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(54) **End support for slats of sectional doors**

(57) The present invention relates to an end support for slats of sectional doors, comprising: - rolling means 11, 12, 13; - a fastening portion 20, used to fasten the support 1 to an end portion of a slat S; - a support portion 30 for the rolling means connected to the fastening portion. The invention is characterised by the fact that the support and fastening portions overlap so as to define between them a seat 40 for housing an end portion of the slat. The rolling means are associated to the support portion, below it with respect to the seat 40. The support portion has two abutment elements 32, 33 facing the seat to define an abutment surface for the end portion of the slat. The rolling means comprise rotation pins 14, 15, 16, each of which is supported at its two ends by the two abutment elements 32, 33.

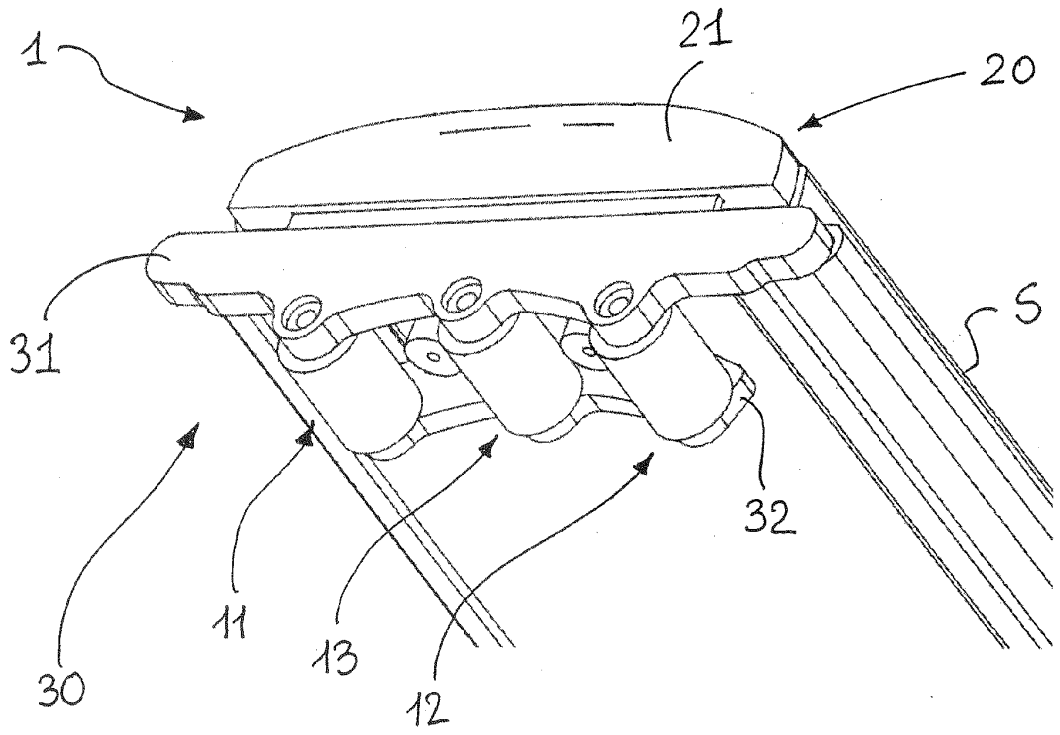

Fig. 1

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Description

Field of application

[0001] The present invention relates to an end support for slats of sectional doors.

[0002] Advantageously, the end support according to the present invention can be used for the production and assembly of vertically sliding sectional doors, suitable in particular for closing off apertures of large dimensions.

State of the art

[0003] As is known, a sectional door comprises a multiplicity of modular slats hinged longitudinally to each other to form a closure cover and slidingly inserted at both ends in suitable guides.

[0004] Operatively, the cover is moved between a closed position, in which it is normally positioned vertically at the aperture to be closed off, and an open position, in which it is normally positioned horizontally above the aperture. To such purpose each guide comprises a vertical section, which is positioned at the aperture to be closed off, and a horizontal section, which is positioned above the vertical section, for example near the ceiling of the space to be closed off. The guide further comprises a connection section (generally at 90°) between the vertical section and the horizontal section.

[0005] The sliding of the slats inside the guides is permitted by suitable supports which are fastened to the ends of the slats.

[0006] Generally, such supports are provided with a portion used for fastening to the slat. Such fastening portion is suitably shaped to be inserted with an interference ratio inside the inner cavity of the slat. The slats are in fact made with hollow sections (usually in steel, aluminium or plastic material).

[0007] The supports are provided with one or two wheels which slideably engage the guide. The wheels are connected to the support by cantilevered pins, so as to project externally from the support and be inserted in the guides.

[0008] The supports described above are frequently subject to wear and breakage.

[0009] When in operation, on account of the weight of the slats themselves and of the stresses deriving from the movement of the slats along the guides, the pins are in fact subject to torsional and/or flectional stresses which may cause their permanent deformation and in some cases even breakage.

[0010] Another limitation found with traditional supports is related to the movement at the connection section of the guides. At this change of direction the sliding of the slats is less smooth on account of the resistance opposed by the slats and frictions present. The traditional supports are not currently able to attenuate this problem.

[0011] Secondarily, the resistance to sliding which occurs at the connection section of the guides determines an increase in the operating load which inevitably accentuates the torsional and/or flectional stresses on the pins of the wheels, increasing wear and the risk of breakage.

Presentation of the invention

[0012] Consequently, the purpose of the present invention is to overcome the drawbacks of the prior art described above, by providing an end support for slats of sectional doors which is less subject to wear and therefore proves more reliable.

[0013] A further purpose of the present invention is to provide an end support for slats of sectional doors which facilitates the sliding of the slats at the connection sections of the guides.

[0014] A further purpose of the present invention is to provide an end support for slats of sectional doors which is easy to adapt to the dimensions of the slats.

[0015] A further purpose of the present invention is to provide an end support for slats of sectional doors which is easy and economical to produce.

Brief description of the drawings

[0016] The technical characteristics of the invention, according to the aforesaid purposes, can be seen clearly from the contents of the following claims and the advantages of the same will be more clearly comprehensible from the detailed description which follows, made with reference to the appended drawings, showing one or more embodiments by way of non-limiting examples, wherein:

[0017] — Figures 1 and 2 show two perspective views of an end support for slats of sectional doors according to a preferred embodiment of the invention, shown in a condition of assembly to a slat;

[0018] - Figure 3 shows a perspective view of a detail of a sectional door, with some slats provided with supports according to the invention, engaged in a guide;

[0019] — Figure 4 shows a cross-section view of a support for slats according to the invention associated to a guide;

[0020] — Figures 5, 6 and 7 show three exploded views of the end support shown in Figures 1 and 2;

[0021] — Figure 8 shows a perspective view of the end support according to a preferred embodiment of the invention;

[0022] — Figures 9 and 10 show two schematic views of a support with rolling means positioned according to a preferred embodiment of the invention, shown respectively in an operating condition when positioned in a horizontal section of a guide and when positioned in a connection section;

[0023] - Figure 11 show a schematic view of the positioning of the rolling means in a support according to a particularly preferred embodiment.

Detailed description

[0024] The end support for slats of sectional doors according to the invention will be globally denoted in the appended drawings by reference numeral 1.

[0025] According to a general embodiment of the invention, the end support 1 comprises:

[0026] — rolling means 11, 12, 13;

[0027] — a fastening portion 20, used to fasten the support 1 to an end portion of a slat S; and

[0028] - a support portion 30 for the rolling means 11, 12, 13 connected to the fastening portion 20.

[0029] According to a first aspect of the present invention, the support portion 30 and the fastening portion 20 overlap so as to define between them a seat 40 for housing an end portion of the slat S.

[0030] "Housing" is here generally understood to mean the positioning of at least a part of the end portion of a slat.

[0031] As will be described further below, the fastening portion 20 may be of the coupling type, that is shaped so as to couple with an interference ratio inside the cavity present inside the section (metal or plastic) forming the slat. In this case, the aforesaid seat 40 will house only a perimetral wall of the slat.

[0032] Alternatively, according to a preferred embodiment of the invention which will be described further below, the fastening portion 20 is not of the coupling type, that is, it is not destined to couple with interference in the inner cavity of the section forming the slat. The fastening portion is rather defined substantially by a free appendage which rests on the outer surface of the slat and is fastened to it by suitable means of attachment. In this case, the aforementioned seat 40 will house the entire end portion of the slat, as illustrated in Figures 1, 2 and 4.

[0033] Advantageously, in both cases, the presence of the housing seat 40 can permit the support portion 30 of the rolling means to co-operate with the fastening portion 20 in blocking the slat S to the support 1. Thanks to the presence of the seat 40 the two fastening and support portions can thereby hold the slat in a vice between them, acting on the entire thickness of the slat (as shown in the appended Drawings) or only on a part of it. This makes the connection of the support 1 to a slat S more stable and safer.

[0034] According to another aspect of the invention, the rolling means 11, 12, 13 are associated to the support portion 30, below it with respect to the seat 40. The support portion 30 has two abutment elements 32, 33 which face the seat 40 to define an abutment surface for the end portion of the slat S. The rolling means 11, 12, 13 comprise rotation pins 14, 15, 16, each of which is supported at its two ends by the aforementioned two abutment elements 32, 33.

[0035] In other words, the rotation pins are connected to the support portion by a fork attachment and therefore supported mechanically at both ends.

[0036] Thanks to this configuration of the support 1, when the support 1 is fitted to one end of a slat S, the rolling means 11, 12 and 13 are no longer positioned in cantilever manner, completely external to the dimensions of the slat S (as in the traditional solutions of the prior art), but rather the rolling means are positioned under the slat S, with the rotation pins supported at both ends and therefore mechanically equilibrated. The stresses deriving from the slats in fact discharge onto the abutment elements 32, 33 and then onto the support portion 30. Operatively in fact, the slat S abuts against the aforesaid two abutments 31, 32 positioned at the ends of the pins of the rolling means. This way the torsional and/or flectional stresses on the pins and therefore the risk of permanent deformation and breakage are reduced.

[0037] Preferably, as will be described further below and as is illustrated for example in Figures 5, 6 and 8, the two abutment elements 31, 32 define a continuous abutment surface. Alternative solutions may however be envisaged in which the two abutment elements are separate and define two separate abutment surfaces.

[0038] Advantageously, the rolling means comprise at least two main rolling bodies 11, 12 with first rotation axis X1, X2 parallel to each other.

[0039] The shape of the abutment surface corresponds to that of the slat S and may therefore be of different shapes, for example, flat, convex or concave.

[0040] Preferably, the rolling bodies are composed of rollers, even though functionally equivalent elements may be used, such as for example wheels.

[0041] Preferably, as illustrated in particular in Figures 5, 8, 9 and 10 the rolling means comprise at least one secondary rolling body 13 positioned between the two main rolling bodies 11, 12. Such secondary rolling body 13 has a second rotation axis X3 parallel to the first axis (X1, X2). Such secondary body 13 has its active rolling surface positioned closer to the seat 40 than the active rolling surfaces of the two main bodies 11, 12.

[0042] "Active rolling surface" is taken to mean the surface portion of the rolling body which during rotation is in the position of contact with the guide G for the sliding of the slats.

[0043] In other words, in relation to the housing seat 40 the secondary body 13 is in a staggered position with respect to the two main rolling bodies 11, 12 at a greater height.

[0044] In yet other words, as illustrated schematically in Figure 11, the secondary body 13 is positioned so as to have its active rolling surface raised in relation to a shared rolling surface M of the two main bodies 11,12.

[0045] According to a particularly preferred embodiment illustrated in the appended drawings and in particular in the schematic Figure 11, the two main bodies 11, 12 and the secondary body 13 have the same diameter. The staggering of the active rolling surfaces is achieved by staggering the position of the second axis X3 in relation to the first rotation axis X1, X2. In other words, the rotation axis X3 of the secondary rolling body 13 lies on a plane included between the housing seat 40 and a common plane Q which the two first axes X1, X2 lie on.

[0046] In particular, if the main rolling bodies 11 and 12 have the same diameter, the two first axis X1, X2 are positioned in relation to the abutment surface in such a way that when the slat S is associated to the support 1, the common plane which the two first axis X1, X2 lie on is parallel to the direction of longitudinal extension L of the slat S.

[0047] Alternatively, an embodiment may be envisaged in which the three axes are coplanar and the secondary body has a smaller diameter, or a mixed solution, in which the axes are staggered and the diameters of the bodies are different.

[0048] Thanks to the staggering in relation to the main bodies 11, 12 the secondary body 13 is able to intervene in the sliding of the support 1 in correspondence with the connection sections of the guides, already when the support 1 has partially engaged the connection T and the two main bodies 11, 12 find themselves on two sections of the guide with different orientation, for example one on the section aligned with the horizontal section O of the guide and one on a section aligned with the vertical section V of the guide, as illustrated in Figure 10, or when one body is in a rectilinear section and the other body in a curvilinear section. In this situation the profile of the guide G intersects the theoretical rolling plane of the main bodies and comes closer to the seat 40 coming into contact with the secondary body 13.

[0049] It is understood that the dimensions of the support 1, and in particular of the rolling bodies, may be such that at a connection section of a guide two or more supports 1 are present corresponding to two or more adjacent slats and that as a result all the rolling bodies of the same support are in the curvilinear section. Figure 11 should therefore be understood as purely illustrative, the ratio scale of the support and the guide not being observed.

[0050] The secondary rolling body 13 does not intervene rather when both the main bodies 11,12 engage the same flat section of the guide G, shown for example in Figure 9.

[0051] Thanks to the presence of the secondary body 13 the sliding of the slats S at the connection section of the guides is facilitated. Thanks to the invention, on the connection section there are three rollers which join to the guide G, improving the rolling and making the movement smoother.

[0052] Preferably, as illustrated in particular in figures 9 and 10, the main bodies 11, 12 and the secondary body 13 are mutually positioned one with the other so as to be tangent to a circular arc C having a predefined radius of curvature R.

[0053] Operatively, the radius of curvature R is chosen in such way as to correspond to the radius of curvature of the connection section T of the guide G.

[0054] Alternative solutions may be envisaged in which the main bodies 11, 12 and the secondary body 13 are positioned in such a way as to be tangent to a non-circular curvilinear section, for example elliptical or cusp-shaped, depending on the effective shape of the support section.

[0055] Advantageously, the staggering of the main rolling bodies 11, 12 and the secondary body 13 need not necessarily be considered in conjunction with the positioning of the rolling means under the slat, as described above, but also separately from such characteristics.

[0056] In particular, the staggering of the staggered rolling bodies may be adopted both in traditional supports with rolling means cantilevered to the slat, and in supports according to the invention which have the rolling means positioned under the housing seat of the slat in the support itself and mechanically associated to it by abutments.

[0057] A traditional type support as regards the support of the rolling means, in which the rolling means are provided with cantilevered pins and comprise at least two main rolling bodies 11, 12 with first rotation axis X1, X2 parallel to each other, and at least one secondary rolling body 13, which is positioned between the aforesaid two main bodies and has a second rotation axis X3 parallel to the first axis therefore falls within the scope of the present invention. Such secondary body 13 is positioned so as to have its active rolling surface raised in relation to a common rolling surface M of the two main bodies 11, 12.

[0058] Preferably, as illustrated in particular in figures 9 and 10, the main bodies 11, 12 and the secondary body 13 are mutually positioned one with the other so as to be tangent to a circular arc C having a predefined radius of curvature R.

[0059] The advantages of this embodiment have already been highlighted above and consist essentially in facilitating the sliding of the support 1 at a connection section R of a guide.

[0060] According to a particularly preferred embodiment shown in the appended drawing, the support portion 30 comprises:

[0061] — a first base 31, at which such support portion 30 is associated to the fastening portion 20;

[0062] — a first appendage 32 connected in cantilever manner to the first base 31 by means of a bridge 33 which extends at the housing seat 40.

[0063] The rolling means 11, 12, 13 are rotationally supported between the aforesaid base 31 and the aforesaid first appendage 32. As may be seen in the appended drawings, the rolling bodies are positioned under the bridge 33.

[0064] The first appendage 32 and the bridge 33 respectively define the aforementioned two abutment elements destined to receive in abutment the end portion of the slat S inserted in the housing seat 40.

[0065] Preferably, as illustrated in particular in figures 5,6 and 8, the first appendage 32 and the bridge 33 are connected to each other without interruption to form a single abutment surface 34 (facing the seat 40) for the end portion of the slat S.

[0066] The fastening portion 20 comprises in turn:

[0067] — a second base 21, at which such fastening portion 20 is associated to the support portion 30;

[0068] — a second appendage 22 which is connected in cantilever manner to the second base 21 and which extends upward of the first appendage 31 and the bridge 33, at the housing seat 40.

[0069] The second appendage 22 defines an upper abutment surface for the slat at the side facing the housing seat 40.

[0070] In particular, the first axis X1, X2 and, if the secondary rolling body 13 is provided, also the second axis X2, are parallel to the aforesaid abutment surface 34, which the slat S is, as already said, destined to abut against.

[0071] Advantageously, as mentioned earlier, the support 1 according to the invention may comprise rigid connection means (not shown in the Figures) between the fastening portion 20 and the support portion 30. Such connection means (such as screws or bolts) traverse the housing seat 40 and permit the attachment of the slat S to the two fastening 20 and support 30 portions, of the support 1. To such purpose, special through seats 25, 26, 35, 36 (coaxial in pairs) are made on the fastening portion 20 and on the support portion 30 at the housing seat 40. In particular, the through seats are positioned between one rotation axis and the other of the individual rolling bodies.

[0072] According to a particularly preferred embodiment, the fastening portion 20 and the support portion 30 are made as separate elements from each other. The two portions 20 and 30 are movably connected to each other by guide means 61, 62 making it possible to vary the distance H between them at the housing seat 40 and thereby to vary the opening of the seat 40 itself. The support 1 according to the invention is therefore easily adaptable to slats S of different thicknesses.

[0073] In particular, as illustrated in figures 5, 6 and 7, the guide means comprise:

[0074] — a protuberance 61 which extends from the first base 31 of the support portion 30 in a direction substantially orthogonal to the first appendage 32 and to the rotation axes of the rolling means;

[0075] - an engagement seat 62, which is made on the second base 21 of the fastening portion 20 and which slidingly receives within it the aforesaid protuberance 61.

[0076] In particular, the two bases 21 and 31 are suitable to receive in abutment the head of the slat S, as illustrated in Figure 4.

[0077] The present invention relates to a slat for sectional doors, provided at least at one end portion with an end support 1 as described above.

[0078] In particular, as may be observed in Figures 1, 2 and 4 the end portion of a slat S is inserted inside the housing seat 40. The slat S is oriented in such a way that its main longitudinal extension axis L is parallel to the rotation axes X1, X2, X3 of the rolling bodies 11, 12 and 13.

[0079] According to a preferred embodiment of the inventionthe rolling means are positioned under the slat S, as illustrated in Figures 1, 2, 3 and 4.

[0080] Thanks to the support 1 according to the invention, according to the preferred embodiment with rolling means positioned under the housing seat 40, the portion of slat entering inside the guide increases. This gives greater stability and resistance to the individual slat and to the overall assembly of slats forming the cover of a sectional door.

[0081] Compared to the traditional solutions, the support 1 according to the invention has smaller ground dimensions. In fact the support 1 encloses the end of the slat receiving it in the housing seat and supports the rolling means within the ground dimensions of the slat itself.

[0082] The present invention offers various advantages, some of which already described.

[0083] The end support 1 according to the invention has a better resistance to wear determined by the position of the rolling means, inserted under the slat and therefore not subject to torsional stresses.

[0084] The aforesaid positioning of the rolling means also reduces the supporting distance of the slats between the two guides, lending the cover greater rigidity.

[0085] The use of at least three rolling bodies, of which two main and one secondary, the latter staggered in relation to the former, facilitates the movement of the support (and therefore of the associated slat) at the connection sections of the guides, that is in the most critical points where the cover (i.e. the assembly of slats) opposes greater resistance to sliding, increasing the operating load.

[0086] The support according to the invention is, in addition, easily adaptable to slats of different thicknesses.

[0087] The support according to the invention can, in addition, be attached to the slats in a more stable and safer manner.

[0088] The invention thus conceived thereby achieves the predefined objectives.

[0089] Obviously, it may assume, in its practical embodiment forms and configurations other than those illustrated above while remaining within the sphere of protection.

[0090] Moreover, all the parts may be replaced with technically equivalent elements and the dimensions, forms and materials used may be varied as required.

Claims

1. End support for slats of sectional doors, comprising:

   - rolling means (11, 12, 13);
   - a fastening portion (20), used to fasten the support (1) to an end portion of a slat (S);
   - a support portion (30) for said rolling means (11, 12, 13) connected to the fastening portion (20);

characterised by the fact that the support portion (30) and the fastening portion (20) overlap so as to define between them a seat (40) for housing an end portion of the slat (S), the rolling means (11,12,13) being associated to the support portion (30) below said support portion with respect to said seat (40), said support portion (30) having two abutment elements (32,33) facing said seat to define an abutment surface for the end portion of the slat (S), the rolling means (11,12,13) comprising rotation pins (14,15,16), each of which is supported at its two ends by said two abutment elements (32, 33).

2. Support according to claim 1, wherein the rolling means comprise at least two main rolling bodies (11, 12) with first rotation axis (X1, X2) parallel to each other.

3. Support according to claim 2, wherein said rolling means comprise at least one secondary rolling body (13) positioned between the two main rolling bodies (11, 12) and having a second rotation axis (X3) parallel to the first axis (X1, X2), said secondary body (13) having the active rolling surface positioned closer to the seat (40) than the active rolling surfaces of the two main bodies (11, 12).

4. Support according to claim 3, wherein the main bodies (11, 12) and the secondary body (13) are positioned so as to be tangent to a circular arc (C) having a predefined radius of curvature (R).

5. Support according to one or more of the previous claims, wherein said support portion (30) comprises:

- a first base (31) at which the support portion (30) is associated to the fastening portion (20);
- a first appendage (32) connected in cantilever manner to the main body (31) by means of a bridge (33);

the rolling means (11,12,13) being rotationally supported between said first base (31) and said first appendage (32), said first appendage (32) and said bridge (33) respectively defining said two abutment elements.

6. Support according to claim 5, wherein said first appendage (32) and said bridge (33) are connected to each other without interruption to form a single abutment surface (34) for the end portion of the slat (S), facing said seat (40).

7. Support according to claim 3 or 4 and claim 5, wherein said first axis (X1, X2) and said second axis (X2) are parallel to said abutment surface (34).

8. Support according to one or more of the previous claims, comprising means for rigidly connecting the fastening portion (20) and the support portion (30), such connecting means crossing said seat (40), suitable coaxial through seats (25,26, 35,36) being made on the fastening portion (20) and the support portion (30).

9. Support according to one or more of the previous claims, wherein said fastening portion (20) and said support portion (30) are connected to each other by guiding means (60) which make it possible to vary the distance (H) between said two portions (20,30) and thereby the aperture of said seat (40).

10. End support for slats of sectional doors, comprising:

- rolling means (11, 12, 13);
- a fastening portion (20), used to fasten the support (1) to an end portion of a slat (S);
- a support portion (30) for said rolling means (11, 12, 13) connected to the fastening portion (20); **characterised by** the fact that

the rolling means comprise at least two main rolling bodies (11,12) with first rotation axis (X1,X2) parallel to each other, and at least one secondary rolling body (13) which is positioned between said two main rolling bodies (11,12) and has a second rotation axis (X3) parallel to said first axis (X1,X2), said secondary body (13) being positioned so as to present the active rolling surface raised in relation to a common rolling plane (M) of the two main bodies (11,12).

11. Support according to claim 10, wherein the main bodies (11, 12) and the secondary body (13) are positioned so as to be tangent to a circular arc (C) having a predefined radius of curvature (R).

12. Slat for sectional doors, provided at least at one end portion with a support (1) according to one or more of the claims from 1 to 9 or according to claims 10 or 11.

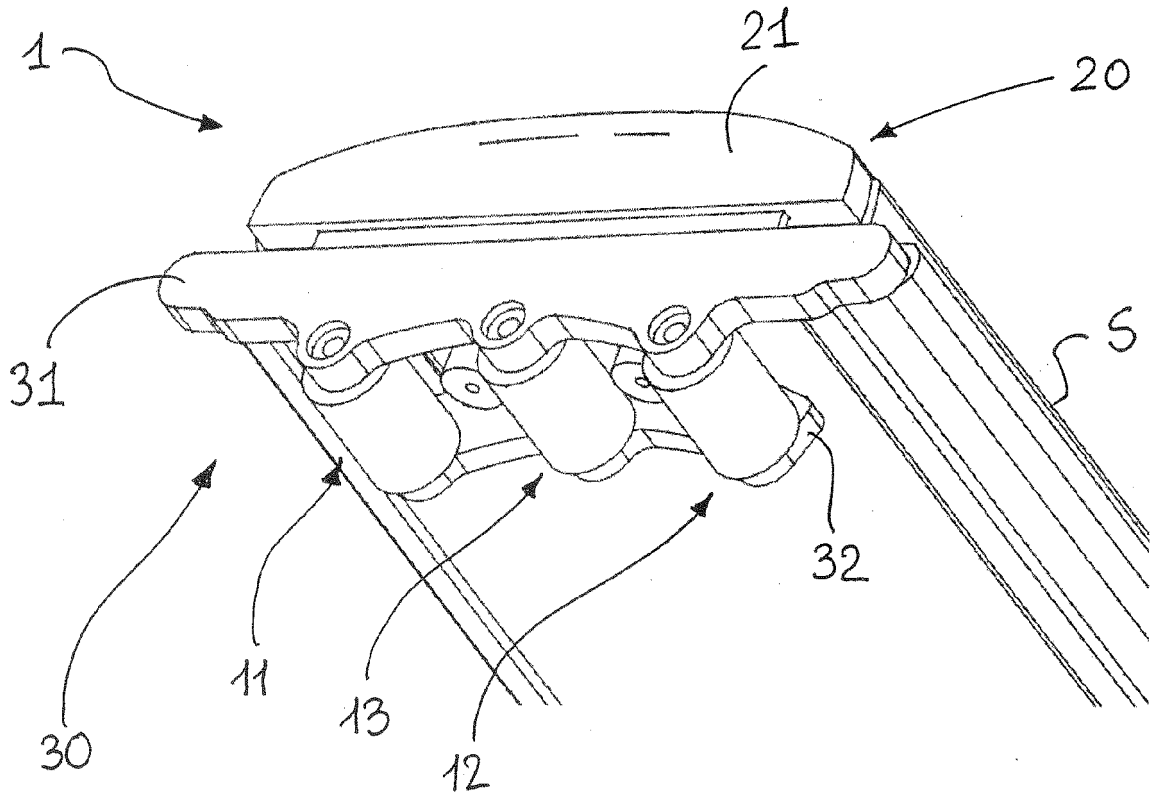

Fig. 1

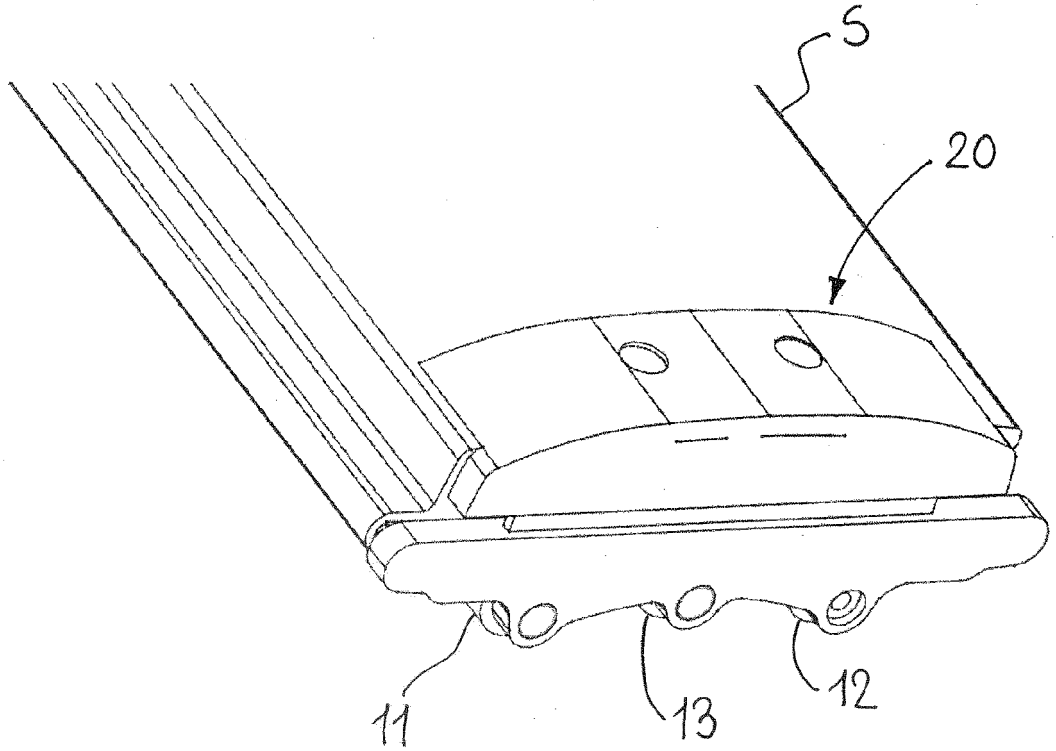

Fig. 2

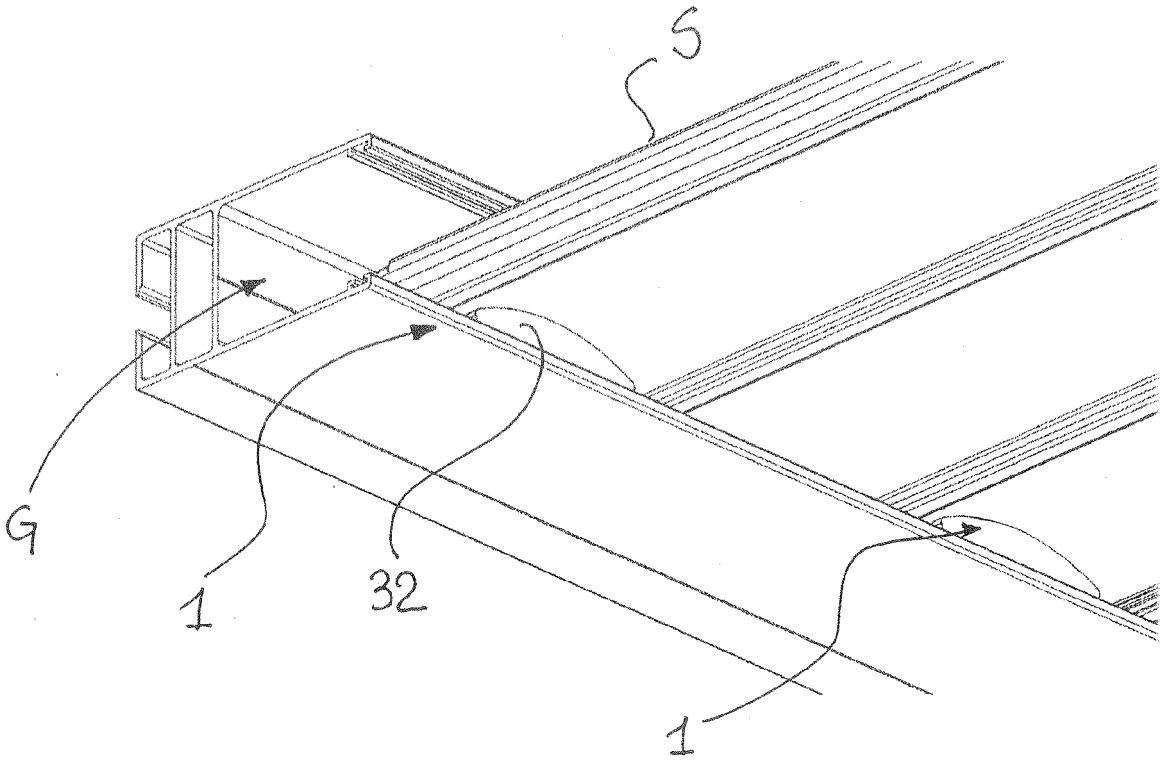

Fig. 3

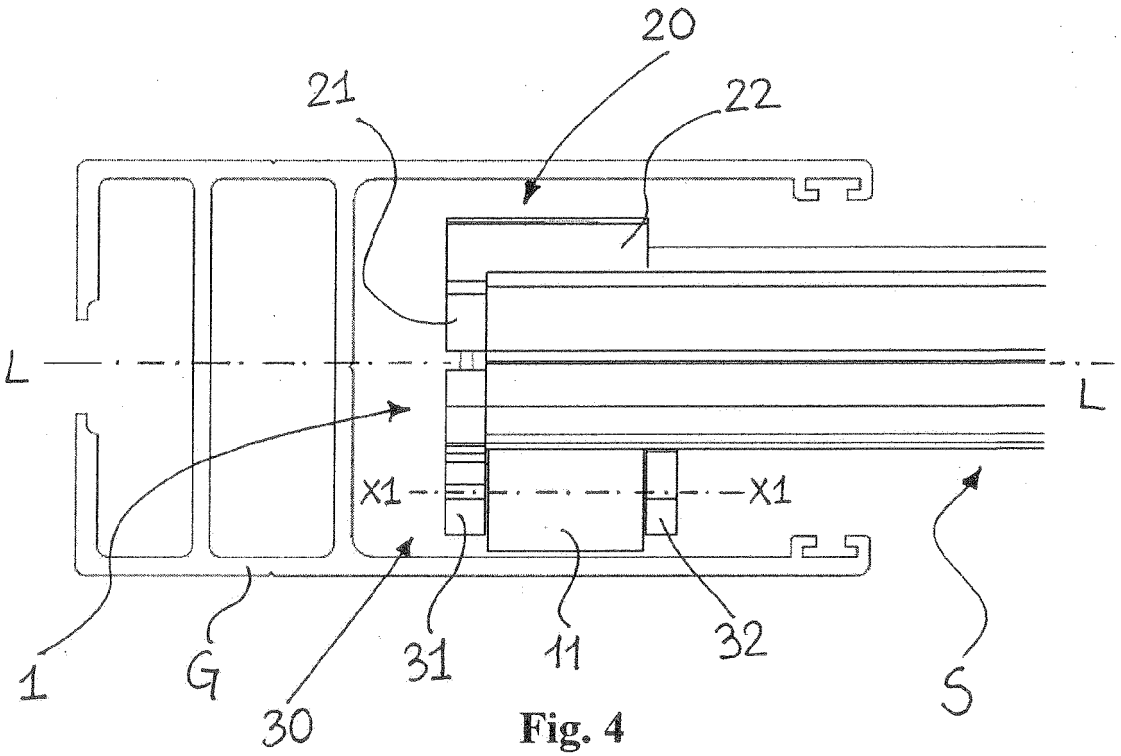

Fig. 4

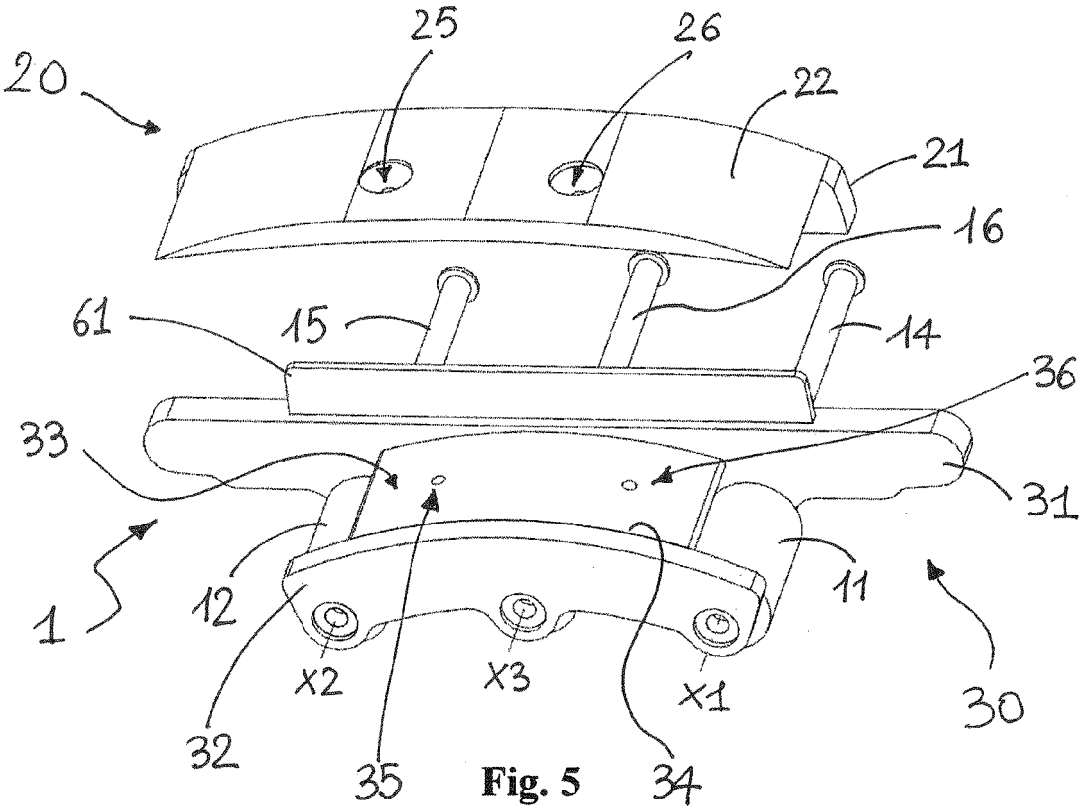
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Fig. 5

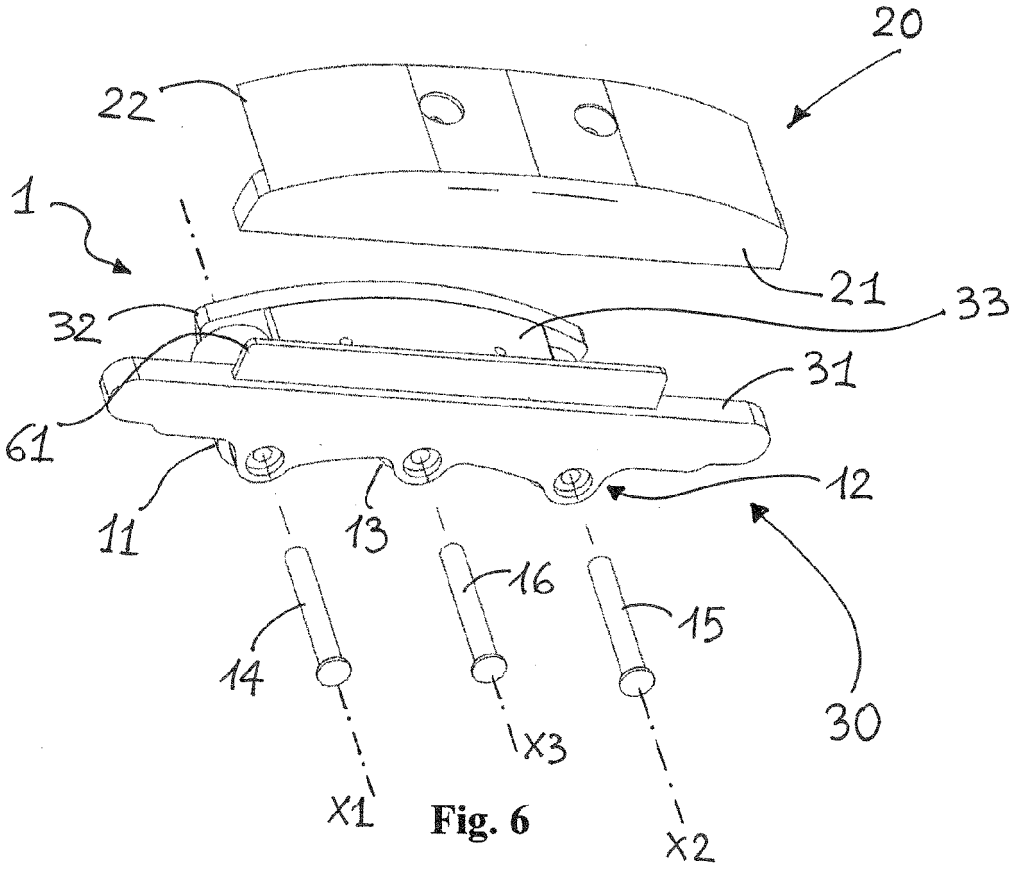
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Fig. 6

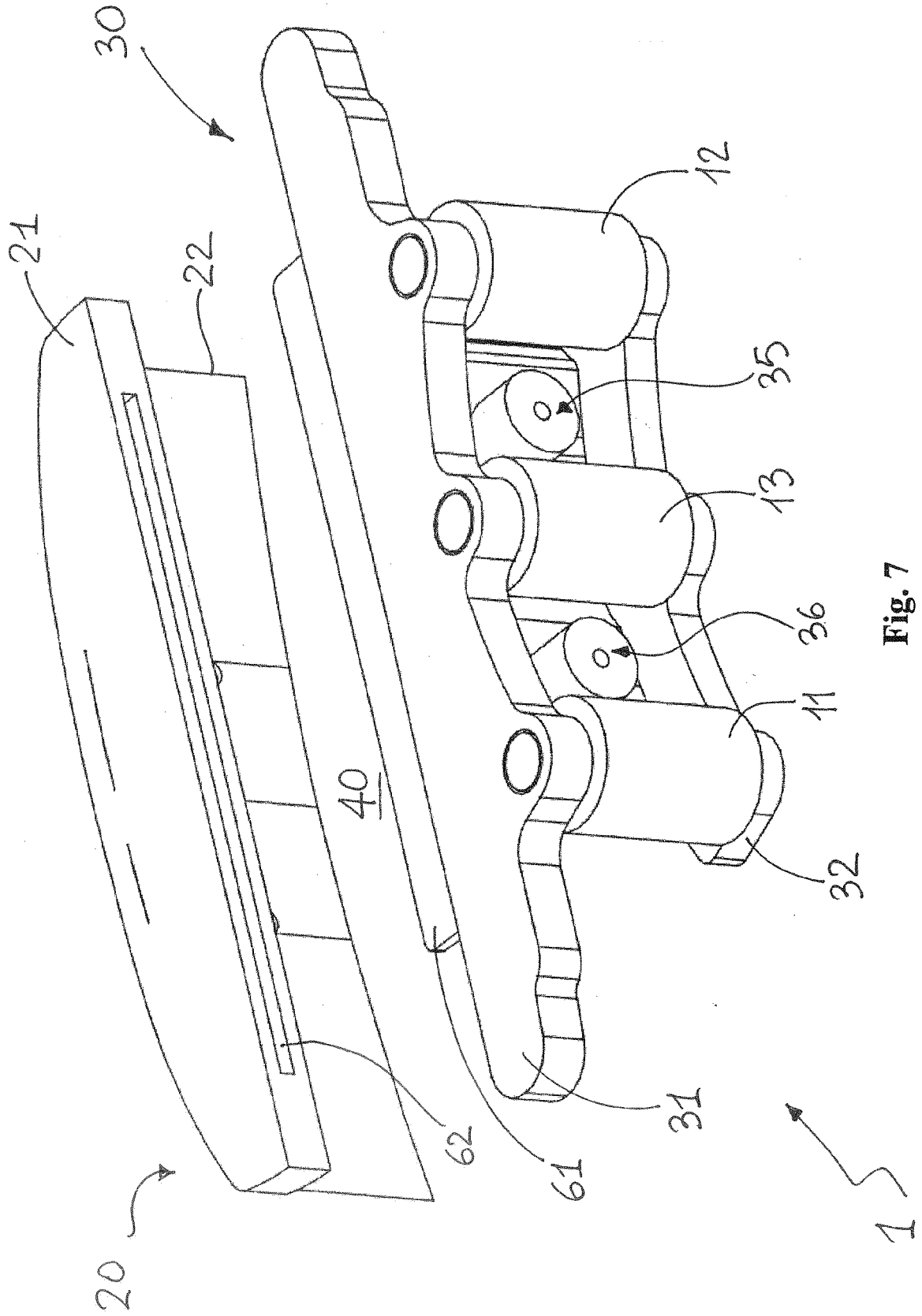

Fig. 7

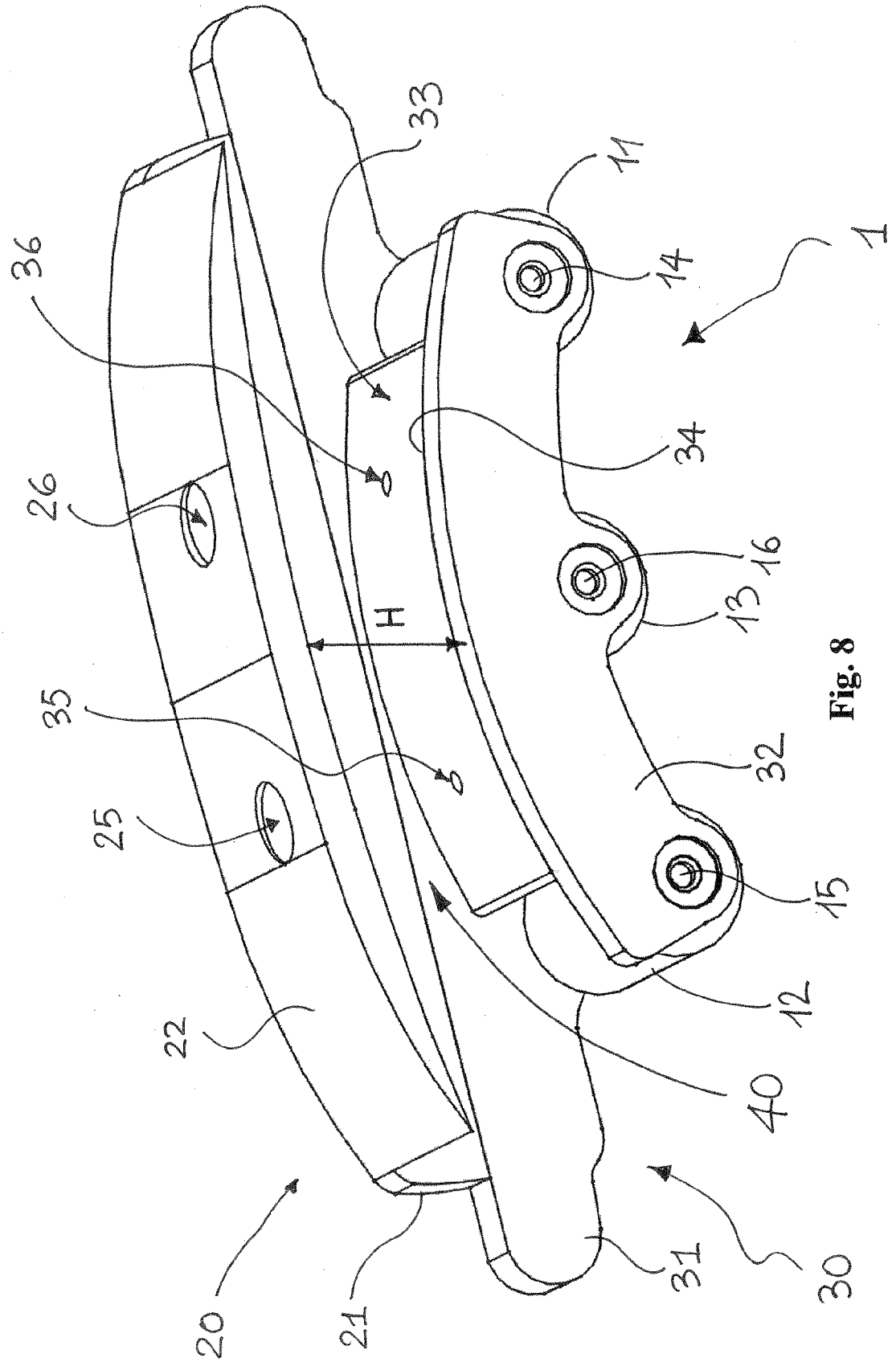

Fig. 8

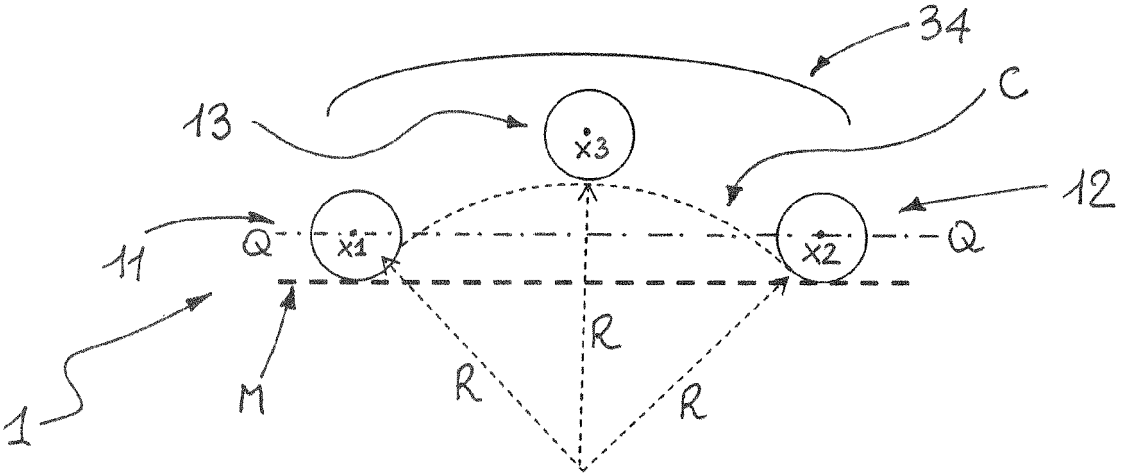

Fig. 11

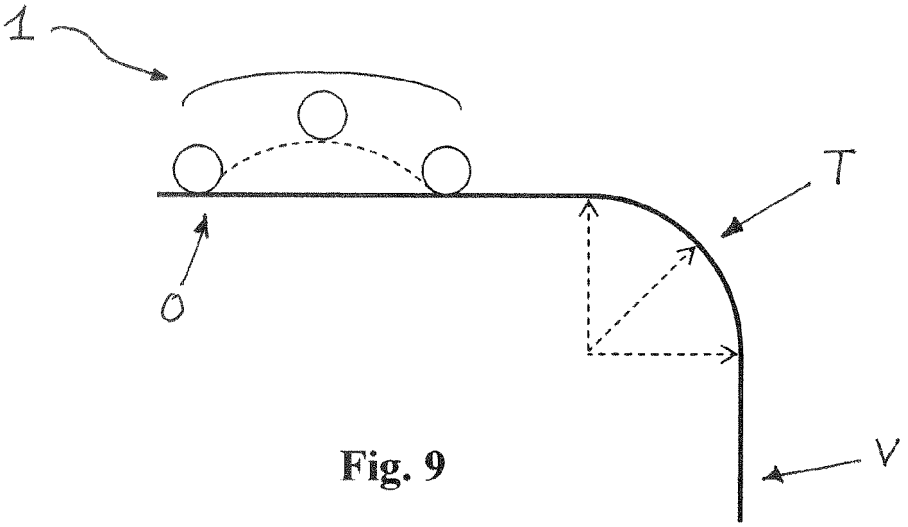

Fig. 9

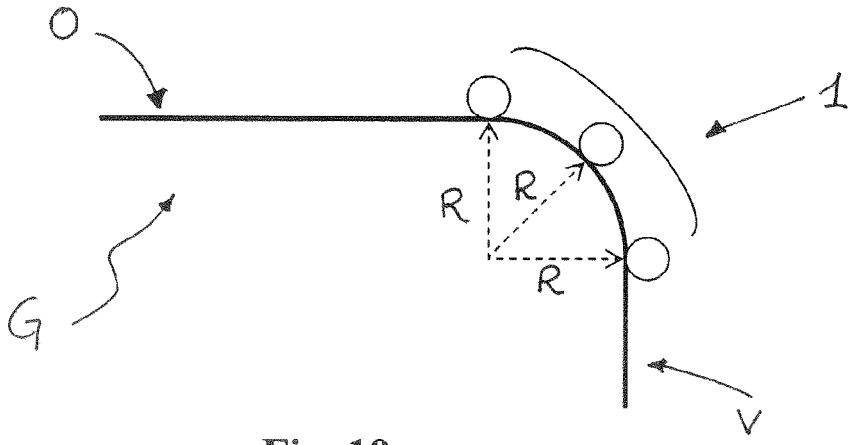

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 11 18 5473

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E06B
E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 April 2012	Tänzler, Ansgar

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