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(54) **A ground fixation device**

(57) The present invention relates to an adjustable ground fixation device (6) for supporting attaching posts such as lamps, flagpoles, signs and similar vertical objects. The invention provides a flexible means of attach-

ing said posts and apparatus onto the ground by providing a rail (10) and a plurality of movable threaded rods (18) which can be translated in the direction of said rail and by providing means (14,15,16) for fixing the rail to the ground.

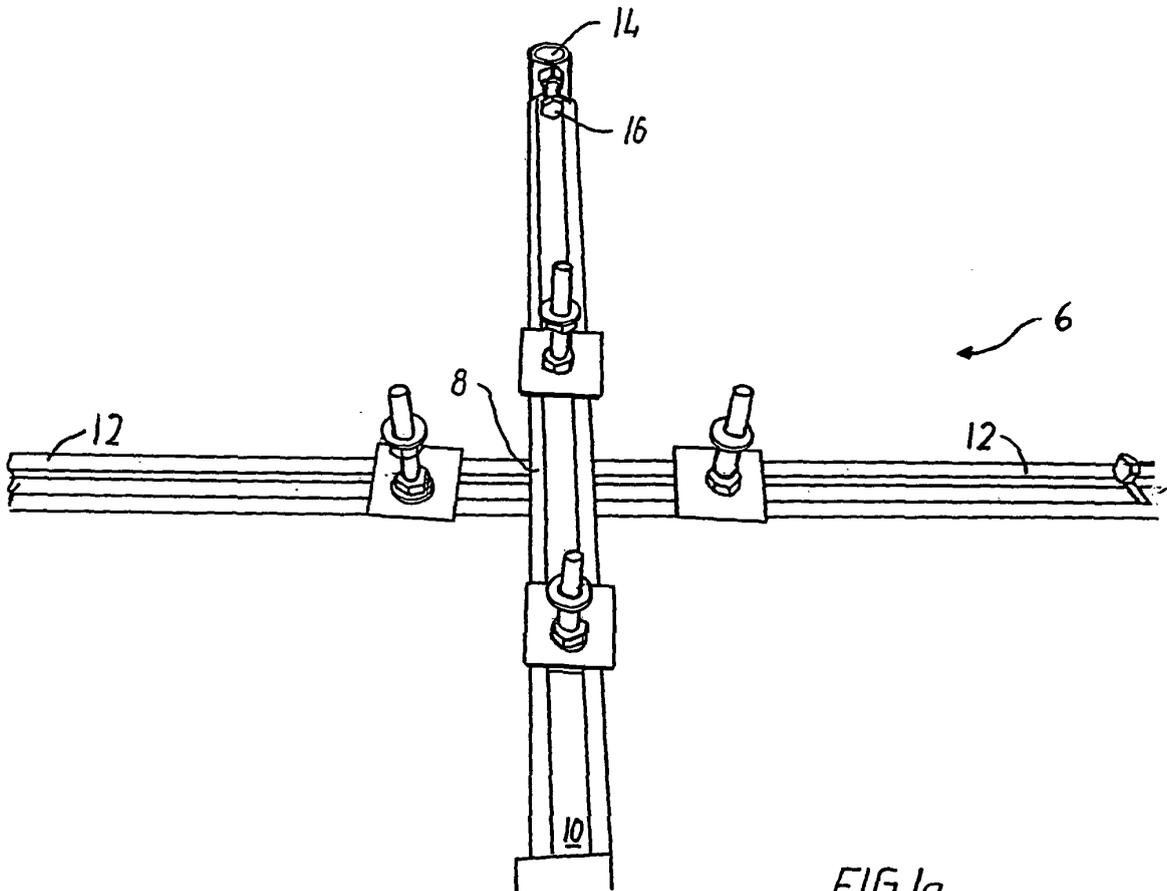


FIG.1a

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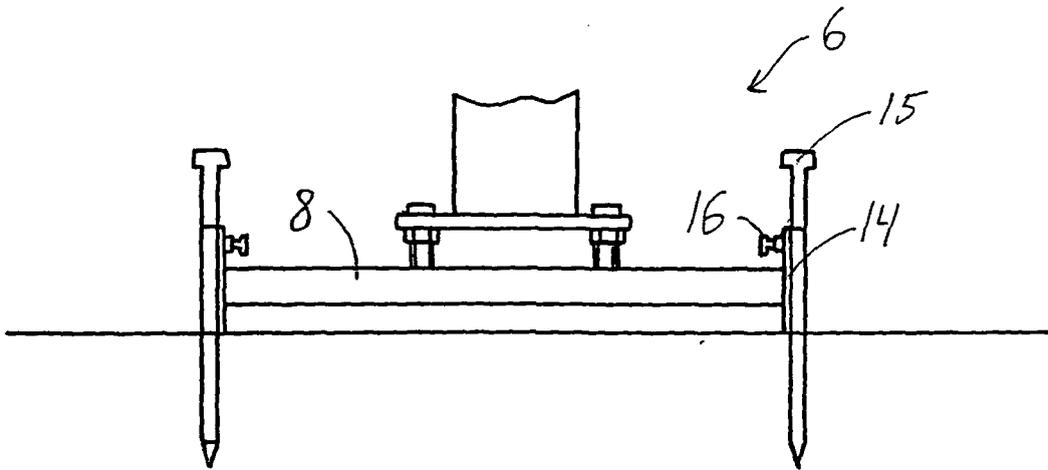


FIG.1b

DescriptionTECHNICAL FIELD

[0001] The invention relates to a ground fixation device and in particular to an adjustable ground fixation device for supporting posts such as lamps, flagpoles, signs and similar vertical objects.

BACKGROUND OF THE INVENTION

[0002] Conventional ground fixation devices for posts generally consist of an anchoring mechanism such as spikes, screws or similar to be deployed below the ground and a flange or similar to remain above ground for connecting the spike to the pole. Normally, such ground fixation systems are designed for one single application only and the spike and flange are fixed non-interchangeable integrated parts of the ground fixation device. For a new application such as either a different form of post or a different nature of the ground, normally a new ground fixation device must be developed.

[0003] A first example of prior art can be found in US 7,175,141 describing a sign support system. The support system features an upright vertical support post, a horizontal base provided for stability, a plurality of spikes extending into the ground and a removable sign post which can be inserted into the support post and is held in place by a detent pin. To remove the support system, a lever is provided to pull the spikes upwardly out of the ground. This invention provides a stable sign support structure, which at the same time can be very easily set up and removed. This system does not provide the possibility of performing an adjustment to a vertical position of the support post.

[0004] A second example of prior art can be found in US 7,219,872, wherein an adjustable post support has been described. The post support comprises a lower spike part and an upper bracket part. Two curved domes and a fastening device provide a ball and socket type connection between the lower spike part and the upper bracket part. This provides an adjustable connection in different positions to allow a vertical position of the post also in case the spike is driven into the ground offset from vertical.

[0005] A third example of prior art can be found in US 6,273,390, dealing with an adjustable post holder. The post holder is formed by a lower spike part and an upper bracket part, where the lower spike part and an upper bracket part are connected by a curved seat and an adjustable tightening member. This provides an adjustable connection in different positions to allow a vertical position of the post also in case the spike is driven into the ground offset from vertical.

[0006] A fourth example of prior art can be found in US 6,308,926, wherein an adjustable post holder is described. The post holder is formed by a lower spike part and an upper bracket part where the bracket part is di-

vided into a first bracket part connected to the spike and a second bracket part, which is adjustably attached to the first bracket part. This provides a substantial tolerance between the bracket part and the post upon tightening of the bracket.

[0007] A fifth example of prior art can be found in US 4,939,877, describing an anchor device. The anchor device comprises a ground spike, a sleeve and a connector tube where the sleeve is shaped as a four-pointed star in a way to connect to cylindrical posts as well as posts of rectangular shapes.

[0008] A sixth example of prior art can be found in US 6,735,911, wherein an earth anchor is described. The earth anchor comprises a central hub and a plurality of legs extending from the hub. At the distal end of each leg is a foot and a spike. The spike is driven into the ground at a predefined angle dictated by the angle of each foot. When subjected to forces trying to lift the central hub, the plurality of spikes will due to the angle of the spikes initiate a rotational movement and dig deeper into the ground.

SUMMARY OF THE INVENTION

[0009] Such ground fixation devices as described above in the prior art provide only a limited flexibility by allowing some tolerance between the ground fixation device and the attaching post, thereby permitting small manufacture errors or by allowing some tolerance between the post and the ground fixation device permitting small mounting errors. The attaching posts may not differ substantially from the intended type. It would, however, be advantageous to be able to use substantially different posts together with the same ground fixation device.

[0010] On the above background, it is the aim of the present invention to provide a flexible and adjustable ground fixation device for supporting and attaching of posts such as lamps, flagpoles, signs and similar vertical objects.

[0011] The ground fixation device consists of one or a plurality of rails providing a base. At the end of each rail is a holder to accommodate an anchoring mechanism such as a spike or screw or similar.

[0012] The rails further accommodate a plurality of threaded rods clamped at variable positions along the rail. The threaded rods are used to fix the post onto the ground fixation device.

[0013] The invention provides adaptability to various configurations of the fixation holes in the object to be connected to the ground fixation device. The invention may further provide variable fixation points into the ground by using the previously mentioned rail.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In the following detailed description of the invention, the concepts of the invention will be illustrated by reference to five specific embodiments of the invention, but it is understood that the scope of the invention

is not limited to those embodiments.

[0015] The present invention will be better understood with reference to the following detailed description of embodiments of the invention taken in conjunction with the figures, where

figure 1a shows a cross-shaped rail arrangement of a first embodiment,
 figure 1b shows a rail arrangement including the anchoring devices,
 figure 2a shows a threaded rod together with plates and nuts for clamping the threaded rod to the rails,
 figure 2b shows a vertical sectional view of a threaded rod together with plates and nuts for clamping the threaded rod to the rails,
 figure 3 shows a cross-shaped rail arrangement of the first embodiment together with a lamp post,
 figure 4 shows a rail with an elongated plate from a second embodiment,
 figure 5 shows a pair of rails from a third embodiment for two or more poles
 figure 6 shows a flexible holder tube from a fourth embodiment,
 figure 7 shows a plate from a fifth embodiment, and
 figure 8 shows an arrangement with an inclined spike.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The invention relates to an adjustable ground fixation device 8 for supporting and attaching posts such as lamps, flagpoles, signs and similar vertical objects.

[0017] Referring to figure 1a, a ground fixation device 6 in a first embodiment comprises a rail system 8 comprising three base rails where one longer rail 10 has approx. twice the length of the other two shorter rails 12. The two shorter rails 12 are mounted perpendicular onto the longer rail 10 and placed on the ground in the shape of a cross for stability in all directions.

[0018] The long rail 10 and the short rails 12 in the rail system 8 are shaped in a U-form with two L-shaped flanges in each end pointing inwards provided for mounting of a plurality (2-4) of threaded rods 18 as described below in an arbitrary position along the rail.

[0019] Referring to figure 1b, at each periphery end of the rail system 8, a cylindrical holder tube 14 can be placed in vertical direction towards the ground for inserting an anchoring mechanism 15 such as a screw or a spike or the like. The cylindrical holder tube further comprises a thread 16 for inserting a screw to fix the anchoring mechanism onto the ground fixation device 6.

[0020] Referring to figure 2a and 2b, a threaded rod 18 can be clamped onto the rail using a rectangular inner plate 20 with a threaded hole in the centre being attached to one end of the threaded rod where one side of the inner plate 20 is longer than the distance between the rail flanges 9 in the rail system 8 and one side being

shorter than the distance between the rail flanges 9 in the rail system 8 in a way that the inner plate 20 can be inserted between the flanges 9 and turned 90 degrees to attach to the inner side of the rail flange 9. The inner plate 20 has grooves 22 that extend along the short end of the inner plate 20 to fit to the inner side of the flange 9 to provide rotational stability of the inner plate 20 in relation to the rail system 8. On the opposite side of the rail flange, an outer plate 24 is provided with both sides being larger than the distance between the rail flanges 9 and with a hole in the centre through which the threaded rod is fitted and clamped to the rail by a nut 26, thereby clamping the threaded rod 18 to the rail system 8. Other ways of clamping the threaded rod to the rail can be envisaged without deviating from the concept of the present invention.

[0021] Referring to figure 3, the remaining length of the threaded rod 18 can be used for clamping an attaching post 31 between two further nuts 28 and 30 in a flexible way at the end of the threaded rod 18, provided the attaching post 31 comprises suitable holes for fitting onto the threaded rods 18.

[0022] Referring to figure 4, in a second embodiment, a bolt 32 is used instead of a threaded rod to clamp a rectangular outer plate 34 together with an inner plate 20 as described above in embodiment 1. The rectangular outer plate 34 of the second embodiment has a long side significantly longer than the short side and a hole for fitting a threaded rod 36 near each short side, where one of the holes is used to fit the rectangular outer plate 24 onto the rail and the other hole is used to clamp a threaded rod 36 onto the outer plate 24 by two nuts 38 mounted onto each side of the outer rectangular plate. By rotating the outer rectangular plate 34 around the bolt 32, an additional degree of freedom compared to the first embodiment is obtained for the threaded rod 36 which can then be used for clamping the attaching post 31 between two further nuts 40 in a flexible way.

[0023] Referring to figure 5, in a third embodiment, two or more parallel rails are used instead of two cross-shaped rails providing the possibility of attaching two or more posts. Stability in all directions is provided by interconnecting the two posts transversally to the parallel rails by using a solid long object, such as a large sign, a fence or the like.

[0024] Referring to figure 6, in a fourth embodiment, a movable cylindrical holder tube 42 is attached to a bracket 44. The bracket is further attached to the rail by one or a pair of threaded rods 46 in a similar way as the threaded rod 18 described in the first embodiment. This provides flexibility in the direction of the rail system 8 for the attachment of the anchoring mechanism. By using an elongated bracket additionally some rotational freedom can be given to the cylindrical holder tube 42.

[0025] Referring to figure 7, in a fifth embodiment, four threaded rods 48 are attached to a large plate 50 with two tubes 52 attached in line in two of the corners of the plate. This will provide a hinge function for aiding in rais-

ing of large objects such as flagpoles onto the ground fixation device 6, provided the large object has a corresponding tube for fitting a rod into the corresponding tube and the two previous mentioned tubes 52.

[0026] Referring to figure 8, as an additional feature, the holding tube 14 can be inclined in relation to the vertical plane for providing additional hold for the anchoring mechanism 15 to withstand larger forces in the vertical direction.

[0027] The ground fixation device can be mounted to a post by the following below-mentioned steps:

[0028] The post is mounted onto the ground fixation device with the post in a horizontal position by inserting the holes in the flange of the post into the threaded rods and then clamping the flange between two nuts.

[0029] The post is then raised to a vertical position and the spikes are plugged into the ground deep enough for providing a hold.

[0030] The screws in the vertical tubes around the spikes are tightened to fasten the ground fixation device in an appropriate preferably horizontal alignment.

[0031] Alternatively, the movable tube can be used for further adjustment of the tube.

[0032] Adjusting the nuts of the threaded rod can further regulate the vertical alignment of the post.

[0033] Adjusting the position of the threaded rods in the rails can regulate the horizontal alignment.

[0034] Alternatively, the elongated bracket can be used to further allow the threaded rod to be positioned outside of the rail system, thus the threaded rod is not limited to the positions within the dimensions of the rail system.

[0035] Alternatively, a non-vertical object can be mounted as well by adjusting the nuts of the threaded rod and / or adjusting the screws in the vertical tube.

- 20. Inner plate
- 22. Groove
- 5 24. Outer plate
- 26. Nut
- 28. Nut
- 10 30. Nut
- 31. Post
- 15 32. Bolt
- 34. Rectangular plate
- 36. Treaded rod
- 20 38. Nut
- 40. Nut
- 25 42. Movable cylindrical holding tube
- 44. Bracket
- 46. Threaded rod
- 30 48. Treaded rod
- 50. Large plate
- 35 52. Tube

LIST OF PARTS

[0036]

- 6. Ground fixation device
- 8. Rail system
- 9. Rain flange
- 10. Long rail
- 12. Short rail
- 14. Cylindrical holding tube
- 15. Anchoring device
- 16. Fixing screw
- 18. Threaded rod

Claims

- 40 1. An adjustable ground fixation device for supporting attaching posts such as lamps, flagpoles, signs and similar vertical or horizontal objects **characterized by** providing a flexible means of attaching said posts and similar vertical objects and apparatus onto the ground fixation device by providing a rail and a number of movable threaded rods which can be translated in the direction of said rail and by providing means for fixing the rail to the ground.
- 45
- 50 2. An adjustable ground fixation device according to claim 1, furthermore comprising two additional rails placed perpendicular onto said first rail in a cross-shape.
- 55 3. An adjustable ground fixation device according to claim 1 or 2, furthermore comprising an extension plate to said threaded rod, thereby providing a rotational degree of freedom to said threaded rod.

4. An adjustable ground fixation device according to claim 1, 2 or 3, furthermore comprising one or a plurality of holders placed on the rail vertically to the ground plane for inserting an anchoring mechanism. 5
5. An adjustable ground fixation device according to claim 4, wherein said holders have a thread and a screw for fixing the anchoring mechanism.
6. An adjustable ground fixation device according to claim 4 or 5, wherein said holders are movable. 10
7. An adjustable ground fixation device according to claim 4, 5 or 6, wherein said holder is inclined in relation to the vertical plane. 15

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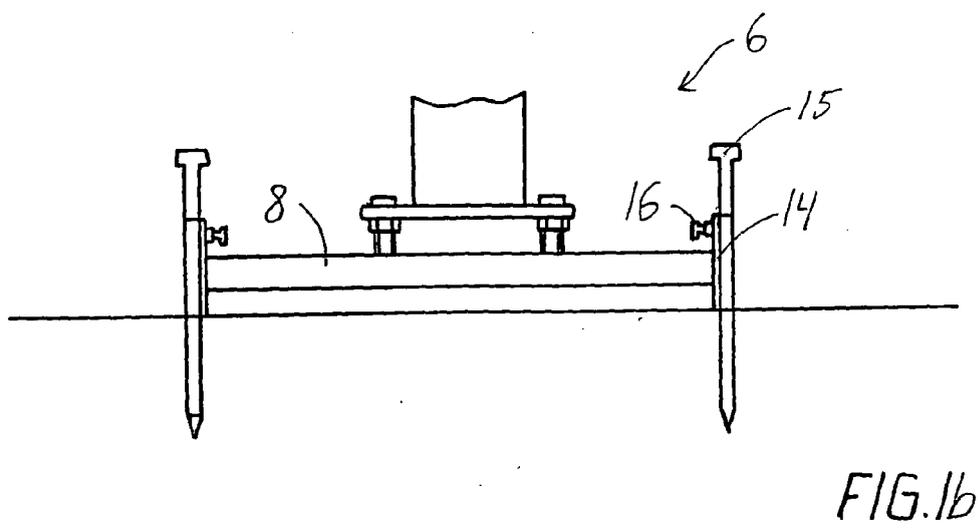
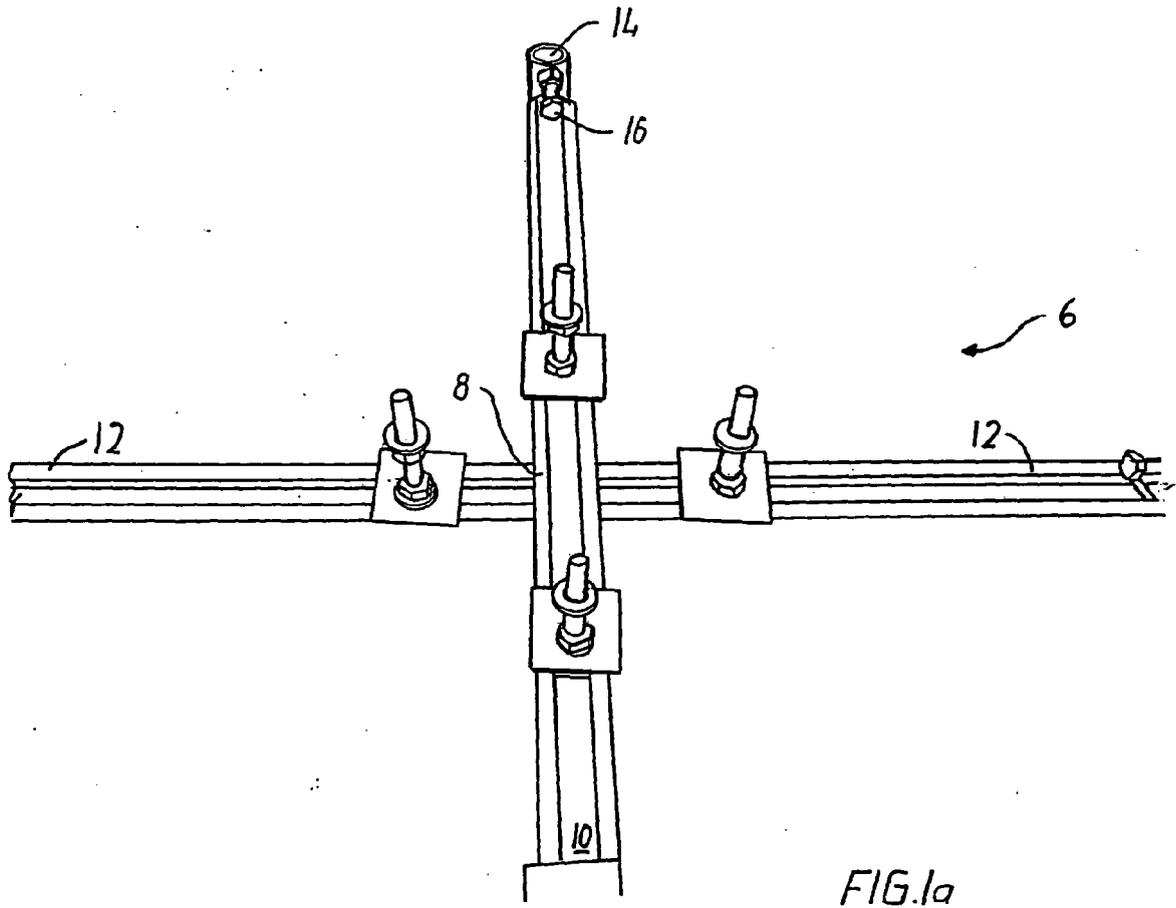
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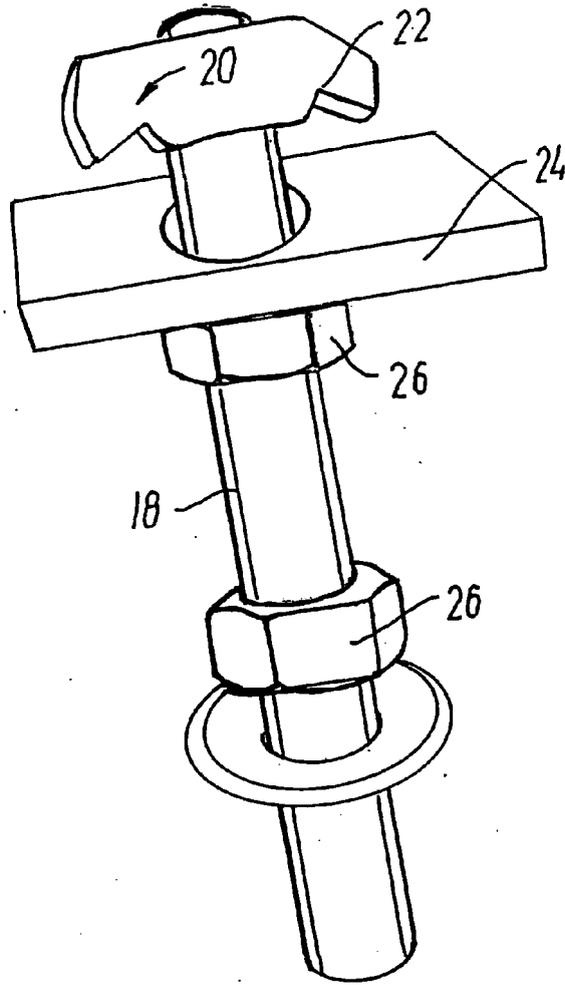


FIG. 2a

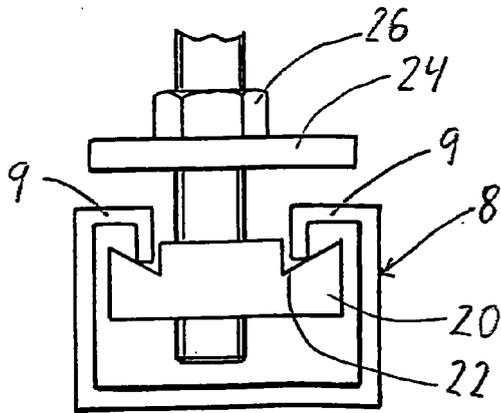


FIG. 2b

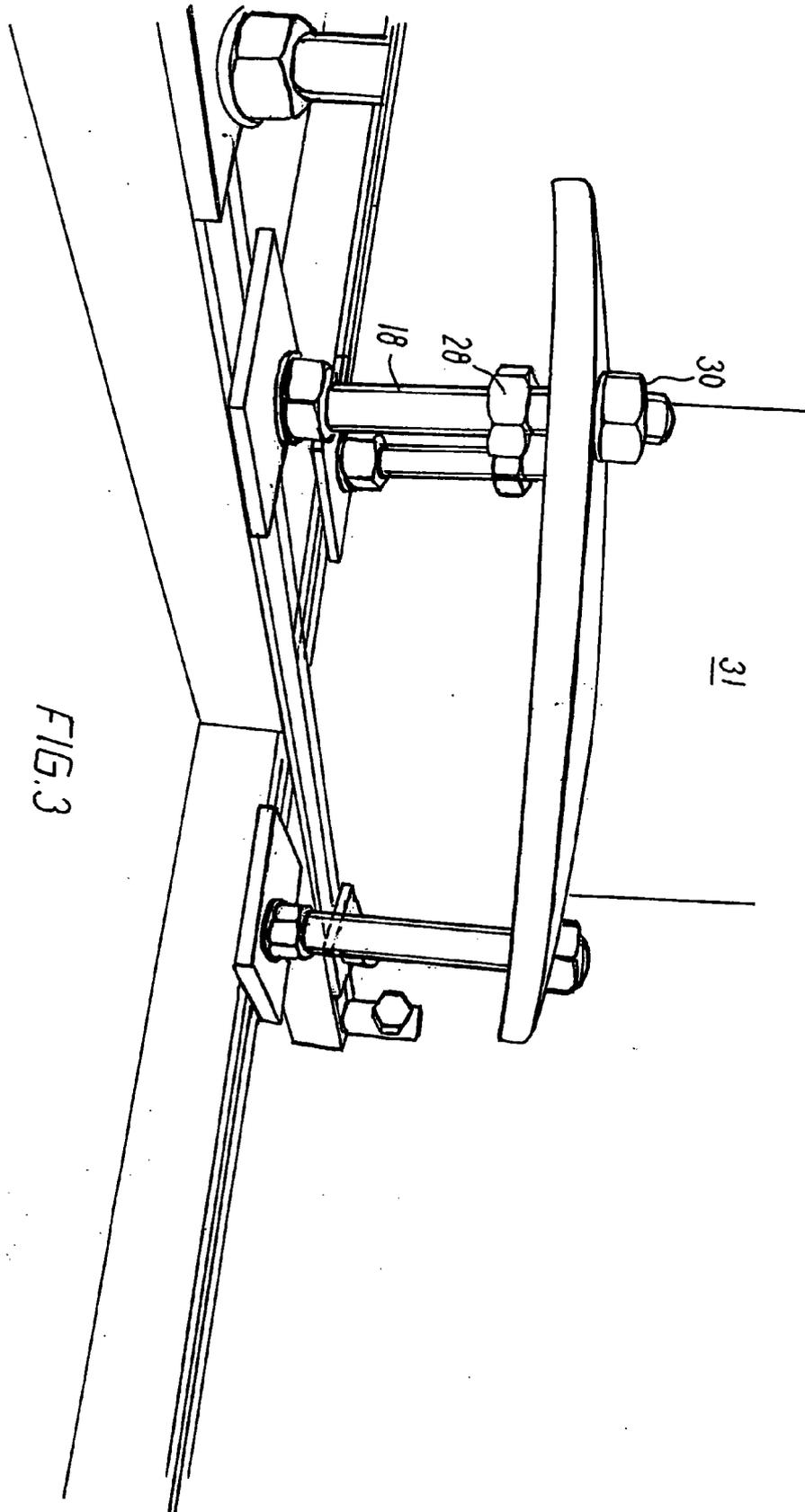


FIG. 3

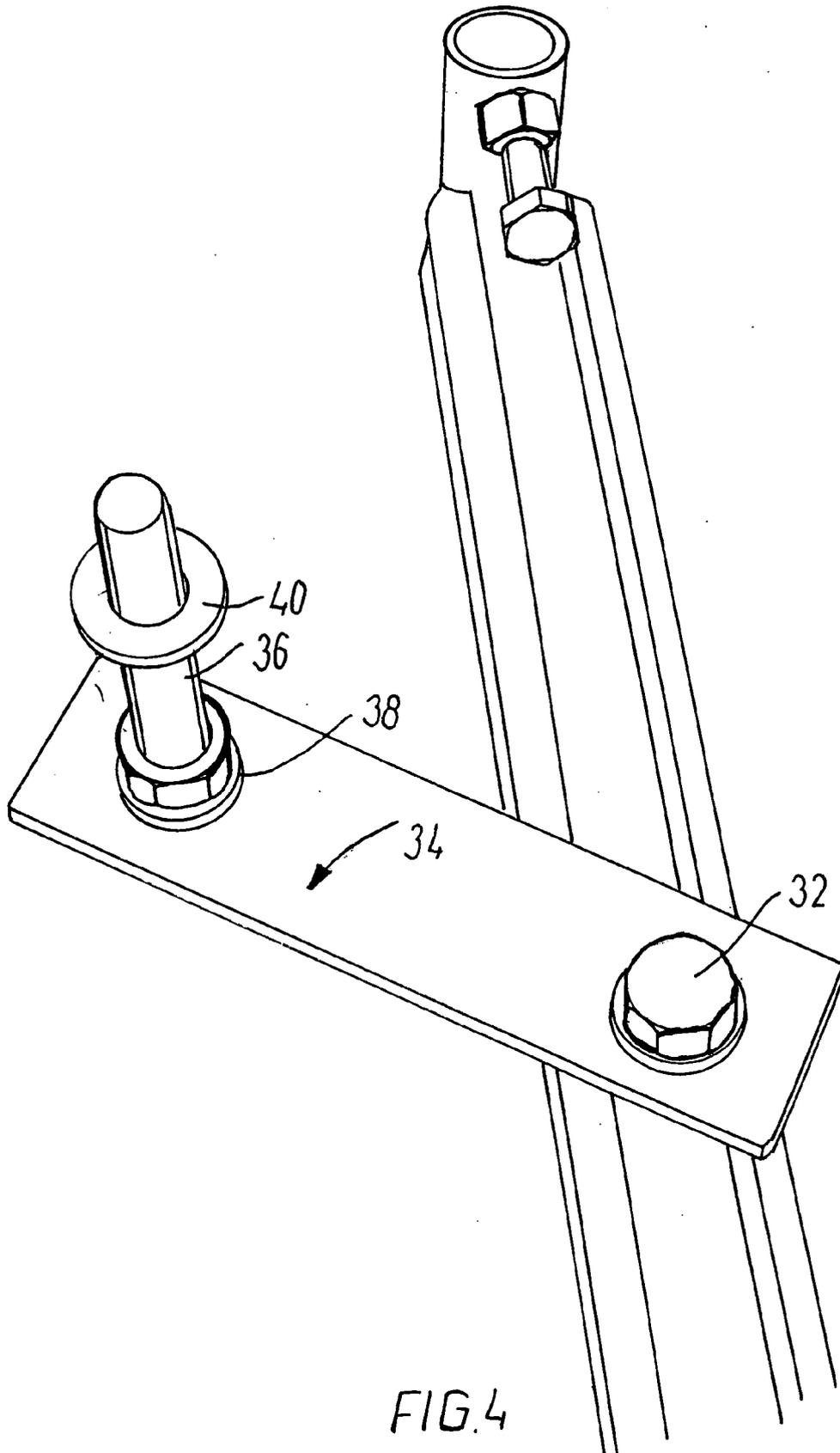


FIG.4

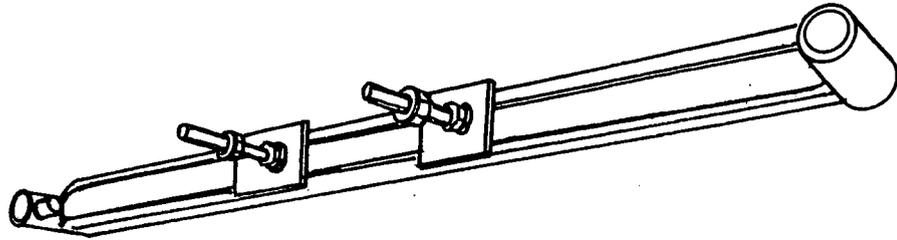
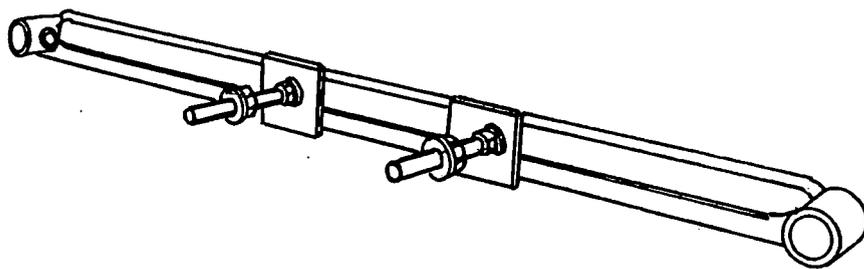


FIG.5



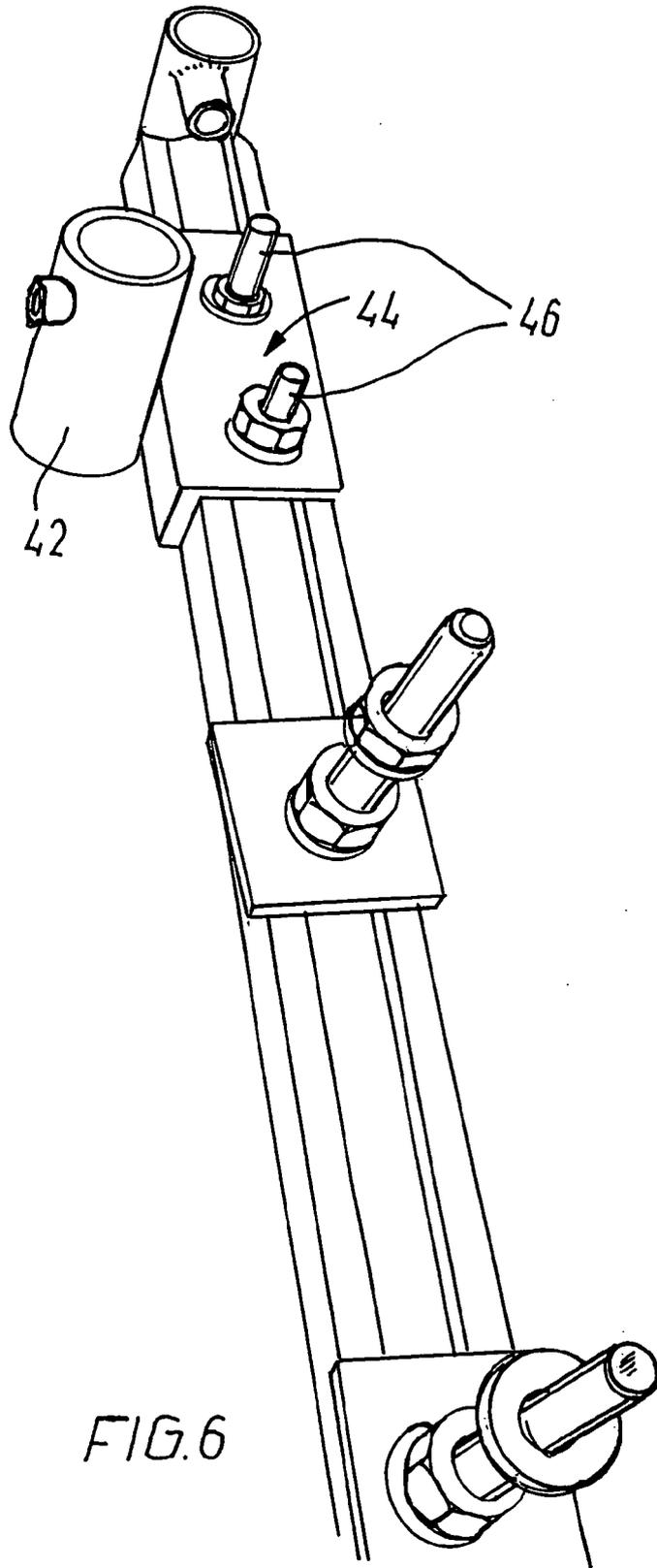


FIG. 6

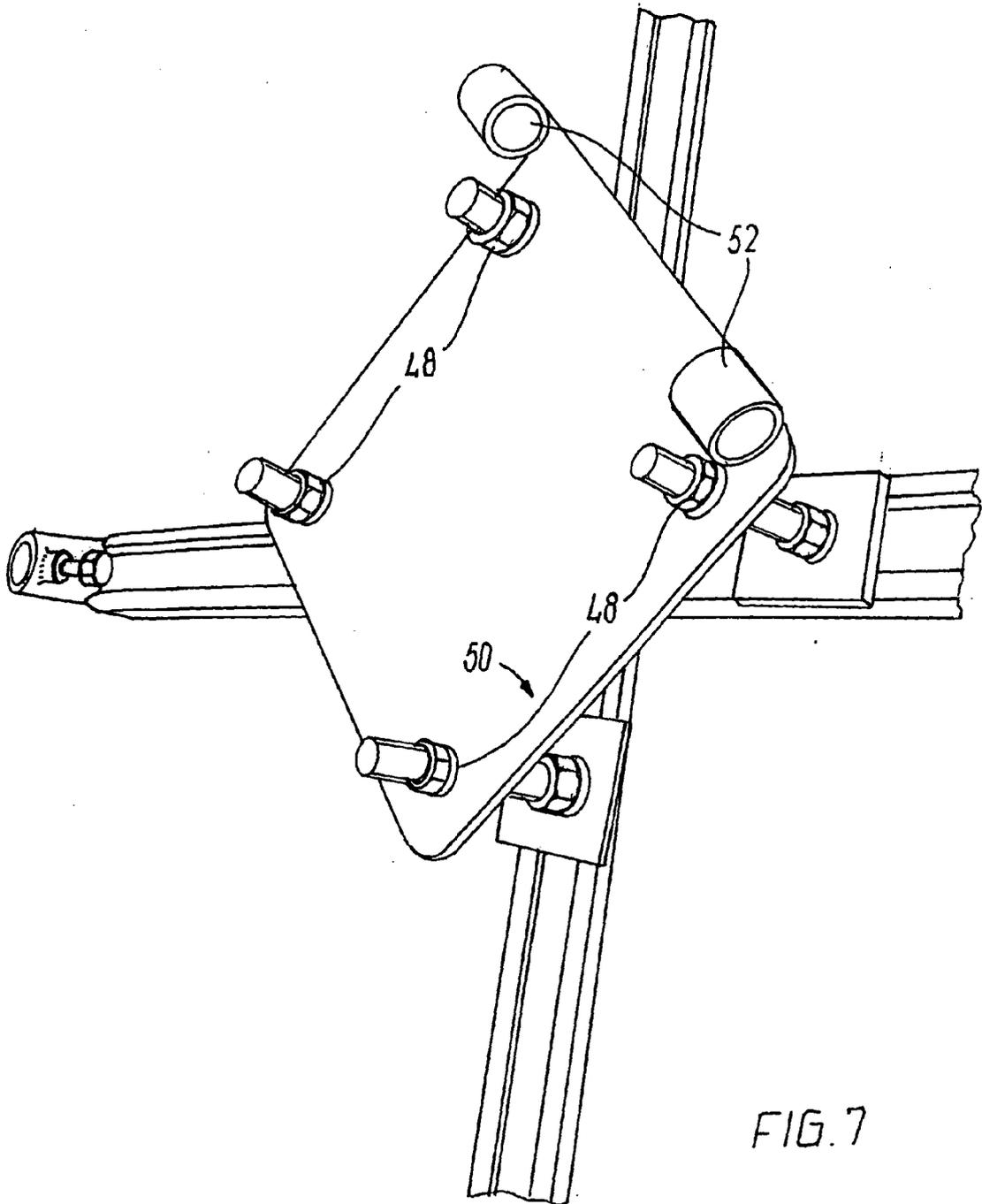


FIG. 7

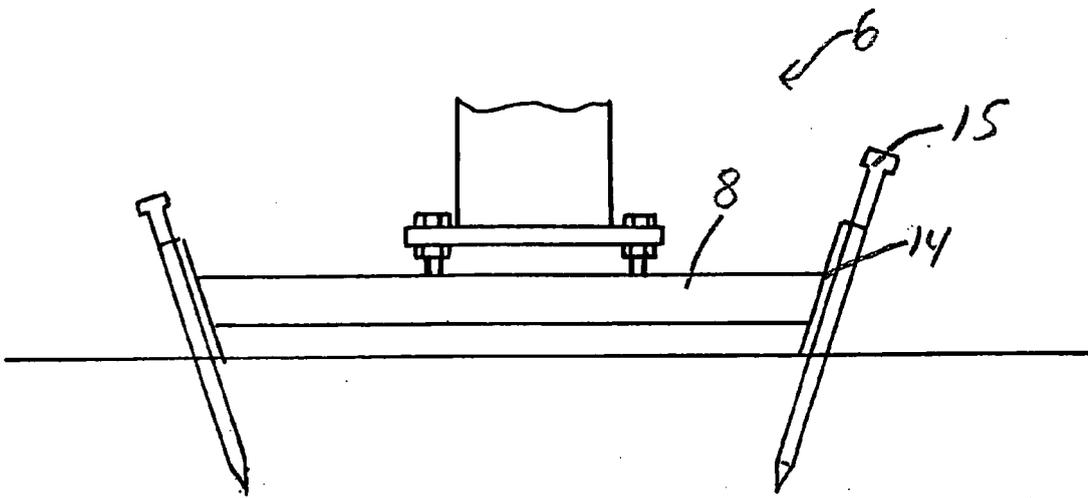


FIG.8



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 203 19 861 U1 (KRAUS PETER [DE]) 18 March 2004 (2004-03-18)	1	INV. E04H12/22
Y	* paragraph [0017] - paragraph [0025]; figures 1,2 *	2-4,6,7	
Y	----- DE 41 16 738 A1 (BAUMANN VERWERTUNGS GMBH [DE]) 26 November 1992 (1992-11-26) * column 2, line 24 - column 3, line 65; figure 1 *	2-4,6,7	
A	----- DE 34 43 451 C1 (BBC BROWN BOVERI & CIE) 13 March 1986 (1986-03-13) * abstract; figure 1 *	1,2	
A,D	----- US 6 735 911 B1 (ALEXANDER BILLY W [US]) 18 May 2004 (2004-05-18) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E04H E01F
Place of search		Date of completion of the search	Examiner
The Hague		15 July 2008	Clasing, Martina
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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