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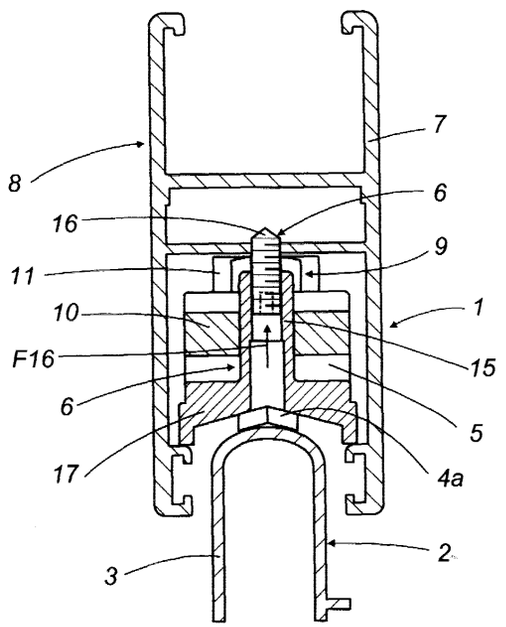
(54) A one-piece carriage for sliding door and window frames.

(57) A one piece carriage for sliding door and window frames (1) comprises a pair of wheels (4a, 4b), sliding on a fixed track (3), connected in such a way that they can turn idly, at the relative ends of a support body (5) which can be attached, using relative means (6), to a crosspiece (7) which is part of a mobile frame (8), and support means (9) for the mobile crosspiece (7) which also adjust the position of the mobile crosspiece (7) relative to the track (3), said means being made in the form of a single body on the support body (5) and designed to allow an adjusting oscillation of the mobile crosspiece (7) relative to the support body (5), in operation, according to the differences in the levels of the track (3) and the mobile crosspiece (7).

FIG. 2



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Description

[0001] The present invention relates to a rocker carriage for sliding door and window frames, in particular frames made of metal, wood or PVC sections.

[0002] The above-mentioned sliding door and window frames usually consist of an outer frame whose base (the portion which is the fixed crosspiece) is fitted with a longitudinal track. A pair (preferably) of wheels attached to the mobile crosspiece of the wing rest on this track.

[0003] In a simplified solution, the wheels are attached to a casing located close to each end of the wing, forming the box-shaped body of the carriage, which is attached to the internal part of the mobile crosspiece and, in the most simple solution, supports a single wheel. The height of the latter is adjustable, relative to the box-shaped body, to allow the adjustments during wing assembly needed to compensate for any differences in the levels of the crosspieces or play resulting from assembly.

[0004] A more complete solution, which facilitates compensation of the differences in the level of the track, uses carriages, each having a pair of wheels rotatably attached to a rocker arm. The rocker arm pivots on the casing and the casing is fitted with fixing means, such as a grub screw or a screw, located and operating between the casing and the mobile crosspiece. These allow connection of the carriage and the mobile crosspiece, creating a solution which is satisfactory both from the point of view of wheel alignment and improved distribution of the load supported.

[0005] Although the above solution allows more precise and continuous adjustment of the position of the carriage relative to the surfaces (the fixed and mobile crosspieces) on which it runs or rests, on the other hand it is expensive to build and assemble all of the carriage parts relative to the type of product and its use, and it involves high warehouse costs on account of the large number of components.

[0006] Another known type of rocker carriage is described in patent IT - 1.276.347 by the Applicant, in which the centre of a box-shaped body, to which the two wheels are attached, has a tapered central portion, extending perpendicular to a longitudinal axis of the carriage, by a bilateral and loose connection with a fork which is part of a T-shaped plate. The central tapered portion also has an upper surface, in contact with the horizontal portion of the T, with a concave profile, creating a virtual pivot between the plate and the box-shaped body which allows the latter to oscillate in such a way that it is adjusted relative to the plate, in operation, according to the differences in the levels of the sliding track and the mobile crosspiece of the sliding wing.

[0007] The carriage structured in this way further optimises adjustment of the flat surfaces on the frame, but also creates a disadvantage, given the need for an adjustment which is difficult, with the carriage mounted, due to the particular structure of the carriage and the presence of two elements - the box-shaped body and the "T" shaped plate, interacting to allow both the connection to the mobile crosspiece and the adjustment. In addition, this structure may wear with the passage of time (especially on door and window frames which are very large and heavy), since the forces involved during sliding tend to concentrate on the central point, that is to say, the virtual pivot of the carriage, making wing sliding jerky, partly due to incorrect maintenance of the window or door frame flat surface.

[0008] The aim of the present invention is, therefore, to overcome the above-mentioned disadvantage by providing a rocker carriage for sliding door and window frames which is compact and simply and rapidly assembled, with an adjustment system which is precise and constant over time.

[0009] These aims are fulfilled by a one piece carriage for sliding door and window frames which comprises a pair of wheels which run on a fixed track and are attached in such a way that they turn idly to the ends of a box-shaped support body. The body may be attached, with relative means, to a crosspiece which is part of a mobile frame, and support means for the mobile frame, and for adjusting the mobile frame relative to the track, made in the form of a single body on the support body and designed to allow an oscillating adjustment of the mobile crosspiece relative to the support body, in operation, according to the differences in the levels of the track and the mobile crosspiece.

[0010] The technical features of the present invention, in accordance with the above-mentioned aims, are set out in the claims herein and the advantages more clearly illustrated in the detailed description which follows, with reference to the accompanying drawings, which illustrate a preferred embodiment without limiting the scope of application, and in which:

- Figure 1 is a perspective view of a one piece carriage for sliding door and window frames, in accordance with the present invention;
- Figure 2 is a schematic front view with some parts in cross-section and some parts cut away to better illustrate others, of the carriage illustrated in Figure 1 applied to a sliding door or window frame;
- Figure 3 is a side view with some parts in cross-section, of the carriage illustrated in the previous figures;
- Figures 4 and 5 are, respectively, a perspective view and a front cross-section of a detail of the carriage illustrated in the previous figures;
- Figure 6 is a perspective view of an alternative embodiment of the rocker carriage according to the present invention;
- Figure 7 is a side view with some parts in cross-section and some parts cut away to better illustrate others, of the carriage illustrated in Figure 6;
- Figures 8 and 9 are, respectively, perspective and

side views of a detail of the carriage illustrated in Figures 6 and 7.

[0011] With reference to the accompanying drawings and in particular Figures 1 and 2, the carriage disclosed may be applied to sliding door or window frames, labelled 1 as a whole.

[0012] These sliding door or window frames 1 basically comprise a fixed frame 2, on which the lower portion which forms a fixed crosspiece is fitted with a longitudinal track 3. At least one pair of wheels 4a and 4b connected in such a way that they can turn idly to the ends of a box-shaped support body 5, slide on the track in a longitudinal sliding direction indicated by arrow S in Figures 1 and 3.

[0013] The support body 5 may be attached, using appropriate means 6, to a crosspiece 7 which is part of a mobile frame 8 (again see Figure 2).

[0014] In addition, the carriage comprises support means 9 for the mobile crosspiece 7, said means also being used to adjust the mobile crosspiece 7 relative to the track 3 and being made in the form of a single body on the support body 5. This allows oscillating adjustment between the mobile frame 7 and the support body 5, in operation, according to the differences in the levels of the track 3 and the mobile crosspiece 7.

[0015] This adjustment is also made possible by the means 6 which attach the support body 5 to the mobile crosspiece 7. These means are made on an end extension 10 of the support body 5, to prevent relative movements between the support body 5 and the mobile crosspiece 7 in the direction of sliding S, but allow a limited oscillation of the support body 5 relative to the connecting means 6, with constant contact of the mobile crosspiece 7 on the support means 9 irrespective of the levels of the track 3 and the mobile crosspiece 7. The oscillating movements are indicated in Figure 3 by the Y' and Y'' axes and, the oscillation of the support body 5 relative to the means 6 is indicated by Z' and Z''.

[0016] More specifically, as illustrated in Figures 1 and 3, the above-mentioned support and adjustment means 9 consist of an upper surface 11 of the support body 5 with an arced support profile for the mobile crosspiece 7 and for tilting between the latter and the support body 5 so as to form at least one contact zone Z with the mobile crosspiece 7, according to the differences in the levels of the track 3 and the mobile crosspiece 7.

[0017] Looking more closely at the construction details, the above-mentioned upper arced surface 11 comprises the central contact zone Z and two arced side zones Z1 and Z2, on either side of the central zone Z, connecting the latter to the support body 5.

[0018] The two side zones Z1 and Z2 have openings 12 and 13 forming an extension of seats for the wheels 4a and 4b on the support body 5.

[0019] Returning to the connecting means 6, these comprise the horizontal extension 10 of one end of the support body 5 with a through-seat 14 in which means 15 for connection to the mobile crosspiece 7 are loosely connected.

[0020] The connecting means 15 (see also Figures 4 and 5) comprise a tubular element 15 which is loosely held in the seat 14 and contains screw means 16 (a grub screw), designed to connect to the mobile crosspiece 7 (see Figure 2 and arrow F16) by making contact with it. In addition to this connection, the grub screw 16 is stably connected to the tubular element 15, by interference due to plastic deformation of the inner surface of the tubular element 15 (with an undercut 15r), so as to form a fixed pin which allows the minimal oscillation between the mobile crosspiece 7 and the support body 5.

[0021] To further stabilise this pin, the tubular element 15 has a lower support base 17, in a single body, with a lower profile 18 which matches the profile of the track 3.

[0022] Therefore, the carriage structured in this way is rapidly and easily fitted on the mobile crosspiece 7 using the grub screw 16 which connects the carriage to the mobile crosspiece and allows minimal oscillation, in operation, designed to allow automatic compensation of the differences in level between the mobile crosspiece 7 and the track 3, thanks to the central arced contact zone Z.

[0023] The weight of the mobile wing 8 on the carriage is discharged in the optimum manner by the arced configuration of the entire upper surface 11, meaning that the only element needed to connect the carriage to the mobile crosspiece 7 is the grub screw 16.

[0024] An alternative embodiment of the carriage described above is illustrated in Figures 6 to 9. In this embodiment the support body 5, which is more compact than the support body previously considered, loosely holds the means 6 for connection to the mobile crosspiece 7 in a central zone 20 of the support body 5.

[0025] In addition to this arrangement of the connecting means 6, the support body 5 comprises, in the same zone and on both sides of the connecting means 6, the above-mentioned support and adjustment means 9 for the mobile crosspiece 7. In this way, as on the carriage previously described, through direct interaction between the adjustment means 9 and the connecting means 6 close to the carriage centre of gravity, it is possible to obtain an adjusting oscillation between the mobile crosspiece 7 and the support body 5, in operation, according to the differences in the levels of the track 3 and the mobile crosspiece 7.

[0026] Again observing Figures 6 and 7, the connecting means 6 comprise a central through-opening or seat 20, made in the support body 5 and in which the means 21 for connecting the support body 5 to the mobile crosspiece 7 are loosely held.

[0027] This through-seat 20 consists of a pair of angled walls 23 made inside the support body 5, set opposite one another and separated by a distance sufficient to form the seat 20, at the carriage centre of gravity B, for the loose passage of the connecting means 21. The walls 23 also separate the means 6 and the wheels

4a and 4b.

[0028] Similarly to the first embodiment, the connecting means 21 comprise (see also Figures 8 and 9) a tubular element 24, loosely held in the central seat 20 of the support body and itself holding screw means 25 (a grub screw) designed for connection to the mobile crosspiece 7 and for connection, by interference due to plastic deformation, to the tubular element 24, thus allowing a minimal relative oscillation between the mobile crosspiece 7 and the support body 5 (see axes 50' and 50'' in Figure 7).

[0029] The tubular element 24 has a lower base 26, in the form of a single body, with a lower profile 27 which matches the profile of the track 3 and an arced upper profile 28.

[0030] The arced upper profile 28 is contained in a matching arced portion 29 on the support body 5, allowing the minimal oscillation of the tubular element 24.

[0031] To maintain the stable contact between the mobile crosspiece 7 and the support body 5, there are, as already indicated, support means 9 which comprise two upper surfaces 30 and 31 of the support body 5. These surfaces are separate and have an arced profile that extends by an amount at least equal to the diameter D of the tubular element 24. These arced profiles 30 and 31 are located on both sides of the tubular element 24, to allow constant contact between the mobile crosspiece 7 and the support body 5 in the event of the abovementioned relative minimal oscillation between the support body 5 and the mobile crosspiece 7 (see axes 51' and 51'' in Figure 7).

[0032] The latter embodiment may be used, for example, for small sliding door and window frames, and where there is a limited working space for assembly of the carriage.

[0033] Thus, the two embodiments described use a simple structure to fulfil the preset aims, partly thanks to a single element forming the carriage, which is rapidly fitted without the need for adjustments after fitting. Thanks to the connection established, by means of the oscillations allowed by the connection with the tubular element and the arced surface, the carriage can adjust to the differences in level between the track and the mobile carriage.

[0034] The invention described can be subject to numerous modifications and variations without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A carriage for sliding door and window frames (1) of the type comprising a fixed frame (2), on which the lower portion forming a fixed crosspiece is fitted with a longitudinal track (3), at least one pair of wheels (4a, 4b) running on the track and connected, in such a way that they can turn idly, to the ends of a support body (5) which may be attached, using appropriate means (6), to a crosspiece (7) which is part of a mobile frame (8), the carriage being **characterised in that** it comprises support means (9) for the mobile crosspiece (7), said means also being used to adjust the mobile crosspiece (7) relative to the track (3) and being made in the form of a single body on the support body (5) designed to allow oscillating adjustment between the mobile crosspiece (7) and the support body (5), in operation, according to the differences in the levels of the track (3) and the mobile crosspiece (7).

2. The carriage according to claim 1, **characterised in that** the means (6) for connecting the support body (5) to the mobile crosspiece (7) are made on at least one end extension (10) on the support body (5), preventing relative movements between the support body (5) and the mobile crosspiece (7) in the direction of sliding (S), but allowing a limited oscillation of the support body (5) relative to the connecting means (6), with constant contact of the mobile crosspiece (7) on the support means (9) irrespective of their levels.

3. The carriage according to claim 1, **characterised in that** the support and adjustment means (9) consist of an upper surface (11) of the support body (5) having an arced support profile for the mobile crosspiece (7) and for tilting between the mobile crosspiece (7) and the support body (5) so as to form at least one contact zone (Z) with the mobile crosspiece (7), according to the differences in the levels of the track (3) and the mobile crosspiece (7).

4. The carriage according to claim 3, **characterised in that** the upper arced surface (11) comprises the central contact zone (Z) and two arced side zones (Z1, Z2) on either side of the central zone (Z), connecting the latter to the support body (5) and having relative openings (12, 13) forming an extension of seats for the wheels (4a, 4b) on the support body (5).

5. The carriage according to claims 1 and 2, **characterised in that** the connecting means (6) comprise the horizontal extension (10) of one end of the support body (5), having a through-seat (14) in which means (15) for connection to the mobile crosspiece (7) are loosely connected.

6. The carriage according to claims 1, 2 and 5, **characterised in that** the connecting means (15) comprise a tubular element (15) which is loosely held in the seat (14) and holds screw means (16) designed to connect to the mobile crosspiece (7) and to connect, by interference due to plastic deformation, to

the tubular element (15), allowing said minimal oscillation between the mobile crosspiece (7) and the support body (5).

7. The carriage according to claims 5 and 6, **characterised in that** the tubular element (15) has a lower support base (17), in a single body, with a lower profile (18) which matches the profile of the track (3).

8. The carriage according to claim 1, **characterised in that** the support body (5) loosely holds the means (6) for connection to the mobile crosspiece (7) in a central zone (20) of the support body (5) and comprising in the same zone and on both sides of the connecting means (6), the support and adjustment means (9) for the mobile crosspiece (7), being designed, through interaction with the connecting means (6), to allow an adjusting oscillation between the mobile crosspiece (7) and the support body (5), in operation, according to the differences in the levels of the track (3) and the mobile crosspiece (7).

9. The carriage according to claim 8, **characterised in that** the connecting means (6) comprise a central through-opening or seat (20) in the support body (5), loosely holding the means (21) for connecting the carriage to the mobile crosspiece (7).

10. The carriage according to claim 9, **characterised in that** the through-seat (20) consists of a pair of walls (22, 23) made inside the support body (5), being set opposite one another and separated by a distance sufficient to form the central seat (20), at the carriage centre of gravity (B), for the loose passage of the connecting means (21).

11. The carriage according to claim 9, **characterised in that** the connecting means (21) comprise a tubular element (24) loosely held in the central seat (20) of the support body (5) and itself holding screw means (25) designed for connection to the mobile crosspiece (7) and for connection, by interference due to plastic deformation, to the tubular element (24), thus allowing a minimal relative oscillation between the mobile crosspiece (7) and the support body (5).

12. The carriage according to claims 8 and 11, **characterised in that** the tubular element (24) has a lower base (26), in the form of a single body, having a lower profile (27) which matches the profile of the track (3) and an arced upper profile (28) contained in a matching arced portion (29) on the support body (5), allowing oscillation of the tubular element (24).

13. The carriage according to claim 8, **characterised in that** the support means (9) comprise two upper surfaces (30, 31) of the support body (5), these surfaces being separate and having an arced profile that extends by an amount at least equal to the diameter (D) of a tubular element (24), being part of the connecting means (6), the arced profiles (30, 31) located on both sides of the tubular element (24), allowing constant contact between the mobile crosspiece (7) and the support body (5) in the event of relative minimal oscillation between the support body (5) and the mobile crosspiece (7).

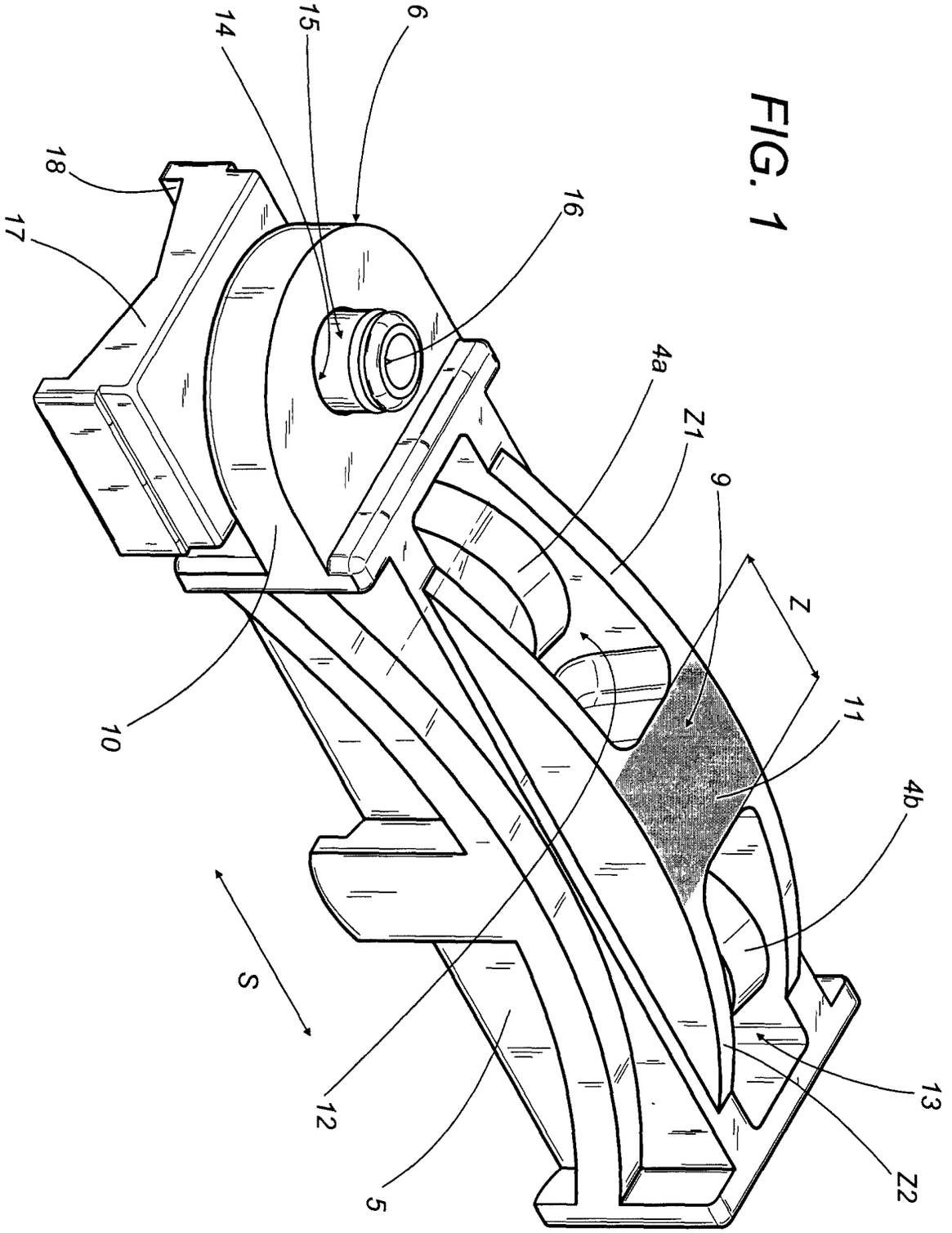

FIG. 1

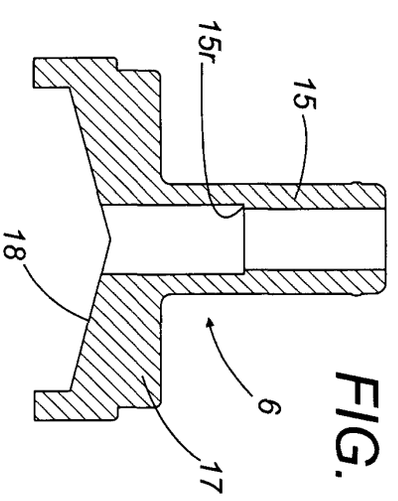

FIG. 5

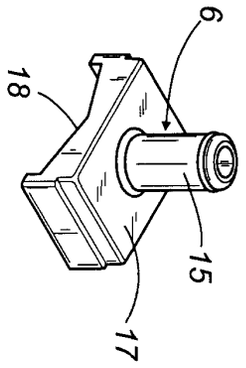

FIG. 4

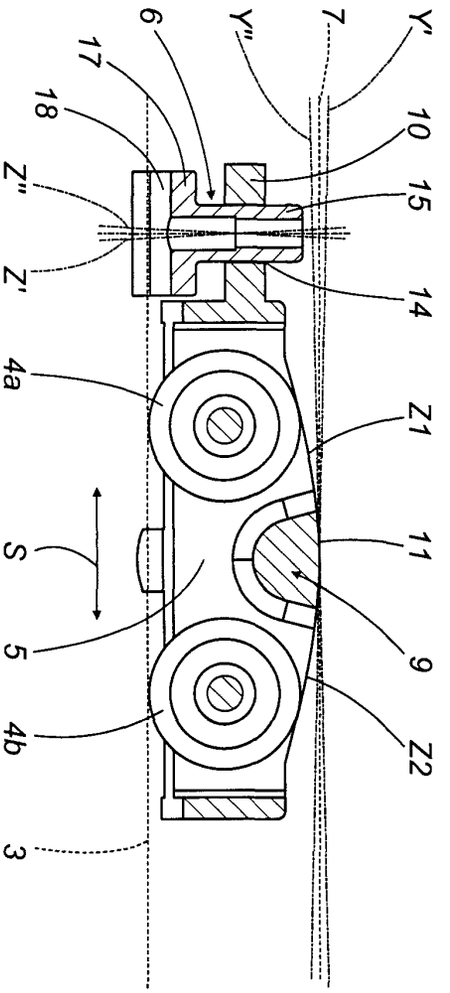

FIG. 3

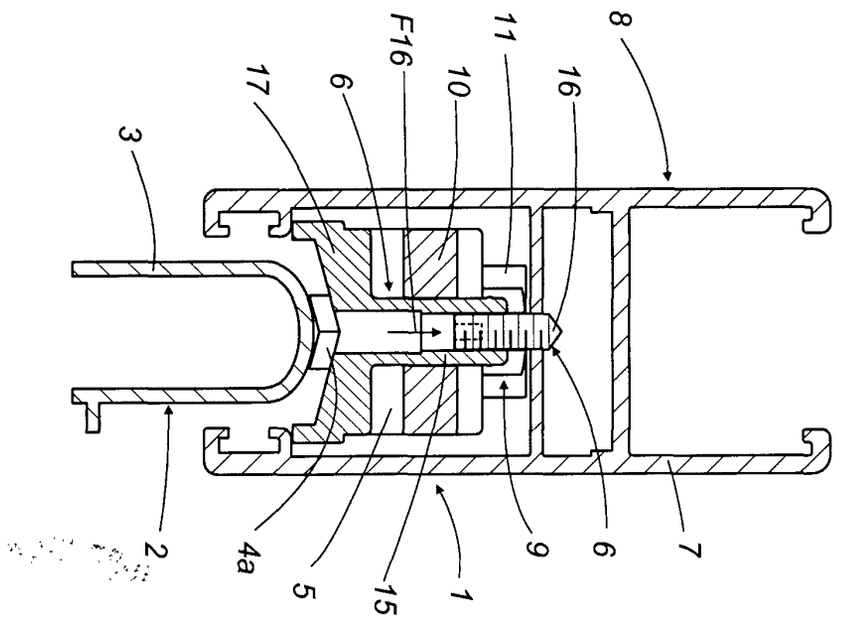

FIG. 2

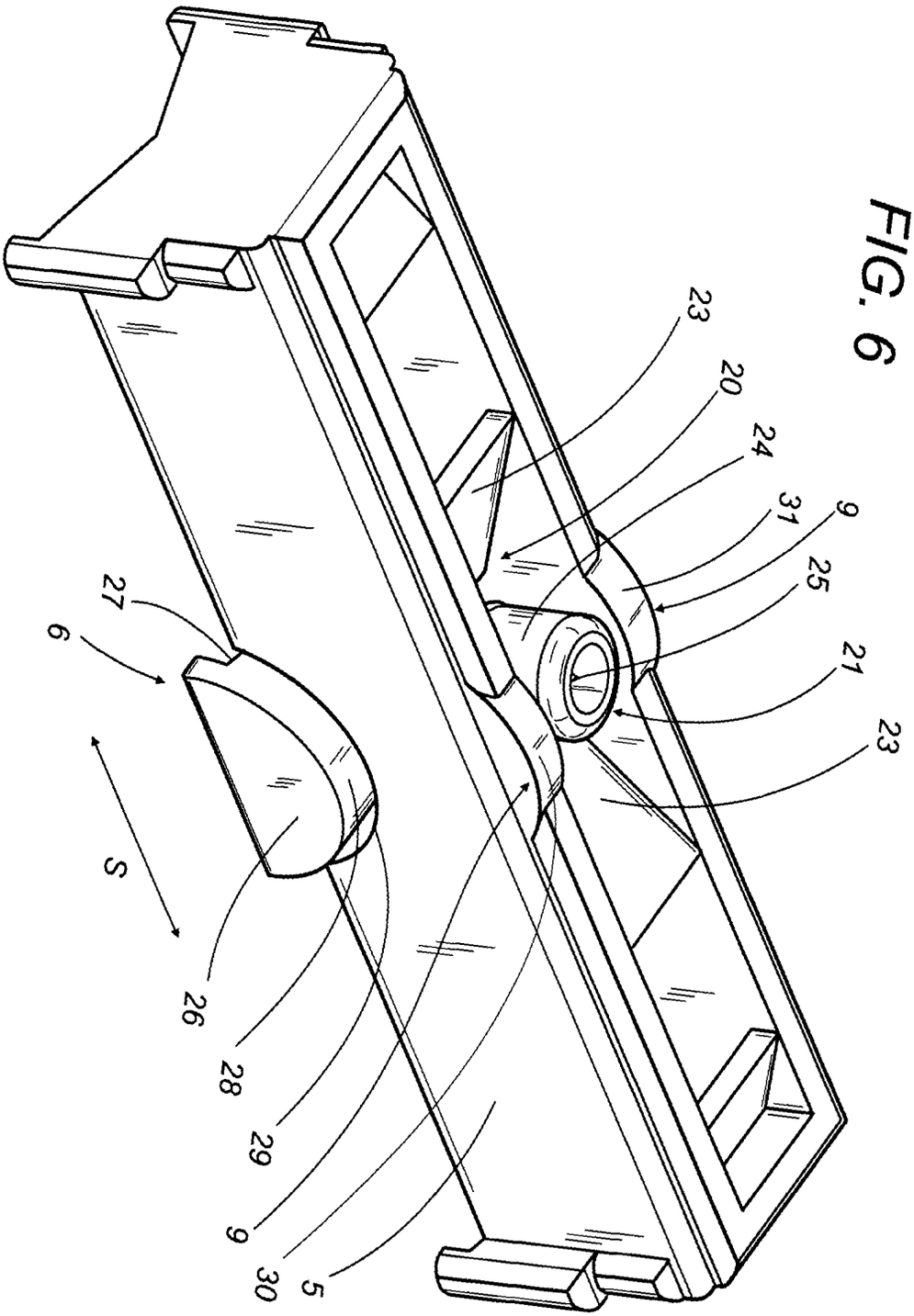

FIG. 6

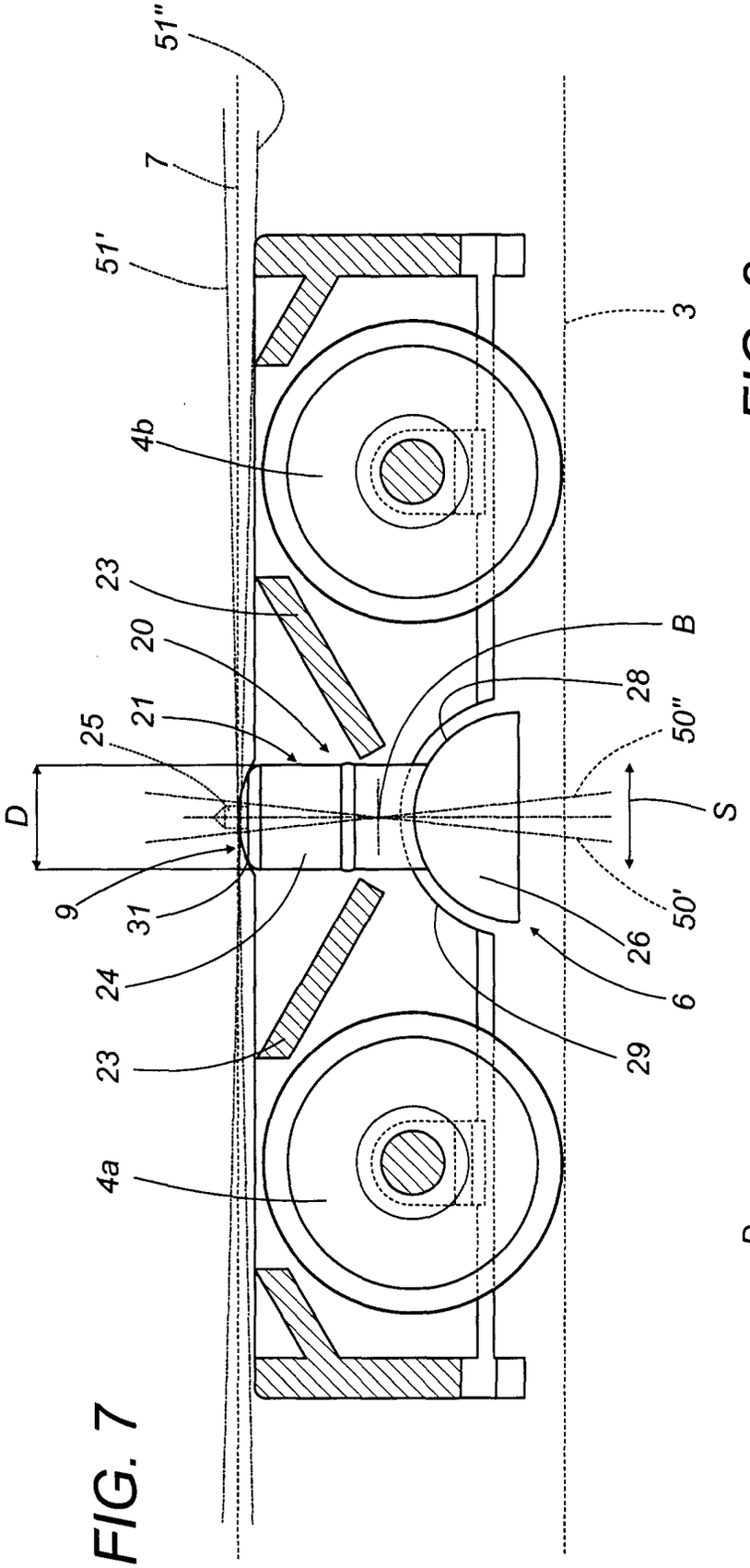

FIG. 7

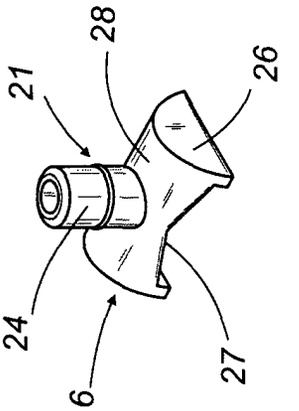

FIG. 8

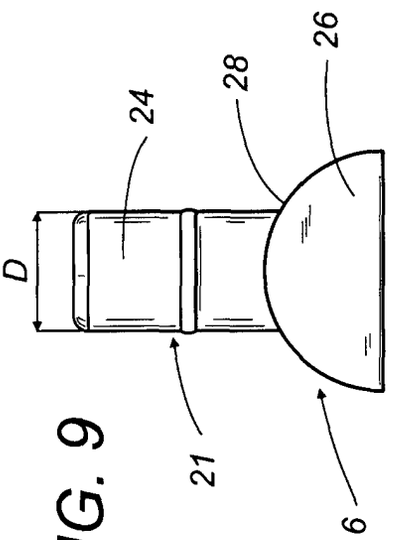

FIG. 9