

(19)



(11)

EP 3 015 618 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
04.05.2016 Bulletin 2016/18

(51) Int Cl.:
E04F 10/10 (2006.01)

(21) Application number: **15191533.7**

(22) Date of filing: **26.10.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
 Designated Extension States:
BA ME
 Designated Validation States:
MA

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(30) Priority: **28.10.2014 IT PD20140283**

(54) **COVERING APPARATUS**

(57) Covering apparatus which comprises a support structure (2) provided with two lateral beams (3) that are parallel to each other and side-by-side; a plurality of covering blades (10) each provided with two opposite ends (11) associated with the respective lateral beams (3); two sliding rods (30) actuatable to slide along the respective lateral beams (3) in order to move the aforesaid covering blades (10) between a closure position and an open position; a plurality of orientation guides (24) fixed along

the lateral beams (3) at the ends (11) of the covering blades (10) and adapted to determine the tilt of the same covering blades (10).

In addition, each covering blade (10) comprises, at each end (11) thereof, a first coupling element (27) rotatably constrained to the corresponding sliding rod (30), and a second coupling element (28) which is slidably constrained in the corresponding orientation guide (24).

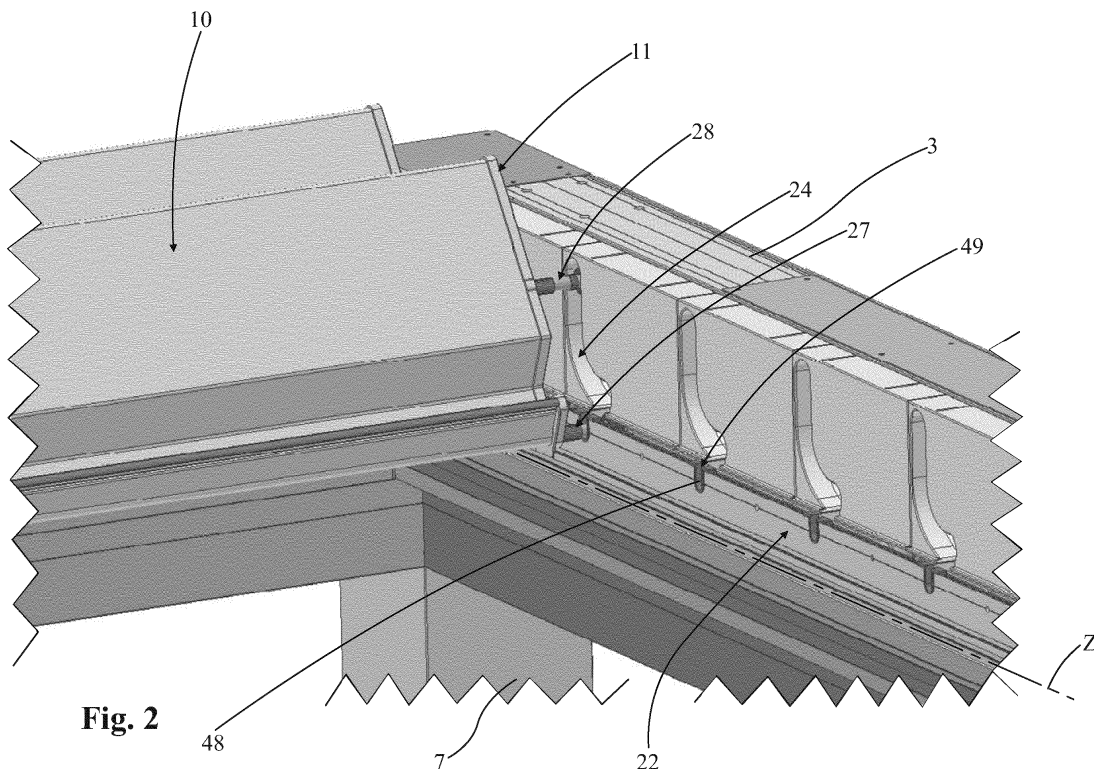


Fig. 2

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Description

Field of application

[0001] The present invention regards a covering apparatus according to the preamble of the independent claim.

[0002] The present apparatus is intended to be employed for the covering of external surfaces, protecting them from weathering agents and in particular from sun and rain.

[0003] The present covering apparatus is recommended for obtaining pergolas, verandas and more generally covering structures, both in gardens of private homes and in open spaces of public places, such as restaurants, hotels, bathing establishments or other structures. The covering apparatus, object of the present invention, therefore falls within the industrial field of production of awnings for covering outdoor areas.

State of the art

[0004] Numerous solutions for covering apparatuses for outdoor areas are known on the market, termed "brise soleil" structures in the jargon of the field, which comprise a support structure, e.g. a canopy, fixed to the ground and provided with two lateral longitudinal members which support a plurality of oscillating blades adapted to protect an underlying ground surface.

[0005] For example, the Italian patent application No. UD2012A000217 describes a brise soleil covering apparatus of known type comprising a plurality of oscillating blades, each provided at its ends with rotation pins hinged to the corresponding longitudinal members.

[0006] The apparatus furthermore comprises movement means connected to the oscillating blades in order to drive the latter to rotate between a closure position, in which the blades are placed substantially horizontal and partially superimposed, each over the next, in order to prevent the passage of light and/or rain, and an open position, in which the blades are arranged tilted, delimiting openings between them for the passage of light.

[0007] More in detail, the aforesaid movement means comprise two rods placed along respective lateral longitudinal members and connected to the respective ends of the blades. In particular, each blade is provided at each end thereof with a lever pivoted to the corresponding movement rod by means of a pivoting pin.

[0008] The rods can be driven by an actuator to move along the corresponding longitudinal members in a manner such to rotate the blades around their rotation pins between the closure position and the open position.

[0009] The covering apparatus furthermore comprises two gutters fixed to the respective longitudinal members and arranged at the respective ends of the blades in order to collect the water that descends from the latter when it rains.

[0010] In particular, each gutter is provided with an in-

ternal edge spaced, by means of an interspace, from the lower surface of the blades in order to allow the rotation of the latter around their pins.

[0011] Each rod of the movement means has substantially laminar shape and can be driven to move such that, when the blades are in the closure position, the movement rod is placed to close the interspace between the internal edge of the gutter and the lower face of the blades, in order to prevent the water that descends into the gutter from overflowing from the internal edge of the latter and falling into the underlying area protected by the covering apparatus.

[0012] In particular, each rod is driven to move such that, when the blades are in open position, the rod is lowered inside the gutter, and when the blades are in closure position, the rod is lifted until it abuts against the lower face of the blades themselves.

[0013] The main drawback of the brise soleil covering apparatus of known type described in the patent application UD2012A000217 is due to the fact that it requires long, complex mounting operations, in particular for engaging the rotation pin of each blade with the corresponding longitudinal member and for pivoting the lever of each blade with the corresponding rod of the movement means.

[0014] A further drawback of the above-described brise soleil covering apparatus of known type is due to the fact that possible maintenance operations, for example for replacing a damaged blade, are particularly complex and strenuous, since it is necessary to dismantle both the longitudinal members and the rods of the movement means.

[0015] A further drawback of the above-described brise soleil covering apparatus of known type is due to the fact that when the blades are in the closure position, with the rod of the movement means placed in abutment against the lower face of the latter in order to close the internal side of the gutter, fissures are in any case present between the gutter and the corresponding movement rod which allow the passage of water and air, with a consequent insufficient insulation of the space below the blades.

Presentation of the invention

[0016] In this situation, the problem underlying the present invention is therefore that of eliminating the drawbacks of the abovementioned solutions of known type, by providing a covering apparatus which is simple and quick to mount and install.

[0017] A further object of the present invention is to provide a covering apparatus which requires simple and rapid maintenance.

[0018] A further object of the present invention is to provide a covering apparatus which allows ensuring a good hermetic closure of the covering blades on the support structure. A further object of the present invention is to provide a covering apparatus which allows executing,

in a simple and safe manner, the electrical power supply to light sources placed inside the blades.

[0019] A further object of the present invention is to provide a covering apparatus which is structurally simple and inexpensive to make.

Brief description of the drawings

[0020] The technical characteristics of the present invention, according to the aforesaid objects, are clearly seen in the contents of the below-reported claims and the advantages thereof will be more evident in the following detailed description, made with reference to the enclosed drawings, which represent some merely exemplifying and non-limiting embodiments of the invention, in which:

- figure 1 shows a top perspective view of the covering apparatus for outdoor areas, object of the present invention;
- figure 2 shows a perspective view of a detail of the covering apparatus relative to the movement means and to the orientation guides of the covering blades, in accordance with a first embodiment of the present invention;
- figure 3 illustrates a further perspective view of the movement means and of the orientation guides illustrated in figure 3, with some parts removed in order to better illustrate other parts;
- figure 4 illustrates a detail of the present covering apparatus relative to the movement means and to the relative longitudinal guide;
- figure 5 illustrates a perspective view of a detail of the apparatus illustrated in figure 2 relative to one of the orientation guides;
- figure 6 illustrates a side view of the orientation guide illustrated in figure 5;
- figures 7a,b,c,d illustrate four different positions of the covering blades of the present apparatus, in accordance with the first embodiment of the present invention, during the movement of the blades between the closure position and the open position with maximum tilt;
- figure 8 illustrates a side view of one of the orientation guides, in accordance with a second embodiment of the present invention;
- figure 9 illustrates a detail of the covering apparatus relative to the orientation guides of the covering blades, in accordance with a third embodiment of the present invention;
- figure 10 illustrates a perspective view of a detail of the apparatus illustrated in figure 9, relative to one of the orientation guides;
- figures 11a,b,c,d illustrate four different positions of the covering blades of the present apparatus, in accordance with the aforesaid third embodiment of the present invention, during the movement of the blades between the closure position and the open

- position with maximum tilt;
- figure 12 illustrates a detail of the covering apparatus, object of the present invention, relative to one of the covering blades;
- 5 - figure 13 illustrates a detail of the covering blade illustrated in figure 12 relative to one end of the blade itself;
- figure 14 illustrates a detail of the present covering apparatus relative to an embodiment variant of the covering blades provided with a plurality of light sources;
- 10 - figure 15 illustrates a detail of the covering blade illustrated in figure 14, partially in exploded view, relative to one end of the blade itself;
- 15 - figure 16 illustrates an exploded view of a detail of the blade illustrated in figures 14 and 15, relative to a connection element of the power supply cables of the power supply sources;
- figure 17 illustrates a section view of the rotatable body of the connection element illustrated in figure 16;
- 20 - figure 18 illustrates a detail relative to a lateral beam of the present covering apparatus, with some parts removed in order to better illustrate other parts;
- 25 - figure 19 illustrates a detail relative to a front beam of the present covering apparatus, with some parts removed in order to better illustrate other parts.

Detailed description of a preferred embodiment

[0021] With reference to the set of drawings, reference number 1 indicates the covering apparatus, object of the present invention, in its entirety.

[0022] The present covering apparatus 1 is indicated for obtaining pergolas, verandas and more generally structures for covering outdoor settings, for example gardens of private homes and open spaces of public places, such as restaurants, hotels, bathing establishments, etc.

[0023] In accordance with the embodiments illustrated in the enclosed figures the covering apparatus 1, object of the present invention, comprises a support structure 2 provided with two lateral beams 3 that are parallel to each other and side-by-side, each longitudinally extended, between a first and a second end 4 and 5 thereof, along a corresponding first extension direction X, preferably substantially horizontal. Advantageously, the support structure 2 also comprises two first columns 6 rested on the ground, each supporting the first end 4 of the corresponding lateral beam 3. Preferably, the support structure 2 further comprises two second columns 7 arranged to support the second ends 5 of the corresponding lateral beams 3, thus making a self-supporting structure in particular of substantially parallelepiped form.

[0024] Otherwise, in accordance with a different embodiment, not illustrated in the enclosed figures, the support structure 2 of the covering apparatus 1 leans against a vertical wall (such as a building wall), to which the second ends 5 of the lateral beams 3 are anchored.

[0025] In accordance with a further different embodiment not illustrated in the enclosed figures, the first and second ends 4, 5 of the lateral beams 3 of the support structure 2 are respectively supported by a first and second lateral wall facing each other, in a manner such that the support structure 2 of the covering apparatus 1 is interposed between the two aforesaid vertical walls.

[0026] Preferably, in accordance with a particular characteristic of the present invention, the support structure 2 of the covering apparatus 1 comprises two front beams 8, 9 that are parallel to each other and side-by-side and are arranged to connect the aforesaid lateral beams 3, including in particular a first front beam 8 placed to connect the first ends 4 of the lateral beams 3 and a second front beam 9 placed to connect the second ends 5 of the lateral beams 3 themselves.

[0027] Advantageously, each beam 3, 8, 9 of the support structure 2 is obtained with a metal section (in particular made of extruded aluminum), preferably hollow.

[0028] According to the present invention the covering apparatus 1 comprises a plurality of covering blades 10 arranged one after the other according to the aforesaid first extension direction X of the lateral beams 3.

[0029] Advantageously, the aforesaid plurality of covering blades 10 in succession comprises two end blades 10', 10", including a first end blade 10' arranged side-by-side the first front beam 8 and a last end blade 10" arranged side-by-side the second front beam 9. Of course, without departing from the protective scope of the present invention, the succession of the aforesaid covering blades 10 can be considered, in an entirely equivalent manner, in the direction opposite that considered above, i.e. from the second front beam 9 to the first front beam 8.

[0030] Each covering blade 10 is extended along a second extension direction Y substantially orthogonal to the first extension direction X of the lateral beams 3 and is provided with two opposite ends 11 associated with the respective lateral beams 3.

[0031] The covering blades 10 are movable between a closure position, in which they are arranged partially superimposed, each over the next, covering an underlying ground surface in order to protect the latter from the sun and/or rain, and an open position, in which the covering blades 10 are arranged each spaced from the next, delimiting passage openings 12 between them susceptible of being traversed by the light and air. Advantageously, with reference to the embodiments illustrated in the enclosed figures, each covering blade 10 has substantially flattened form, and is preferably provided with a substantially flat internal wall 13 which, when the covering blade 10 is arranged in the closure position, is directed downward and is arranged parallel to the first extension directions X of the lateral beams 3. In addition, each covering blade 10 is provided with an external wall 14 (directed in the direction opposite the internal wall 13) which, when the covering blade 10 is arranged in closure position, is directed upward and is susceptible of being hit by the sunrays and/or by the rain.

[0032] Advantageously, each covering blade 10, when it is arranged in closure position, is oriented substantially parallel to a lying plane α identified by the first extension directions X of the lateral beams 3 and by the second extension directions Y of the covering blades 10.

[0033] When the covering blades 10 are in open position, these are orientated tilted with respect to the aforesaid lying plane α and substantially parallel to each other, in a manner such that each covering blade 10 is spaced from the adjacent blades 10, opening the aforesaid passage openings 12.

[0034] Advantageously, in accordance with the embodiments illustrated in figures 12-15, each covering blade 10 is provided with two longitudinal sides 17, 18 placed to connect between the internal wall 13 and the external wall 14 of the blade 10 itself, and including a first longitudinal side 17 which, when the blade 10 is in open position, is directed downward, and a second longitudinal side 18 which, when the blade 10 is in open position, is directed upward.

[0035] In particular, the first longitudinal side 17 is provided with a first terminal portion 19, and the second longitudinal side 18 is provided with a second terminal portion 20, preferably projecting, which, when the covering blades 10 are in closure position, abuts against the first terminal portion 19 of the successive covering blade 10, in a manner such to close the passage openings 12.

[0036] Preferably, each covering blade 10 is provided with a collection channel 21 obtained on the external wall 14 of the blade 10 itself and arranged along the first longitudinal side 17 of the same covering blade 10. In this manner, when the covering blade 10 is brought from the closure position to the open position, the water that possibly remained on the external wall 14 of the blade 10 is conveyed to descend into the aforesaid collection channel 21, preventing the water from falling on the underlying ground surface. Advantageously, according to the embodiments illustrated in the enclosed figures, the first longitudinal side 17 of the covering blade 10 is tilted an acute angle with respect to the bottom of the collection channel 21, in a manner such that, when the covering blade 10 is in closure position, the first longitudinal side 17 retains the water inside the collection channel 21.

[0037] Preferably, in accordance with the embodiments illustrated in figures 12-15, each covering blade 10 comprises a shaped profile 15 comprising in particular the aforesaid internal 13 and external 14 walls and the aforesaid longitudinal sides 17, 18. Such shaped profile 15, preferably obtained via extrusion, is longitudinally extended along the second extension direction Y and is closed at the ends 11 of the covering blade 10 by two lateral caps 16, in particular made of plastic material.

[0038] In accordance with the idea underlying the present invention, the covering apparatus 1 comprises movement means 22 mechanically connected to the covering blades 10 and drivable by actuator means 23 to slide along at least one of the lateral beams 3 between a retreated position and an advanced position in order

to move the covering blades 10 respectively between the closure position and the open position.

[0039] In particular, the movement means 22 are arranged in order to slide along at least one sliding direction Z substantially parallel to the first extension direction X of the lateral beam 3.

[0040] Preferably, in accordance with the embodiments illustrated in the enclosed figures, movement means 22 are provided that are arranged at each lateral beam 3 of the support structure 2 and mechanically connected to the corresponding ends 11 of the covering blades 10, as described in detail hereinbelow.

[0041] The covering apparatus 1 also comprises a plurality of orientation guides 24 fixed along at least one of the lateral beams 3 at the ends 11 of the plurality of covering blades 10. Each of such orientation guides 24 is at least partially extended along a path which is arranged on a plane substantially orthogonal to the second extension directions Y of the covering blades 10 and is extended between one first part 25 closer to the movement means 22 and at least one second part 26 further from the movement means 22 themselves.

[0042] Each covering blade 10 comprises, at at least one end 11 thereof, a first coupling element 27 constrained to the movement means 22 and a second coupling element 28 constrained to the corresponding orientation guide 24.

[0043] More in detail, the first coupling element 27 of each covering blade 10 is rotatably constrained to the corresponding movement means 22 around a rotation axis R1 parallel to the second extension direction Y of the corresponding covering blade 10, and is movable by such movement means 22 to slide along the aforesaid sliding direction Z.

[0044] Advantageously, the first coupling element 27 of each covering blade 10 is arranged at the first longitudinal side 17 of the covering blade 10 itself, and in particular it is positioned at the edge which connects the aforesaid first longitudinal side 17 with the internal wall 13 of the covering blade 10.

[0045] The aforesaid second coupling element 28 of each covering blade 10 is slidably constrained in the corresponding orientation guide 24 and, when the movement means 22 are in their retreated position, is arranged at the aforesaid first part 25 of the path of the corresponding orientation guide 24, orienting the covering blade 10 in the closure position, and, when the movement means 22 are in their advanced position, the second coupling element 28 is positioned at the second part 26 of the path, orienting the covering blade 10 in the open position.

[0046] Preferably, in accordance with the embodiments illustrated in the enclosed figures, the aforesaid orientation guides 24 are fixed along each lateral beam 3 and the covering blades 10 are provided, at each end 11 thereof, with the corresponding first and second coupling element 27, 28 respectively constrained to the corresponding movement means 22 and to the corresponding orientation guides 24.

[0047] In operation, the actuator means 23 act on the movement means 22 in order to drive the latter to move the first coupling element 27 of each covering blade 10 to slide along the sliding direction Z, pushing the respective second coupling element 28 to slide in the respective orientation guide 24 between the first path part 25, in which the covering blade 10 is in the closure position, and the second path part 26, in which the covering blade 10 is in the open position arranged in particular with a tilt greater than that assumed in the closure position.

[0048] More in detail, following the sliding of the second coupling element 28 between the first part 25 and the second part 26 of the path of the corresponding orientation guide 24, the corresponding covering blade 10 rotates around the rotation axis R1 of the corresponding first coupling element 27 which (thrust by the movement means 22) slides along the sliding direction Z.

[0049] In substance, each covering blade 10, in its movement between the closure position and the open position, completes a rotation-translation movement, completing a translation along the sliding direction Z and simultaneously a rotation around the corresponding rotation axis R1.

[0050] Advantageously, the covering apparatus 1 comprises two longitudinal guides 29, each fixed to the support structure 2 and arranged along the respective lateral beam 3 extended parallel to the sliding direction Z. The corresponding movement means 22 are slidably constrained to each of such longitudinal guides 29 in order to move along the corresponding sliding direction Z.

[0051] Preferably, the movement means 22 comprise two movement rods 30, each arranged along the corresponding lateral beam 3 and extended parallel to the sliding direction Z. Each movement rod 30 is advantageously slidably constrained to the corresponding longitudinal guide 29 in particular by means of engagement elements 31 comprising preferably idle wheels 32.

[0052] In accordance with the embodiment illustrated in the enclosed figures, each longitudinal guide 29 is fixed to the respective lateral beam 3 and is preferably obtained with a metal section, in particular obtained via extrusion.

[0053] Advantageously, with reference to the embodiment illustrated in figures 3 and 4, each longitudinal guide 29 has preferably L-shaped cross section, and is provided with a base wall 33, on which the engagement elements 31 of the corresponding movement rod 30 preferably rest, and with a lateral wall 34 joined, preferably at a right angle, to the base wall 33 and fixed to the corresponding lateral beam 3, in particular by means of coupling appendages 35 engaged in corresponding engagement seats 36 of the lateral beam 3 itself.

[0054] Advantageously, each movement rod 30 preferably comprises a metal section obtained in particular via extrusion, and is provided with a longitudinal wall 37 which is limited on the upper part by a longitudinal edge 38, and preferably on the lower part joined at an angle to a bottom portion 39 which in particular is extended

below the base wall 33 of the corresponding longitudinal guide 29.

[0055] Advantageously, the longitudinal wall 37 of the movement rod 30 is interposed between the corresponding longitudinal guide 29 and the corresponding ends 11 of the covering blades 10. In particular, the longitudinal wall 37 is provided with a first side 40 directed towards the ends 11 of the covering blades 10 and with a second side 41 directed towards the longitudinal guide 29, partially delimiting the latter, and preferably arranged facing the lateral wall 34 of the longitudinal guide 29 itself.

[0056] In particular, on the second side 41 of the longitudinal wall 37 of the movement rod 30, the engagement elements 31 of the rod 30 itself are fixed, which are slidably rested on the base wall 33 of the corresponding longitudinal guide 29.

[0057] Advantageously, with reference to the embodiment illustrated in figure 18, the actuator means 23, which drive each movement rod 30 to slide on the respective longitudinal guide 29, comprise at least one linear actuator 42 fixed to the corresponding lateral beam 3 and mechanically connected to the corresponding movement rod 30. In particular, two aforesaid linear actuators 42 are provided, each acting on the corresponding movement rod 30.

[0058] Preferably, each linear actuator 42 is arranged inside the tubular section of the corresponding lateral beam 3, is provided with a jacket 43 fixed to the aforesaid tubular section and with a drive stem 44 movable parallel to the sliding direction Z and fixed to the corresponding movement rod 30 by means of preferably a connection arm 45 passing through a slit 46 obtained on the tubular section of the lateral beam 3 and preferably fixed on the lower face of the bottom portion 39 of the movement rod 30. Advantageously, each first coupling element 27 of each covering blade 10 comprises a first projecting pin 47 which is extended along the corresponding rotation axis R1 projectingly extended from the corresponding end 11 of the covering blade 10 itself, and is fixed in particular to the corresponding lateral cap 16 of the covering blade 10. Such first projecting pin 47 is rotatably constrained to the corresponding movement rod 30 in order to allow the rotation of the covering blade 10 around the rotation axis R1 during the movement of the blade 10 between the closure position and the open position.

[0059] The longitudinal wall 37 of the movement rod 30 is provided with multiple pivoting seats 48, each one bearing internally, rotatably constrained, the aforesaid first projecting pin 47 of the corresponding first coupling element 27 of the corresponding covering blade 10. Each pivoting seat 48 is provided with an upper opening 49 obtained on the longitudinal edge 38 of the longitudinal wall 37 and through which the corresponding first projecting pin 47, during the mounting of the covering apparatus 1, is susceptible of being inserted in the pivoting seat 48 itself.

[0060] More in detail, preferably, each pivoting seat 48 is provided with two lateral sides between which the first

projecting pin 47 of the corresponding first coupling element 27 is arranged and which are susceptible of abutting against such first projecting pin 47 when the movement rod 30 is driven to move between the retreated position and the advanced position, in order to move the first coupling element 27 along the sliding direction Z in a manner so as to cause the movement of the covering blade 10 as described above.

[0061] Advantageously, each pivoting seat 48 of each movement rod 30 is obtained in a through manner in the longitudinal wall 37 of the latter between the first and the second side 40, 41 of the longitudinal wall 37 itself.

[0062] The first projecting pin 47 of each covering blade 10 is arranged in the corresponding pivoting seat 48 projectingly extended beyond the second side 41 of the longitudinal wall 37 of the corresponding movement rod 30, entering with its end portion 47' into the corresponding longitudinal guide 29. The end portion 47' of the first projecting pin 47 rotatably supports a first slide element 50 constrained to the longitudinal guide 29, and preferably comprising a first idle wheel 50' inserted in such longitudinal guide 29 and rested in particular on the base wall 33 of the latter.

[0063] Advantageously, in accordance with the embodiment illustrated in figure 4, the base wall 33 of each longitudinal guide 29 is provided, on its internal surface, with multiple rails 33', 33" extended along the sliding direction Z that are parallel to each other and side-by-side, including at least one first rail 33', in which the first idle wheels 50' of the first coupling elements 27 of the covering blades 10 are inserted, and at least one second rail 33" in which the idle wheels 32 of the engagement elements 31 of the corresponding movement rod 30 are inserted.

[0064] Preferably, with reference to the embodiment illustrated in figure 13, each second coupling element 28 of the covering blades 10 comprises a second projecting pin 51 projectingly extended from the corresponding end 11 of the covering blade 10 and fixed in particular to the corresponding lateral cap 16.

[0065] Such second projecting pin 51 is extended parallel to the first projecting pin 47 of the first coupling element 27 of the corresponding covering blade 10 and rotatably supports a second slide element 52, which preferably comprises at least one second idle wheel 52' inserted in the corresponding orientation guide 24 in order to slide inside the latter during the movement of the corresponding covering blade 10 between the closure position and the open position.

[0066] Advantageously, with reference to the embodiments illustrated in figures 7a-d and 11a-d, each covering blade 10 is positionable in multiple different open positions having different tilts with respect to the lying plane α , in order to allow sunray protection with the variation of the sun's position with respect to the horizon at different times during the day.

[0067] In particular, each covering blade 10 is positionable between the closure position, in which it is substan-

tially parallel to the lying plane α (as illustrated in the examples illustrated in figures 7a and 11a), and an open position of maximum tilt, in which the blade 10 is tilted with an angle greater than 90° with respect to the lying plane α , and preferably comprised between about 130° - 140° (as illustrated in the examples illustrated in figures 7d and 11d).

[0068] Advantageously, with reference to the embodiments illustrated in figures 7c and 11c, each first coupling element 27 of the covering blades 10 is positionable by the movement means 22 along the sliding direction Z in a corresponding alignment point, in which the first coupling element 27 is arranged aligned with the corresponding second coupling element 28 according to an alignment direction orthogonal to the first extension direction X of the lateral beams 3 and to the second extension direction Y of the covering blades 10.

[0069] Preferably, when the first coupling element 27 is arranged in the aforesaid alignment point, the corresponding covering blade 10 is positioned substantially orthogonal to the lying plane α .

[0070] In particular, with reference to the sliding direction of the movement means 22 from the retreated position to the advanced position, when the first coupling element 27 is arranged upstream of the aforesaid alignment point, the corresponding covering blade 10 is tilted a tilt angle less than 90° with respect to the lying plane α and is arranged with its internal face directed downward (as illustrated in the examples of figures 7a,b and 11a, b). When the first coupling element 27 is arranged downstream of the aforesaid alignment point, the corresponding covering blade 10 is arranged in the open position tilted a tilt angle greater than 90° with respect to the lying plane α and is arranged with its internal wall 13 directed upward (as illustrated in figures 7d and 11d).

[0071] More in detail, with reference to the embodiments illustrated in figures 7a and 11a, when the covering blades 10 are in the closure position, each first coupling element 27 is arranged upstream of the corresponding alignment point.

[0072] In operation, when the covering blades 10 are driven to move from the closure position to the open position, the movement rod 30 pushes the first coupling element 27 of each blade 10 to slide in the longitudinal guide 29, stopping it when the covering blade 10 has reached the open position with the desired tilt.

[0073] In particular, with reference to the embodiments of figures 7b and 11b, in order to arrange the covering blade 10 with a tilt angle less than 90° with respect to the lying plane α , the first coupling element 27 is arranged upstream of the corresponding alignment point.

[0074] With reference to the embodiments of figures 7d and 11d, in order to arrange the covering blade 10 with a tilt angle greater than 90° , the first coupling element 27 is arranged downstream of the corresponding alignment point.

[0075] Advantageously, the second part 26 of each orientation guide 24 comprises an inversion section 53

which is arranged in a manner such that, when the first coupling element 27 of the corresponding covering blade 10 is moved closer to the corresponding alignment point, such inversion section 53 is traversed by the corresponding second coupling element 28 in a first sliding direction, and, when the first coupling element 27 is moved away from the alignment point, the inversion section 53 is traversed by the second coupling element 28 in a second sliding direction opposite the first sliding direction.

[0076] In this manner, when each covering blade 10 is moved between a position with tilt angle less than 90° to a position with tilt angle greater than 90° , the aforesaid inversion section 53 substantially allows the second coupling element 28 to slide in the corresponding orientation guide 24 until it reaches a position of maximum distance from the longitudinal guide 29 (in which the second coupling element 28 is aligned with the corresponding first coupling element 27) and subsequently to return close to the longitudinal guide 29 in order to allow the first coupling element 27 to continue its travel along the sliding direction Z away from the alignment point, in order to arrange the covering blade 10 in the desired position.

[0077] Advantageously, the inversion section 53 of each orientation guide 24 has a projection on the lying plane α which is superimposed on the projection on the same plane α of at least one remaining portion of the orientation guide 24.

[0078] In accordance with a first embodiment illustrated in figures 5, 6 and 7a-d and with a second embodiment illustrated in figure 8, the inversion section 53 of each orientation guide 24 is extended substantially orthogonal to the sliding direction Z of the movement means 22.

[0079] In accordance with a third embodiment illustrated in figures 9, 10 and 11a-d, the inversion section 53 of each orientation guide 24 is substantially extended with a curved shape, substantially bending towards the first part 25 of the orientation guide 24 itself and with the cavity directed towards the longitudinal guide 29.

[0080] Advantageously, according to a particular characteristic of the present invention, the second part 26 of each orientation guide 24 is provided with a curved section 54 (having convexity directed towards the corresponding longitudinal guide 29) which is preferably arranged to connect between the first part 25 of the orientation guide 24 itself and the inversion section 53.

[0081] Otherwise, in accordance with a non-illustrated embodiment of the present invention, the second part 26 of each orientation guide 24 has a substantially rectilinear section, tilted with respect to the sliding direction Z of the movement means 22. Advantageously, the present covering apparatus 1 comprises multiple shaped bodies 55, each fixed to the respective lateral beam 3 and provided with an internal face 56 which is directed towards the corresponding end 11 of the covering blades 10 and on which at least one of the aforesaid orientation guides 24 is obtained.

[0082] Preferably, with reference to the particular embodiments illustrated in the enclosed figures, on the in-

ternal face 56 of each shaped body 55, only one orientation guide 24 is obtained in order to be able to adjustably arrange the number of the covering blades 10 and hence the length of the lateral beams 3 of the covering apparatus 1.

[0083] Preferably, the shaped bodies 55 are fixed to the corresponding lateral beam 3 arranged aligned with each other according to a direction parallel to the first extension direction X of the lateral beam 3 itself.

[0084] In particular, each shaped body 55 has preferably parallelepiped shape and is provided with an external side 57 directed in the direction opposite the internal face 56 of the shaped body 55 itself and fixed adjacent to the corresponding lateral beam 3. Preferably, each shaped body 55 is provided with a lower face 58 and with an upper face 59, directed in opposite directions from each other, and extended between the internal face 56 and the external side 57 of the shaped body 55 itself.

[0085] Advantageously, the lower face 58 of each shaped body 55 is directed towards the longitudinal guide 29 of the corresponding lateral beam 3 and is arranged as an upper delimitation of such longitudinal guide 29, in particular facing the base wall 33 of the latter.

[0086] More in detail, with reference to the embodiments illustrated in figures 3-10, each shaped body 55 is provided with at least one coupling foot 60 which is projectingly extended preferably from the lower face 58 and from the external side 57 of the shaped body 55 itself, and is inserted in a coupling seat 61 integral with the corresponding lateral beam 3 and obtained in particular on the lateral wall 34 of the corresponding longitudinal guide 29.

[0087] Advantageously, each shaped body 55 is provided with at least one retention element 62 snappingly engaged in a retention seat 63 obtained on the respective lateral beam 3. More in detail, with reference to the embodiments illustrated in figures 5, 6, 8 and 10, the retention element 62 is preferably obtained on the upper face 59 of the corresponding shaped body 55 and preferably comprises a flexible tongue 64 which at least partially defines the aforesaid upper face 59 and from which an engagement tooth 65 is projectingly extended, susceptible of being inserted in the corresponding retention seat 63 of the lateral beam 3 following elastic deformation of the flexible tongue 64. Advantageously, in accordance with the embodiments illustrated in figures 6, 8 and 10, each orientation guide 24 is extended along its path between a first end 66, closer to the corresponding longitudinal guide 29, and an opposite second end 67 arranged further away from the longitudinal guide 29 itself.

[0088] Preferably, the first part 25 of the path of each orientation guide 24 (adapted to guide the second coupling element 28 of the covering blade 10 in closure position) is arranged at the first end 66 of the orientation guide 24 itself and advantageously in proximity to the lower face 58 of the shaped body 55.

[0089] The second part 26 of the path of each orientation guide 24 is extended between the first part 25 of the

path and the second end 67 of the orientation guide 24 itself; such second end 67 delimits the inversion portion 53 of the second part 26 of the path. Advantageously, in accordance with the first embodiment of the present invention illustrated in figures 5 and 6, the first part 25 of each orientation guide 24 is provided with a first insertion opening 68 obtained on the lower face 58 of the shaped body 55 and through which the corresponding second coupling element 28 of the covering blade 10 is susceptible of being inserted in the orientation guide 24 itself.

[0090] Preferably, still in accordance with the aforesaid first embodiment, the second part 26 of each orientation guide 24 is closed at the second end 67 by a closure wall of the shaped body 55.

[0091] More in detail, in operation, in accordance with the aforesaid first embodiment and during installation of the covering apparatus 1, in order to mount the covering blades 10 it is sufficient to arrange the blades 10 with the first coupling elements 27 inserted in the corresponding pivoting seats 48 of the movement rods 30 arranged in the retreated position (in a manner such to arrange the blades 10 in the closure position), and then fix the shaped bodies 55 by inserting the second coupling element 28 of the covering blades 10 in the first insertion opening 68 of the shaped body 55, thus arranging the second coupling element 28 within the corresponding orientation guide 24.

[0092] Advantageously, in accordance with the second embodiment illustrated in figure 8, each orientation guide 24 is provided, in addition to the aforesaid first insertion opening 68, with a second insertion opening 69 obtained on the upper face 59 of the shaped body 55 at the second part 26 of the guide 24 itself, in order to allow the correct positioning of the corresponding first and second coupling element 27, 28 of the corresponding covering blade 10, as described in detail hereinbelow.

[0093] In operation, in accordance with the aforesaid second embodiment, the shaped bodies 55 are fixed to the corresponding lateral beams 3 advantageously during production of the apparatus 1. During installation of the apparatus 1, in order to mount the covering blades 10, the movement rods 30 are arranged with their pivoting seats 48 aligned with the first insertion opening 68 of the corresponding shaped profile 15. Subsequently, each covering blade 10 is mounted by inserted the first coupling element 27 in the second insertion opening 69 of the corresponding shaped body 55, then sliding such first coupling element 27 along the orientation guide 24 until it reaches the first insertion opening 68, through which the first element 27 enters into the corresponding pivoting seat 48 of the movement rod 30. Following such operation, the second coupling element 28 of the covering blade 10 is inserted, following the first 27, in the orientation guide 24 through the same second insertion opening 69.

[0094] Preferably, in accordance with the second embodiment illustrated in figure 8, the second insertion opening 69 of each orientation guide 24 is closed by

means of an obstruction cap 70 fixed, in a removable manner, on the upper face 59 of the corresponding shaped body 55, in order to prevent the exit of the second coupling element 28 of the covering blade 10 from the orientation guide 24.

[0095] Preferably, multiple obstruction caps 70 are provided, each fixed to the upper face 59 of the corresponding shaped body 55 by means of fixing means such as retention screws (not illustrated in the enclosed figures).

[0096] In accordance with a different, non-illustrated embodiment, each obstruction cap 70 is adapted to close the second insertion openings 69 of multiple shaped bodies 55 and in particular, for each lateral beam 3, only one aforesaid obstruction cap 70 is provided, placed on the upper faces 59 of all the shaped bodies 55 fixed to such lateral beam 3.

[0097] Advantageously, in accordance with the third embodiment illustrated in figures 9-11d, each shaped body 55 is provided with a first insertion groove 71 obtained on the internal face 56 of the shaped body 55 itself and extended in a through manner between the upper face 59 and the lower face 58 of the shaped body 55. Through such first insertion groove 71, the corresponding first coupling element 27 of the covering blade 10 is susceptible of being inserted in the corresponding pivoting seat 48 of the corresponding movement rod 30.

[0098] Preferably, such first insertion groove 71 is extended along a rectilinear path, substantially orthogonal to the sliding direction Z of the corresponding movement rod 30.

[0099] Advantageously, each shaped body 55 is provided with a second insertion groove 72 obtained on the internal face 56 of the same shaped body 55 and placed to connect between the first insertion groove 71 and the first part 25 of the orientation guide 24 in a manner such that, through the first and the second insertion groove 71, 72, the corresponding second coupling element 28 of the covering blade 10 is susceptible of being inserted in the orientation guide 24.

[0100] In particular, the second insertion groove 72 has curved shape with the concavity directed towards the corresponding longitudinal guide 29.

[0101] In operation, in accordance with the aforesaid third embodiment of the present invention, the shaped bodies 55 are fixed to the corresponding lateral beams 3 advantageously during production of the covering apparatus 1. During installation of the apparatus 1, the movement rod 30 is arranged with its pivoting seats 48 aligned with the first insertion grooves 71 of the corresponding shaped bodies 55, and subsequently each first coupling element 27 of each covering blade 10 is inserted within the first insertion groove 71 of the corresponding shaped body 55 until the first coupling element 27 enters into the corresponding pivoting seat 48 of the movement rod 30.

[0102] Following the insertion of the first coupling element 27 in the first insertion groove 71, the corresponding

second coupling element 28 is also inserted in such first insertion groove 71; such second coupling element 28, when the first coupling element 27 has entered into the corresponding pivoting seat 48 of the movement rod 30, is arranged at the point of junction of the first insertion groove 71 with the second insertion groove 72. Subsequently, by rotating the covering blade 10 around the rotation axis R1 of the first coupling element 27, the second coupling element 28 is made to slide in the second insertion groove 72 until it enters into the corresponding orientation guide 24.

[0103] The arrangement of the covering blades 10 and the orientation guides 24 of the covering apparatus 1 according to the present invention allows executing, in a particularly facilitated manner, the maintenance operations that provide for replacing one or more covering blades 10, in particular without having to dismantle the lateral beams 3 of the apparatus 1 itself, since it is sufficient to at most remove only the orientation guides 24 associated with the blade 10 to be replaced.

[0104] In particular, in accordance with the aforesaid first and second embodiment illustrated respectively in figures 5-6 and in figure 8, in order to replace one of the covering blades 10, it is sufficient to only remove the orientation guides 24 engaged with the second coupling elements 28 of the covering blade 10 to be replaced.

[0105] In accordance with the aforesaid third embodiment illustrated in figures 9-10, in order to replace one of the covering blades 10, it is sufficient to simply remove the covering blade 10 to be replaced, by reversing the operations described above for mounting the blades 10.

[0106] Advantageously, the covering apparatus 1 according to the present invention comprises two lateral gutters 73, each fixed to the support structure 2 of the apparatus 1 itself and arranged at the respective lateral beam 3 extended parallel to the first extension direction X of the latter. In particular, each lateral gutter 73 is arranged below the corresponding lateral beam 3, and is preferably extended between two first end parts thereof fixed to the corresponding first and second column 6, 7 of the support structure 2.

[0107] With reference to the embodiment illustrated in figure 18, each lateral gutter 73 comprises a first internal containment wall 74 delimited on the upper part by a first internal longitudinal edge 75 arranged under the covering blades 10, and a first external containment wall 76 delimited on the upper part by a first external longitudinal edge 77. Each lateral gutter 73 is also provided with a first longitudinal opening 78 obtained between the aforesaid first longitudinal edges 75, 77 and arranged under the corresponding ends 11 of the covering blades 10 in order to allow the entrance into the lateral gutter 73 of rainwater susceptible of descending from the covering blades 10 themselves.

[0108] Advantageously, the two first containment walls 74, 76 of each lateral gutter 73 are arranged parallel to each other and side-by-side, and are connected on the lower part preferably by means of a bottom wall 79 ar-

ranged in particular orthogonal to the two first containment walls 74, 76.

[0109] Advantageously, the first external containment wall 76 of each lateral gutter 73 is fixed to the respective lateral beam 3. Preferably the first external longitudinal edge 77 of the first external containment wall 76 is connected to a bottom wall of the respective lateral beam 3, which in particular partially encloses the first longitudinal opening 78 of the lateral gutter 73 along such first external longitudinal edge 77.

[0110] Preferably, the first internal containment wall 74 of each lateral gutter 73 comprises a first portion 80' extended from the first bottom wall 79 and a second portion 80", which is projectingly extended, preferably at an angle, from the first portion 80' into the area below the covering blades 10 and terminates on the upper part with the first internal longitudinal edge 75.

[0111] Advantageously, each lateral gutter 73 is provided with first sealing means 81 which are arranged along the first internal longitudinal edge 75 of the first internal containment wall 74, preferably substantially along the entire longitudinal extension of the lateral gutter 73.

[0112] When the covering blades 10 are arranged in their closure position, the aforesaid first sealing means 81 are compressed between the first internal longitudinal edge 75 of the lateral gutter 73 and the internal walls 13 of the covering blades 10 in a manner such to substantially hermetically isolate the zone below the covering blades 10 from the zone occupied by the lateral gutters 73 and from the lateral beams 3 susceptible of being soaked by rainwater.

[0113] Preferably, in accordance with the embodiment illustrated in figure 18, the first sealing means 81 comprise a first balloon gasket 81' provided with a first engagement appendage inserted in a retention relationship within a first longitudinal groove obtained on the first internal longitudinal edge 75 of the first internal containment wall 74 of the corresponding lateral gutter 73.

[0114] Advantageously, the lateral caps 16 of each covering blade 10 comprise a drip-catcher tab 93, which is projectingly extended below the internal wall 13 of the corresponding covering blade 10 and, when the latter is in closure position, is preferably inserted within the corresponding lateral gutter 73 through the first longitudinal opening 78 of the latter, in particular being arranged with a lower edge 94 thereof at a lower height than that of the first internal longitudinal edge 75 of the first internal containment wall 74 of the lateral gutter 73 itself.

[0115] In this manner, the aforesaid drip-catcher tab 93 allows conveying the rainwater, which falls on the external wall 14 of the corresponding covering blade 10, into the underlying lateral gutter 73, without part of the water drops being able to re-ascend along the internal wall 13 of the covering blade 10 towards the center of the latter and fall outside the lateral gutter 73 on the ground surface protected by the covering apparatus 1.

[0116] Advantageously, the covering apparatus 1, ob-

ject of the present invention, comprises two front gutters 82, each fixed to the support structure 2 of the apparatus 1 itself and arranged at the respective front beam 8, 9 extended parallel to the second extension direction Y of the covering blades 10. In particular, each front gutter 82 and is arranged below the corresponding front beam 8, 9, and is preferably extended between two second end parts thereof fixed to the corresponding column 6, 7 of the support structure 2.

[0117] With reference to the embodiment illustrated in figure 19, each front gutter 82 comprises a second internal containment wall 83 delimited on the upper part by a second internal longitudinal edge 84 arranged under the corresponding end blade 10', 10", and a second external containment wall 85 delimited on the upper part by a second external longitudinal edge 86. Each front gutter 82 is also provided with a second longitudinal opening 87 obtained between the aforesaid second longitudinal edges 84, 86.

[0118] Advantageously, the two second containment walls 83, 85 of each front gutter 82 are arranged that are parallel to each other and side-by-side, and are connected on the lower part preferably by means of a second bottom wall 88 arranged in particular orthogonal to the two second containment walls 83, 85.

[0119] Advantageously, the second external containment wall 85 of each front gutter 82 is fixed to the respective front beam 8, 9, at the second external longitudinal edge 86 of the second external containment wall 85 itself.

[0120] Preferably, the second internal containment wall 83 of each front gutter 82 comprises a first portion 89 extended from the second bottom wall 88 and a second portion 90, which is projectingly extended, preferably at an angle, from the first portion 89 into the area below the corresponding end blades 10', 10" and terminates on the upper part with the second internal longitudinal edge 84.

[0121] Each front gutter 82 is provided with second sealing means 91 which are arranged along the second internal longitudinal edge 84 of the second internal containment wall 83, preferably extended along the entire longitudinal extension of the front gutter 82 itself. When the covering blades 10 are arranged in their closure position, the aforesaid second sealing means 91 are compressed in sealing relationship between the second internal longitudinal edge 84 of the second internal containment wall 83 of the front gutter 82 and the internal wall 13 of the corresponding end blade 10'.

[0122] Preferably, in accordance with the embodiment illustrated in figure 19, the second sealing means 91 comprise a second balloon gasket 91' provided with a second engagement appendage inserted in retention relationship within a second longitudinal groove obtained on the second internal longitudinal edge 84 of the second internal containment wall 83 of the corresponding front gutter 82.

[0123] Advantageously, with reference to the embodiment illustrated in figure 12, each covering blade 10 com-

prises a transverse gasket 92, preferably balloon-like, which is arranged on the first terminal portion 19 of the first longitudinal side 17 of the blade 10 itself.

[0124] In this manner, when the covering blades 10 are in closure position, the transverse gasket 92 of each blade 10 is sealingly compressed between the first terminal portion 19 (on which the transverse gasket 92 itself is fixed) and the second terminal portion 20 of the second longitudinal side 18 of the subsequent covering blade 10, in order to prevent infiltrations of water and substantially air between each covering blade 10 and the next one.

[0125] The aforesaid first and second sealing means 81, 91, respectively of the lateral 73 and front 82 gutters, and advantageously the transverse gaskets 92 of the covering blades 10, allow, when the covering blades 10 are in closure position, substantially hermetically isolating the outer zone above the covering blades 10 from the space below the blades 10 themselves, ensure a good insulation against the passage of air and water.

[0126] In particular, advantageously, the sides of the support structure 2 of the covering apparatus 1, delimited between two side-by-side columns 6, 7, can be closed by means of panels or windows (of type *per se* known to the man skilled in the art) ensuring, together with the aforesaid sealing means 81, 91 and transverse gaskets 92, a substantially total and hermetic closure of the space below the covering blades 10 with respect to the air and water coming from the outside environment.

[0127] Advantageously, in accordance with the embodiment illustrated in figures 14 - 17, at least one of the covering blades 10 is provided with a plurality of light sources 95, preferably of LED type, arranged in an internal cavity of the shaped profile 15 of the covering blade 10 itself and adapted to emit light ray beams through corresponding through windows 96 obtained on the internal wall 13 of the shaped body 15 of the covering blade 10.

[0128] In particular, each through window 96 is hermetically sealed by means of a corresponding sealing gasket interposed between the edge of the through window 96 and the light source 95 arranged in such through window 96.

[0129] The internal cavity of the shaped profile 15, in which the light sources 95 of the corresponding covering blade 10 are housed, is closed at the ends 11 of the blade 10 by the corresponding lateral caps 16.

[0130] Preferably, the covering apparatus 1 comprises multiple aforesaid covering blades 10 provided with light sources 95, with such blades 10 arranged alternated with one or more covering blades 10 lacking light sources, so as to uniformly illuminate the underlying ground surface.

[0131] Suitably, the covering apparatus 1 comprises power supply cables 97 electrically connected to the light sources 95 in order to supply the latter with electrical energy coming from a power supply source, such as a home electricity network.

[0132] In particular, with reference to the embodiment illustrated in figures 15 and 16, such power supply cables

97 comprise a longitudinal section 98 which is extended along one of the lateral beams 3 adjacent to the corresponding ends 11 of the covering blades 10, and multiple transverse sections 99; each transverse section 99 is derived from the aforesaid longitudinal section 98, enters into the shaped profile 15 of the corresponding covering blade 10 and is electrically connected to the light sources 95 arranged inside the latter.

[0133] In particular, the lateral caps 16 of the covering blades 10 arranged adjacent to the longitudinal section 98 of the power supply cables 97 are provided with corresponding access holes 100, preferably circular, traversed by the power supply cables 97 and in particular by the corresponding transverse sections 99 of the latter, in order to allow each transverse section 99 to enter into the shaped profile 15 of the corresponding covering blade 10.

[0134] Each covering blade 10, provided with light sources 95, comprises a connection element 101 engaged with the power supply cables 97 and coupled to the access hole 100 in order to retain the power supply cables 97 hung from the covering blade 10 during the movement of the latter, closing the access hole 100 in a substantially hermetic manner.

[0135] More in detail, with reference to the embodiment illustrated in figure 16, each connection element 101 comprises a rotatable body 102 rotatably inserted in the access hole 100 of the closure cap 16 with a revolution axis R2 parallel to the rotation axis R1 of the first coupling element 27 of the corresponding covering blade 10.

[0136] More in detail, the rotatable body 102 has substantially tubular form with preferably circular section and is extended along the revolution axis R2 between an external position 104 arranged outside the shaped profile 15 of the covering blade 10 and an internal portion 105 arranged in the internal cavity of the shaped profile 15 itself.

[0137] In addition, with reference to the embodiment illustrated in figure 17, the rotatable body 102 is provided with an external surface 106 and with an internal surface 107 which delimits an internal channel 108 traversed by the power supply cables 97 and extended between at least one first opening 109', 109" obtained on the external portion 104 and a second opening 110 obtained on the internal portion 107.

[0138] Advantageously, the external portion 104 of the rotatable body 102 is delimited by a first end edge 111 which defines a first axial opening 109' of the external portion 104 itself preferably aligned with the revolution axis R2 of the rotatable body 102.

[0139] In addition, advantageously, the external portion 104 of the rotatable body 102 is provided with two first transverse openings 109" obtained in a through manner between the external surface 106 and the internal surface 107 of the rotatable body 102 itself and traversed by the longitudinal section 98 of the power supply cables 97.

[0140] In particular, the two first transverse openings

109" are arranged in diametrically opposite position from each other with respect to the revolution axis R2, and are connected to the first axial opening 109' in order to allow the insertion therein of the longitudinal section 98 of the power supply cables 97 during the mounting operations of the covering apparatus 1.

[0141] Preferably, the internal portion 105 of the rotatable body 102 is delimited by a second end edge 112 which defines the second opening 110 of the internal portion 105 itself preferably arranged aligned with the first axial opening 109' of the external portion 104 along the revolution axis R2 of the rotatable body 102.

[0142] Advantageously, from the longitudinal section portion 98 arranged inside the rotatable body 102, the corresponding transverse section 99 is extended which enters into the shaped profile 15 of the covering blade 10 through the second opening 110 of the rotatable body 102 itself.

[0143] Advantageously, each connection element 101 comprises one or more sealing elements 113, such as annular gaskets, interposed between the external surface 106 of the rotatable body 102 and the profile of the access hole 100 of the lateral cap 16 of the covering blade 10, in order to ensure the substantially hermetic closure of the access hole 100 itself.

[0144] According to the invention, each connection element 101 also comprises third sealing means 114 placed to hermetically close the first openings 109', 109" and at least partially extended between the power supply cables 97 and the rotatable body 102. Preferably, the third sealing means 114 comprise an internal gasket 115 arranged around the longitudinal section 98 of the power supply cables 97 at the first transverse openings 109" of the rotatable body 102, hermetically closing the latter openings.

[0145] More in detail, such internal gasket 115 comprises an annular portion 116 arranged in the internal channel 108 of the rotatable body 102, from which two radial portions 117 are projectingly extended that are arranged in the corresponding first transverse openings 109"; each portion 117 is provided with a corresponding through hole 118, through which the longitudinal section 98 of the power supply cables 97 passes. Preferably, the aforesaid internal gasket 115 is obtained with at least two half-parts, each in particular comprising a corresponding half of the annular portion 116 and radial portions 117 and is coupled to the other half-part so as to retain, between them, the longitudinal section 98 of the power supply cables 97.

[0146] Advantageously, the third sealing means 114 of each connection element 101 comprise a closure cap 119 fixed in sealing relationship on the first end edge 111 of the rotatable body 102 and preferably abutting against the internal gasket 115.

[0147] In operation, during the movement of the covering blades 10 between the closure position and the open position, the rotatable body 102 of each connection element 101 is susceptible of rotating around its revolu-

tion axis R2, being adapted for arranging power supply cables 97 such to maintain the longitudinal section 98 of the latter substantially parallel to the lateral beam 3, thus preventing entanglement and/or tearing of the cables 97 themselves.

[0148] Preferably, the longitudinal section 98 of the power supply cables 97 is engaged with one end thereof constrained to the support structure 2 of the covering apparatus 1, in particular at the first end 4 of the lateral beam 3 adjacent to such longitudinal section 98. The longitudinal section 98 is provided with an initial portion extended between the constrained end thereof and the covering blade 10 provided with light sources 98 closest to the first end 4 of the lateral beam 3.

[0149] Such initial portion of the longitudinal section 98 has length greater than the distance between the first end 4 of the lateral beam 3 and the aforesaid blade 10 closest to such first end 4. More in detail, the initial portion of the longitudinal section 98 is enlarged by an amount at least equal to the length of the displacement that the covering blades 10 complete along the sliding direction Z during their movement between the closure position and the open position, in a manner such to prevent tearing the longitudinal section 98 itself of the power supply cables 97 during the movement of the blades 10.

[0150] The above-described connection element 101 is also advantageously employable for covering blades different from those described above, for example blades of known type movable by means of rotation around pins hinged to the lateral beams.

[0151] The invention thus conceived therefore attains the pre-established objects.

35 Claims

1. Covering apparatus (1), which comprises:

- a support structure (2) provided with at least two lateral beams (3) that are parallel to each other and side-by-side, each longitudinally extended along a corresponding first extension direction (X);
 - a plurality of covering blades (10) arranged one after the other according to said first extension direction (X), each of such covering blades (10) extended along a second extension direction (Y) substantially orthogonal to said first extension direction (X), and provided with two opposite ends (11) associated with said respective lateral beams (3);
- said covering blades (10) being movable between a closure position, in which said covering blades (10) are arranged partially superimposed, each over the next, covering an underlying ground surface, and at least one open position, in which said covering blades (10) are arranged each spaced from the next, delimiting

- passage openings (12) between them;
said covering apparatus (1) being **characterized in that** it further comprises:
- movement means (22) actuatable to slide along at least one of said lateral beams (3) between a retreated position and an advanced position;
 - a plurality of orientation guides (24) fixed along at least one of said lateral beams (3) at the ends (11) of said plurality of covering blades (10), each of such orientation guides (24) at least partially extended along a path which is arranged on a plane substantially orthogonal to the second extension directions (Y) of said covering blades (10) and is extended between one first part (25) closer to said movement means (22) and at least one second part (26) further from said movement means (22);
- each said covering blade (10) comprising, at least one said end (11) thereof:
- a first coupling element (27), which is rotatably constrained to said movement means (22) around a rotation axis (R1) substantially parallel to the second extension direction (Y) of said covering blade (10);
 - a second coupling element (28) slidably constrained in the corresponding said orientation guide (24), such second coupling element (28):
 - with said movement means (22) in said retreated position, is arranged in the first part (25) of said path, with said covering blade (10) in said closure position,
 - with said movement means (22) in said advanced position, is arranged in the second part (26) of said path, with said covering blade (10) in said at least one open position.
2. Covering apparatus (1) according to claim number 1, **characterized in that** it comprises at least one longitudinal guide (29) which is fixed to said support structure (2), is arranged along said respective lateral beam (3) and is extended parallel to a sliding direction (Z) substantially parallel to the first extension direction (X) of said lateral beam (3), said movement means (22) being slidably constrained to the longitudinal guide (29).
 3. Covering apparatus (1) according to claim number 2, **characterized in that** said movement means (22) comprise at least one movement rod (30), which is extended substantially parallel to sliding direction (Z) and is slidably constrained to the longitudinal guide (29) of the respective lateral beam (3).
 4. Covering apparatus (1) according to claim number 3, **characterized in that** the first coupling element (27) of each said covering blade (10) comprises a first projecting pin (47) projectingly extended from the corresponding end (11) of said covering blade (10); said movement rod (30) comprising at least one longitudinal wall (37) limited on the upper part by a longitudinal edge (38) and provided with multiple pivoting seats (48), each one bearing internally, rotatably constrained, the first projecting pin (47) of the first coupling element (27) of said corresponding covering blade (10) and is provided with an upper opening (49) obtained on the longitudinal edge (38) of said longitudinal wall (37), and through such upper opening (49) said first projecting pin (47) is susceptible of being inserted in said pivoting seat (48).
 5. Covering apparatus (1) according to claim number 4, **characterized in that** the longitudinal wall (37) of said movement rod (30) is interposed between said longitudinal guide (29) and the ends (11) of said covering blades (10), and is provided with a first side (40) directed towards said ends (11) and with a second side (41) directed towards said longitudinal guide (29), partially delimiting the latter; each said pivoting seat (48) being obtained in said longitudinal wall (37) in a through manner between said first side (40) and second side (41); the first projecting pin (47) of each said covering blade (10) projectingly extended beyond the second side (41) of said movement rod (30), entering with its end portion (47') into said longitudinal guide (29), such end portion (47') rotatably supports a first slide element (50) constrained in said longitudinal guide (29).
 6. Covering apparatus (1) according to any one of the preceding claims from 2 to 5, **characterized in that** each said first coupling element (27) is positionable by said movement means (22) along said sliding direction (Z) in a corresponding alignment point, in which said first coupling element (27) is arranged aligned with said second coupling element (28) according to an alignment direction orthogonal to the first extension direction (X) of said lateral beams (3) and to the second extension direction (Y) of said covering blades (10); each said orientation guide (24) comprising at least one inversion section (53) which is arranged in a manner such that, with said first coupling element (27) moved closer to said alignment point, said inversion section (53) is traversed by said second coupling element (28) in a first sliding direction, and, with said first coupling element (27) moved away from said alignment point, said inversion section (53) is traversed by said second coupling element (28) in a second sliding direction opposite said first sliding direction.
 7. Covering apparatus (1) according to any one of the preceding claims, **characterized in that** it comprises

- es multiple shaped bodies (55), each fixed to said respective lateral beam (3) and provided with an internal face (56) directed towards the corresponding end (11) of said covering blades (10), and on such internal face (56) at least one corresponding orientation guide (24) of said orientation guides (24) is obtained.
8. Covering apparatus (1) according to claim number 7 and any one of the claims from 2 to 6, **characterized in that** each said shaped body (55) is provided with a lower face (58) directed towards said longitudinal guide (29) as an at least partial upper delimitation of said longitudinal guide (29).
9. Covering apparatus (1) according to claim number 8, **characterized in that** the first part (25) of each said orientation guide (24) is provided with a first insertion opening (68) obtained on the lower face (58) of said shaped body (55), where through such first insertion opening (68) the second coupling element (28) of said corresponding covering blade (10) is susceptible of being inserted in said orientation guide (24).
10. Covering apparatus (1) according to any one of the claims from 7 to 9, **characterized in that** each said shaped body (55) is provided with at least one retention element (62) snappingly engaged in a retention seat (63) obtained on said respective lateral beam (3).
11. Covering apparatus (1) according to any one of the preceding claims, wherein each said covering blade (10) comprises a first longitudinal side (17) which, with said covering blade (10) in open position, is directed downward, and a second longitudinal side (18) which, with said covering blade (10) in open position, is directed upward; said covering apparatus (1) being **characterized in that** the first coupling element (27) of each covering blade (10) is arranged at said first longitudinal side (17).
12. Covering apparatus (1) according to any one of the preceding claims, wherein each said covering blade (10) is provided with a substantially flat internal wall (13) which, with said covering blade (10) in said closure position, is directed downward and positioned substantially parallel to the first extension direction (X) of each said lateral beam (3); said covering apparatus (1) being **characterized in that** it comprises at least one lateral gutter (73) fixed to said support structure (2), arranged at said respective lateral beam (3) and extended parallel to the first extension direction (X) of the latter; said lateral gutter (73) comprising a first internal containment wall (74) delimited on the upper part by a first internal longitudinal edge (75) arranged under said covering blades (10), and a first external containment wall (76) delimited on the upper part by a first external longitudinal edge (77), where between such first longitudinal edges (75, 77), a first longitudinal opening (78) is obtained, arranged under the corresponding ends (11) of said covering blades (10) and adapted to allow the entrance into said lateral gutter (73) of water susceptible of descending from said covering blades (10); said lateral gutter (73) being provided with first sealing means (81) which are arranged on the first internal longitudinal edge (75) of said first internal containment wall (74) and are compressed in sealing relationship between said first internal longitudinal edge (75) and the internal walls (13) of said covering blades (10) in said closure position.
13. Covering apparatus (1) according to any one of the preceding claims, **characterized in that** each said covering blade (10) comprises:
- a shaped profile (15) extended longitudinally along said second extension direction (Y) and provided with an internal cavity thereof;
 - two lateral caps (16) placed at the corresponding ends (11) of said covering blade (10) closing the internal cavity of said shaped profile (15);
 - a plurality of light sources (95) arranged in the internal cavity of said shaped profile (15) and adapted to emit light ray beams through corresponding through windows (96) obtained on said shaped profile (15);
- said covering apparatus (1) comprising power supply cables (97) electrically connected to said light sources (95) in order to supply the latter with electrical energy coming from a power supply source;
- at least one of said lateral caps (16) being provided with an access hole (100) traversed by said power supply cables (97);
- each said covering blade (10) comprising at least one connection element (101) engaged with said power supply cables (97) and coupled with said access hole (100); said connection element (101) comprising:
- a rotatable body (102) which:
 - is rotatably inserted in said access hole (100) with a revolution axis (R2) parallel to the rotation axis (R1) of the first coupling element (27) of said covering blade (10),
 - has substantially tubular shape and is extended along said revolution axis (R2) between an external portion (104) arranged outside the hollow body (15) of said covering blade (10) and an internal portion (105) arranged in the internal cavity of said hollow

body (15),

- is provided with an external surface (106) and an internal surface (107) which delimits an internal channel (108) traversed by said power supply cables (97) and extended between at least one first opening (109', 109") obtained on said external portion (104) and a second opening (110) obtained on said internal portion (105);
- third sealing means (114) placed to hermetically close said at least one first opening (109', 109").

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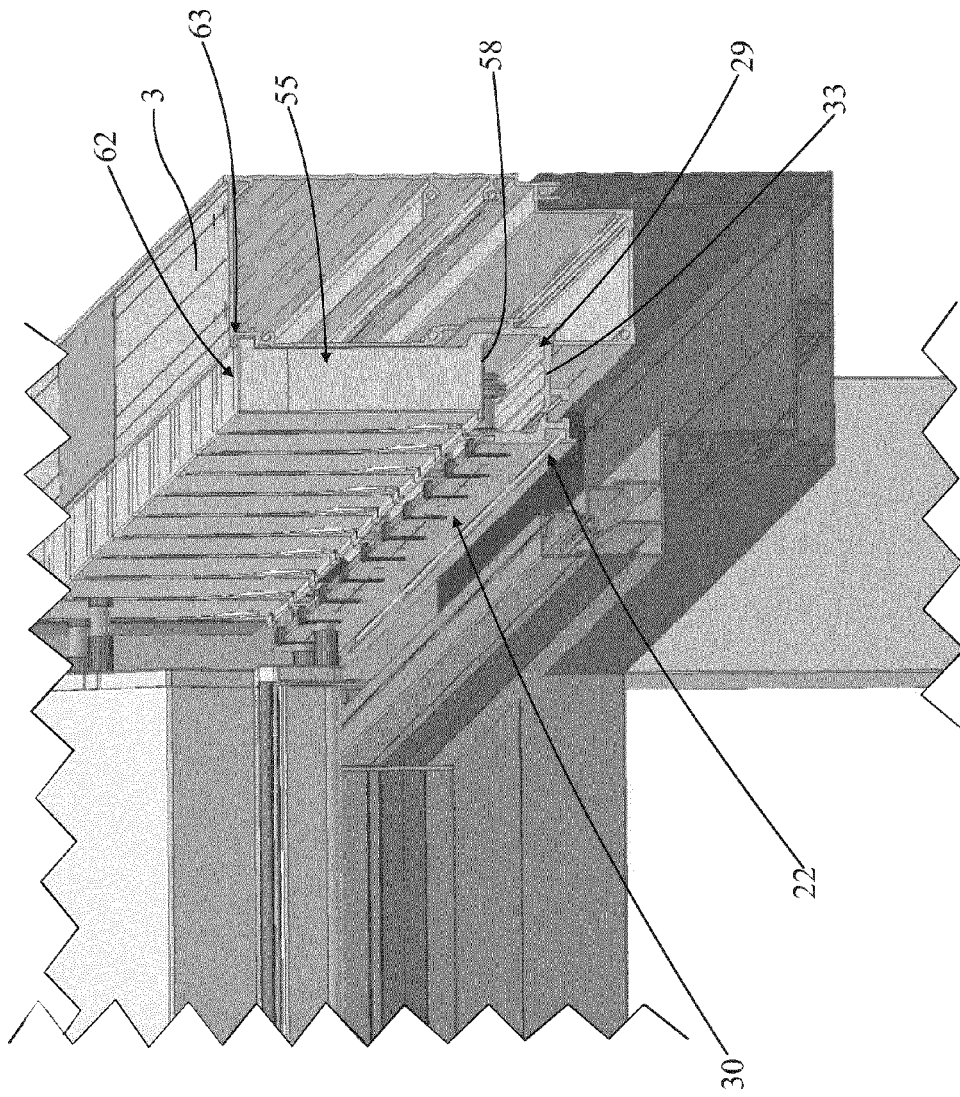


Fig. 3

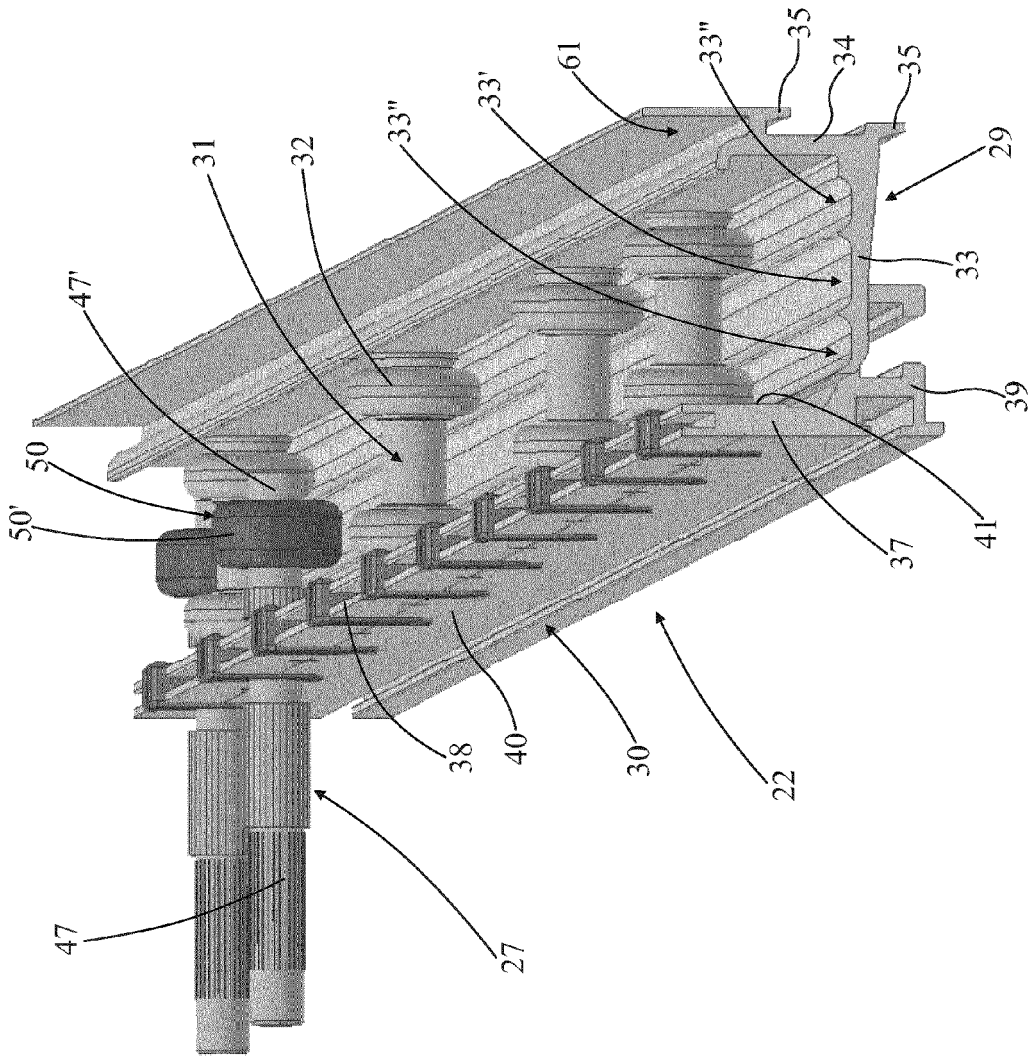


Fig. 4

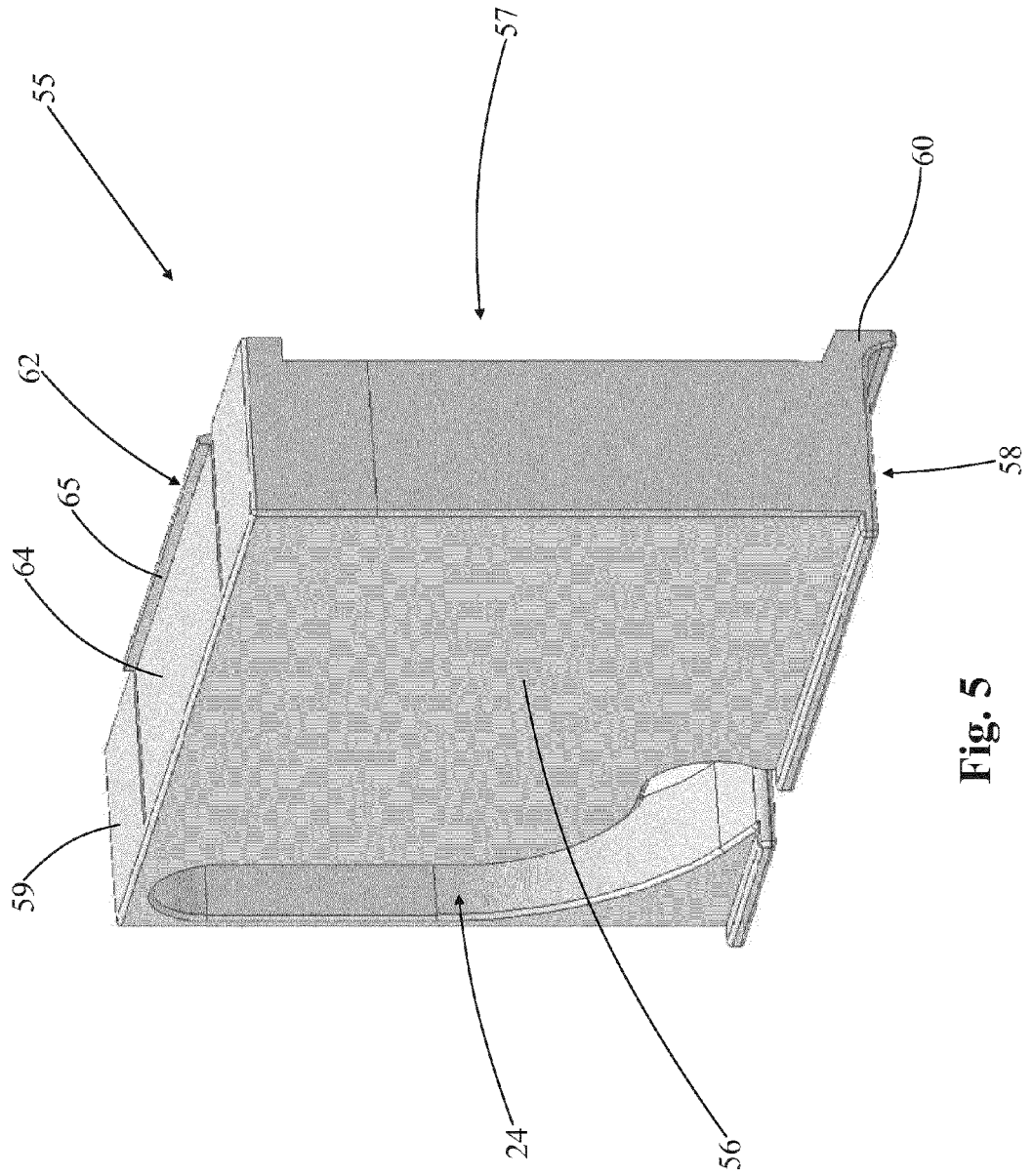


Fig. 5

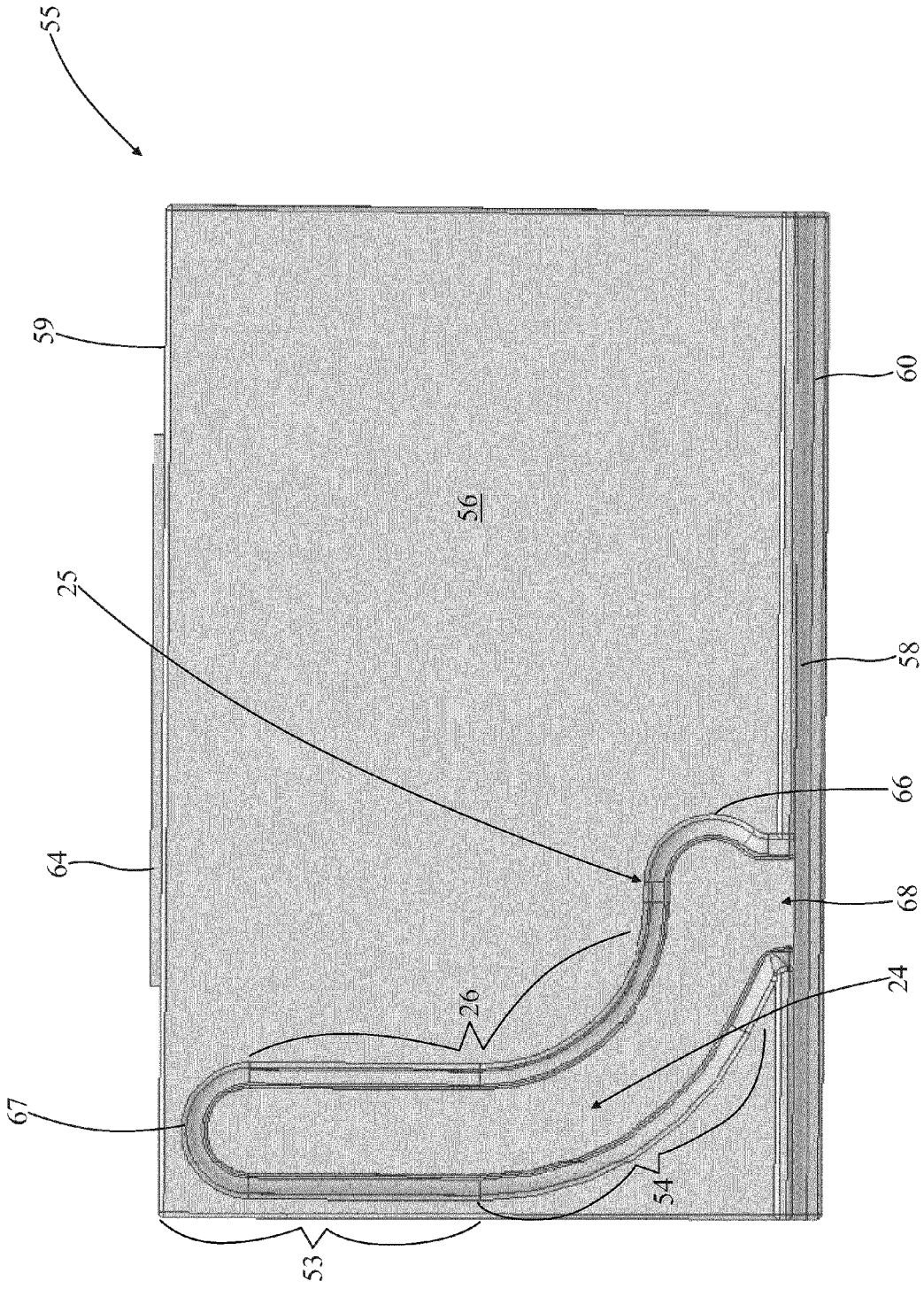


Fig. 6

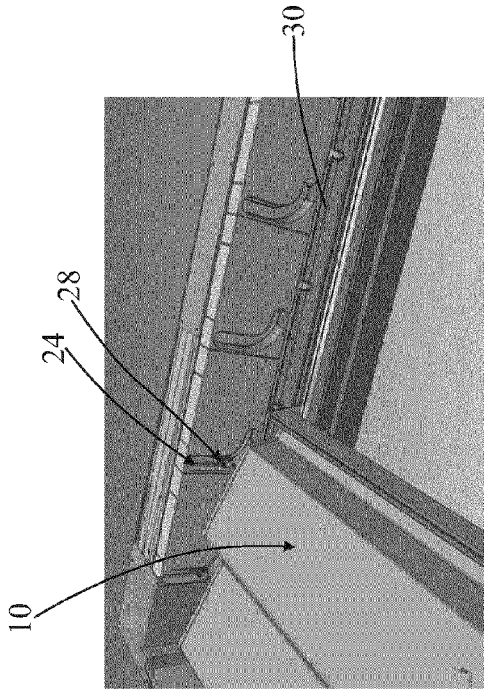


Fig. 7B

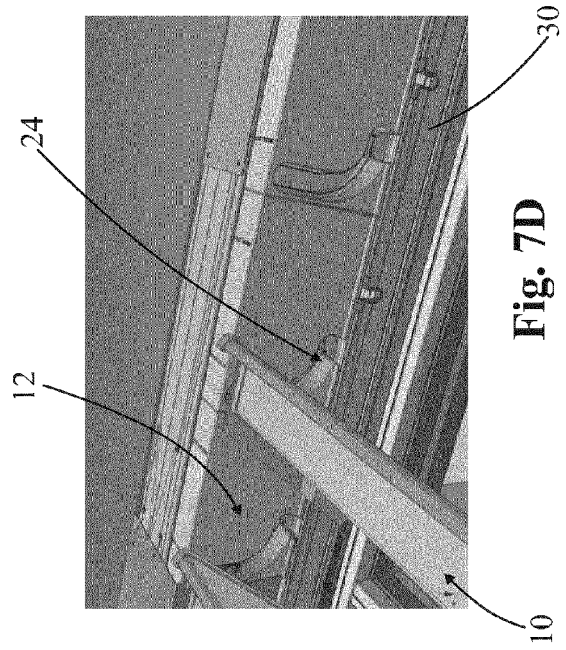


Fig. 7D

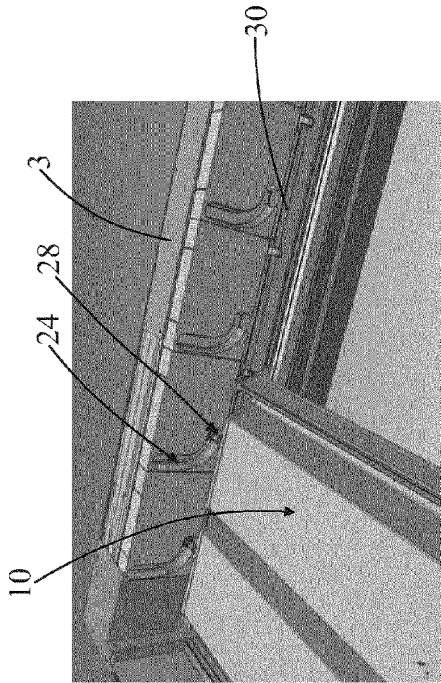


Fig. 7A

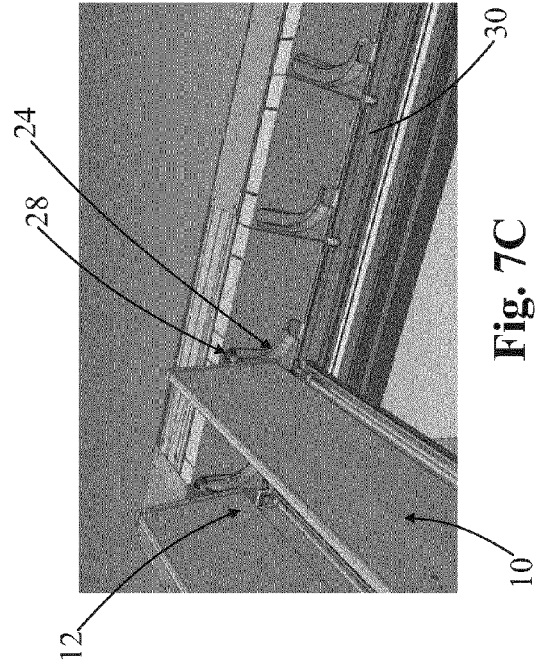


Fig. 7C

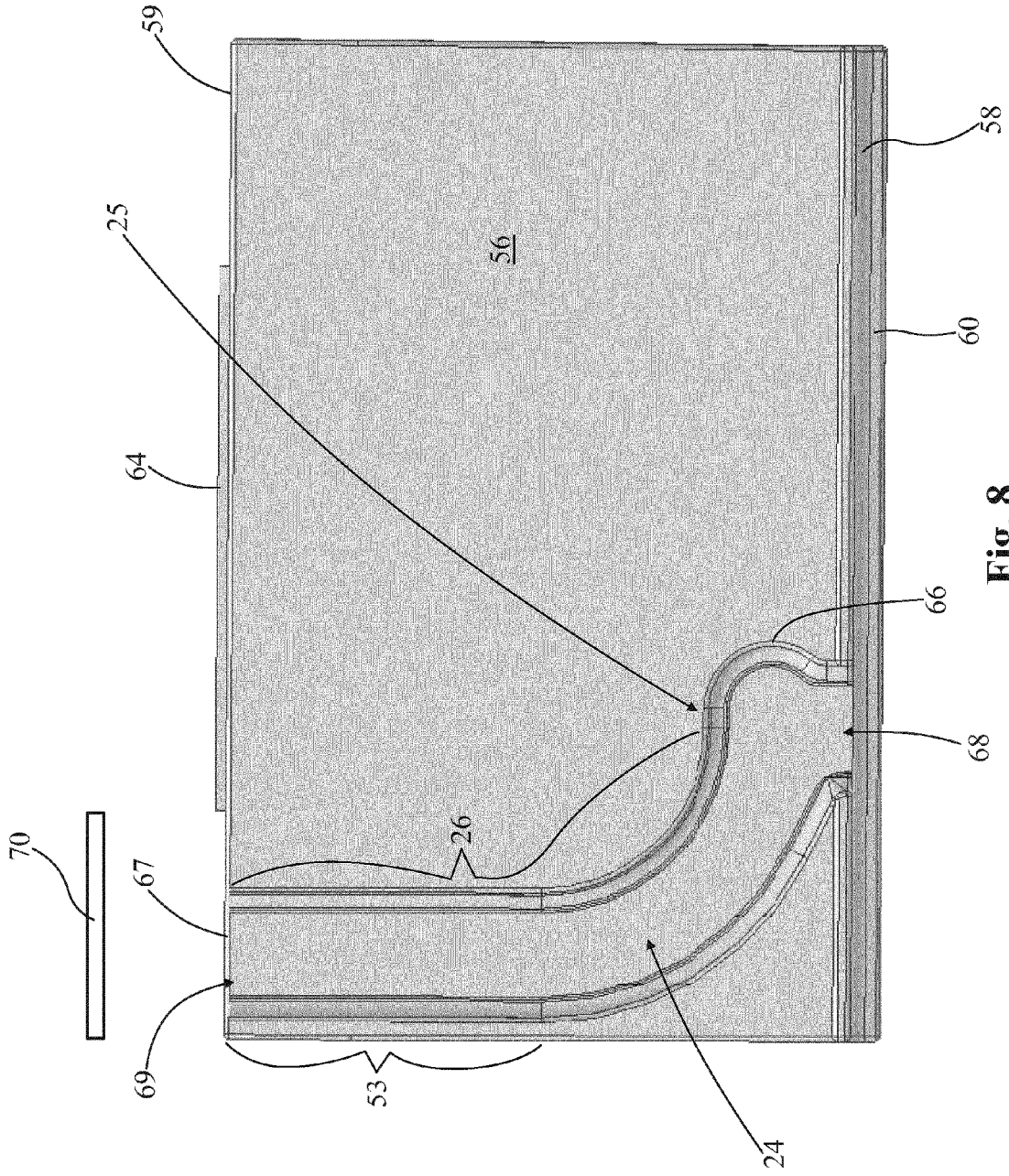


Fig. 8

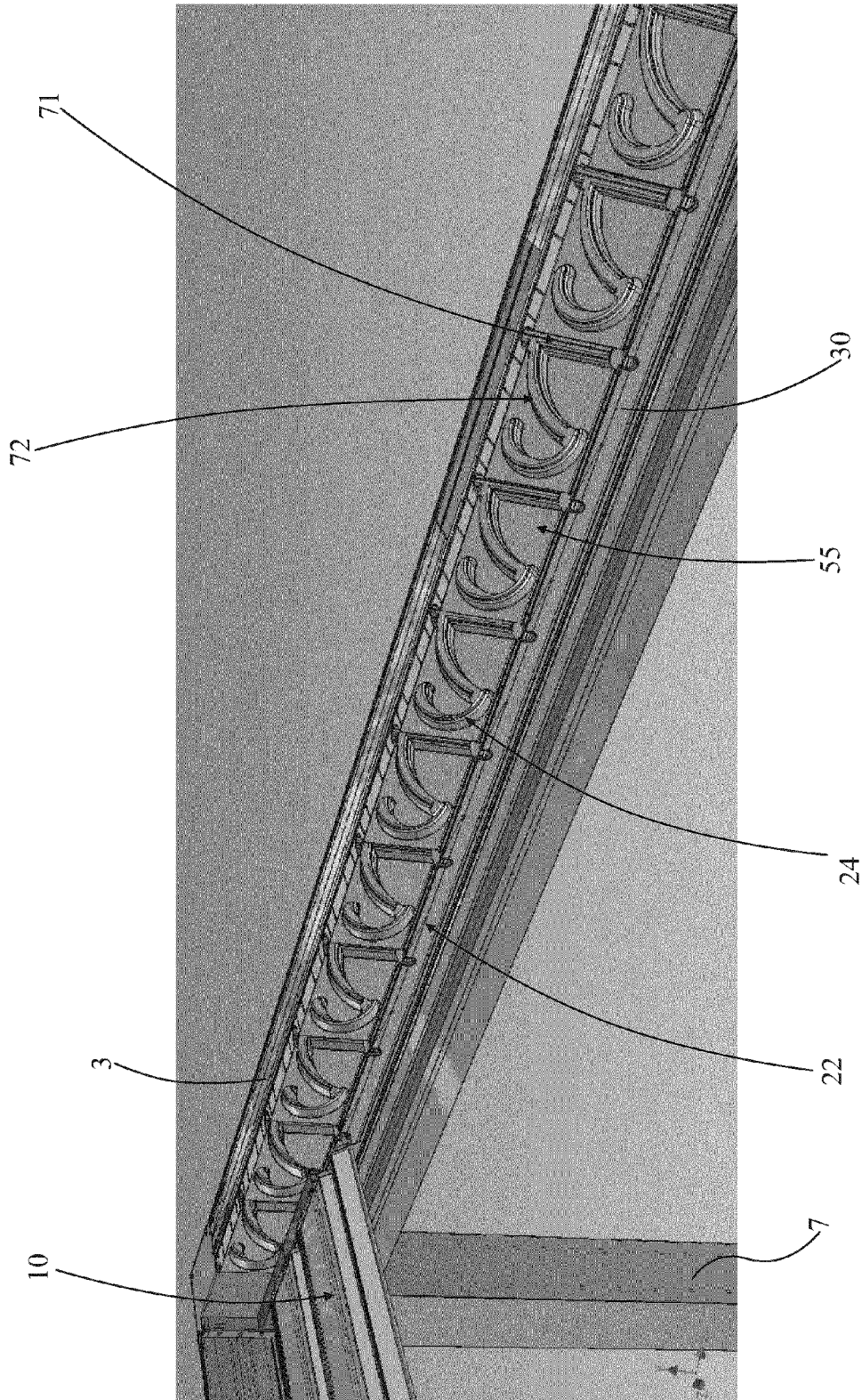


Fig. 9

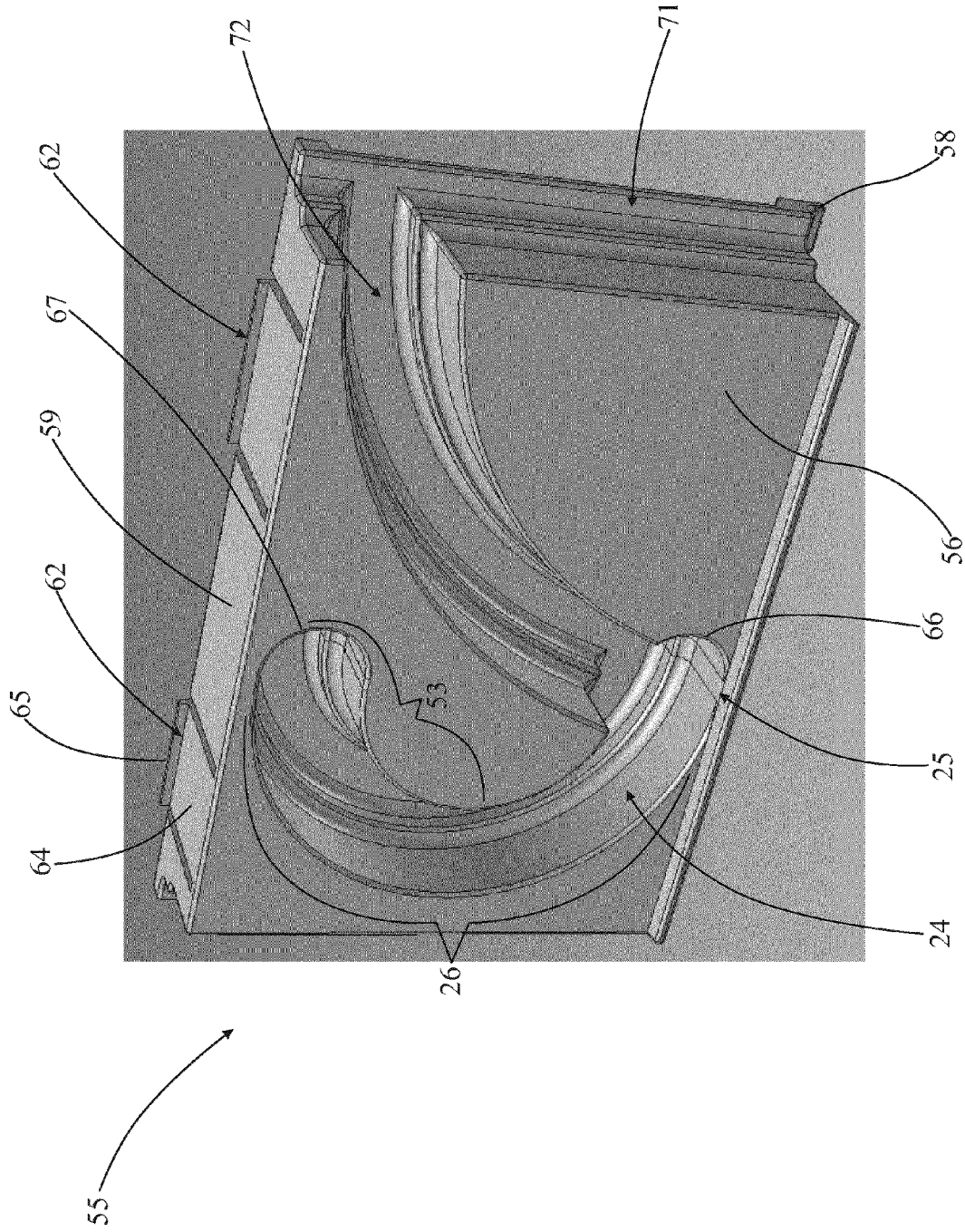
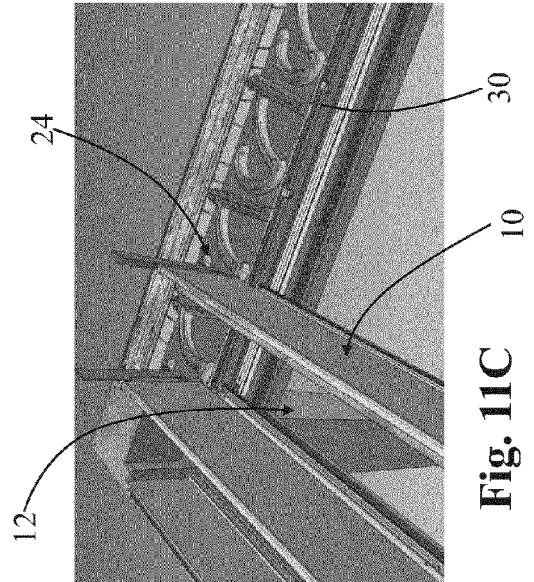
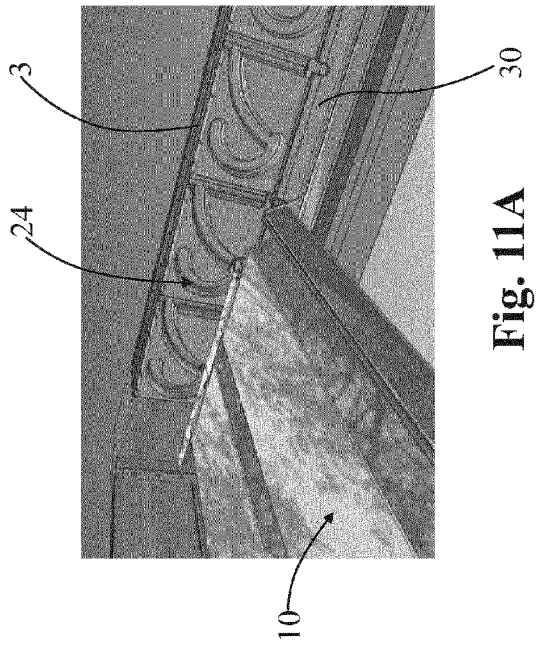
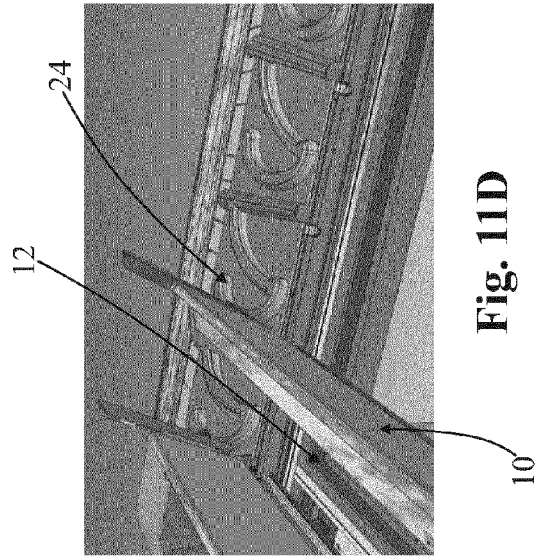
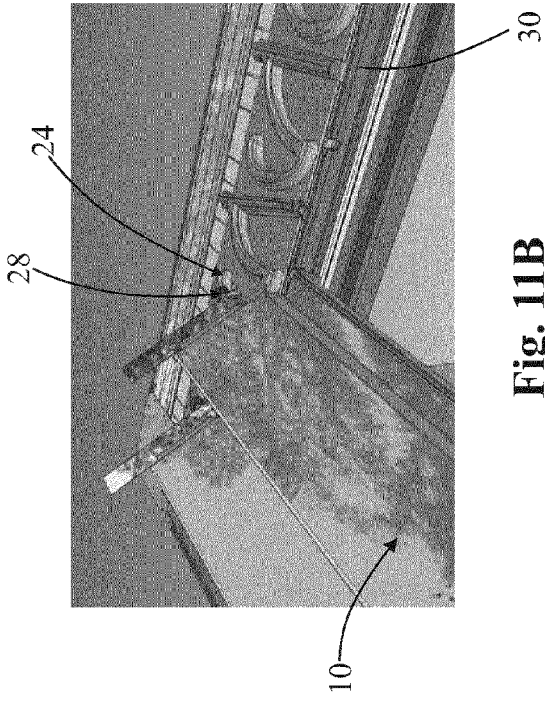


Fig. 10



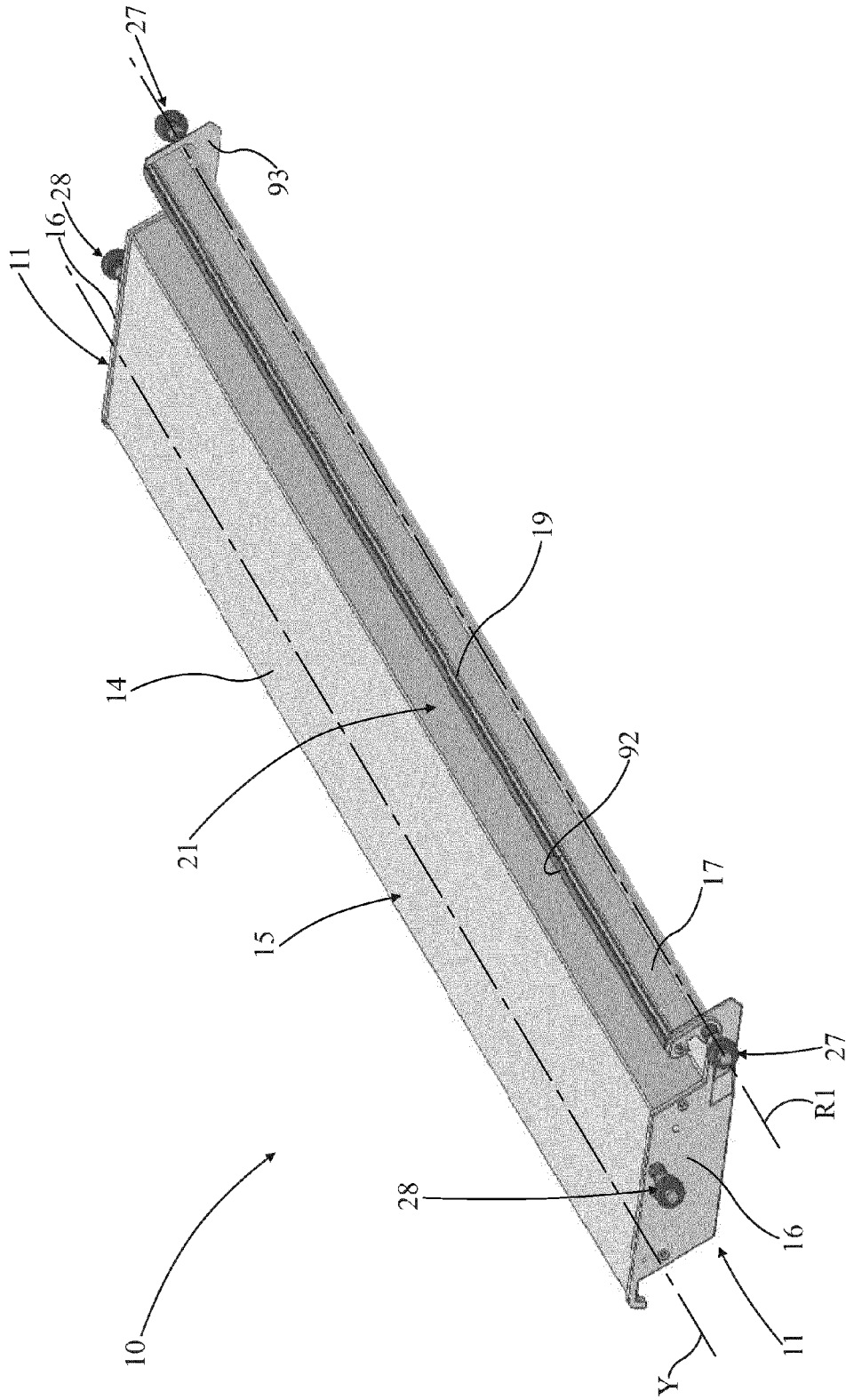


Fig. 12

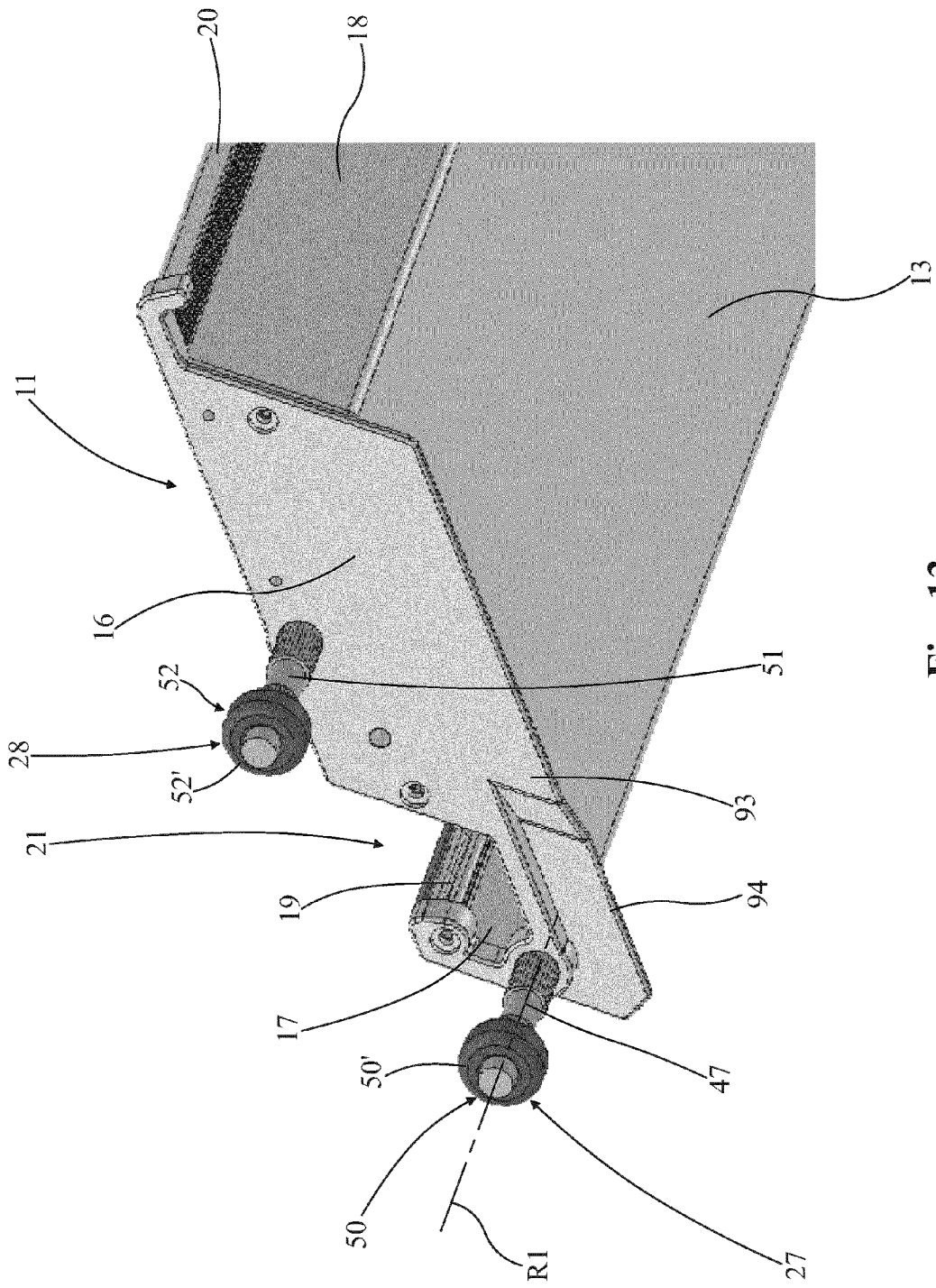


Fig. 13

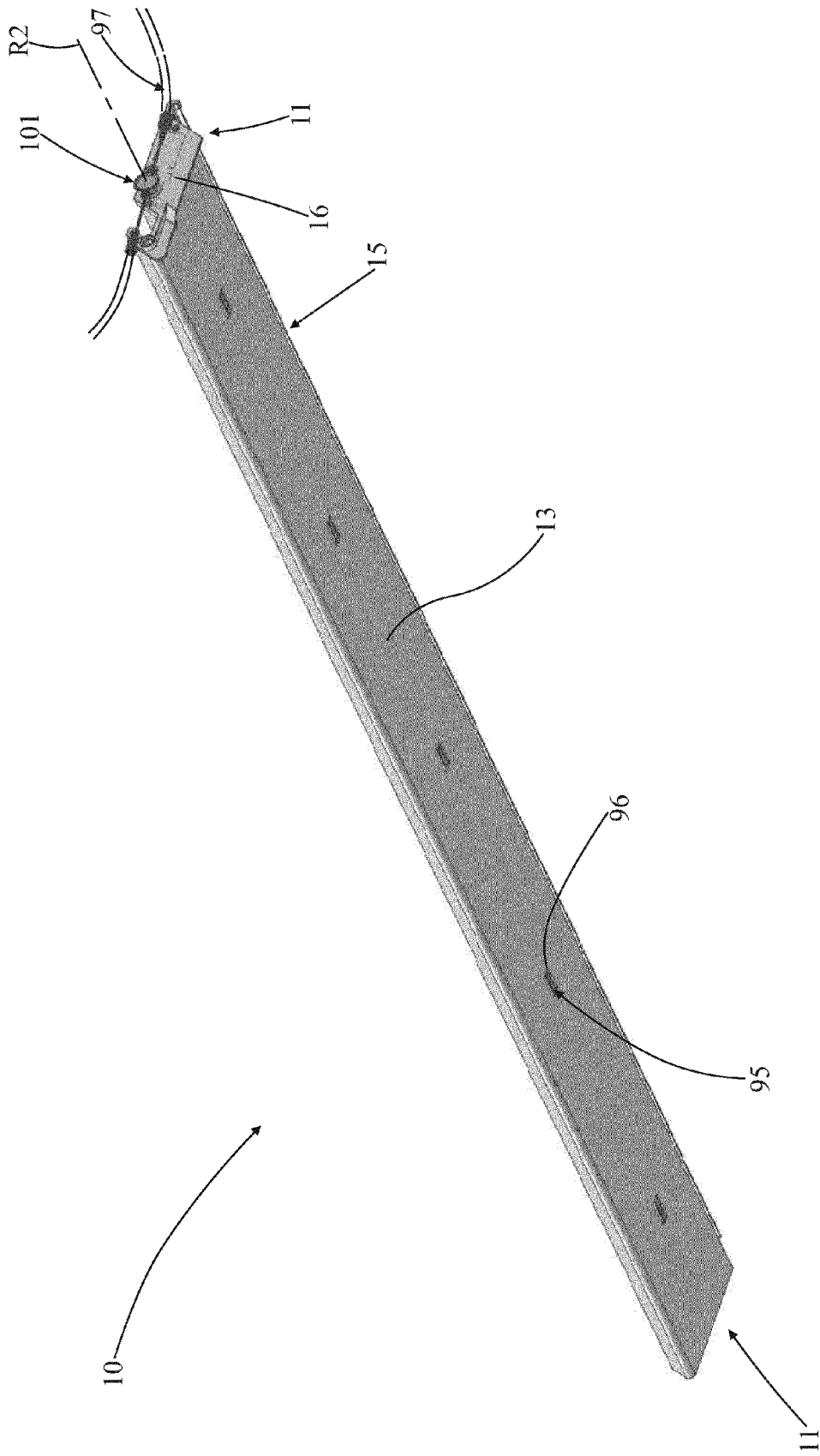


Fig. 14

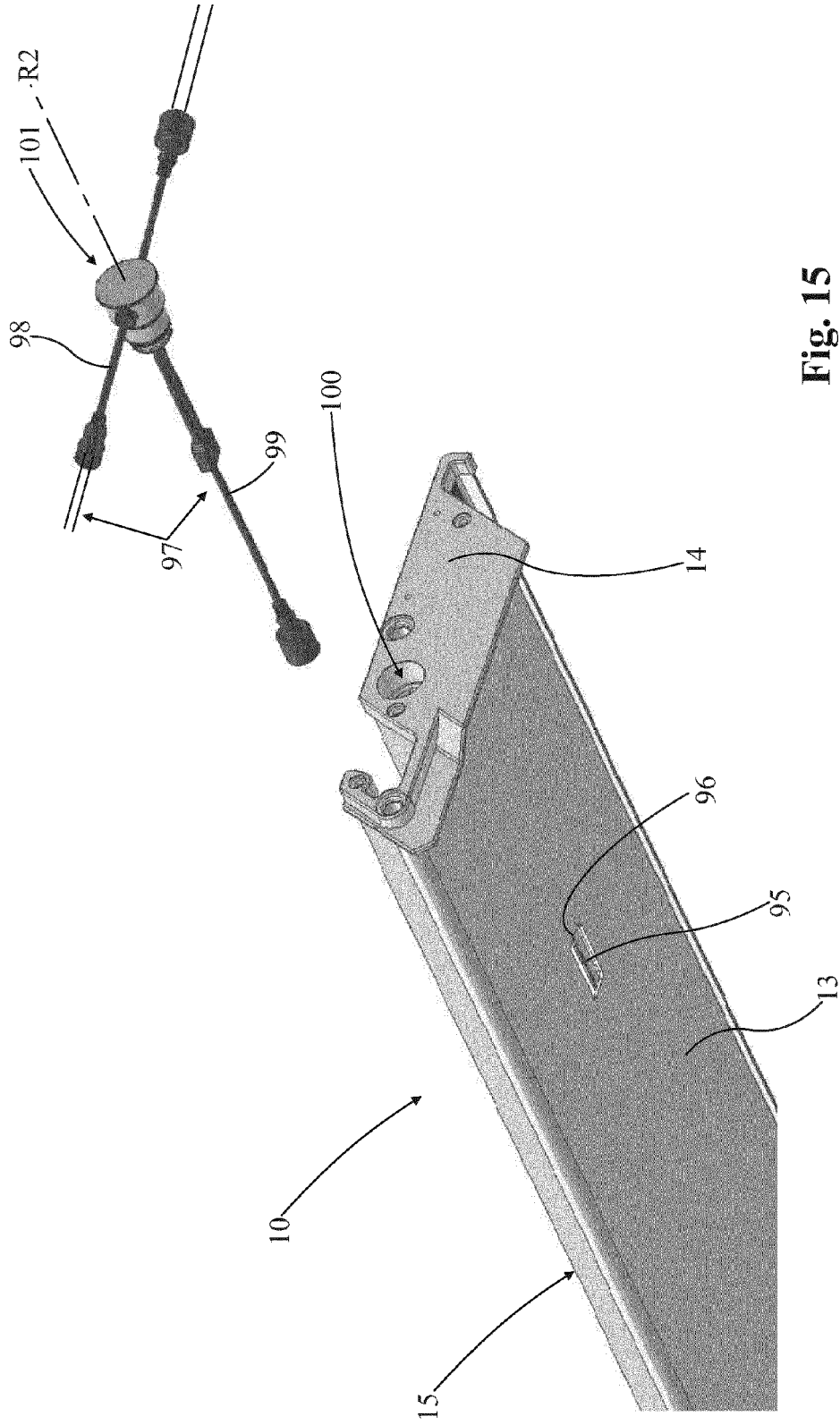


Fig. 15

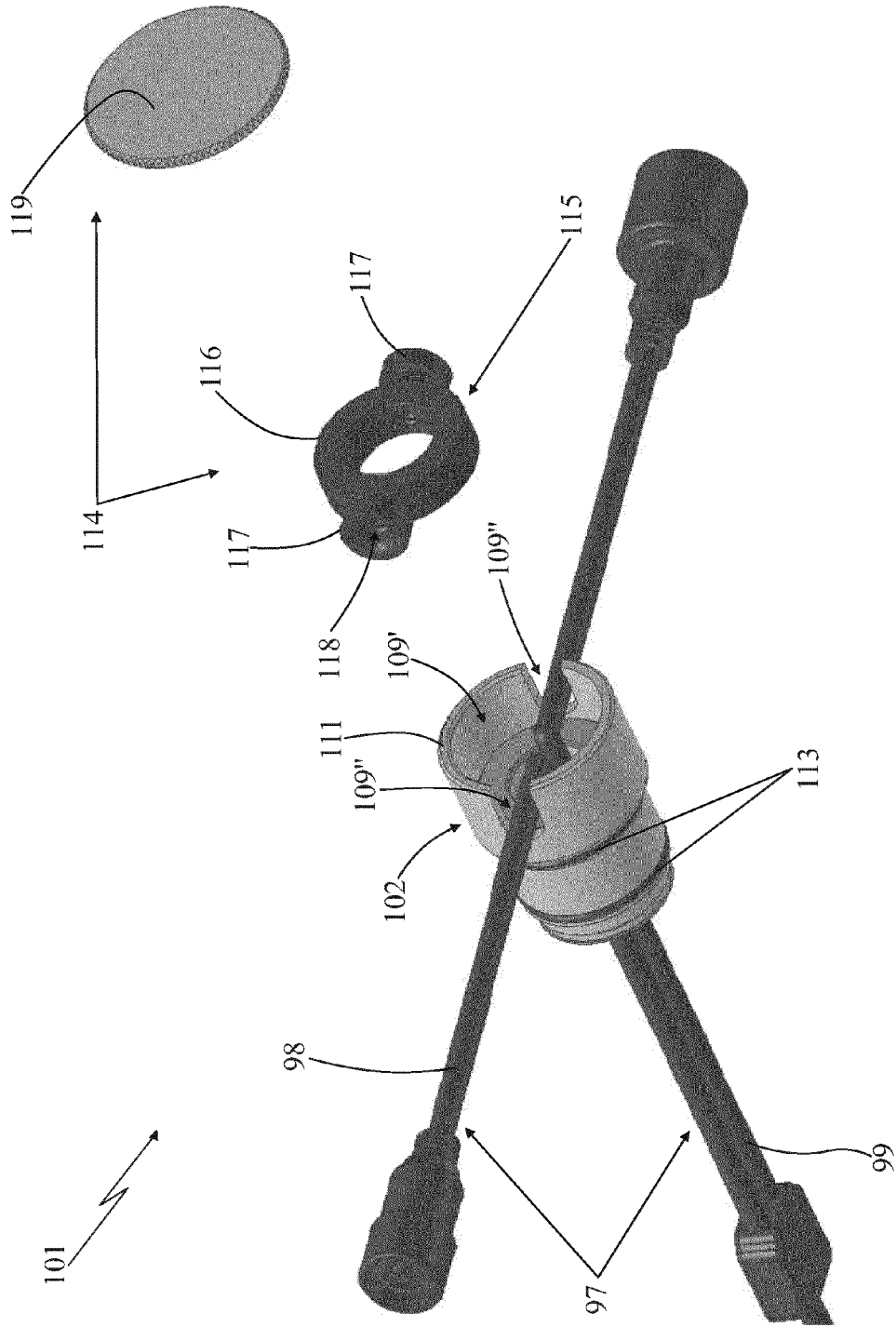


Fig. 16

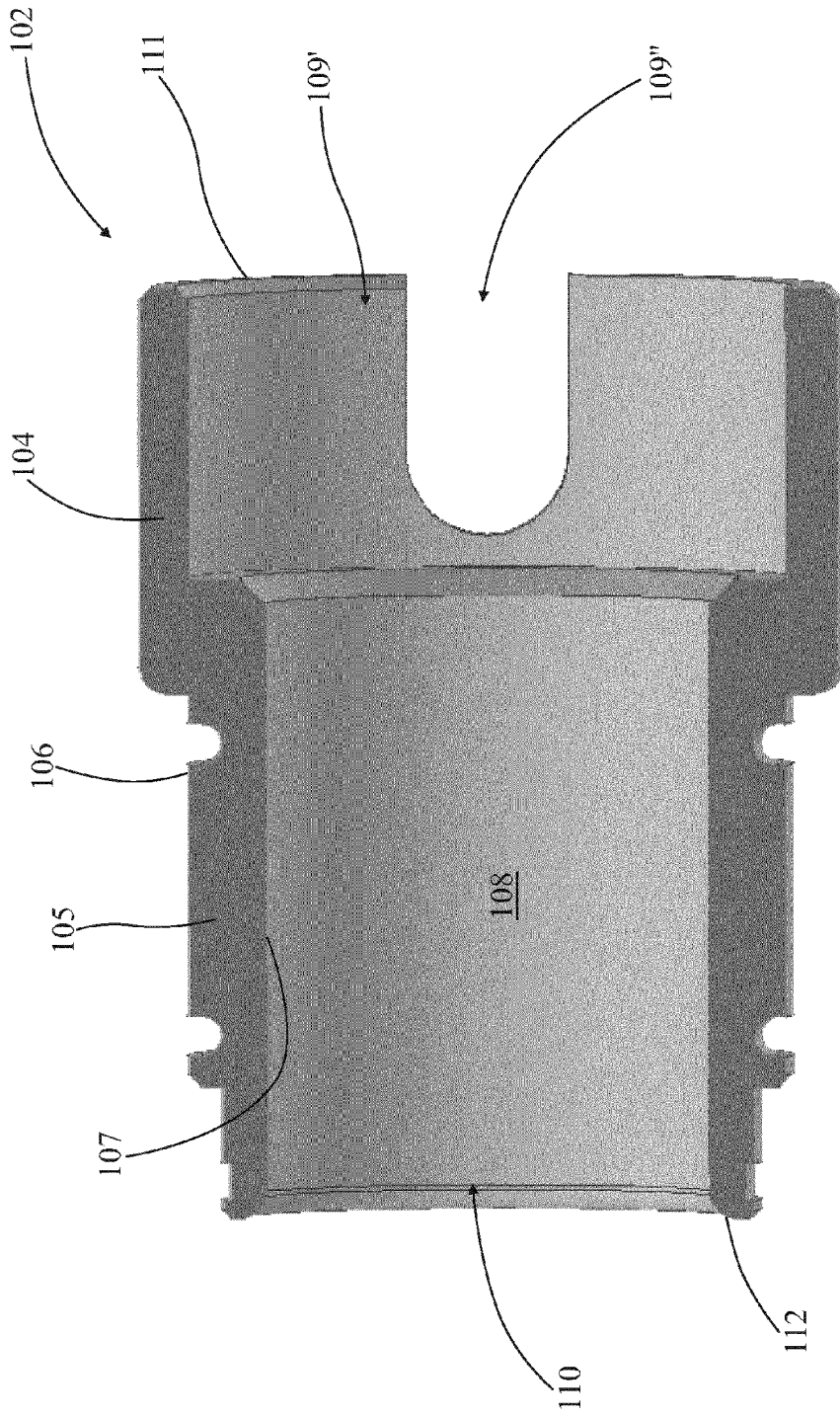


Fig. 17

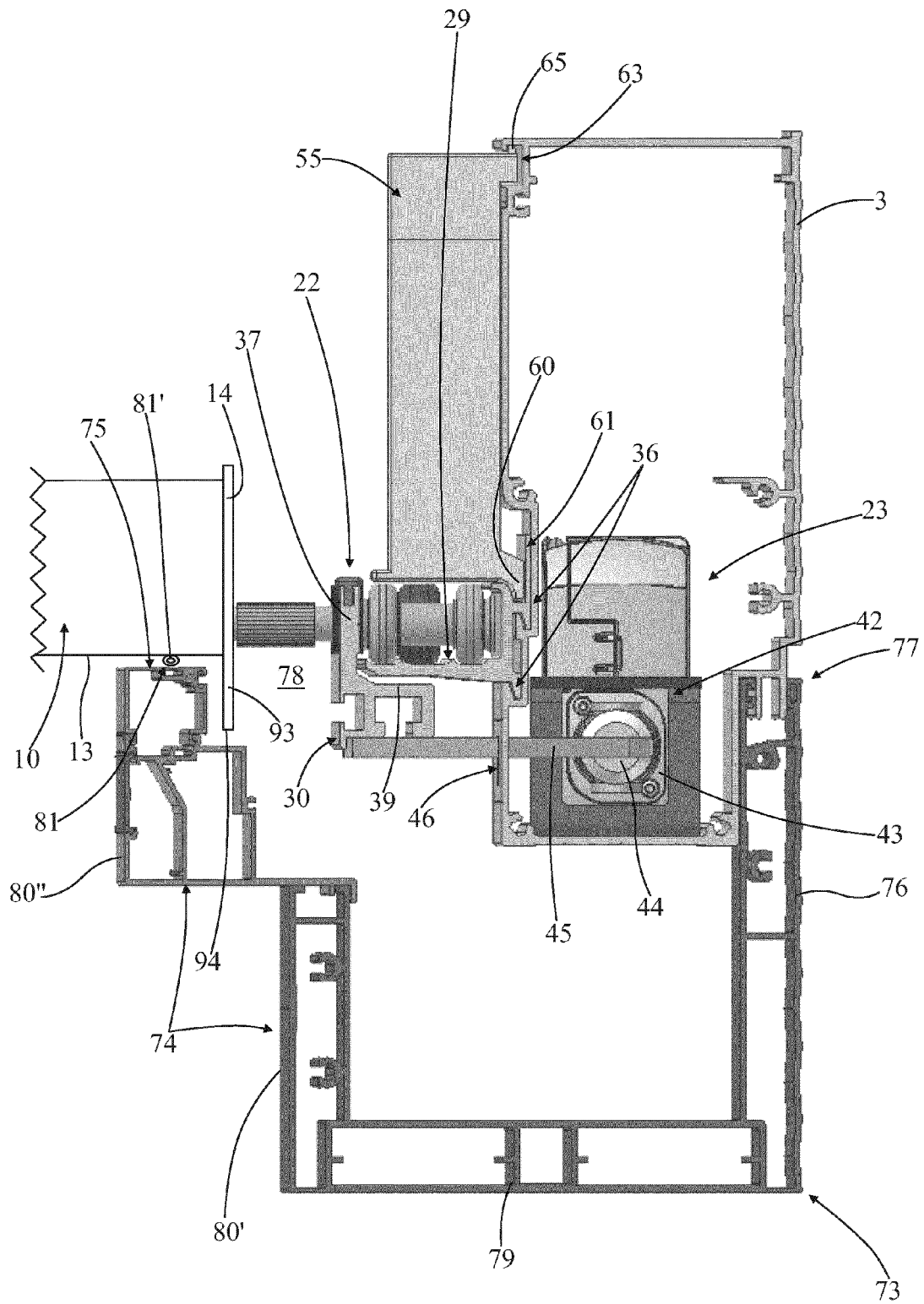


Fig. 18

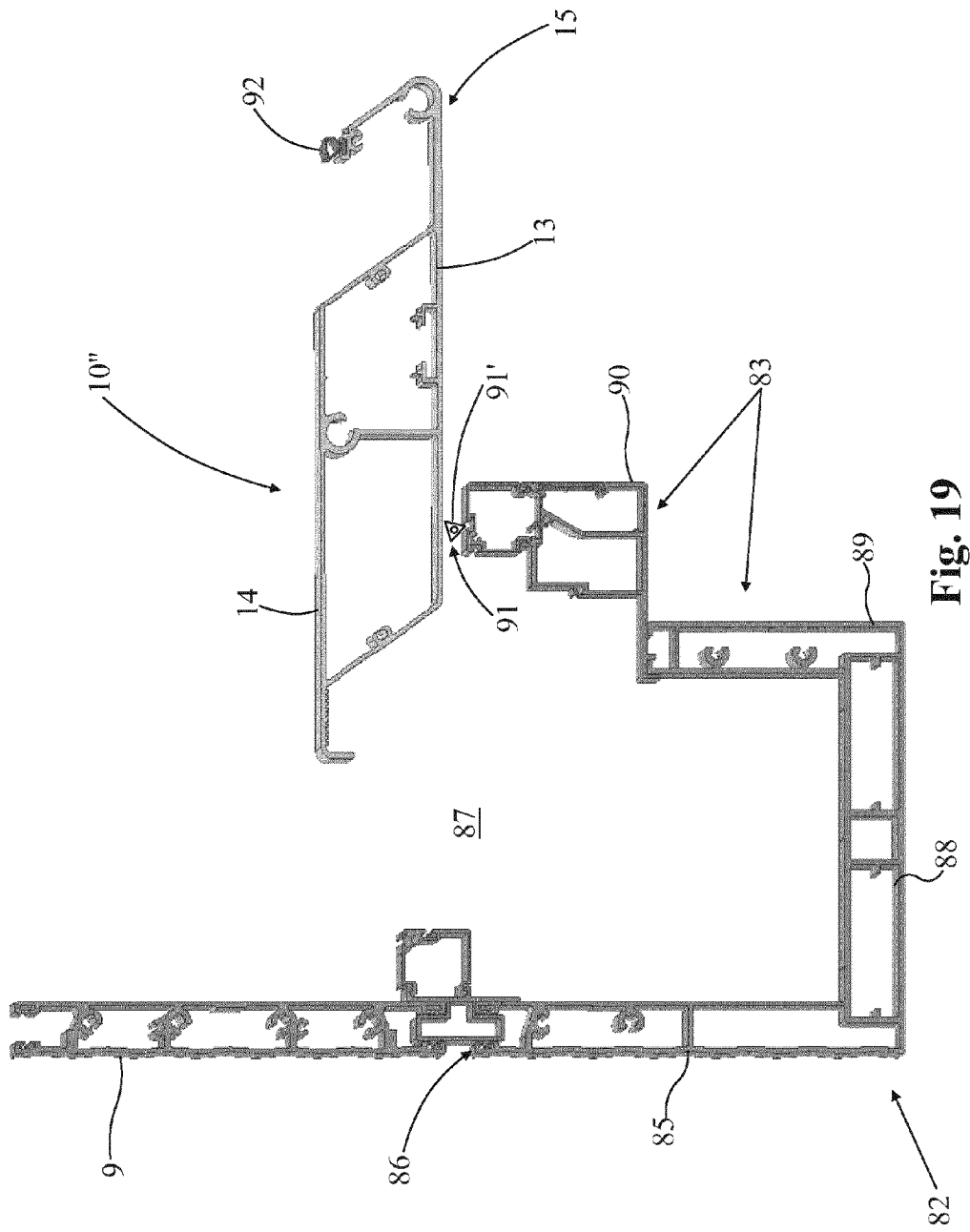


Fig. 19



EUROPEAN SEARCH REPORT

Application Number
EP 15 19 1533

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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)
A	US 2014/175240 A1 (SELZER C SCOTT [US]) 26 June 2014 (2014-06-26) * the whole document * -----	1-13	INV. E04F10/10
			TECHNICAL FIELDS SEARCHED (IPC)
			E04F E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 November 2015	Examiner Cornu, Olivier
CATEGORY OF CITED DOCUMENTS 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		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	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014175240	A1	26-06-2014	NONE

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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