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(54) **COVERING APPARATUS**

(57) Covering apparatus (1), which comprises a support structure (2) provided with two lateral beams (21), a series of covering blades (3) supported by the respective lateral beams (21) and first movement means (4) arranged for rotating the covering blades (3) around a corresponding rotation axis (R). The covering blades comprising an elongated body (32), which is extended between two corresponding ends (32') and two coupling elements (33), each placed to connect between the corresponding end (32') of the elongated body (32) and the first movement means (4). In particular, each coupling

element (33) comprises a guide body (34), provided with a coupling guide (341), a coupling body (35), provided with a first engagement portion (351) engaged with the coupling guide (35), and locking means (36), adapted to constrain the first engagement portion (351) to the coupling guide (35). In addition, one between the guide body (34) and the coupling body (35) is fixed to the end (32') of the covering blade (3), while the other carries, mounted thereon, a rotation pin (37) rotatably connected to the corresponding lateral beam (21).

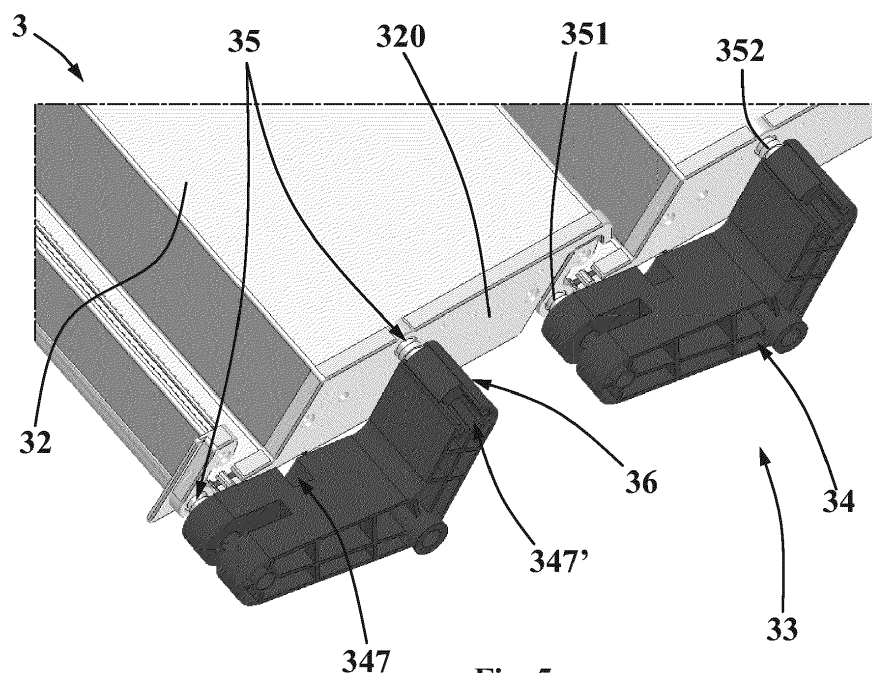


Fig. 5

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 covering external surfaces, protecting them from atmospheric agents and in particular from the sun and rain.

[0003] The present covering apparatus is indicated for making pergolas, verandas and more generally covering structures, both in gardens of private homes and in open spaces of public places, such as for example restaurants, hotels, bathing establishments or other structures.

[0004] The covering apparatus, object of the present invention, thus falls within the industrial field of production of blinds for covering outside environments.

State of the art

[0005] Known on the market are numerous solutions of covering apparatuses for outdoor settings, termed brise soleil in the jargon of the field, which comprise a support structure, e.g. with canopy, fixed to the ground and provided with two lateral longitudinal members which support a series of oscillating blades adapted to protect an underlying ground surface.

[0006] Brise soleil covering apparatuses are for example known which comprise a series of oscillating blades, each of which provided at its ends with rotation pins hinged with the corresponding longitudinal members.

[0007] Such apparatuses also comprise movement means connected to the oscillating blades in order to actuate the latter to rotate between a closed position, in which the blades are placed substantially horizontal and partially superimposed on each other in order to prevent the passage of light and/or rain, and an open position, in which the blades are placed tilted, between them delimiting openings for the passage of light.

[0008] Covering apparatuses are also known whose blades can also be moved, by means of further movement means, between a packed configuration, in which the blades are side-by-side each other in proximity to a same side of the covering apparatus, and an extended configuration, in which they are placed spaced from each other.

[0009] Such apparatuses for example comprise two guides made on the corresponding longitudinal members, and on each guide a series of carriages is mounted which rotatably carry, mounted thereon, the rotation pins of the corresponding covering blades. In addition, at least one of the covering blades carries, mounted thereon, an engagement wheel which is slidably inserted in an actuation bar which is movable on a plane orthogonal to the covering blades in order to actuate the simultaneous rotation of all the blades when they are in extended con-

figuration.

[0010] The oscillating blades of the above-described known apparatuses are generally provided with a substantially tubular elongated body, at whose ends two lateral caps are mounted. The rotation pins of the blade are generally fixed to the lateral caps.

[0011] Normally, the oscillating blades are assembled during production of the covering apparatus, by fixing the lateral caps to the corresponding ends of the elongated body of the blade, for example by means of fitting insertion and fixing screws.

[0012] During installation, after the mounting of the support structure, the blades are generally mounted on the lateral longitudinal members, by hinging each end of the blades to a support profile of the corresponding lateral longitudinal member, and connected to the movement means adapted to actuate the movement of the blades. Subsequently, the lateral longitudinal members are generally close on top with a corresponding coverage profile, aimed to conceal the mechanical components of the covering apparatus.

[0013] The above-described known covering apparatuses have in practice shown that they do not lack drawbacks.

[0014] A first drawback of the aforesaid known covering apparatuses lies in the fact that, during installation, the mounting of the blades is long and complex, since, in particular, the hinging of each blade (with length of several meters) requires the intervention of multiple operators in order to rotatably connect the pins at the ends of each blade to the longitudinal members.

[0015] A further drawback of the covering apparatuses of known type is due to the fact that, if it is necessary to remove even only one blade (due to breakage, malfunctioning or other reasons), it is necessary to remove at least the upper profiles of the longitudinal members. Indeed, the pins of the blades are directly connected to the movement means, which are placed within the longitudinal members. Therefore it is not possible to disconnect the pin from the frame without opening the closure profile for accessing the movement means.

[0016] A further drawback of the known covering apparatuses lies in the fact that the inspection and the maintenance of the parts inside the longitudinal members, such as for example the movement means, is difficult. Indeed, the internal components of the covering apparatus can only be inspected between the openings between the blades when the latter are in open configuration, or by always removing the covering profile of the longitudinal members. In the first case, there is little available space and it is poorly lit, since it is at least partially shaded by the blades themselves. In the second case, the operations to be performed, the manpower and the times necessary even for simple maintenance operations are generally excessive with respect to the actual size of the problem.

[0017] The patent application EP 2730714 A1 describes a further covering apparatus of known type, in

which each covering blade comprises, at the ends thereof, end caps which are each provided with corrugated grooves in which pins are inserted for coupling an articulated movement system. The end cap of each blade is pivoted around a rotation pin connected, by means of a lever, to the pantograph movement system. When the movement system is actuated, the coupling pins slide within the corresponding grooves in order to allow the rotation and translation movements of the blades. The configuration of the latter solution of known type is only aimed to guide the movement of the already-mounted blades and, therefore, it is unable to resolve the aforesaid drawbacks tied to the operations of installation and maintenance of the covering apparatus.

Presentation of the invention

[0018] 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 whose blades are easy and quick to install.

[0019] A further object of the present invention is to provide a covering apparatus, which can be easily inspected.

[0020] A further object of the present invention is to provide a covering apparatus which allows a simpler and quicker maintenance.

[0021] A further object of the present invention is to provide a covering apparatus which is structurally simple and inexpensive to attain.

Brief description of the drawings

[0022] The technical characteristics of the present invention, according to the aforesaid objects, can be clearly seen from the content 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 several merely exemplifying and non-limiting embodiments of the invention, in which:

- figure 1 shows a top perspective view of the covering apparatus, object of the present invention;
- figure 2 shows a perspective view of a detail of the covering apparatus relative to a lateral beam, to movement means and to the covering blades, in accordance with a first preferred embodiment of the present invention;
- figure 3 shows a perspective view from another angle of the detail of figure 2, with several components of the lateral beam and of the movement means removed in order to better illustrate other components of the covering apparatus;
- figure 4 illustrates a front view of the detail of figure 2;
- figure 5 illustrates a perspective view of the ends of two covering blades in succession with relative cou-

pling elements, in accordance with the first embodiment of the invention;

- figure 6 illustrates a perspective view of the coupling element of a covering blade, in accordance with the first embodiment of the invention;
- figure 7 illustrates a perspective view from a different angle of the coupling element of figure 6, with locking means in uncoupled position;
- figure 8 illustrates a perspective view from a different angle of the coupling element of figure 6, with locking means in retention position;
- figure 9 illustrates a side view of the coupling element of figure 6;
- figure 10 illustrates a perspective view of the coupling element of a covering blade, in accordance with a second embodiment of the invention;
- figure 11 illustrates a perspective view of a detail of the covering apparatus relative to movement means and to the covering blades, in accordance with the aforesaid second embodiment of the present invention, with several components removed in order to better illustrate other components of the covering apparatus;
- figure 12 illustrates a perspective view of the coupling element of a covering blade, in accordance with a third embodiment of the invention.

Detailed description of a preferred embodiment

[0023] With reference to the enclosed drawings, reference number 1 overall indicates the covering apparatus that is the object of the present invention.

[0024] The present covering apparatus 1 is indicated for making pergolas, verandas and more generally covering structures of outside environments, such as for example gardens of private homes and open spaces of public places such as restaurants, hotels, bathing establishments etc.

[0025] In accordance with the embodiments illustrated in the enclosed figures, the present covering apparatus 1 comprises a support structure 2 provided with a framework 20, advantageously quadrangular, which comprises two lateral beams 21 that are parallel to and side-by-side each other. In addition, the support structure preferably comprises also two front beams 22 that are parallel to and side-by-side each other, placed to connect the lateral beams 21.

[0026] More in detail, each lateral beam 21 is extended longitudinally, advantageously between a head portion 21' and a bottom portion 21", along a corresponding first extension direction X that is preferably substantially horizontal, and advantageously each front beam 22 is longitudinally extended along a corresponding second extension direction Y substantially orthogonal to the first extension directions X of the lateral beams 21.

[0027] In particular, one of the two front beams 22 is placed to connect the head portions 21' of the lateral beams 21, and the other of the front beams 22 is placed

to connect the bottom portions 21" of the lateral beams 21 themselves.

[0028] Advantageously, each beam 21 and 22 of the support structure 2 respectively comprises a first and a second elongated profile 23 and 24, each preferably obtained with a metallic extrusion, particularly made of aluminum.

[0029] Advantageously, the support structure 2 also comprises two first columns 25 abutted against the ground, and each of which supports the head portion 21' of the corresponding lateral beam 21. Preferably, the support structure 2 comprises two further second columns 26 placed to support the bottom portions 21" of the corresponding lateral beams 21, in this manner attaining a self-supporting structure, in particular with substantially parallelepiped shape.

[0030] Otherwise, in accordance with a different embodiment variant not illustrated in the enclosed figures, the support structure 2 of the covering apparatus 1 is backed against a vertical wall (such as for example the wall of a building), at which the head portions 21' or the bottom portions 21" of the lateral beams 21 are anchored.

[0031] In accordance with a further different embodiment variant not illustrated in the enclosed figures, the head portions 21' and the bottom portions 21" of the lateral beams 21 of the support structure 2 are respectively supported by a first and by a second vertical wall that face each other, such that the support structure 2 of the covering apparatus 1 is interposed between the two aforesaid vertical walls.

[0032] Advantageously, the aforesaid lateral beams 21 and front beams 22 of the framework 20 of the support structure 2 between them delimit an upper opening of the support structure 2 itself, placed above a ground surface intended to be protected by the covering apparatus 1.

[0033] According to the present invention, the covering apparatus 1 comprises a series of covering blades 3 placed one after the other according to the aforesaid first extension direction X of the lateral beams 21, preferably from the head portions 21' to the bottom portions 21" of the lateral beams 21, and advantageously actuatable for closing the aforesaid upper opening of the support structure 2, respectively so as to cover the underlying ground surface in order to protect the latter from sun and/or rain.

[0034] Of course, without departing from the protective scope of the present invention, the succession of the aforesaid covering blades 3 can be considered, in an entirely equivalent manner, in the sense opposite that considered above, i.e. from the bottom portions 21" to the head portions 21' of the lateral beams 21.

[0035] Each covering blade 3 is extended, according to a longitudinal axis W thereof that is substantially orthogonal to the first extension direction X (and preferably substantially horizontal), between two opposite ends 31 supported by the respective lateral beams 21. According to the present invention, the covering apparatus 1 comprises first movement means 4 mechanically connected

to the covering blades 3 and arranged for rotating each of the covering blades 3 around a corresponding rotation axis R, parallel to said longitudinal axis W, between a closed position and at least one open position.

[0036] In particular, the movement of the covering blades 3 between the closed position and the open position is any one movement that has at least one rotary component, for example a pure rotation movement or a rotational-translation movement.

[0037] Advantageously, the covering blades 3 in the closed position, are placed to close the upper opening of the support structure 2, in a manner such, in particular, to cover the underlying ground surface.

[0038] Preferably, in the closed position, the covering blades 3 are placed one in contact with the next (advantageously also by means of seals), in order to close the upper opening of the support structure 2.

[0039] Advantageously, in the open position, the covering blades 3 are placed spaced one from the next, between them delimiting passage openings, advantageously susceptible of being crossed by light and air.

[0040] In addition, the covering blades 3 comprise an elongated body 32, which is longitudinally extended, along the rotation axis R, between two corresponding ends 32', at which the ends 31 of the covering blade 3 are advantageously placed.

[0041] For example, the central body 32 comprises a metallic section (e.g. made of extruded aluminum) advantageously closed at its ends 32' by lateral caps 320.

[0042] Preferably, each covering blade 3 (and in particular its central body 32) is provided with a first longitudinal edge 321 and with a second longitudinal edge 322, which are extended along the corresponding longitudinal axis W between the two opposite ends 31 of the covering blade 3 itself. In particular, the second longitudinal edge 322, with the covering blades 3 in closed position, is placed above the first longitudinal edge 321 of the successive covering blade 3. Advantageously, each covering blade 3 (and in particular its central body 32) is extended transversely between the first longitudinal edge 321 and the second longitudinal edge 322 according to a transverse axis orthogonal to the longitudinal axis W of the covering blade 3 itself.

[0043] Preferably, each covering blade 3 (and in particular its central body 32) is provided with a closure surface 323, in particular substantially flat, which is advantageously extended between the first longitudinal edge 321 and the second longitudinal edge 322 and, when the covering blade 3 is placed in the closed position, it is directed downward and is preferably substantially coplanar with the closure surfaces 323 of the other covering blades 3, also placed in the closed position.

[0044] In accordance with the idea underlying the present invention, each covering blade 3 comprises two coupling elements 33, each of which placed to connect between the corresponding end 32' of the elongated body 32 and the first movement means 4.

[0045] More in detail, with reference to the examples

of figures 6-8, each coupling element 33 comprises a guide body 34, which is provided with a coupling guide 341 extended along a coupling trajectory T lying on a lying plane orthogonal to the rotation axis R.

[0046] In addition, each coupling element 33 comprises at least one coupling body 35, which comprises a first engagement portion 351 engaged with the coupling guide 341 at least by means of translation along the coupling trajectory T.

[0047] In addition, each coupling element 33 comprises locking means 36, which are mechanically connected to the guide body 34 and to the coupling body 35 and constrain the first engagement portion 351 to the coupling guide 341 at least according to the coupling trajectory T.

[0048] In particular, the aforesaid locking means 36 are configured for preventing the first engagement portion 351 from being released (in an undesired manner) from the coupling guide 341, being advantageously arranged for completely locking engagement portion 351 in the coupling guide 341, or even only partially preventing the complete exit of the engagement portion 351 from the coupling guide 341.

[0049] According to the invention, moreover, one, from between the guide body 34 and the coupling body 35, is provided with a rotation pin 37, placed aligned with the rotation axis R of the corresponding covering blade 3 and at least rotatably connected to the corresponding said lateral beam 21. In addition, such body (between the guide body 34 and the coupling body 35) is connected to the first movement means 4 in order to receive, from the latter, the motion for moving the covering blades 3.

[0050] The other from between the guide body 34 and the coupling body 35 is fixed to the corresponding end 32' of the elongated body 32 of the covering blade 3 (and in particular it is not directly engaged by the rotation pin 37).

[0051] In accordance with the embodiments illustrated in the enclosed figures 2-11, the guide body 34 is provided with the rotation pin 37 and is connected to the first movement means 4, and the coupling body 35 is advantageously connected to the corresponding end 32' of the elongated body 32. Preferably, the coupling body 35 is rigidly fixed to the corresponding end 32' of the elongated body 32.

[0052] Such embodiment configuration is employed for example in the embodiments of the invention illustrated in figures 2-11.

[0053] Otherwise, according to a different configuration, the guide body 34 connected to the corresponding end 32' of the elongated body 32 and the coupling body 35 is rotatably connected to the lateral beam 21 (by means of its rotation pin 37) and is connected to the first movement means 4. The latter embodiment configuration is employed for example in the embodiment of the invention illustrated in figure 12.

[0054] In accordance with the exemplifying embodiments illustrated in the enclosed figures, the covering blades 3 are connected to the lateral beams 21, not just

rotatably by means of the rotation pin 37, but also slidably, in order to allow the movement of the covering blades 3 between a packed position and an extended position. Such rotatable and slidable connection is obtained for example by mounting the rotation pins 37 on corresponding carriages 52, as will be described in the particular example illustrated hereinbelow.

[0055] Of course, without departing from the protective scope of the present patent, the covering blades 3 can also be only rotatably constrained to the corresponding lateral beam 21, in a manner such to be able to execute only the rotation movement around the rotation axis R.

[0056] Advantageously, the guide body 34 of the coupling element 33 is provided with an internal face 342, which is directed towards the coupling body 35, and is delimited by a first perimeter edge 343.

[0057] Advantageously, moreover, the guide body 34 of the coupling element 33 is provided with an opposite external face 344, advantageously substantially parallel to the internal face 342, and delimited by a second perimeter edge 345.

[0058] In accordance with the embodiments illustrated in the enclosed figures 2-11, the internal face 342 of the guide body 34 is directed towards the corresponding end 32' of the elongated body 32 of the covering blade 3, and, preferably, the external face 344 is directed towards the corresponding lateral beam 21.

[0059] Advantageously, the guide body 34 is extended parallel to the rotation axis R, between the internal face 342 and the external face 344. Advantageously, moreover, the guide body 34 is provided with a lateral surface 340 extended between the first perimeter edge 343 and the second perimeter edge 345.

[0060] Advantageously, the coupling guide 341 is provided with at least one groove 346, which is made at least on the internal face 342 of the guide body 34 and is extended from a first inlet opening 347 made on the first perimeter edge 343.

[0061] In particular, the first engagement portion 351 of the coupling body 35 is inserted in the groove 346 through the aforesaid first inlet opening 347 by means of translation along the coupling trajectory T.

[0062] Advantageously, the first perimeter edge 343 of the internal face 342 is provided with a lower section 343', substantially directed downward with the covering blades 3 in the closed position, and an upper section 343" directed in the direction opposite the lower section 343'.

[0063] In particular, the first inlet opening 347 of the groove 346 is advantageously made on the upper section 343" of the first perimeter edge 343.

[0064] Of course, without departing from the protective scope of the invention, the first inlet opening 347 of the groove 346 can be made on the lower section 343' of the first perimeter edge 343. More in detail, the groove 346 is extended from the first inlet opening 347 to a closed internal end 348, which is placed within the first perimeter edge 343 and receives the first engagement portion 351

in abutment.

[0065] In addition, the coupling trajectory T of the coupling guide 341 has, between the first inlet opening 347 and the closed internal end 348, an elbow-shaped curve. Preferably, the groove 346 is shaped with an L or J form and is provided with a section adjacent to the closed internal end 348 which is placed vertically when the covering blades 3 are placed in open position.

[0066] Suitably, the curve of the coupling trajectory T of the coupling guide 341 has concavity directed towards the upper section 343" of the first perimeter edge 343.

[0067] In accordance with a first embodiment of the invention illustrated in figures 2-9, the guide body 34 also advantageously comprises a retention seat 349, which is made on the internal face 342, advantageously in a position spaced from the coupling guide 341, and is provided with a second inlet opening 347' made on the first perimeter edge 343. In particular, the second inlet opening 347' of the retention seat 349 is advantageously made on the upper section 343" of the first perimeter edge 343.

[0068] Of course, without departing from the protective scope of the invention, the second inlet opening 347' of the retention seat 349 can be made on the lower section 343' of the first perimeter edge 343.

[0069] Advantageously, the first inlet opening 347 of the groove 346 and the second inlet opening 347' of the retention seat 349 are placed on the same section (upper 343", or lower 343') of the first perimeter edge 343 of the guide body 34.

[0070] Preferably, the coupling body 35 comprises a second engagement portion 352, which is engaged in the retention seat 349 when the first engagement portion 351 placed to the closed internal end 348 of the groove 346.

[0071] More in detail, the retention seat 349 comprises an abutment wall 349', against which the second engagement portion 352 is placed in abutment.

[0072] In accordance with the example of figures 2-7, the engagement portions 352 are formed by two separate parts, both fixed to the corresponding end 32' of the elongated body 32 of the covering blade 3.

[0073] For example, as illustrated in figure 5, the engagement portions 351, 352 of the coupling body 35 are rigidly inserted in corresponding seats made in the corresponding end 32', in particular passing through respective holes made in the corresponding lateral cap 320.

[0074] Advantageously, the first and the second engagement portion 351, 352 of the coupling body 351 are extended (at least for the part inserted, respectively, in the groove 346 and in the retention seat 349) parallel to the rotation axis R, for example projectingly extended from the corresponding end 32' of the elongated body 32.

[0075] In particular, as illustrated for example in the enclosed figures 2-5, the first engagement portion 351 and the second engagement portion 352 comprise corresponding coupling pins (parallel to the rotation axis R) which are respectively inserted in the groove 346 and in the retention seat 349.

[0076] Advantageously, the closed internal end 348 of the groove 346 and the abutment wall 349 of the retention seat 349, against which the aforesaid coupling pins abut, have at least partially circular form and are preferably at least partially counter-shaped with respect to the section of the coupling pins.

[0077] In accordance with the first embodiment of the present invention, the locking means 36 advantageously comprise a closure body 361, which is constrained to the retention seat 349 and placed to at least partially close the second inlet opening 347', and retains the second engagement portion 352 in the retention seat 349 between the abutment wall 349' and the closure body 361 itself.

[0078] Advantageously, the retention seat 349 is extended in a through manner between the internal face 342 and the external face 344 of the guide body 34, preferably with the second inlet opening 347' made crossing the lateral surface 340.

[0079] The locking means 36 are advantageously provided with a positioning guide 362, fixed to the retention seat 349, preferably at the edges of the second inlet opening 347', and extended parallel to the rotation axis R. In particular, the closure body 361 is rotatably constrained to the positioning guide 362.

[0080] More in detail, the closure body 361 is advantageously movable along the positioning guide 362 between an uncoupled position and a retention position. In particular, in the uncoupled position, illustrated in figure 7, the closure body 361 is placed between the second engagement portion 352 of the coupling body 35 and the external face 344 of the guide body 34, in order to allow inserting or removing the second engagement portion 352 through the second inlet opening 347'. In addition, in the retention position, illustrated in figure 8, the closure body 361 is placed in front of the second engagement portion 352, which is retained in the retention seat 349 between the abutment wall 349' and the closure body 361 itself.

[0081] Advantageously, the locking means 36 comprise an elastic retention element 363, which is fixed to the guide body 34 and is projectingly extended in the retention seat 349 between the closure body 361 and the external face 344, in order to retain the closure body 361 itself in the retention position.

[0082] In this manner, the closure body 361 cannot be accidentally removed from the positioning guide 362, thus maintaining the covering blade 3 stably connected to the coupling element 33.

[0083] In operation, with reference to the first embodiment illustrated in figures 2-9, the mounting of the covering blade 3 on the framework 20 of the covering apparatus 1 occurs in the modes described below.

[0084] The coupling body 35 (and in particular its engagement portions 351, 352) is fixed to the end 32' of the support body 32 of the covering blade 3, and the guide body 34 is mechanically connected to the first movement means 4 with the rotation pin 37 rotatably con-

nected to the lateral beam 21.

[0085] Subsequently, the first engagement portion 351 of the coupling body 35 is inserted through the first inlet opening 347 in the groove 346 by means of translation along the coupling trajectory T, up to abutting against the closed internal end 348 of the groove 346 itself.

[0086] Hence, the coupling body 35 (and the corresponding covering blade 3) is advantageously rotated around the first engagement portion 351, so as to bring the second engagement portion 352 into the retention seat 349, crossing the second inlet opening 347'.

[0087] Advantageously, the distance between the first engagement portion 351 and the second engagement portion 352 is substantially equal to the distance between the closed internal end 348 of the groove 346 and the abutment wall 349' of the retention seat 349, in order to allow, in particular, the insertion of the second engagement portion 352 in the retention seat 349 by means of the above-described rotation.

[0088] Preferably, during the insertion of the second coupling portion 352 in the retention seat 349, the closure body 361 of the locking means 36 is situated in uncoupled position, so as to allow the passage of the second coupling portion 352 itself through the second inlet opening 347'. Advantageously, when the closure body 361 is in uncoupled position, it is situated superimposed on the elastic retention element 363, maintaining it in a compressed configuration.

[0089] When the second coupling portion 352 is placed in abutment against the abutment wall 349', the closure body 361 is advantageously translated along the positioning guide 362 in order to be brought from the uncoupled position to the retention position.

[0090] Advantageously, when the closure body 361 is situated in retention position, the elastic retention element 363 is released and takes on a decompressed configuration in which it occupies the trajectory defined by the positioning guide 362, preventing the return of the closure body 361 towards the uncoupled position.

[0091] Suitably, the uncoupling of the covering blade 3 from the framework 20 of the covering apparatus 1 is obtained by executing the above-described operations in opposite order.

[0092] In accordance with a second embodiment of the invention, illustrated in the enclosed figures 10 and 11, the guide body 34 is provided with the rotation pin 37 and is connected to the first movement means 4, and the coupling body 35 is advantageously connected to the corresponding end 32' of the elongated body 32.

[0093] In addition, the guide body 34 is advantageously provided with two coupling guides 341, preferably substantially parallel. In particular, the aforesaid coupling guides 341 are each provided with corresponding grooves 346, each of which made at least on the internal face 342 of the guide body 34 and extended between the corresponding first inlet opening 347, made on the first perimeter edge 343, and the corresponding closed internal end 348.

[0094] In particular, the first inlet opening 347 of each groove 346 is advantageously made on the lower section 343' of the first perimeter edge 343.

[0095] Of course, without departing from the protective scope of the invention, the first inlet opening 347 of the groove 346 can be made on the upper section 343" of the first perimeter edge 343. Advantageously, the coupling body 35 comprises two first engagement portions 351, each engaged with the corresponding coupling guide 341.

[0096] In particular, each first engagement portion 351 of the coupling body 35 is advantageously inserted in the corresponding grooves 346 through the respective aforesaid first inlet opening 347 by means of translation along the coupling trajectory T.

[0097] In operation, the coupling body 35 (and the elongated body 32 of the covering blade 3 fixed thereto) is engaged with the guide body 34 by means of the simultaneous insertion of the first engagement portions 351 in the corresponding coupling guides 341 through each respective first inlet opening 347.

[0098] In particular, the first engagement portions 351 each slide advantageously along the groove 346, following the coupling trajectory T, up to abutting against the closed internal end 348 of the latter.

[0099] Subsequently, at least one of the coupling guides 341 is preferably obstructed by the locking means 36, in order to maintain at least one of the first engagement portions 351 in abutment against the respective closed internal end 348.

[0100] For example, the locking means 36 comprise safety plates 364 fixed (for example by means of suitable screws) to the guide body 34 to close the first inlet openings 347 of the grooves 346, in particular in a manner such to prevent the engagement portions 351 from exiting from the grooves 346 following, for example, movements of the elongated body 32.

[0101] In accordance with a third embodiment of the invention, illustrated in the enclosed figure 12, the coupling body 35 is provided with the rotation pin 37 and is connected to the first movement means 4, and the guide body 34 (not illustrated in the figure) is advantageously connected to the corresponding end 32' of the elongated body 32.

[0102] In particular, according to the example of figure 12, the coupling guide 341 and the first engagement portion 351 make a dovetail coupling. In this case, the coupling trajectory T is substantially rectilinear.

[0103] The coupling body 35 is advantageously provided with an internal surface 353, which is directed towards the guide body 34, and preferably towards the corresponding end 32' of the elongated body 32 of the covering blade 3. Advantageously, the coupling body 35 of the coupling element 33 is provided with an opposite external surface 354, in particular substantially parallel to the internal face 353, and preferably directed towards the first movement means 4.

[0104] Advantageously, moreover, the coupling body

35 is provided with a lateral surface 350 extended to connect between the internal face 353 and the external face 354.

[0105] In accordance with the third embodiment, the coupling body 35 is provided with a first coupling portion 351 fixed to the internal face 353 of the coupling body 35 itself, and preferably made integrally with the latter.

[0106] Advantageously, the first coupling portion 351 has elongated shape with rectilinear extension, and has substantially dovetail cross section with two opposite lateral faces 355, tilted with respect to the internal face 353 of the coupling body 35 and placed away from each other. Preferably, moreover, the first coupling portion 351 is provided with prismatic form with trapezoidal section, with smaller base adjacent to the internal face 353 of the coupling body 35. The guide body 34 (not illustrated in the enclosed figure) is advantageously made in a single body with a lateral cap 320 fixed to the end 32' of the central body 32 of the respective covering blade 3. The guide body 34 is also provided with the coupling guide 341, which is provided with the groove 346 with cross section substantially counter-shaped to size with respect to the cross section of the first engagement portion 351 (in particular with dovetail shape). Advantageously, the groove 346 is extended, with rectilinear connection direction T, between the first inlet opening 347 and the closed terminal end 348.

[0107] In operation, the coupling of the guide body 34 (and of the corresponding end 32' of the central body 32 of the covering blade 3) to the coupling body 35 occurs by means of sliding of the coupling guide 341 along the first engagement portion 351 of the coupling body 35, making the first engagement portion 351 enter into the first inlet opening 37 of the groove 346 until the closed terminal end 348 of the latter abuts against the engagement portion 351.

[0108] Subsequently, the coupling guide 341 and the first engagement portion 351 are constrained by means of the locking means 36.

[0109] For example, the locking means 36 comprise a thrust set screw (not illustrated) mounted on the coupling body 35 and intended to act in abutment against the guide body 34 in order to lock it in the position coupled to the coupling body 35.

[0110] The arrangement of an intermediate coupling element 33 between the elongated body 32 of each covering blade 3 and the first movement means 4, in accordance with the invention and in particular with the above-described embodiments, advantageously allows a simpler mounting and substitution of the covering blades 3 themselves.

[0111] Indeed, in order to mount the covering blades 3, it is sufficient for an operator to connect the ends 32' of the elongated body 32 to the lateral beams 21, coupling the coupling bodies 35 to the coupling guides 341 of the corresponding guide bodies 34, in accordance with that described in the above examples: in this manner, such operation can be easily executed by only one operator,

in particular by simultaneously coupling both ends 32' of the elongated body 32 of each covering blade 3.

[0112] In addition, advantageously, in order to substitute a covering blade 3 it is not necessary to access the first movement means 4 and disconnect, in addition to the mechanical connections therewith, also the rotation pin 37. Indeed, it is sufficient to remove the locking means 36 of the coupling element 33 and separate the guide body 34 and the coupling body 35 from each other. The central body 32 of the covering blade 3 can thus be advantageously removed and substituted.

[0113] Advantageously, the coupling element 33, preferably at least the component (one between the guide body 34 and the coupling body 35) is at least partially made of plastic material.

[0114] Of course, without departing from the protective scope of the invention, one or more components of the coupling element 33 can be made of another type of material, for example of metal. For example, the first and the second engagement portion 351, 352 of the coupling body 35 can be made of steel.

[0115] In accordance with the embodiments illustrated in the enclosed figures, the first movement means 4 of the present covering apparatus 1 comprise, advantageously, a movable bar 41, actuatable in order to be moved on a movement plane substantially perpendicular to the rotation axes R of the covering blades 3 (and in particular substantially vertical).

[0116] Advantageously, the movable bar 41 is extended substantially parallel to the first extension direction X of the lateral beams 21.

[0117] The movable bar 41 is actuatable (by actuation devices described hereinbelow) in order to complete, on the movement plane, a vertical translation motion, i.e. perpendicular to the plane identified by the rotation axes R of the covering blades 3. Of course, without departing from the protective scope of the invention, the movable bar can also be translated along a curved or oblique trajectory.

[0118] In addition, the first movement means 4 advantageously comprise a plurality of engagement elements 42, each mechanically connected to the respective end 31 of the covering blade 3, and preferably fixed to one between the coupling body 35 and the guide body 34 of the coupling element 33 (the same which carries the rotation pin 37 mounted thereon).

[0119] Otherwise, with reference to the example of figure 11, the engagement element 42 is connected to the coupling element 33 by means of a movement lever 43, fixed to the end 31 of the corresponding covering blade 3 and in particular to the guide body 34 of the coupling element 33 itself.

[0120] More in detail, the engagement element 42 is advantageously engaged, at least rotatably, with the movable bar 41 in order to move the covering blade 3 between the open position and the closed position.

[0121] In particular, the engagement of the movable bar 41 with the engagement elements 42 connected to

multiple covering blades 3 maintains the movable bar 41 substantially always at the same tilt (preferably horizontal) even during its entire movement.

[0122] In particular, each covering blade 3 can be positioned between the closed position, in which it is substantially parallel to a plane defined by the rotation axes R of the covering blades 3, and an open position of maximum tilt, in which the covering blade 3 is tilted with an angle preferably greater than or equal to 90° with respect to the plane defined by the rotation axes R, and preferably comprised between about 130°-140°.

[0123] In operation, by moving upward, i.e. away from the ground, the movable bar 41, the latter acts with a first thrust force on the engagement element 42 which determines (possibly through the movement lever 43) a first moment acting on the corresponding covering blade 3 which brings it to rotate in a first rotation sense from the closed position to the open position.

[0124] On the other hand, by moving downward, i.e. approaching the ground, the movable bar 41, the latter acts with a second thrust force on the engagement element 42, which determines, on the corresponding covering blade 3, a second moment with opposite sense with respect to the first moment, which brings it to rotate in a second rotation sense from the open position to the closed position.

[0125] The covering apparatus 1 advantageously comprises actuation means 6 mechanically connected to the movable bar 41 of the first movement means 4 and arranged for moving the movable bar 41 itself between a first end stop position, in which the bar places the covering blades 3 in the closed position, and a second end stop position, in which the movable bar 41 places the covering blades 3 in the open position. Advantageously, the actuation means 6 are susceptible of maintaining the position of the movable bar 41 in any one intermediate position between the first end stop position and the second end stop position in order to maintain the covering blades 3 at any one desired tilt.

[0126] For example, the aforesaid actuation means 6 can comprise a linear actuator 60 having the sleeve hinged to the support structure 2 and the stem mechanically connected to a cam device 61 provided with at least one first shaped profile 62 movable parallel to the movement plane of the movable bar 41.

[0127] In addition, the actuation means 6 advantageously comprise a first cam follower 62' fixed to the movable bar 41 and mechanically engaged with the shaped profile 62, such that, during the movement of the shaped profile 62 itself, the first cam follower 62' vertically pushes the movable bar 41.

[0128] Preferably, in order to improve the distribution of the loads on the covering blades 3, the first movement means 4 comprise two movable bars 41, each advantageously placed at the respective lateral beam 21. In addition, at each end 31 of each covering blade 3, a corresponding engagement element 42 is advantageously fixed, movable from the respective movable bar 41.

Therefore, corresponding actuation means 6 are advantageously provided for each movable bar 41.

[0129] In accordance with the embodiments illustrated in the enclosed figures, the covering blades 3 are susceptible not only of rotating around their rotation axis R, but also of translating along the lateral beams 21 in order to be moved between a packed configuration and an extended configuration.

[0130] More in detail, the covering apparatus 1 comprises second movement means 5 mechanically connected to the covering blades 3 and arranged for translating the covering blades 3 along the first extension directions X of the lateral beams 21 and, advantageously, along the plane defined by the rotation axes R of the covering blades 3. In particular, the covering blades 3 are movable by the second movement means 5 between the packed configuration in which they are placed next to each other in the open position at the head portion 21' (or, alternatively, at the bottom portion 21'') of the lateral beams 21, and the extended configuration, in which the covering blades 3 are placed distributed along the first extension direction X of the lateral beams 21. Advantageously, the movable bar 41 is provided with a longitudinal guide 41' in which the engagement element 42 is slidably engaged, so as to allow the movement of the covering blades 3 during the movement between the packed configuration and the extended configuration. Advantageously, moreover, the engagement element 42 comprises a sliding element 43', for example a wheel, rotatably connected (in particular in an idle manner) to the end 31 of the covering blade 3 and slidable along the longitudinal guide 41'.

[0131] Advantageously, the second movement means 5 comprise two fixed lateral guides 51, each arranged on the corresponding lateral beam 21 and extended along the first extension direction X, and a plurality of carriages 52, which are slidably engaged with the lateral guides 51. Each carriage 52 carries a corresponding covering blade 3 rotatably mounted thereon around the rotation axis R, at the respective end 31 of the blade 3 itself.

[0132] In particular, a first end blade 3' is fixed along the lateral guides 51 (only being able to rotate) and is advantageously pivoted to two carriages 52 fixed to the corresponding lateral beams 21 in a manner such that the first end blade 3' always remains placed at the head portions 21' (or bottom portions 21'') of the lateral beams 21, while the other covering blades 3, during the movement between the packed configuration and the extended configuration, slide along the lateral guides 51 by means of the corresponding carriages 52. In particular, in the passage from the packed configuration to the extended configuration, a second end blade 3'', opposite the first end blade 3' in the series of covering blades 3, is carried by the respective carriages 52 at the bottom portions 21'' (or head portions 21') of the lateral beams 21.

[0133] In particular, each lateral guide 51 is provided with one or more rails with which the carriages 52 are

coupled, by means of corresponding wheels for example.

[0134] Preferably, the rotation pin 37 of each covering blade 3 is rotatably constrained to the corresponding carriage 52 at the respective end 31 of the covering blade 3.

[0135] Advantageously, the second movement means 5 also comprise at least one movement device 53 mechanically connected to the carriages 52 and arranged for moving the carriages 52 along the lateral guides 51 in order to move the covering blades 3 between the packed configuration and the extended configuration. Preferably, the second movement means 5 comprise two movement devices 53, each connected to the carriages 52 placed on the same lateral guide 51.

[0136] In particular, the movement device 53 is advantageously of pantograph type and comprises a series of first rods and a series of second rods rotatably connected to each other and to the carriages 52.

[0137] In addition, the actuation means 6 are advantageously mechanically connected to the movement device 53 in order to move the carriages 52 and the corresponding covering blades 3 between the extended configuration and the packed configuration. Advantageously, the actuation means 6 are susceptible of maintaining the position of the movement device 53 in any one intermediate position in order to maintain the covering blades 3 at any one desired intermediate configuration between the extended configuration and the packed configuration.

[0138] For example, the aforesaid actuation means 6 can comprise a second shaped profile 63 mechanically connected to the linear actuator 60 (or to a different linear actuator) and movable parallel to the first shaped profile 62.

[0139] In addition, the actuation means 6 advantageously comprise a second cam follower 63' fixed to the movement device 53 and mechanically engaged to the second shaped profile 63, in a manner such that, during the movement of the second shaped profile 63 itself, the second cam follower 63' actuates the movement device 53.

[0140] In accordance with a different embodiment not illustrated in the enclosed figures, the covering blades 3 are in a fixed position along the corresponding lateral beams 21, only being able to rotate around the rotation axis R thereof. For example, in such case the rotation pins 37 of the covering blades 3 are hinged directly on the corresponding lateral beams 21, and the engagement element 42 is pivoted to the movable bar 41, forming an articulated parallelogram kinematic mechanism.

[0141] Of course, without departing from the protective scope of the invention, the first movement means 4 and/or the second movement means 5 (if provided) and/or the actuation means 6 can be made of any other form of known type. For example, they can comprise belt movement devices or articulated parallelogram movement devices or actuators of different type.

[0142] The invention thus conceived therefore attains the pre-established objects.

Claims

1. Covering apparatus (1), which comprises:

- a support structure (2) provided with a framework (20), which comprises at least two lateral beams (21) that are parallel to and side-by-side each other, each of which is longitudinally extended along a corresponding first extension direction (X);
- a series of covering blades (3) placed one after the other according to said first extension direction (X), each of which covering blades (3) is extended, according to a longitudinal axis (W) thereof, substantially orthogonal to said first extension direction (X), between two opposite ends (31) supported by the respective said lateral beams (21);
- first movement means (4) mechanically connected to said covering blades (3) and arranged for rotating each of said covering blades (3) around a corresponding rotation axis (R), parallel to said longitudinal axis (W), between a closed position and at least one open position;

said covering blades (3) comprising an elongated body (32), which is longitudinally extended along the rotation axis (R), between two corresponding ends (32'),

said covering apparatus (1) being **characterized in that** each said covering blade (3) comprises two coupling elements (33), each of which is placed to connect between the corresponding said end (32') of said elongated body (32) and said first movement means (4);

wherein each said coupling element (33) comprises:

- a guide body (34), which is provided with at least one coupling guide (341) extended along a coupling trajectory (T) lying on a lying plane orthogonal to said rotation axis (R);
- a coupling body (35), which comprises a first engagement portion (351) engaged with said coupling guide (341) at least by means of translation along said coupling trajectory (T);
- locking means (36), which are mechanically connected to said guide body (34) and to said coupling body (35) and constrain said first engagement portion (351) to said coupling guide (341) at least according to said coupling trajectory (T);

wherein:

- one of said guide body (34) and said coupling body (35) is provided with a rotation pin (37), placed aligned with said rotation axis (R) and at least rotatably connected to the corresponding

- said lateral beam (21), and is connected to said first movement means (4);
- the other of said guide body (34) and said coupling body (35) is fixed to the corresponding end (32') of the elongated body (32) of said covering blade (3).
2. Covering apparatus (1) according to claim 1, **characterized in that** said guide body (34) is provided with said rotation pin (37) and is connected to said first movement means (4), and said coupling body (35) is connected to the corresponding end (32') of said elongated body (32).
 3. Covering apparatus (1) according to claim 1 or 2, **characterized in that** the guide body (34) of said coupling element (33) is provided with an internal face (342), directed towards said coupling body (35) and delimited by a first perimeter edge (343); wherein said coupling guide (341) is provided with at least one groove (346), which is made at least on the internal face (342) of said guide body (34) and is extended from a first inlet opening (347) made on said first perimeter edge (343); wherein the first engagement portion (351) of said coupling body (35) is inserted in said groove (346) through said first inlet opening (347) by means of translation along said coupling trajectory (T).
 4. Covering apparatus (1) according to claim 3, **characterized in that** the first perimeter edge (343) of said internal face (342) is provided with a lower section (343'), substantially directed downward with said covering blades (3) in said closed position, and an upper section (343'') directed in the direction opposite said lower section (343'); wherein the first inlet opening (347) of said groove (346) is made on the upper section (343'') of said first perimeter edge (343).
 5. Covering apparatus (1) according to claim 3 or 4, **characterized in that** said groove (346) is extended from said first inlet opening (347) to a closed internal end (348), which is placed within said first perimeter edge (343) and receives said first engagement portion (351) in abutment;

wherein said guide body (34) comprises a retention seat (349), which is made on said internal face (342) and is provided with a second inlet opening (347') made on said first perimeter edge (343);
wherein said coupling body (35) comprises a second engagement portion (352), which is engaged in said retention seat (349) with said first engagement portion (351) placed at said closed internal end (348) of said groove (347).
 6. Covering apparatus (1) according to claim 5, **characterized in that** said retention seat (349) comprises an abutment wall (349'), against which said second engagement portion (352) is placed in abutment; wherein said locking means (36) comprise a closure body (361), which is constrained to said retention seat (349) and placed to at least partially close said second inlet opening (347'), and retains said second engagement portion (352) in said retention seat (349) between said abutment wall (349') and said closure body (361).
 7. Covering apparatus (1) according to claim 6, **characterized in that** said guide body (34) is extended, parallel to said rotation axis (R), between said internal face (342) and an opposite external face (344) delimited by a second perimeter edge (345);

wherein said retention seat (349) is extended in a through manner between said internal face (342) and said external face (344),
wherein the locking means (36) are provided with a positioning guide (362), fixed to the retention seat (349) and extended parallel to said rotation axis (R), said closure body (361) being slidably constrained with said positioning guide (362),
wherein said closure body (361) is movable along said positioning guide (362) between:

- an uncoupled position, in which said closure body (361) is placed between said second engagement portion (352) and the external face (344) of said guide body (34), in order to insert or remove said second engagement portion (352) through said second inlet opening (347'), and
- a retention position (36), in which said closure body (361) is placed in front of said second engagement portion (352), which is retained in said retention seat (349) between said abutment wall (349') and said closure body (361).
 8. Covering apparatus (1) according to claim 7, **characterized in that** said locking means (36) comprise an elastic retention element (363), which is fixed to the guide body (34) and is projectingly extended in said retention seat (349) between said closure body (361) and said external face (344), in order to retain said closure body (361) in said retention position.
 9. Covering apparatus (1) according to claim 4 and any one of the preceding claims from 5 to 8, **characterized in that** the second inlet opening (347') of said retention seat (349) is made on the upper section (343'') of said first perimeter edge (343).

10. Covering apparatus (1) according to any one of the preceding claims from 5 to 9, **characterized in that** the coupling trajectory (T) of said coupling guide (341) has, between said first inlet opening (347) and said closed internal end (348), at least one substantially elbow-shaped curve.

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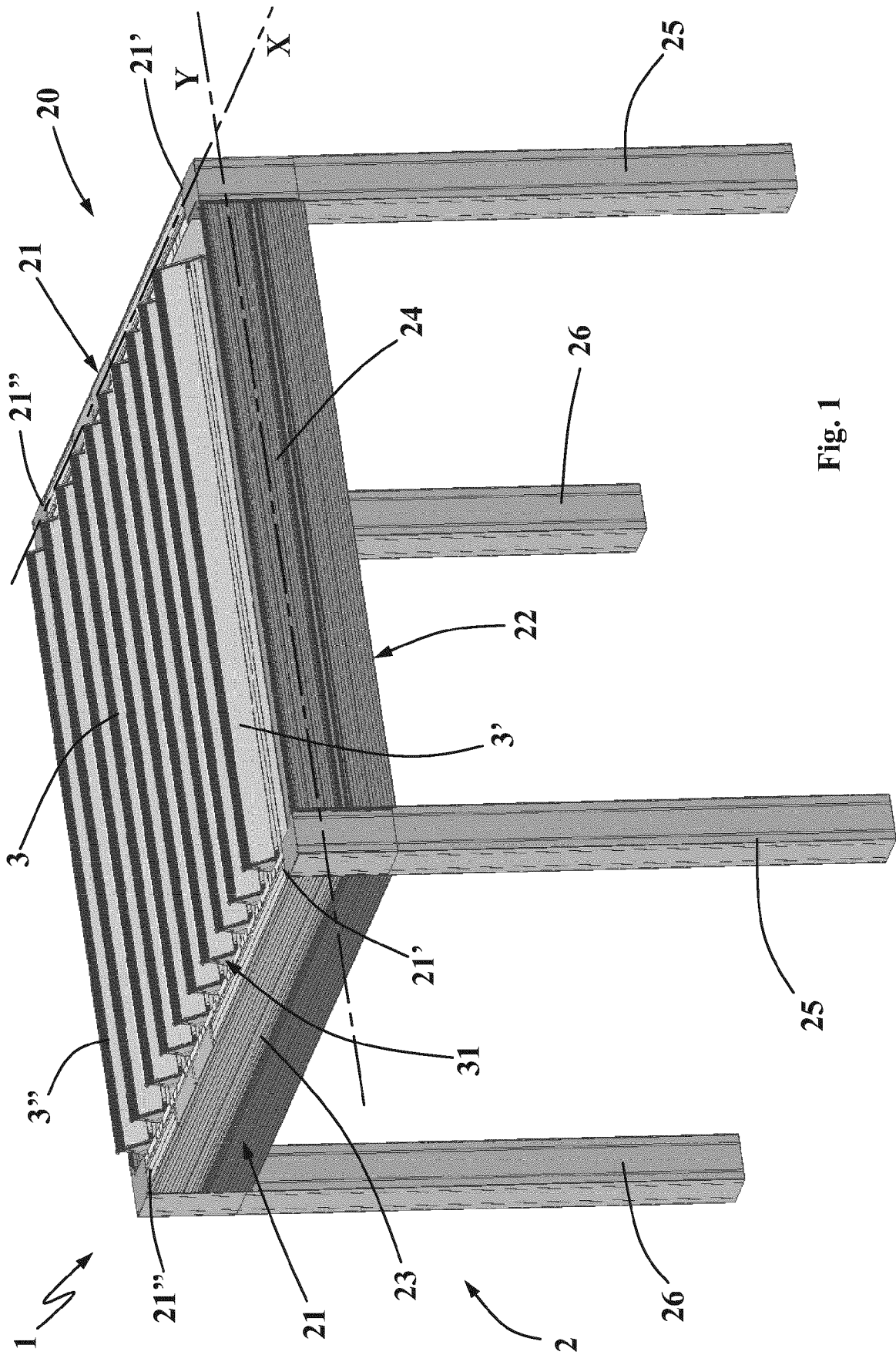
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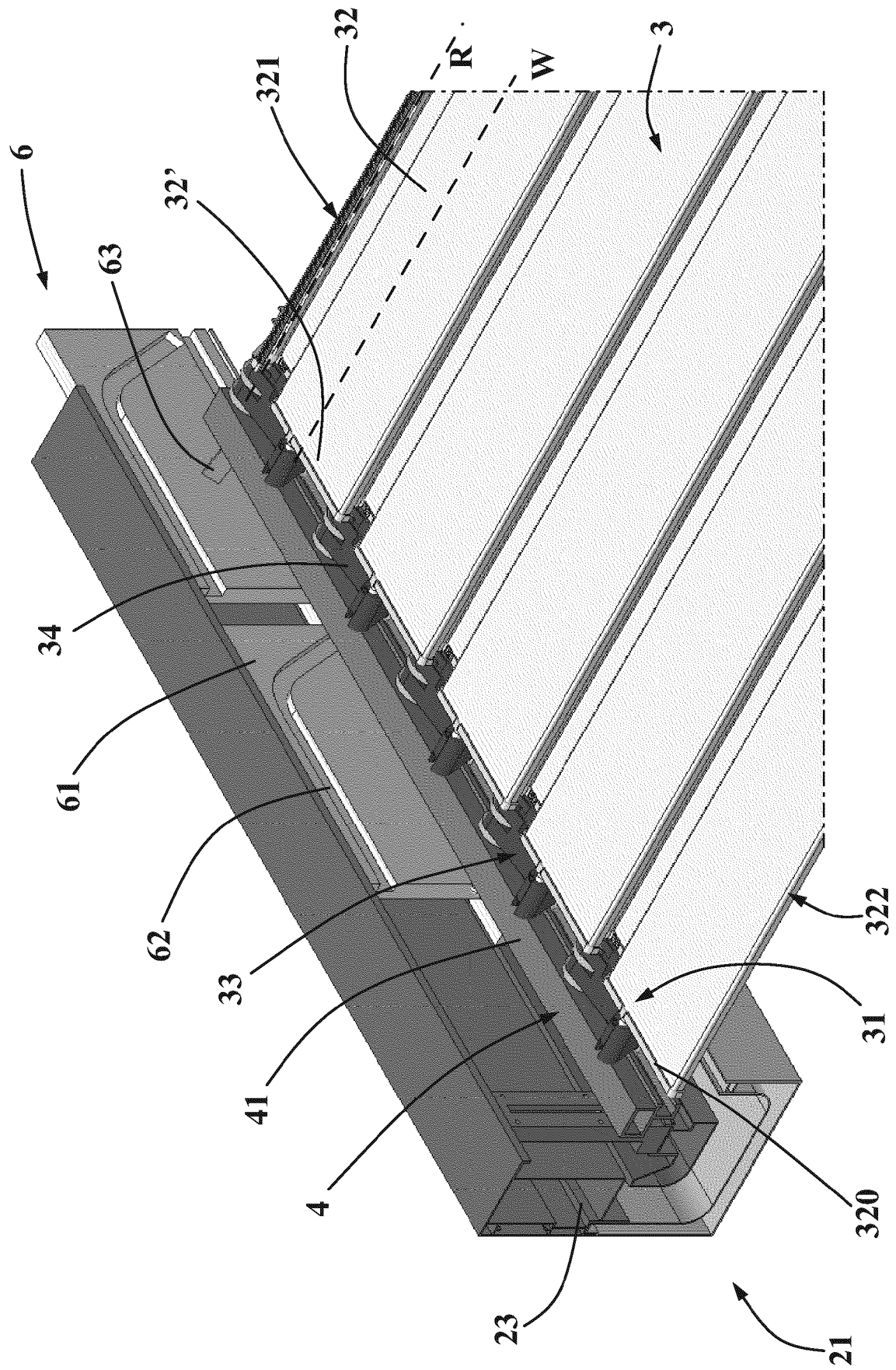


Fig. 2

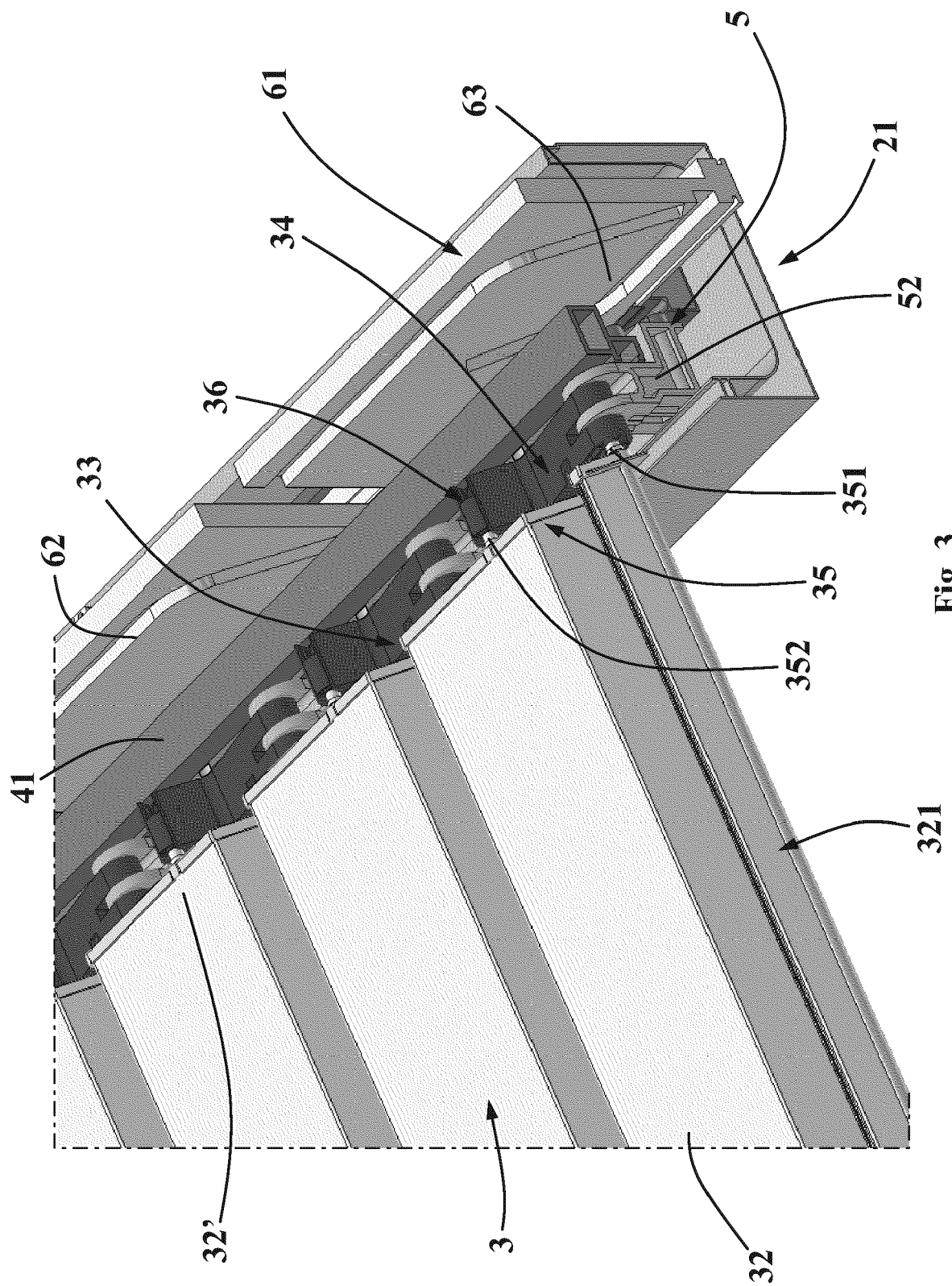


Fig. 3

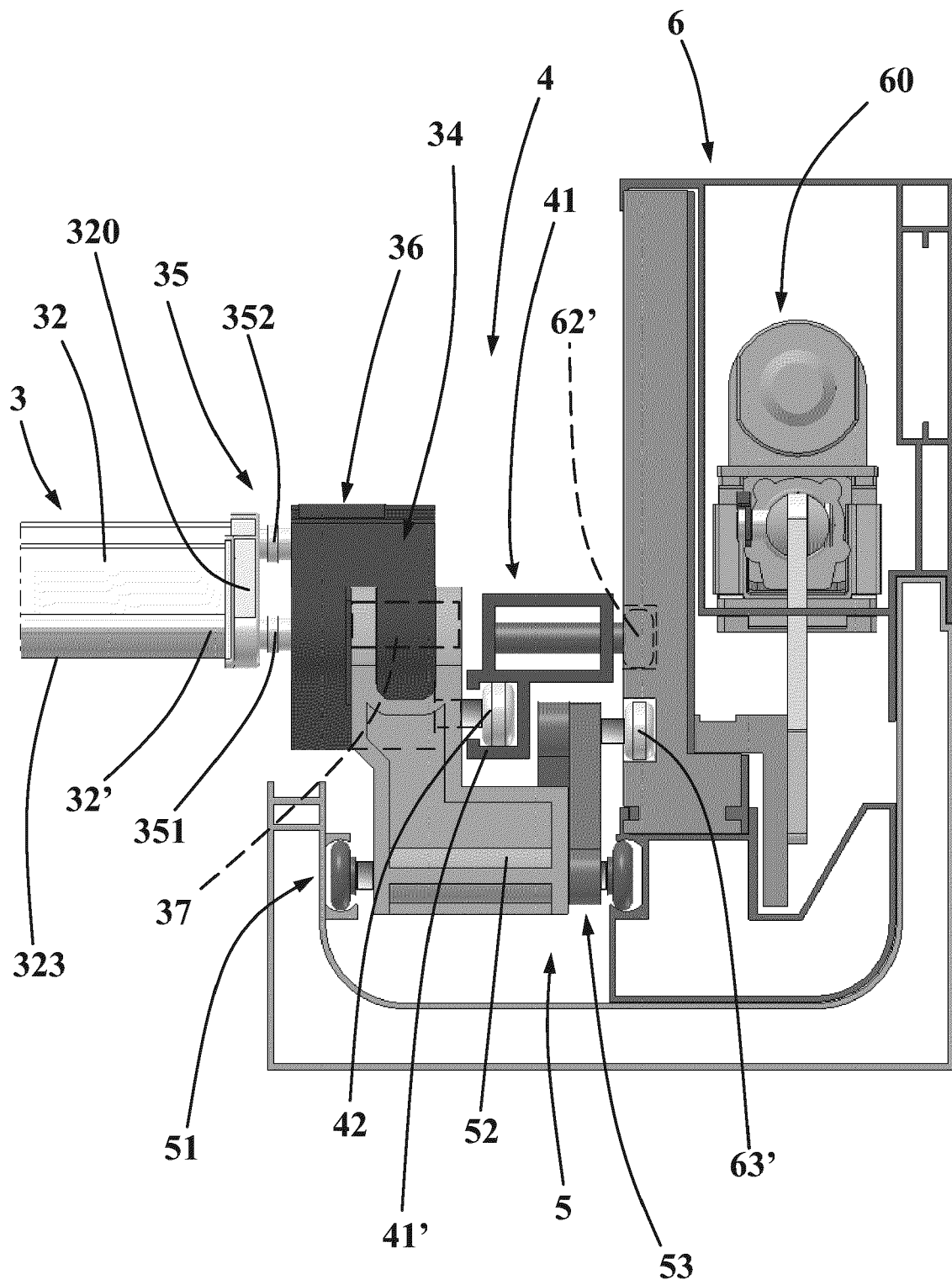


Fig. 4

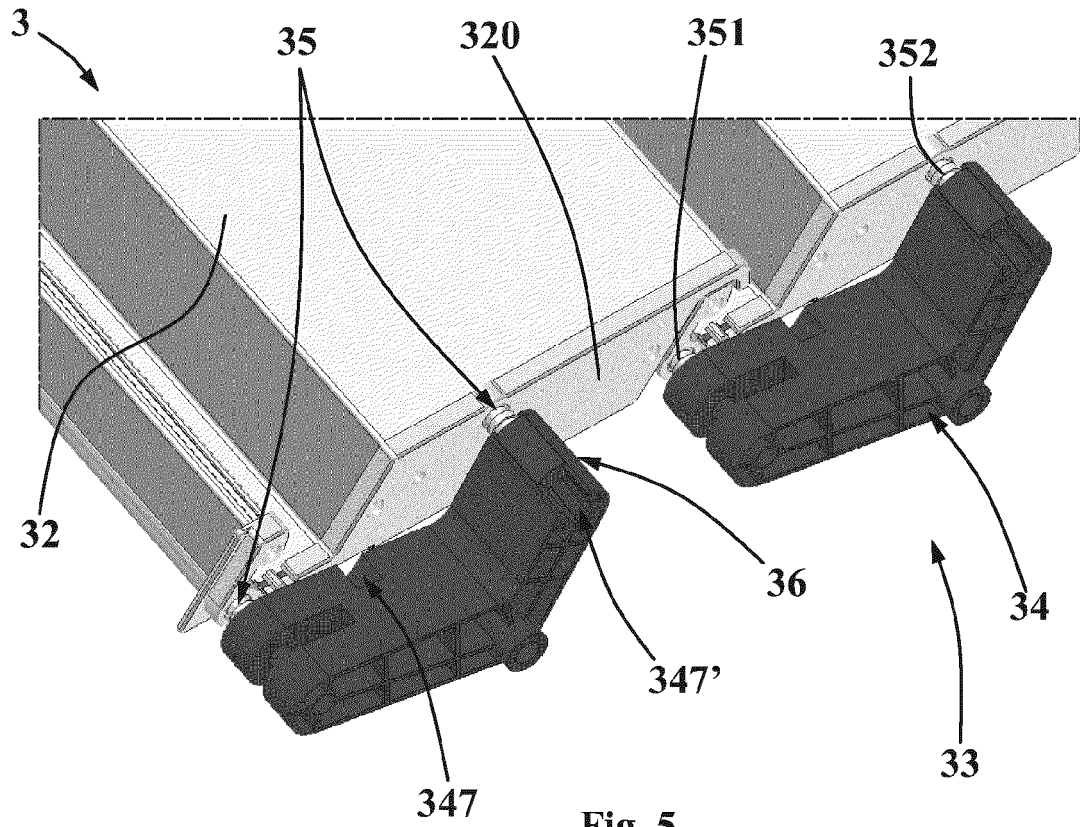


Fig. 5

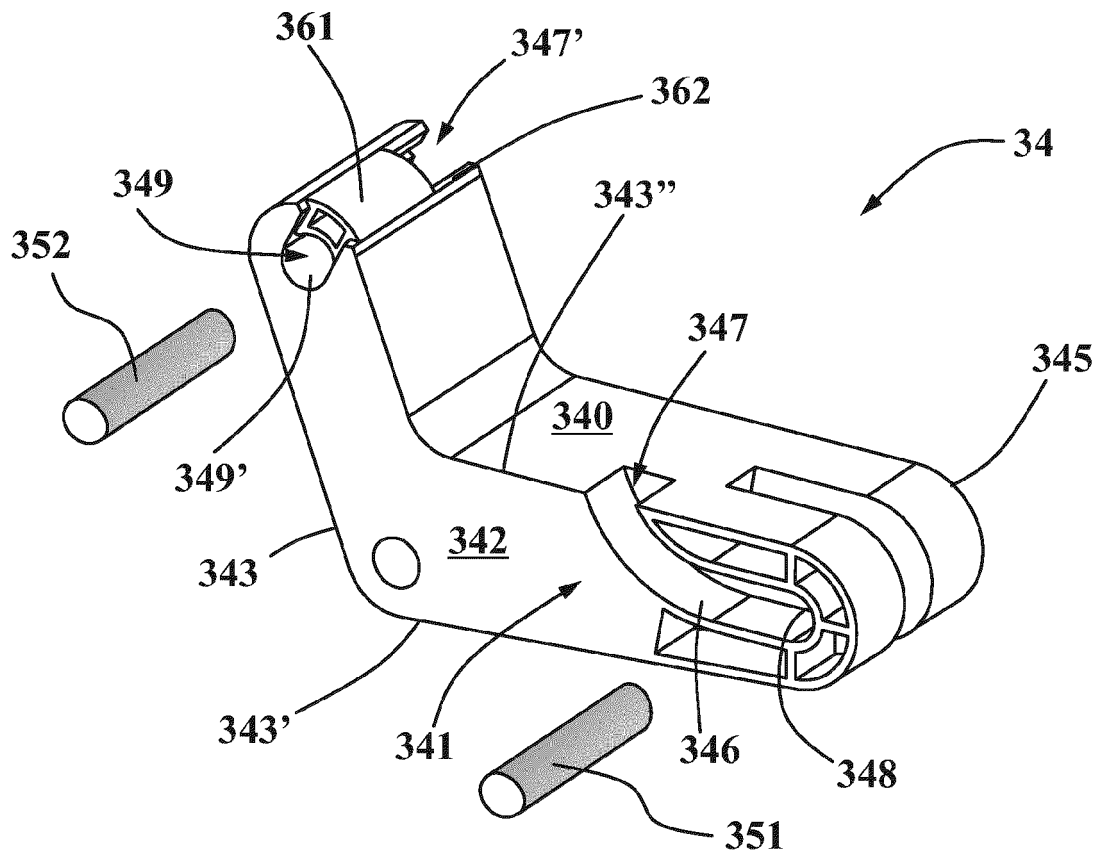


Fig. 6

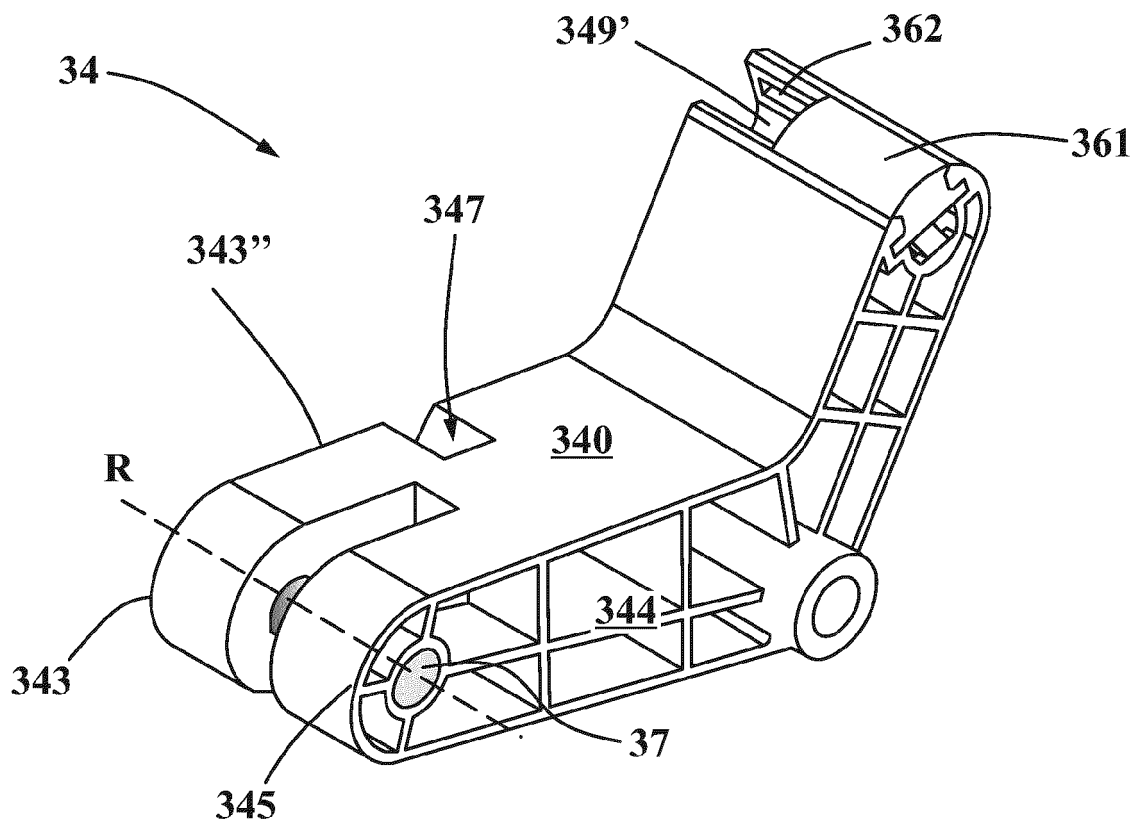


Fig. 7

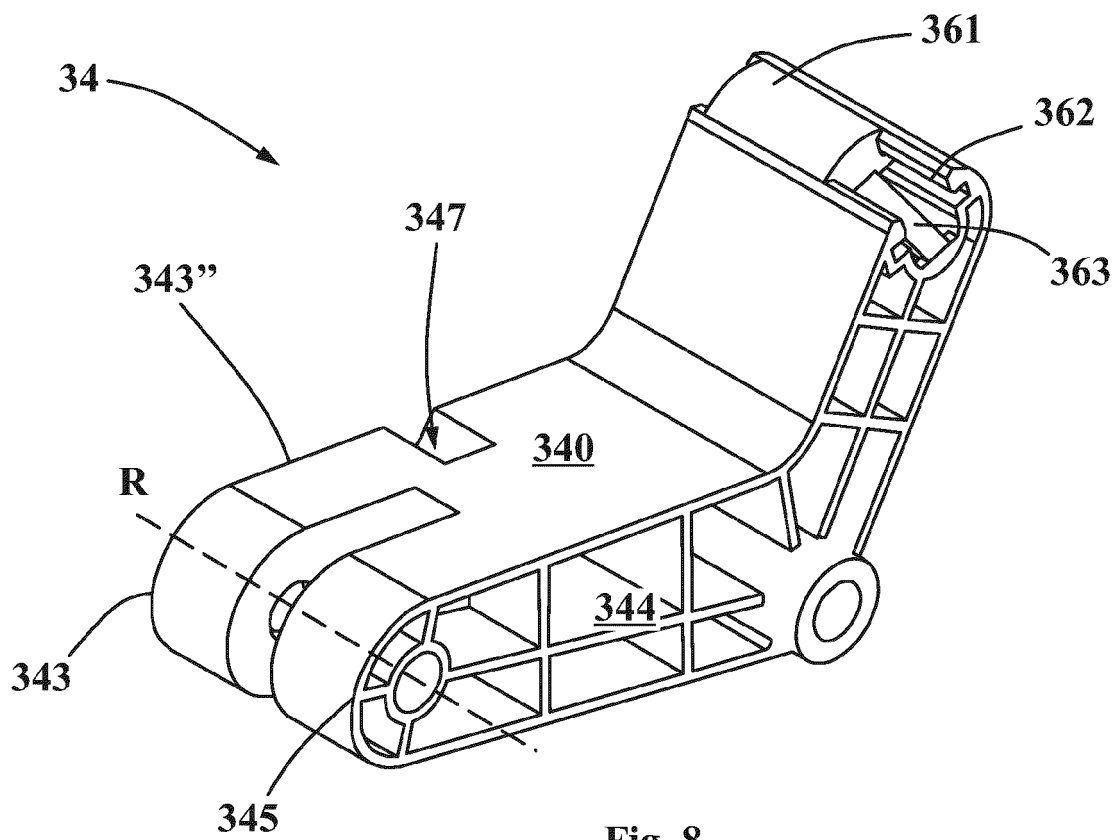


Fig. 8

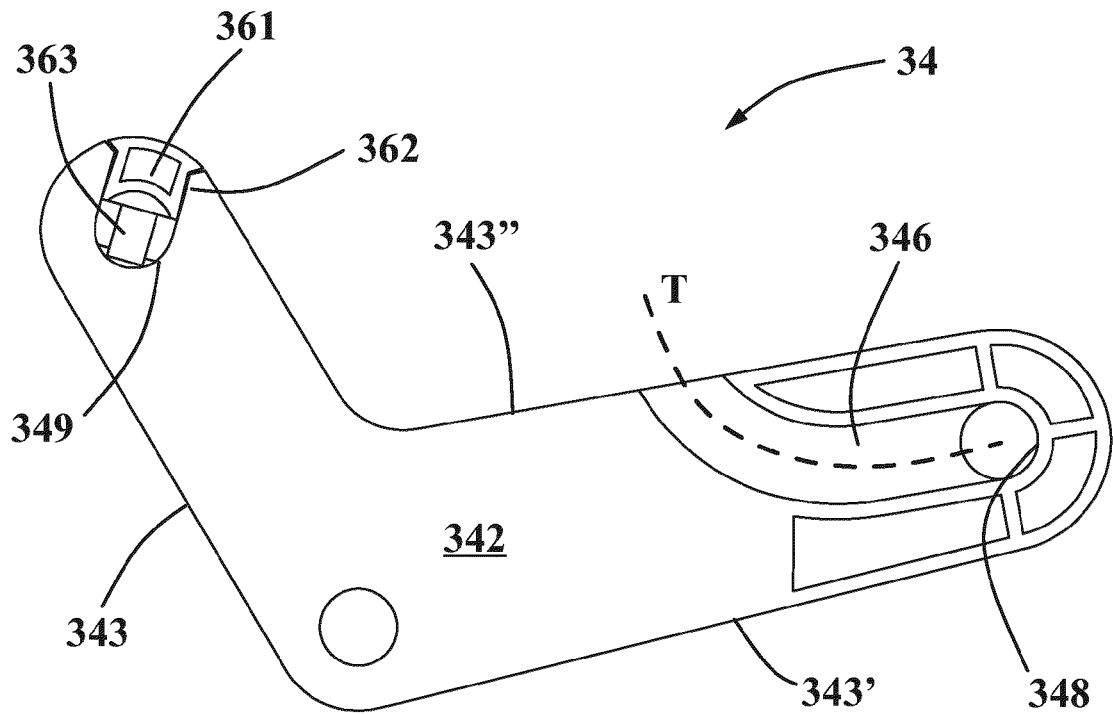


Fig. 9

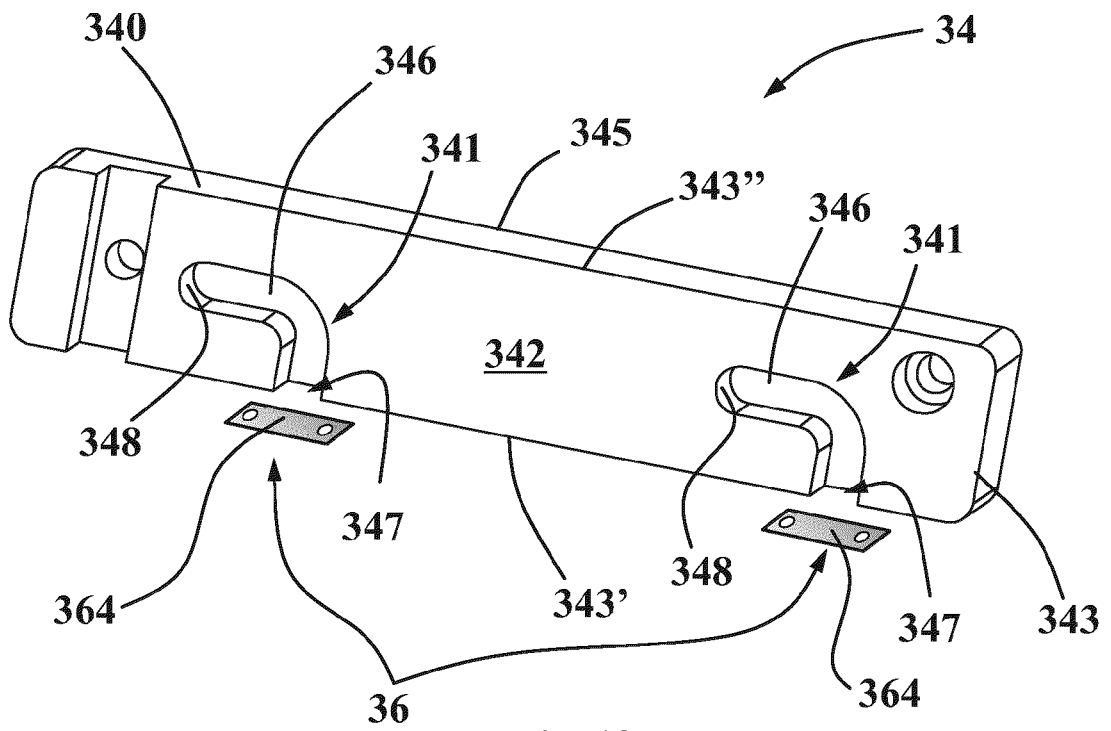


Fig. 10

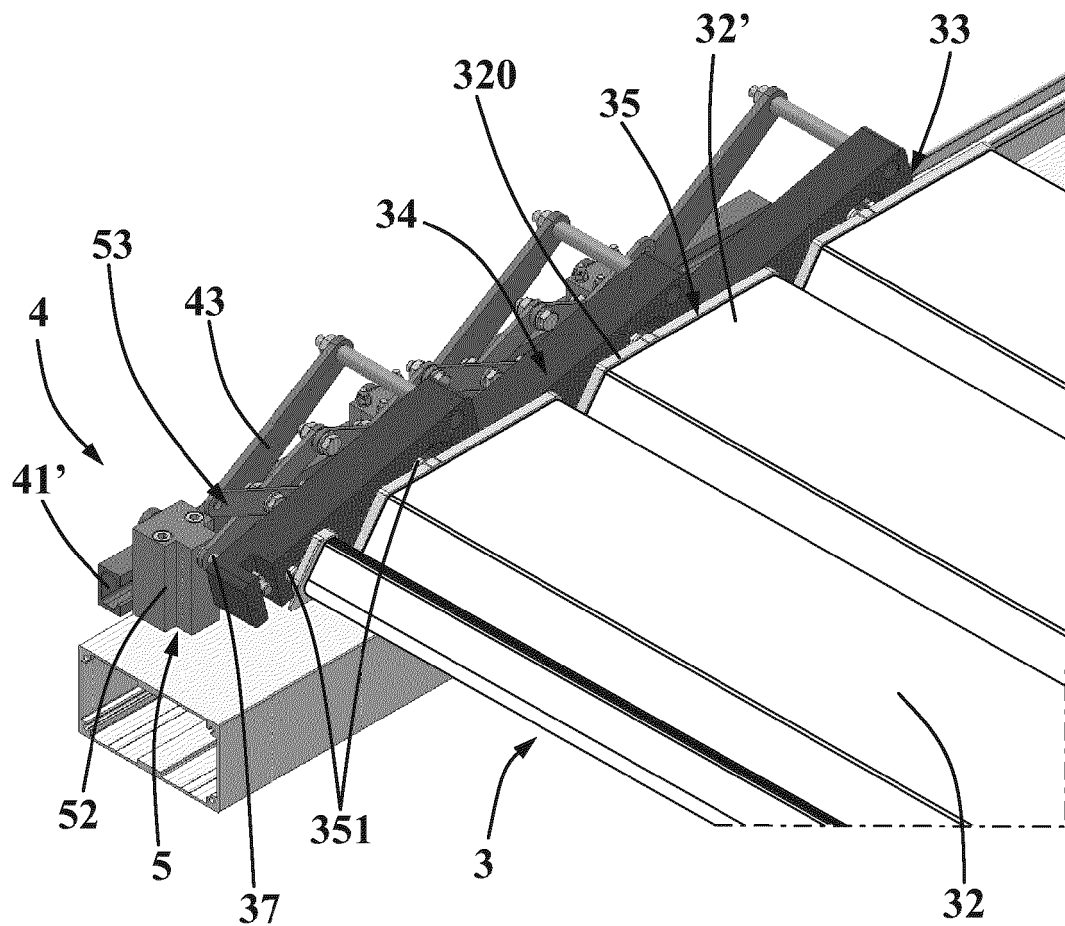


Fig. 11

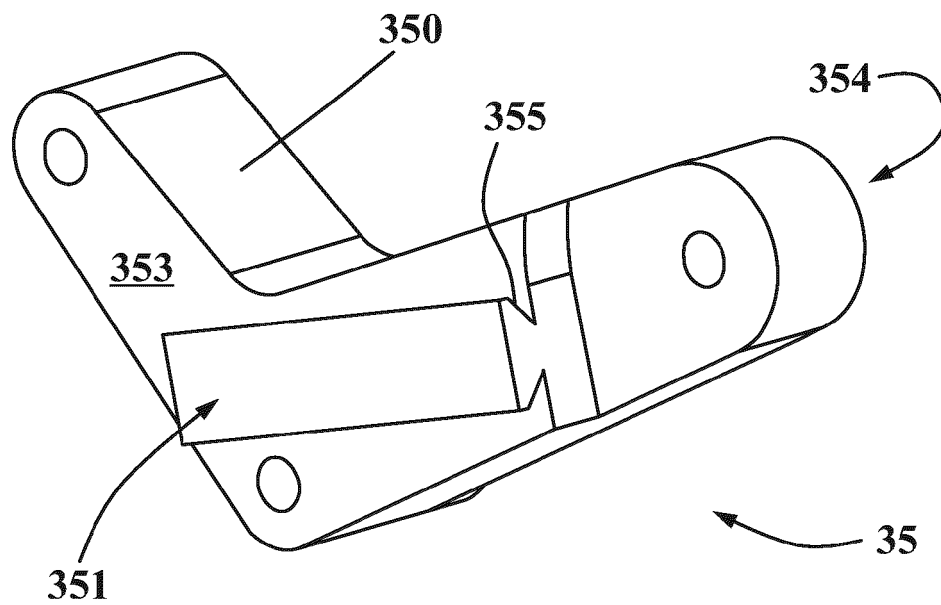


Fig. 12



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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 15 September 2021	Examiner Bourgoin, J
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