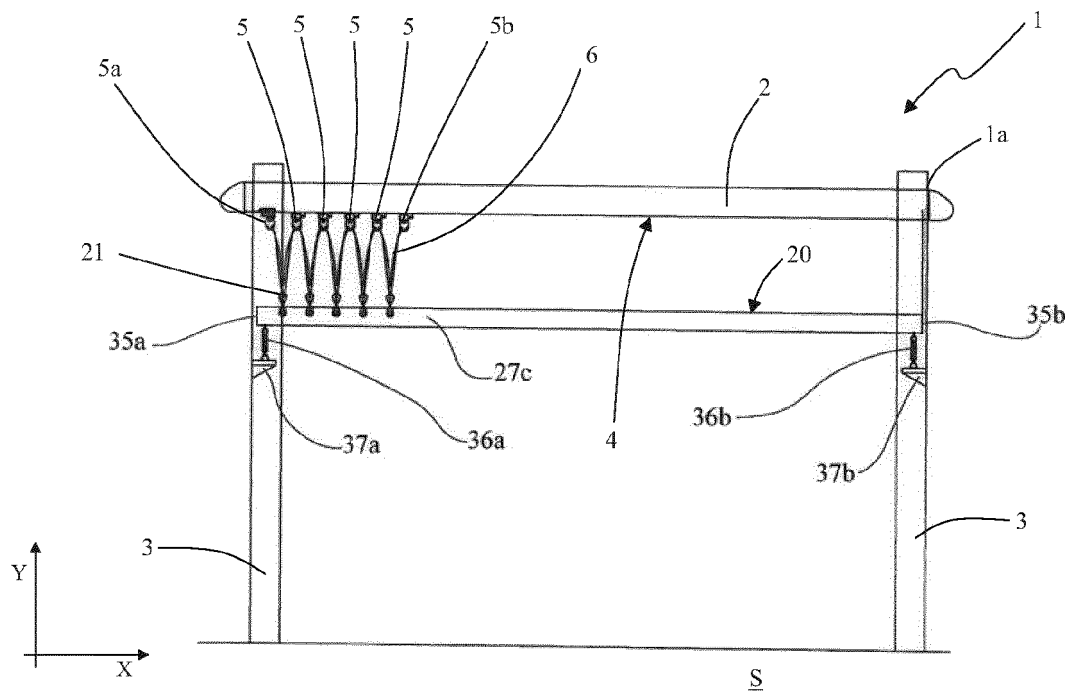


Fig. 6

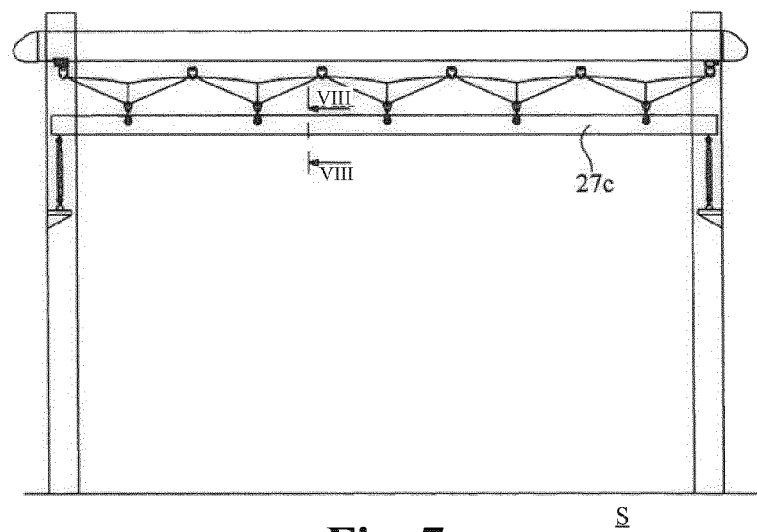


Fig. 7

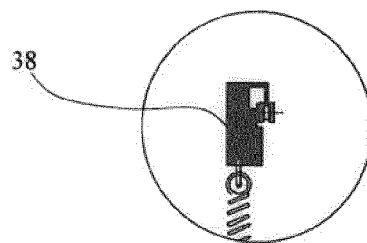


Fig. 8a

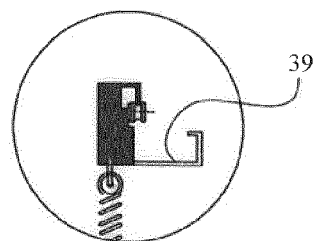


Fig. 8b

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2004003536 A [0008] [0009]
- FR 2840339 [0011] [0013]