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(54) **Porch roof**

(57) Improved shed which is mainly built of piles (2) and/or supporting elements on which are provided girders (3) carrying supporting posts (4,5) on which is pro-

vided a roofing sheet (6), characterised in that the far ends (8) of the girders (3) work in conjunction with spherical elements (7) provided on piles (2) and/or supporting elements or the like.

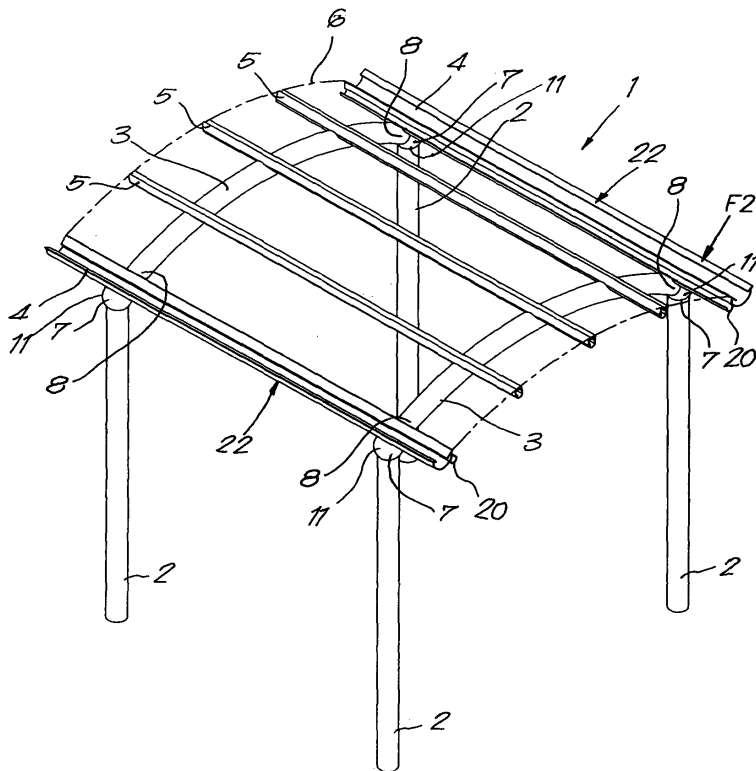


Fig. 1

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Description

[0001] The present invention concerns an improved shed, in particular a shed which can be used for example as a carport to place cars, bicycles or the like out of the rain.

[0002] The improved shed according to the invention can also be used as a pergola or as a basic structure for a veranda or the like.

[0003] The known carports are either built of beams or posts which are sawn to size during their construction, and which are joint by means of bolt and nut connections or by means of welded joints while the carport is being placed and built.

[0004] A disadvantage of the above-mentioned known carports is that the construction requires a lot of custom work and that a major part of the work must be done at the building site.

[0005] The beams that are used in the known carports may be made of wood, metal or plastic, and they may possibly be sawn beforehand in the workshop, but providing bolt holes for the bolt and nut connections or providing welded joints must always be done at the building site. It is known that working in the workshop is much more efficient than working at the building site, which is advantageous to the cost and quality.

[0006] The invention aims to provide an efficient remedy to the above-mentioned and other problems, and to that end, the improved shed according to the invention is mainly built of piles and/or supporting elements on which are provided girders carrying supporting posts on which is provided a roofing sheet, whereby the far ends of the girders work in conjunction with spherical elements provided on piles and/or supporting elements or the like.

[0007] A major advantage which is thus obtained, is that the girders can work in conjunction with the spherical elements according to different directions.

[0008] The girders can always be sawn at right angles to the axis, irrespective of the distance or the difference in level between the spherical elements on the piles or supports.

[0009] The spherical elements can be generally applied for sheds or carports in different sizes. The bridging is determined by the length of the girders.

[0010] According to a preferred embodiment, the girders are posts with a round cross section, such that the open far ends may be circular and a good connection with the spherical element can be obtained over the entire perimeter, irrespective of the direction of the girder.

[0011] Thus is obtained that the forces which the girders exert on the spherical elements are maximally distributed, such that point loads and ensuing local damages are avoided.

[0012] According to another preferred embodiment, the girders have a bent shape, such that the girders can rest on the spherical elements and such that the roof element of the shed and if need be of the carport obtains a bent shape.

[0013] The bent shape guarantees a natural drainage and allows for larger spans.

[0014] According to a special embodiment, the spherical element is provided with a bolt which is hinge-mounted to the spherical element and which is preferably always radially directed or whereby, in other words, the hinge point is situated in the centre point of the spherical element.

[0015] The advantage is that the spherical element can be connected to other structural elements at different angular deflections, if necessary with only one bolt and nut connection.

[0016] In order to better explain the characteristics of the invention, the following preferred embodiments of an improved shed according to the invention are given as an example only without being limitative in any way, with reference to the accompanying drawings in which:

figure 1 schematically represents a shed according to the invention in perspective;

figure 2 schematically represents the corner part as indicated by F2 in figure 1;

figure 3 represents a disassembled view of the corner part as represented in figure 2;

figure 4 is a section according to line IV-IV in figure 2;

figure 5 is a section according to line V-V in figure 4;

figure 6 represents a view as in figure 4, but in another position;

figure 7 represents a variant of the embodiment of the corner part as represented in figure 2;

figure 8 is a section as in figure 5, but for a variant of the embodiment.

[0017] The improved shed 1, as represented in figure 1, mainly consists of four piles 2 supporting a girder 3 two by two onto which cross supporting posts, in particular two external supporting posts 4 and three intermediate supporting posts 5 are provided which in turn carry a roofing sheet 6.

[0018] On every pile 2 is provided a spherical element 7, and the girders 3 consist here of bent tubular sections with a round cross section which rest on the spherical elements 7 with their open far ends 8.

[0019] Figures 2 up to 6 illustrate how the girders 3 are fixed to the spherical elements 7. The circular far end 8 of a girder 3 rests on a spherical element 7, and every girder 3 is provided near the far end 8 of a recess 9 in which an external supporting post 4 can be provided partly countersunk.

[0020] Every spherical element 7 is made of a tube, round in this case, with a spherical head 11. Every spherical element 7 is further provided with a bolt 12 which is provided with an eye 13 to that end on one far end through which has been provided a shaft 14, which shaft 14 goes through the centre point of the spherical head 11 of the spherical element 1.

[0021] The shaft 14 is bearing-mounted in particular with its far ends 15 in two protrusions 16 with a downward

directed shell-shaped recess 17, which protrusions are provided in the tube 10, diagonally opposed to the centre point of the spherical head 11.

[0022] The spherical head 11 is further provided with a groove-shaped recess 18, across the shaft 14 and in this case on one side of the centre line of the tube 10, so as to obtain that the bolt 12 which reaches past the spherical head 11 can rotate over a wider angle around the shaft 14.

[0023] The part of the tube 10 which is not covered by the spherical head 11 forms a cylindrical protrusion 19, whose outer diameter is appropriately smaller than the inner diameter of the piles 2 which are made hollow in this case.

[0024] The shape of a recess 9 in the girder 3 mainly corresponds to the section of the semicircular bearing surface 20 of an external supporting element 4 with the girder 3.

[0025] The girder 3 is in this case provided with a recess 9 near each of the open far ends 3 of the girder 3, and with three recesses 9 situated in between.

[0026] The recesses 9 in the girder 3 near the open far ends 8 are moreover provided with a notch 21 on the side of the open far end 8 concerned.

[0027] The external supporting posts 4 have, apart from the duct-shaped bearing surface 20 with a semicircular section, a duct-shaped gutter 22, whereby the two free far ends 23 of the shell are provided with flat sheet parts 24 which slope in the above-mentioned gutter 22.

[0028] Finally, the external supporting posts 4 are also provided with feed-through apertures 25 at the bearing surfaces 20.

[0029] The intermediate supporting posts 5 are built as posts and have a bearing surface 20 on one side whose shape and dimensions correspond entirely to the bearing surfaces 20 of the external supporting posts 4 in this case.

[0030] All the above-mentioned posts 4 and 5, the girders 3 and the spherical elements 7 are made of aluminium in this embodiment, but of course they can also be made of wood, plastic or another metal.

[0031] The use and assembly of the shed 1 according to the invention is simple and may be for example as follows.

[0032] The four piles 2 are provided on the base, either or not with foundations, of course with the necessary attention being paid to the mutual distance between the piles 2.

[0033] The four spherical elements 7 are placed on the piles 2 by leading the respective cylindrical protrusions 19 in the hollow piles 2, and with the groove-shaped recesses 18 directed towards one another in pairs.

[0034] Next, each of the spherical elements 7 is provided with a bolt 12, in particular by each time leading a shaft 14 through the eye 13 of the bolt 12 concerned and by then putting the shaft 14 behind the shell-shaped recesses 17 in the protrusions 16.

[0035] Next, the girders 3 are provided, in particular with their open far ends 8 against the spherical elements 7. The free far end of the bolt 12 is hereby led through the open far end 8 and through the recess 9.

[0036] The notch 21 makes it possible to apply girders 3 with a large curvature radius, in particular as the notch 21 enlarges the recess 9 and thus the passage for the bolt 12.

[0037] The girders 3 are preferably sawn crosswise to the axis, which considerably simplifies the elaboration of a shed 1 according to the invention.

[0038] By now also applying the external supporting posts 4 and by putting them with their bearing surfaces 20 in the recess 9, and by simultaneously guiding the bolts 12 through the opening in the bearing surface 20, the whole can be fixed by applying a nut 26. The openings 25 may possibly be provided in the external supporting posts 4 at the building site during the construction.

[0039] Indeed, the external supporting post 4 is drawn towards the spherical element 7, and the girder 3 situated in between is thus squeezed against the spherical element 7.

[0040] The open far end 8 of the girder 3 is in this case circular and consequently connects well to the spherical element 7, irrespective of the direction of the girder 3.

[0041] This operation must be repeated with the four spherical elements 7.

[0042] The intermediate supporting posts 5 are then placed in an appropriate manner in the intermediate recesses 9 in the girders 3, and subsequently the roofing sheet 6 can be fixed to the supporting posts 4 and 5.

[0043] At the external supporting posts 4, the roofing sheet 6 is connected to the flat, aligned sheet part 24. Thus is obtained that drained rain water is led directly into the gutter 22.

[0044] The other flat sheet part 24 can be used, if necessary, with a shed 1 with connecting roofing sheets 6.

[0045] The roofing sheet 6 is in this case made of transparent and flexible polycarbonate, but it can also be made of coloured polycarbonate or another plastic such as for example PVC or polyester, or even glass, metal such as sheet steel, or wood or another appropriate material.

[0046] The curvature of the girders 3 determines what shape the roofing sheet 6 will acquire. It is clear that the roofing sheet 6 may be built of several partial sheets.

[0047] Figure 7 illustrates an alternative embodiment of a spherical element 7 on which are provided two girders 3 in this case.

[0048] The spherical element 7 concerned differs from the above-described spherical element 7 in that the groove-shaped recess 18 is provided on either side of the spherical element 7, such that the two bolts 12, which reach past the spherical element 7 here as well, can be directed at a different angular position in this case.

[0049] Here as well, the bolts 12 are hinge-mounted around a shaft 14 which leads through the centre point of the spherical head 11. As a result, the bolts 12 are always radially directed, and this is advantageous in that

the spherical elements 7 can be used for girders 3 with varying curvature radiuses, for different bridges or for different heights of the shed 1.

[0050] The girders 3 are connected to the spherical element 7 in an entirely similar manner by means of a bolt and nut connection, but while making use of the intermediate supporting posts 5.

[0051] The installation differs from the above-described embodiment in that two bolts 12 are provided around the same shaft 14, and in that two girders 3 are provided, in the same plane but at an opposite side of the spherical element 1.

[0052] It is clear that the above-described connection to a spherical element 7 is special and offers several advantages.

[0053] Apart from the above-mentioned flexibility of the spherical element 7 and the fact that it can be generally applied, the use of the spherical element 7, combined with the round tubes as girders 3, offers the advantage that the girders 3 can always be sawn crosswise.

[0054] Thus is obtained a round, open far end 8 which can work perfectly in conjunction with the spherical head 11 of the spherical element 7, whereby a connection along the entire perimeter of the spherical element 7 is obtained, irrespective of the direction of the girder 3.

[0055] The forces exerted on the spherical elements 7 by the girders 3 are maximally distributed, such that point loads and ensuing local damages are avoided.

[0056] The advantage of the specific bolt and nut connection is that it does not restrict the flexibility and general usefulness of the spherical elements 7 in combination with the girders 3 in the shape of round tubes.

[0057] Indeed, as the bolt 12 is hinge-mounted around a shaft 14 leading through the centre point of the spherical head 11, the bolt 12 will always take on a radial direction, such that the direction of the girder 3 has no influence whatsoever on the fastening thereof.

[0058] This degree of freedom offers the advantage that the spherical elements 7 with the above-mentioned bolts 12 can be generally applied, irrespective of the span of the shed 1, and irrespective of the curvature radius of the girders 3.

[0059] It is clear that the use of the above-described specific bolt and nut connection allows for a simple assembly, as only one bolt and nut per angular point are sufficient.

[0060] Moreover, since no welded joints must be provided on the building site, the entire shed 1 according to the invention can be made of aluminium, which makes the construction light and corrosion-resistant.

[0061] Moreover, the connection is aesthetic and safe, since the bolt head as well as the nut 26 are provided in a concealed manner.

[0062] For larger constructions, a longer shaft 14 can be provided which can be inserted via a feed-through opening in the side wall of the spherical element 7, as represented in figure 8.

[0063] To this end, the spherical element 7 is provided

with a bore in the surface across the cylindrical protrusion 19, across the groove-shaped recesses 13 and through the centre point of the spherical element 7.

[0064] The bore reaches as of the wall of the spherical element 7 into the part of the spherical element 7 which is situated diagonally opposed to the latter, and preferably up to a distance from the outer wall there.

[0065] In such an embodiment, the protrusions 16 with the downward directed shell-shaped recesses 17 must not be provided.

[0066] After the shaft 14 has been applied, whereby during the assembly, the shaft 14 is led through the eye 13 of the bolt 12 concerned, the feed-through opening can be sealed. This will preferably be done before the painting takes place, such that the sealing is painted as well.

[0067] It is clear that a shed 1 according to the invention, or at least parts thereof, can also be made of plastic, wood or another metal. It is also clear that the piles 2 can be replaced by other supporting elements, for example supports which can be fixed against an adjacent construction, such as a wall or the like.

[0068] The spherical elements 7 can in this case be provided on the above-mentioned supports, and the further construction is entirely similar.

[0069] It is also clear that the spherical elements 7 may bear different girders 3 which are not necessarily situated in a single plane.

[0070] The girders 3 must not necessarily have the shape as represented, but they may consist for example of straight posts or posts having a bent shape.

[0071] Besides, the girders 3 must not necessarily lead from one spherical element 7 to another spherical element 7, but they may be connected to a support, for example with one far end, in another manner as well, for example a sliding support so as to prevent tensions.

[0072] The number of girders 3 and/or supporting posts 4 or 5 used is not restrictive, and it is clear that many combinations of the components are possible.

[0073] It is clear that the section of the bearing surface 20 must not necessarily be semi-circular or must not necessarily define the segment of a circle, but such an embodiment offers the advantage that the supporting posts 4 or 5 can be placed in the girders 3 according to different directions.

[0074] The present invention is by no means limited to the embodiments given as an example and represented in the figures; on the contrary, such an improved shed can be made according to different variants while still remaining within the scope of the invention.

Claims

1. Improved shed which is mainly built of piles (2) and/or supporting elements on which are provided girders (3) carrying supporting posts (4,5) on which is provided a roofing sheet (6), **characterised in that** the

far ends (8) of the girders (3) work in conjunction with spherical elements (7) provided on piles (2) and/or supporting elements or the like.

2. Improved shed according to claim 1, **characterised in that** the girders (3) are posts having a round cross section. 5
3. Improved shed according to claim 1 or 2, **characterised in that** the girders (3) are bent. 10
4. Improved shed according to claim 1, **characterised in that** the girders (3) are provided with a recess near their far ends (8) in which the supporting posts (4,5) can at least partially be held. 15
5. Improved shed according to claim 4, **characterised in that** a supporting post (4,5) has a bearing surface (20) whose cross section represents the segment of a circle, and **in that** the girders (3) are provided with a recess (9) at least near their far ends (8), whose shape corresponds to the section of the above-mentioned bearing surface (20) with the girder (3). 20
6. Improved shed according to claim 4, **characterised in that** the recesses (9) in the girder (3) near the open far ends (8) on the side of the open far end (8) concerned are provided with a notch (21). 25
7. Improved shed according to claim 1, **characterised in that** a spherical element (7) is provided with at least one bolt (12) . 30
8. Improved shed according to claim 7, **characterised in that** a bolt (12) is hinge-mounted to the spherical element (7). 35
9. Improved shed according to claim 1, **characterised in that** the spherical element (7) is built of a tube (10) with a spherical head (11). 40
10. Improved shed according to claims 8 and 9, **characterised in that** the bolt (12) is provided with an eye (13) at one far end through which is provided a shaft (14), which shaft (14) leads through the centre point of the spherical head (11) of the spherical element (7). 45
11. Improved shed according to claim 10, **characterised in that** the shaft (14) with its far ends (15) is bearing-mounted in two protrusions (16) having a shell-shaped recess (17) which are provided in the tube (10) and diagonally opposed to the centre point of the spherical head (11). 50
12. Improved shed according to any of the preceding claims, **characterised in that** the spherical element (7) is provided with a groove-shaped recess (18) 55

crosswise to the shaft (14), in order to obtain that the bolt (12), which reaches past the spherical head (11), can rotate over a wider angle around the shaft (14).

13. Improved shed according to claim 1, **characterised in that** the external supporting posts (4) are provided with a gutter (22).
14. Improved shed according to claim 1, **characterised in that** the gutter (22) is provided with sheet parts (24) which slope in the above-mentioned gutter (22) in a slanting manner.

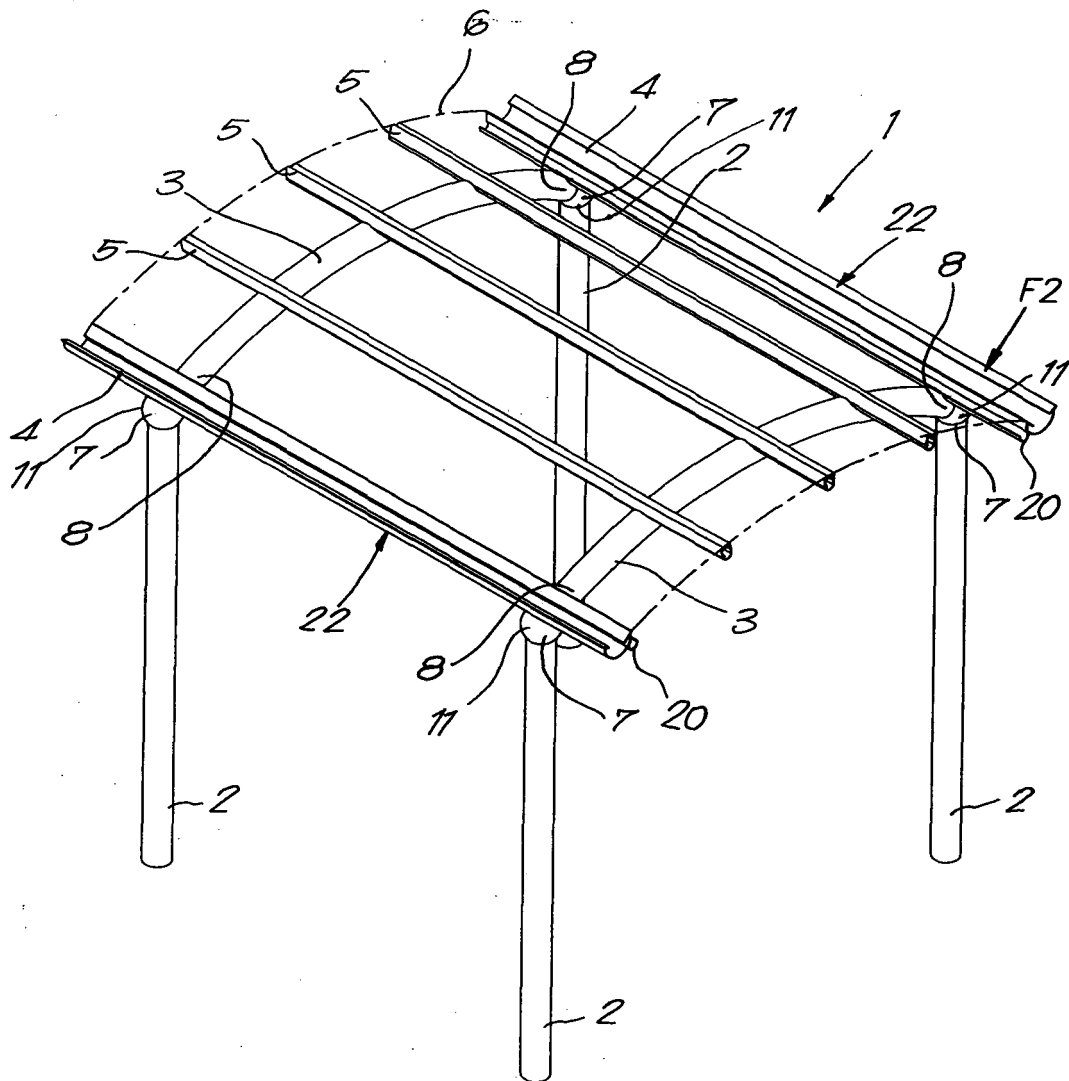
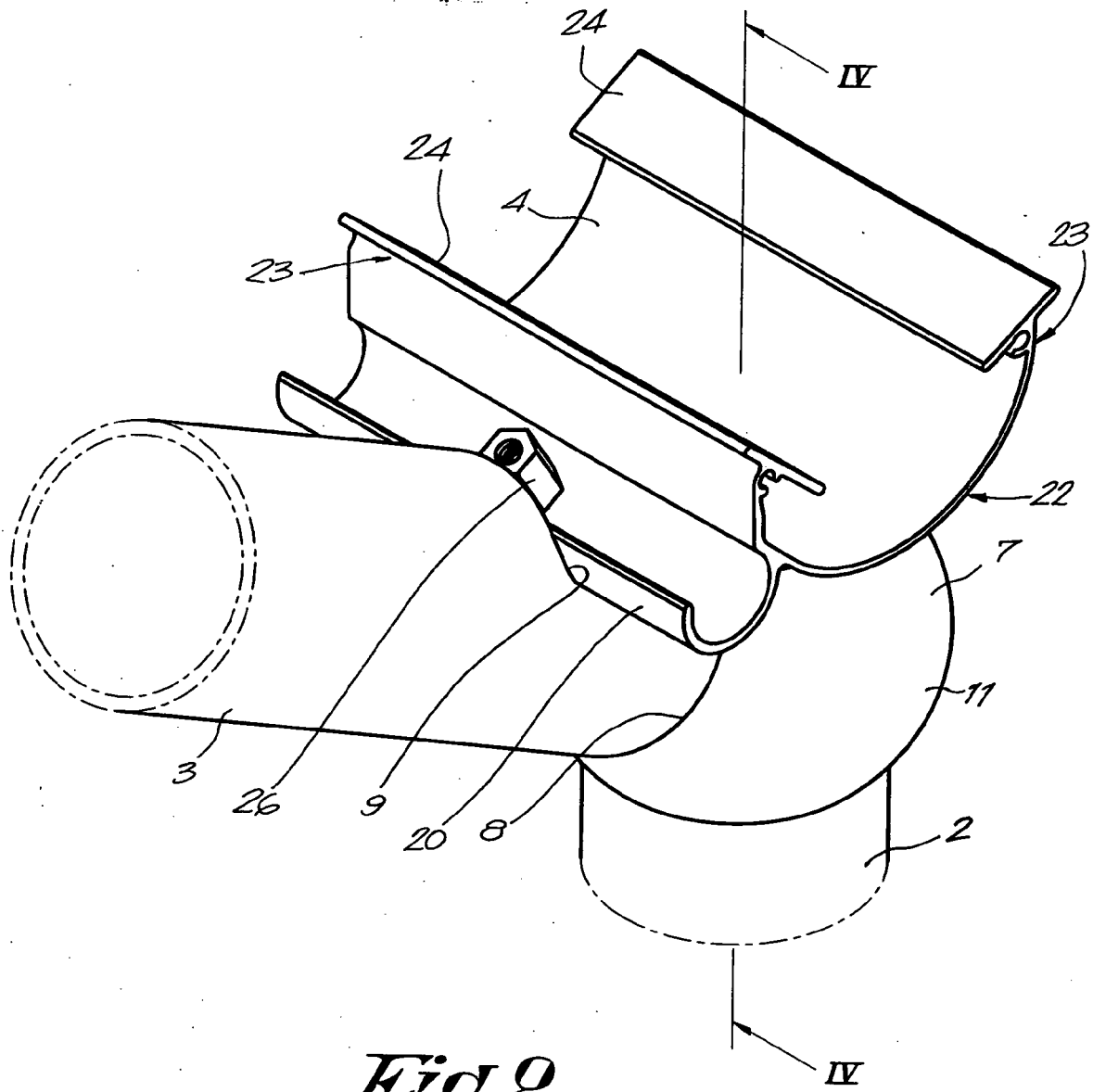


Fig. 1



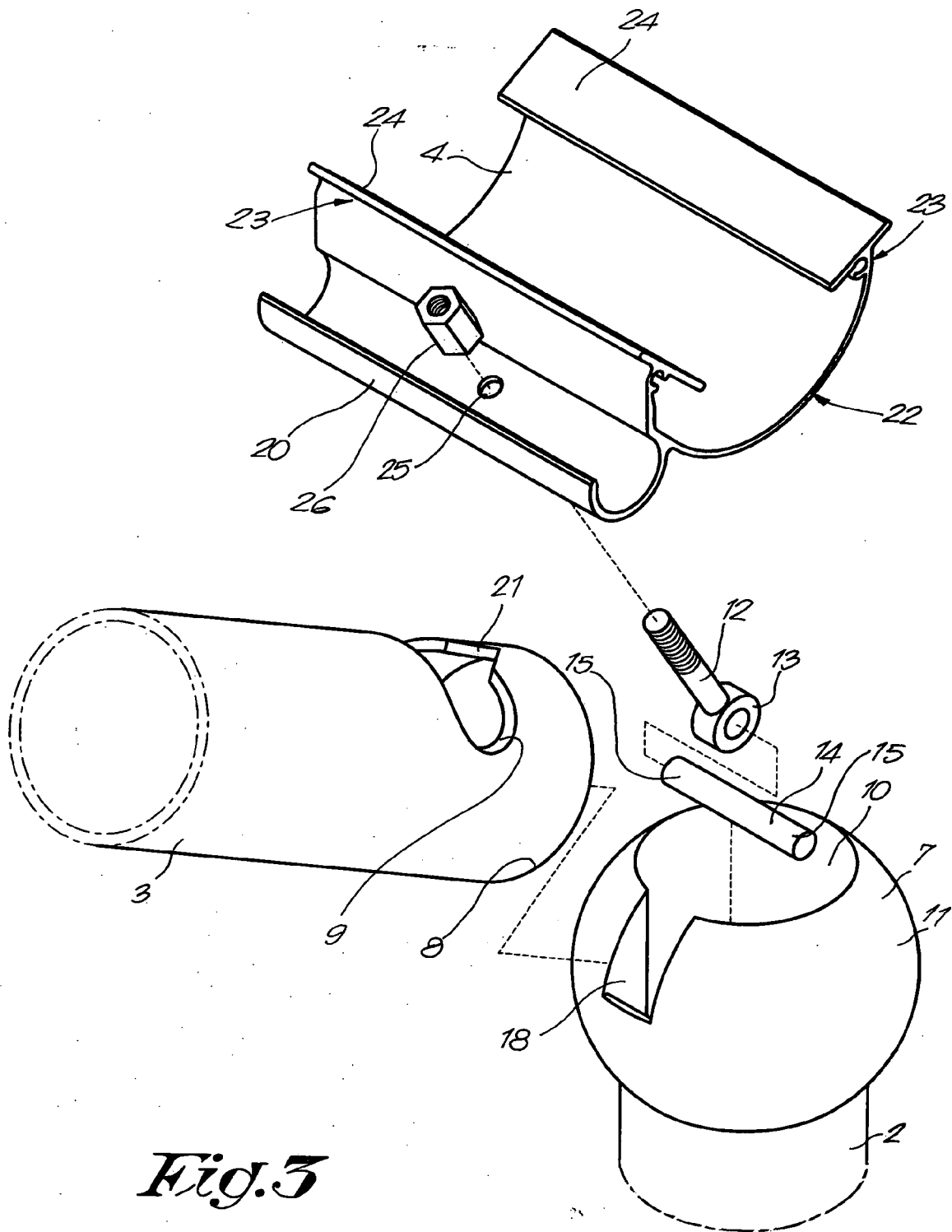


Fig.3

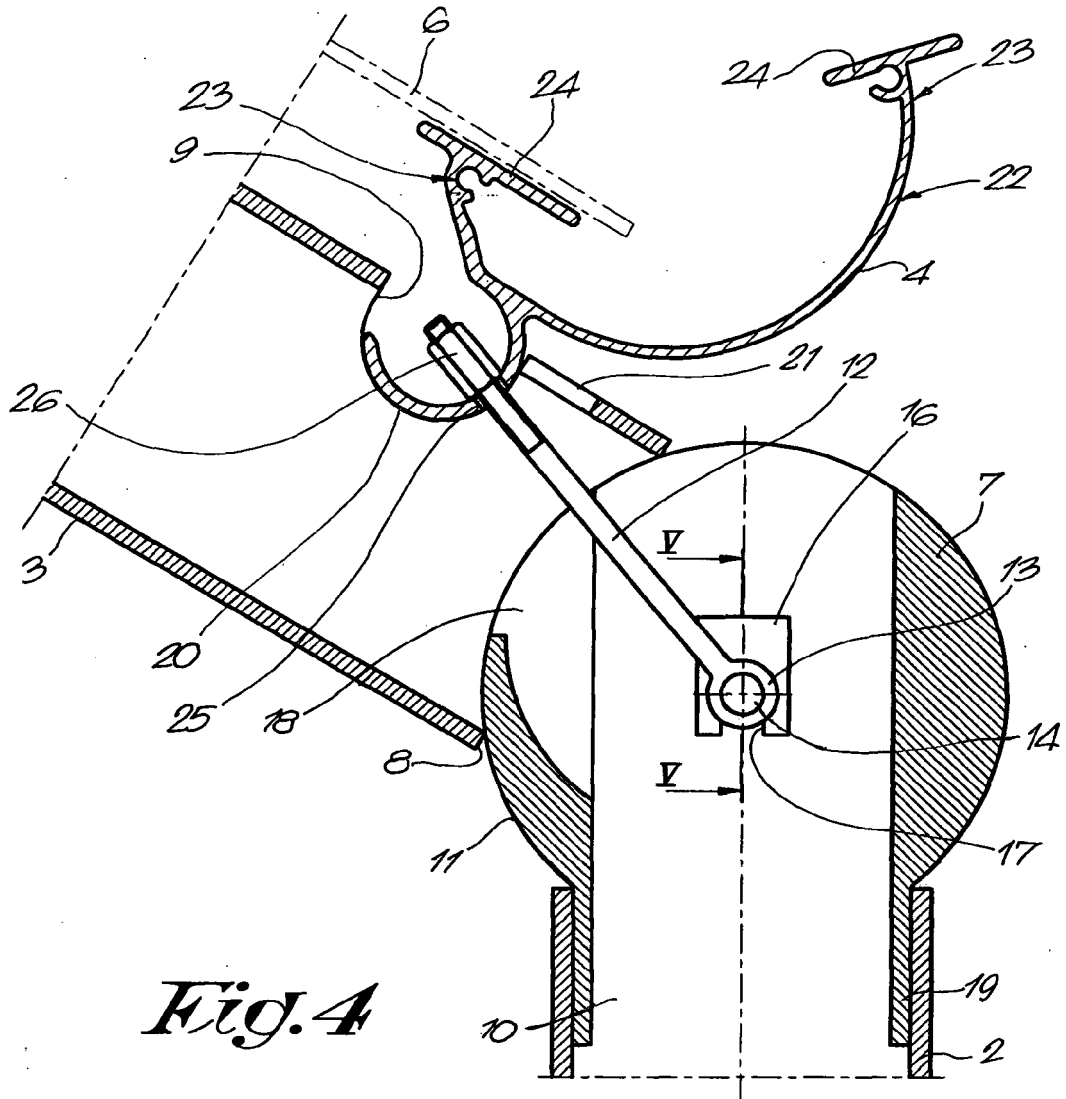


Fig. 4

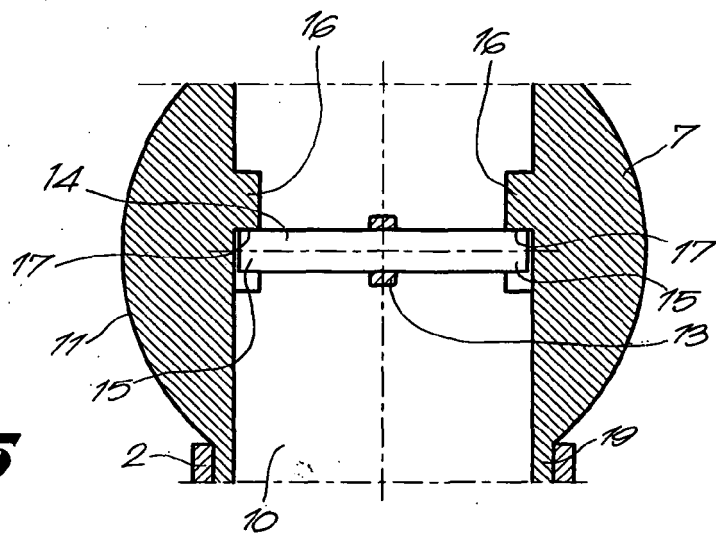
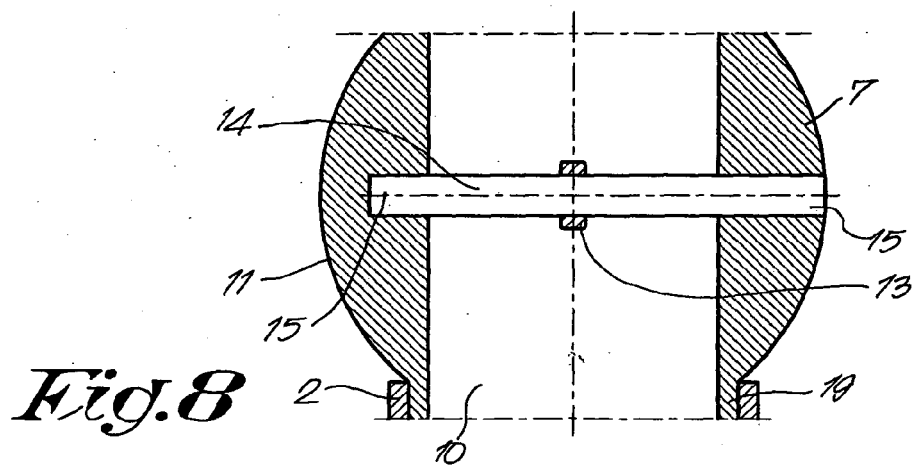
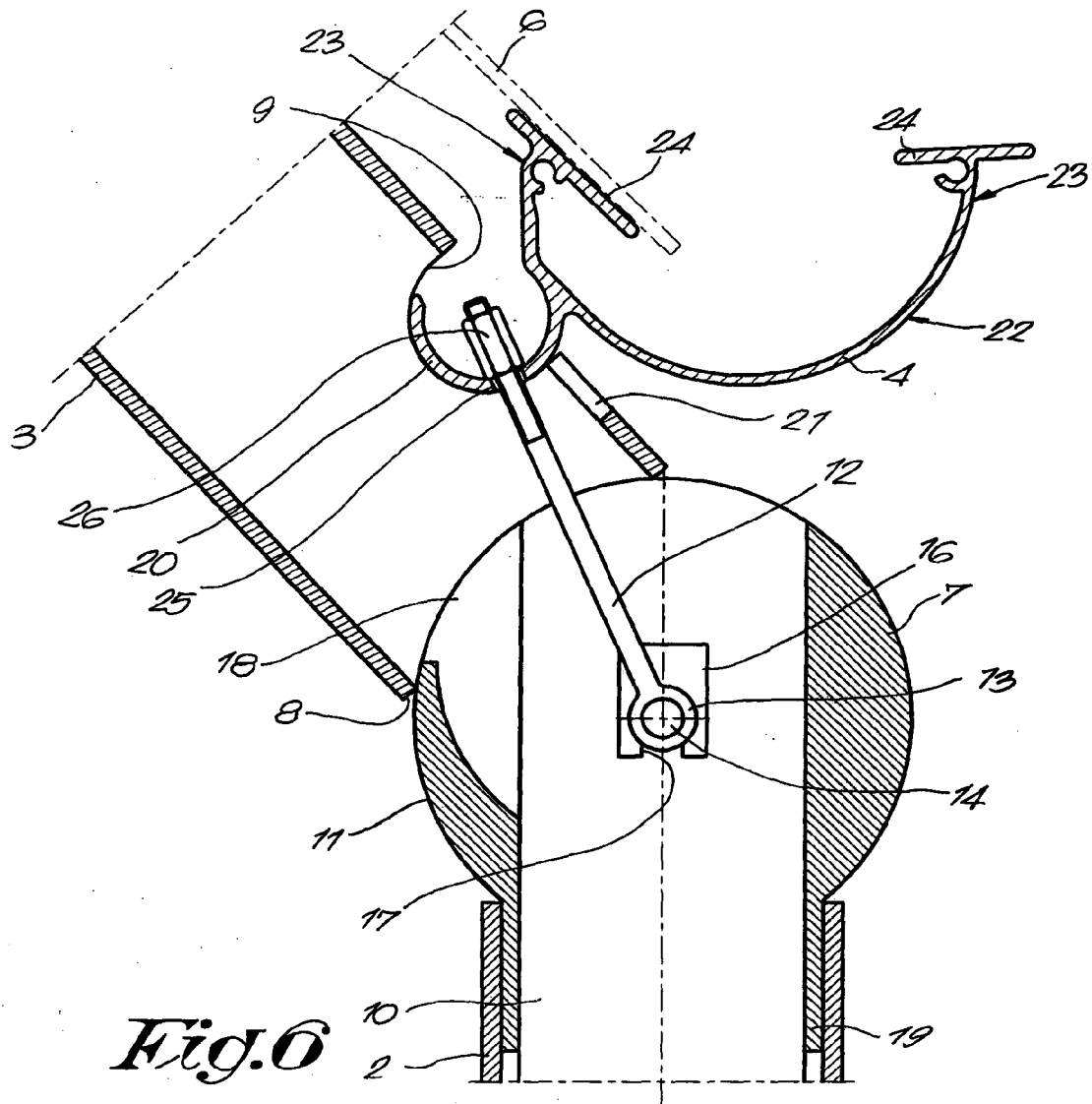


Fig. 5



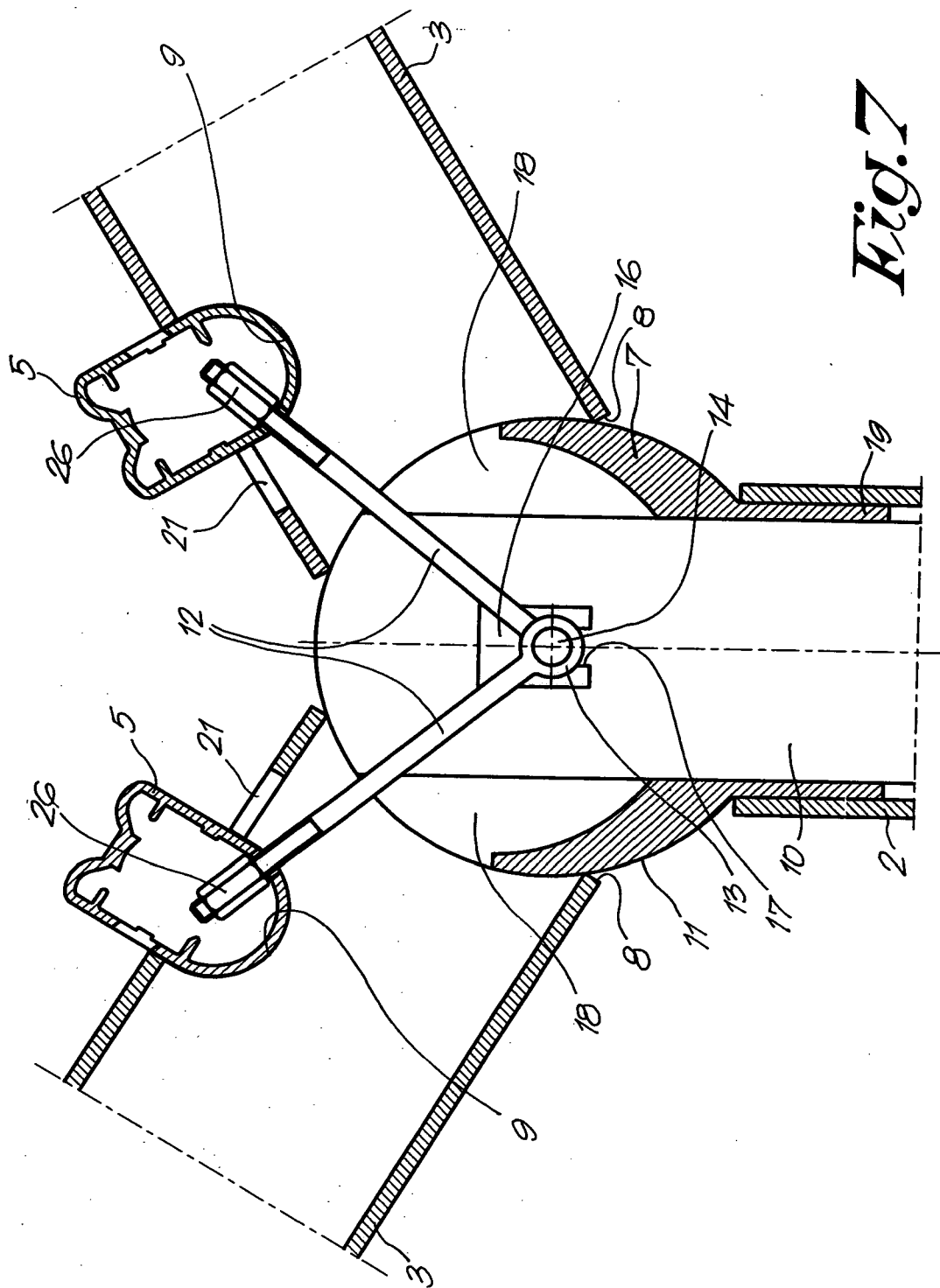


Fig. 7



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 07 7867

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			TECHNICAL FIELDS SEARCHED (IPC)
			E04H E04B F16B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 12 April 2006	Examiner Fordham, A
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 05 07 7867

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