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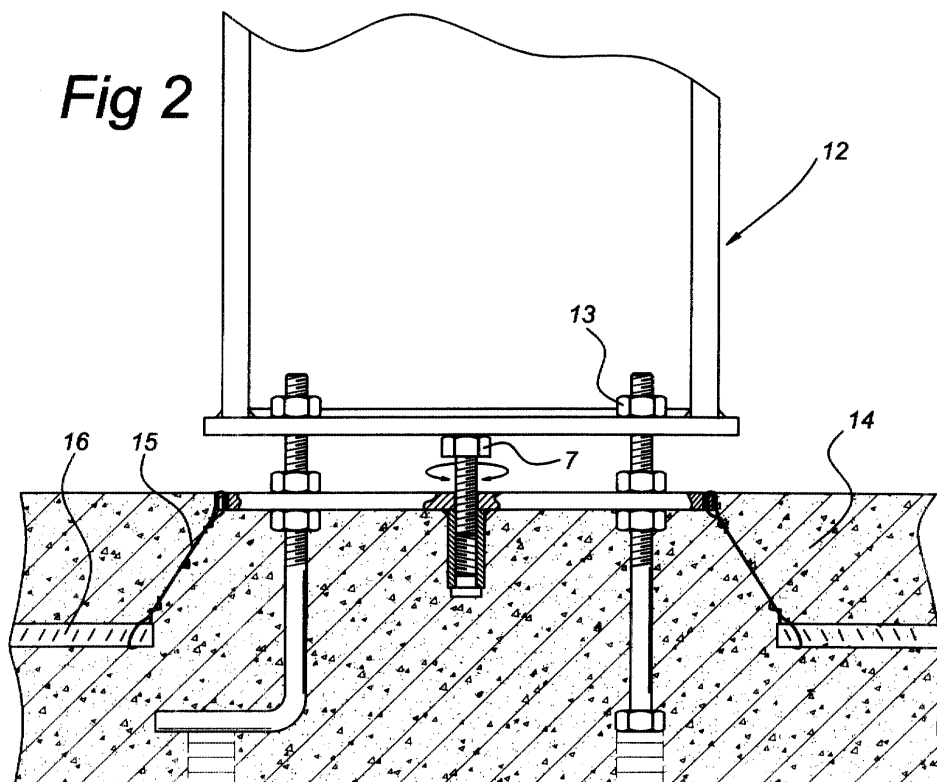
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(54) **Fixing structure and method for the installation thereof**

(57) Fixing structure (1,31) for joining a column (12) or the like to a concrete structure (14) which is to be poured. Two or more anchor components (3,4) are fixed to a fixing plate which is also provided with adjusting means. The plate is cast into the concrete with the an-

chor components. The column or the like is brought into the correct position with the aid of the adjusting means. The gap between the column and the concrete structure is then sealed with a sealing strip (17) and the space within said strip is filled with casting concrete.



Description

[0001] The present invention relates to a fixing structure for joining a column or the like to a concrete structure which is to be poured, comprising at least two anchor components which are to be cast in situ and are located some distance apart, which anchor components are provided with screw thread for fixing said column or the like, the fixing structure comprising a fixing member in which said anchor components have been fitted.

[0002] A structure of this type is disclosed in US 5 505 033 A. In this structure the foot of a column is placed on a concrete block and the column is positioned with the aid of cast-in tie anchors.

[0003] In the general state of the art two or more anchors are cast in a concrete structure in order to fix a column or the like to the concrete structure. These anchors are generally provided at the end with screw thread on which nuts later have to be fitted in order to fix the column in place. The distance between the anchors must, of course, correspond to the distance between the holes made in the base plate of the column and to this end the anchors are held apart with the aid of a wooden template when pouring.

[0004] After pouring, such a template is removed by breaking out or the like. Nuts then have to be fitted on the screw thread. It is also possible that these nuts are already present. The column is then placed in position, bearing on the nuts. Yet further nuts are fitted on the upper side of the column in order to fix the column in place. Correct positioning of the column can be ensured by adjusting the nuts which support the column. The gap between the foot of the column and the concrete is then grouted under. Such undergrouting takes place by filling the gap concerned with the aid of an easily workable concrete material. This is an accurate and time-consuming operation. After all, it must be ensured that the gap between the column and the poured structure is completely filled with concrete because the weight of the column and any further structure supported by the latter must be transferred here later on. A method that is generally customary is to place a heavy object, such as a paving stone or the like, on three sides of a square column, after which the mix is tamped with a block of wood or the like on the side that is still open in order thus to achieve adequate compaction. It is understood that this is on the one hand a time-consuming activity but, on the other hand, an activity which is not readily controllable.

[0005] As a result of the use of the wooden template and the undergrouting described above, fixing a column or the like to a concrete structure is a time-consuming activity.

[0006] The aim of the present invention is to avoid this disadvantage and to provide a fixing structure with which a column can be placed in position and adjusted quickly and effectively.

[0007] This aim is achieved with a structure as described above in that said fixing member is provided,

between the opening for said anchor components, with adjusting means for said column or the like, which adjusting means comprise a support that can be moved outwards (upwards) with respect to said member. As a result of the use of a fixing member to which the anchor components are fixed, as well as adjusting means arranged therein, on the one hand the anchors can be positioned very accurately before pouring and, on the other hand, the column can be adjusted very accurately without time-consuming adjustment of nuts on the anchors being required. Furthermore, it is possible after undergrouting to apply some stress to the nuts on the anchors, so that the structure is pretensioned.

[0008] The fixing member can be a plate-shaped member. If, however, there are concerns that cavities could arise as a result of the presence of air beneath the plate, it is possible to construct the plate as one or more strip-shaped parts. In the case of the embodiment with strip-shaped parts it is possible to provide various strip-shaped parts which are attached to one another. By this means, matching to the spacing between the anchor components can be provided in a simple manner.

[0009] The plate and/or other structure by means of which the anchor components are placed in the desired position can be removable or non-removable. Especially if plastic parts are used, removability can be achieved in a simple manner. This takes place after the adjusting means have been cast in situ. Moreover, when plastic parts are used in combination with steel anchor components locking of the anchor components to the plastic plate or strip can be achieved in a simple manner. Plastic must be understood to mean both hard plastics and permanently deformable plastics, such as rubber-like materials. Rubber-like materials in particular can be very easily removed.

[0010] Preferably, the fixing means comprise one or more supporting or adjusting bolts accommodated in a sleeve or other structure in the fixing member.

[0011] The position of the column can be controlled by moving such a supporting or adjusting bolt outwards. Reaction can be generated by fitting the fixing nuts on the threaded anchors. These fixing nuts are essential for subsequent fixing of the column to the fixing structure.

[0012] The introduction of concrete can be yet further simplified if pourable concrete of thin consistency or another settable material is used that has an appreciable supporting function. In such a case it is proposed according to the invention to make use of a sealing strip to form shuttering around the gap between the bottom of the column and the top of the concrete structure and to pour in material of thin consistency to completely fill this gap. This sealing strip can be made of plastic material, which may or may not be reinforced with metallic materials, and temporarily attached to the concrete structure with the aid of a layer of adhesive or mastic. Moreover, in this way it is possible to use a low shrinkage mix so that the risk of incomplete support, as can arise

in the state of the art when using relatively easily workable concrete of thick consistency, no longer exists.

[0013] It must be understood that the anchor components to be cast in situ can comprise any structures known in the state of the art. It is possible that these components do not protrude above the plate and, for example, comprise sleeves provided with screw thread. If the adjusting means have been recessed in the plate or are subsequently recessed in the plate, it is possible by this means to "cast in" the fixing plates and then to make the area around the fixing plate flat, for example by smoothing.

[0014] The invention also relates to a method for positioning a column, comprising casting a fixing structure in situ as described above, followed by fitting the sealing strip, described above, around the fixing structure, after which the space within said strip is filled with a settable casting composition.

[0015] The invention will be explained in more detail with reference to an illustrative embodiment shown in the drawing. In the drawing:

Fig. 1 shows, diagrammatically, a side view of one embodiment of a fixing structure according to the invention;

Fig. 2 shows the fixing structure according to Fig. 1 after casting into concrete and during the adjustment of a column;

Fig. 3 shows a sealing strip according to one embodiment of the present invention;

Fig. 4 shows the positioning of the sealing strip on the concrete structure while concrete-like material of thin consistency is poured in,

Fig. 5 shows, diagrammatically, a perspective view of a variant of the fixing structure according to the preceding figures; and

Fig. 6 shows a section of the structure shown in Fig. 5.

[0016] In Fig. 1 the fixing structure according to the invention is indicated in its entirety by 1. The most simple embodiment is shown in Fig. 1, only two anchor components 3 and 4 being shown. These components have been permanently fixed in advance to plate 2 with the aid of nuts 6. With this arrangement the nuts are relatively weak plastic nuts or another movable structure. It will be understood that this fixing to plate 2 can also take place by welding, pressing or some other method. In the example shown, anchor component 3 is provided with a bent-over end and anchor component 4 is provided with a bolt head 10. It will be understood that two identical anchor ends can also be used. When using anchor component 4, which like anchor component 3 is provided with a screw thread 5, use can be made of a bolt-like structure. This has the advantage that a relatively high grade type of steel can be used in a manner that is readily achieved. After all, anchor component 3 will in general be made of a steel of low strength (less than 50 kg/

mm²), whilst a bolt can have a strength of more than 80 kg/mm² without high costs.

[0017] The fixing plate 2 can be of any material known in the state of the art, but will in general be made of steel. Fixing plate 2 is provided in the centre thereof with a sleeve 8 that is provided with screw thread and is fixed to said plate in some way. An adjusting bolt 7 can be accommodated in sleeve 8.

[0018] Because the distance between the bolt holes in columns and other structures is standardised, the fixing structure 1 can be delivered to the site as a prefabricated member. It is then, as shown in Fig. 2, positioned in some way in a concrete structure to be poured. An additional reinforcing rod is indicated by 16 and a wire link to plate 2, which serves to hold the fixing structure in place during pouring of concrete 14, is indicated by 15.

[0019] After the concrete has been poured and has set (to some extent), column 12 is placed in position. As a result of the accurate positioning of the anchor components 3 and 4 with respect to plate 2, the openings in column 12 will always correspond to the anchor components concerned. Adjusting bolt 7 can be moved outwards in advance, so that it is ensured that the column is positioned at the correct height. Because the adjusting bolt 7 is in the centre of the plate 2, it is relatively simple to adjust the column such that it is absolutely vertical. When adjustment is carried out by means of bolt 7, the nuts 8 will be displaced relative to the thread. A firm and adjustable connection can be provided by tightening nuts 13. Plate 2 is sufficiently strong to absorb the compressive force originating from supporting bolt 7 of the column.

[0020] It will be understood that more than two anchors can be present. Optionally, more than one adjusting bolt 7 can be present.

[0021] Fig. 3 shows a sealing strip that is indicated in its entirety by 17. This strip consists of a base section 18 that is provided with a layer of adhesive or mastic 21 on the underside thereof. 20 shows an upright section that can be made of a readily deformable plastic or metallic material. 19 indicates scoring in the base section 18, by means of which the latter can be bent, as shown with the aid of Fig. 4.

[0022] Fig. 4 shows the structure according to Fig. 2 when fitting the sealing strip 17. What is achieved by means of such a seal is that it is possible to introduce a casting concrete of relatively thin consistency into the gap between the underside of column 12 and the top of the poured concrete floor. This concrete is indicated by 22. Such a concrete has particularly low shrinkage, with the result that after it has set the column bears directly on the poured concrete part.

[0023] It will be understood that the time-consuming production of a template, removal of the wooden template after pouring the concrete and attaching bottom supporting nuts to the anchor components to support the column is avoided in this way. By working with a con-

crete of thin consistency it is possible rapidly and effectively to ensure that the entire gap between the bottom of the column and the concrete floor is completely filled with concrete, so that maximum transfer of supporting forces is achieved. On the one hand, an appreciable saving in time and, on the other hand, an appreciable improvement in the quality of the product handed over can be achieved as a result.

[0024] A further variant of the fixing structure according to the invention is shown in Figs 5 and 6. This variant is indicated in its entirety by 31. The anchor rods are indicated by 3. This fixing structure consists of a fixing member 30 made up of strips 32 and 33 which are joined to one another with the aid of bolts 38. Strip 32 is provided in the centre with a threaded bush 36 into which a bolt 37, that serves as adjusting bolt, can be screwed. A multiplicity of different dimensions can be provided by varying the strips 32 and 33. It has been found that the spacing of the openings 34 between the strips 32 varies very substantially from structure to structure. In this way it is possible, without further measures being required, to cover a wide range of different spacings by keeping a very restricted group of strips 32, 33 in stock.

[0025] The strips shown here can be made of plastic material. These can be so constructed that the anchors 3 can be pushed through them but are held firmly clamped by them. Other structures are possible, for example sleeve structures which engage around the threaded anchors and are slid over the latter both from the top and from the bottom and engage on the strip-shaped part 32 between them such that the latter is clamped. Other structures for accommodating the stud 3 such that it is clamped are conceivable. Such structures can, moreover, be implemented in such a way that the strips 32, 34 are easily removable after the anchor components 3 have been cast in situ. In this way the fixing member 30 can be used again. In this context it is, of course, essential that the threaded bush 36 remains behind in the poured concrete, so that adjustment remains possible. Such variants can also be used in the case of the embodiment in the preceding figures.

[0026] Of course, it is possible to protect the protruding threaded parts during transport and storage, but also during casting in situ, by sleeve-shaped plastic caps or the like.

[0027] These and further variants and modifications of the structure described above are obvious to those skilled in the art after reading the above description and fall within the scope of the appended claims.

Claims

1. Fixing structure (1, 31) for joining a column (12) or the like to a concrete structure (14) which is to be poured, comprising at least two anchor components (3, 4) which are to be cast in situ and are located some distance apart, which anchor components are

provided with screw thread (5) for fixing said column or the like, the fixing structure comprising a fixing member (2, 30) in which said anchor components have been fitted, characterised in that said fixing member is provided, between the opening for said anchor components, with adjusting means for said column or the like, which adjusting means comprise a support (7, 37) that can be moved outwards (upwards) with respect to said member.

2. Fixing structure according to Claim 1, wherein that part of an anchor component (4) that is to be cast in situ is constructed as a bolt provided with a head (10).
3. Fixing structure according to one of the preceding claims, wherein said fixing member comprises a plate-shaped part provided with openings for accommodating said anchor components.
4. Fixing structure according to one of Claims 1 or 2, wherein said fixing member comprises a strip-shaped part (33) provided with openings (34) for accommodating said anchor components (3).
5. Fixing structure according to Claim 4, comprising at least two strip-shaped parts (32, 33) joined to one another.
6. Fixing structure according to one of the preceding claims, wherein said fixing member is removable after said adjusting means have been cast in situ.
7. Fixing structure according to one of the preceding claims, wherein said fixing member comprises means for the temporary fixing thereof to other reinforcing parts of the structure to be poured.
8. Fixing structure according to one of the preceding claims, comprising a sealing strip (17).
9. Fixing structure according to Claim 8, wherein said sealing strip comprises a horizontal base section (18) and a sealing section (20) projecting essentially vertically therefrom.
10. Fixing structure according to Claim 8 or 9, wherein said base section is provided with adhesive means (21).
11. Method for positioning a column, comprising casting a fixing structure according to one of Claims 1 - 7, in concrete, followed by fitting a sealing strip according to one of Claims 8 - 10 around the fixing structure, after which the space within said strip is filled with a settable casting composition.

Fig 1

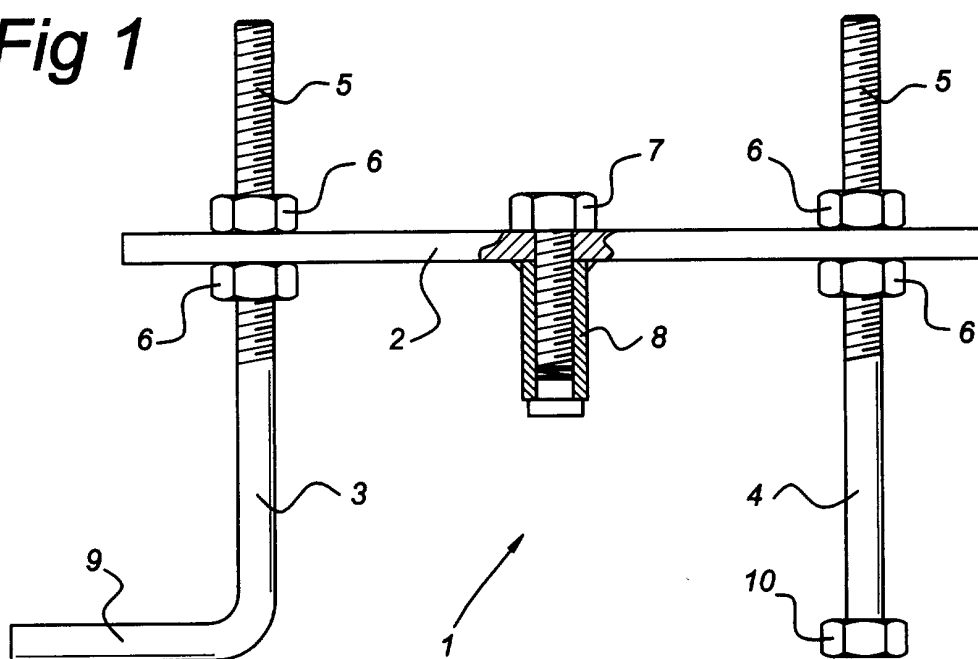


Fig 2

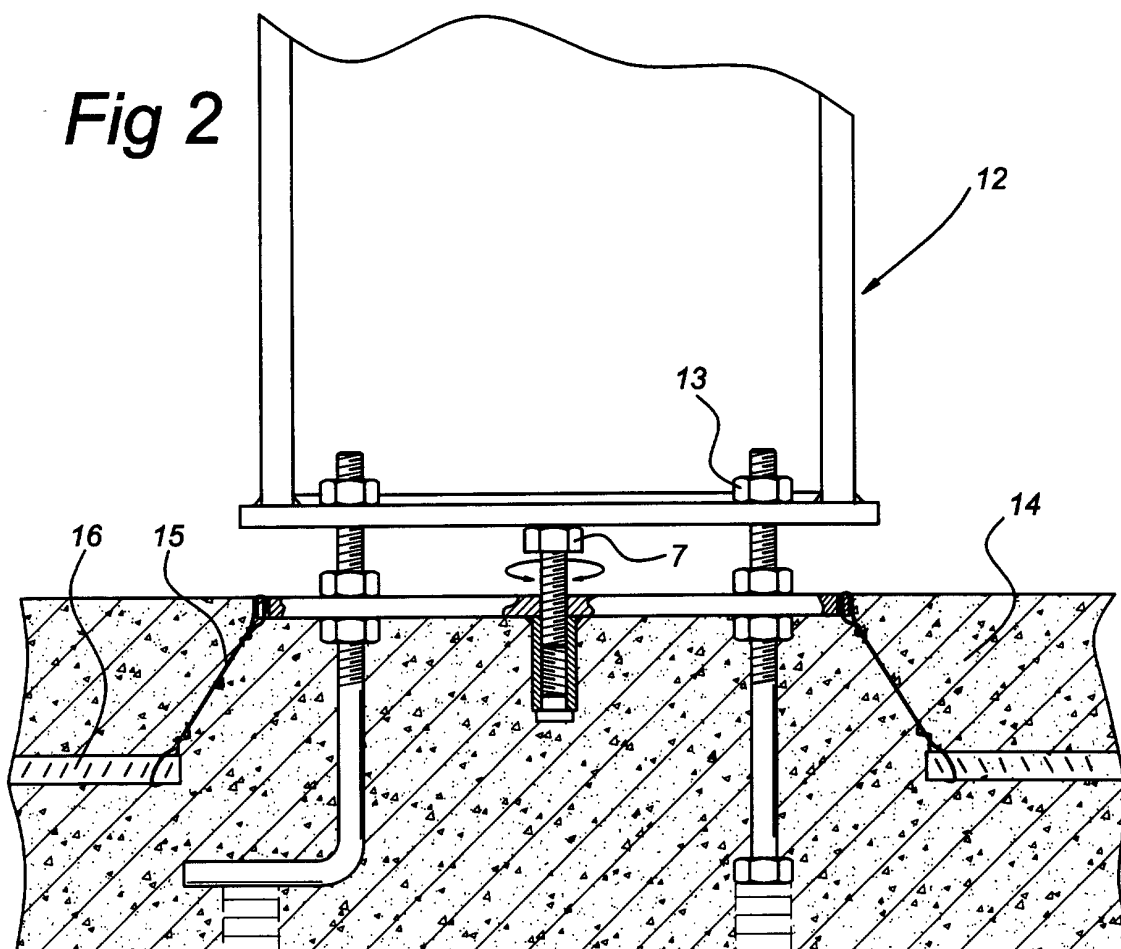


Fig 3

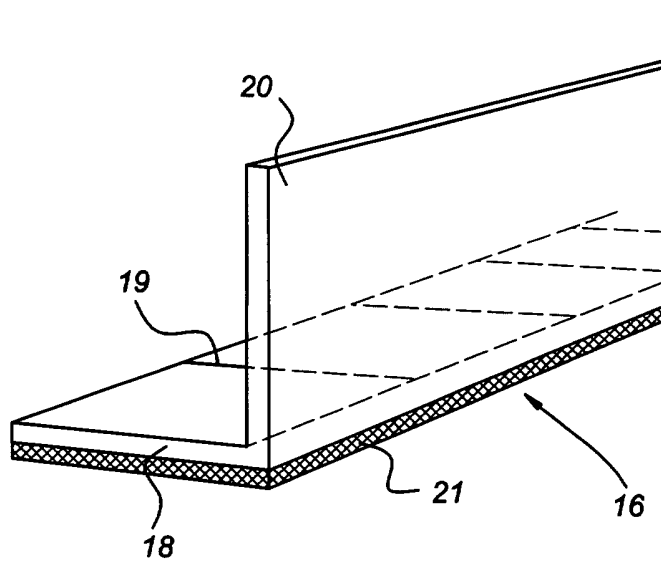


Fig 4

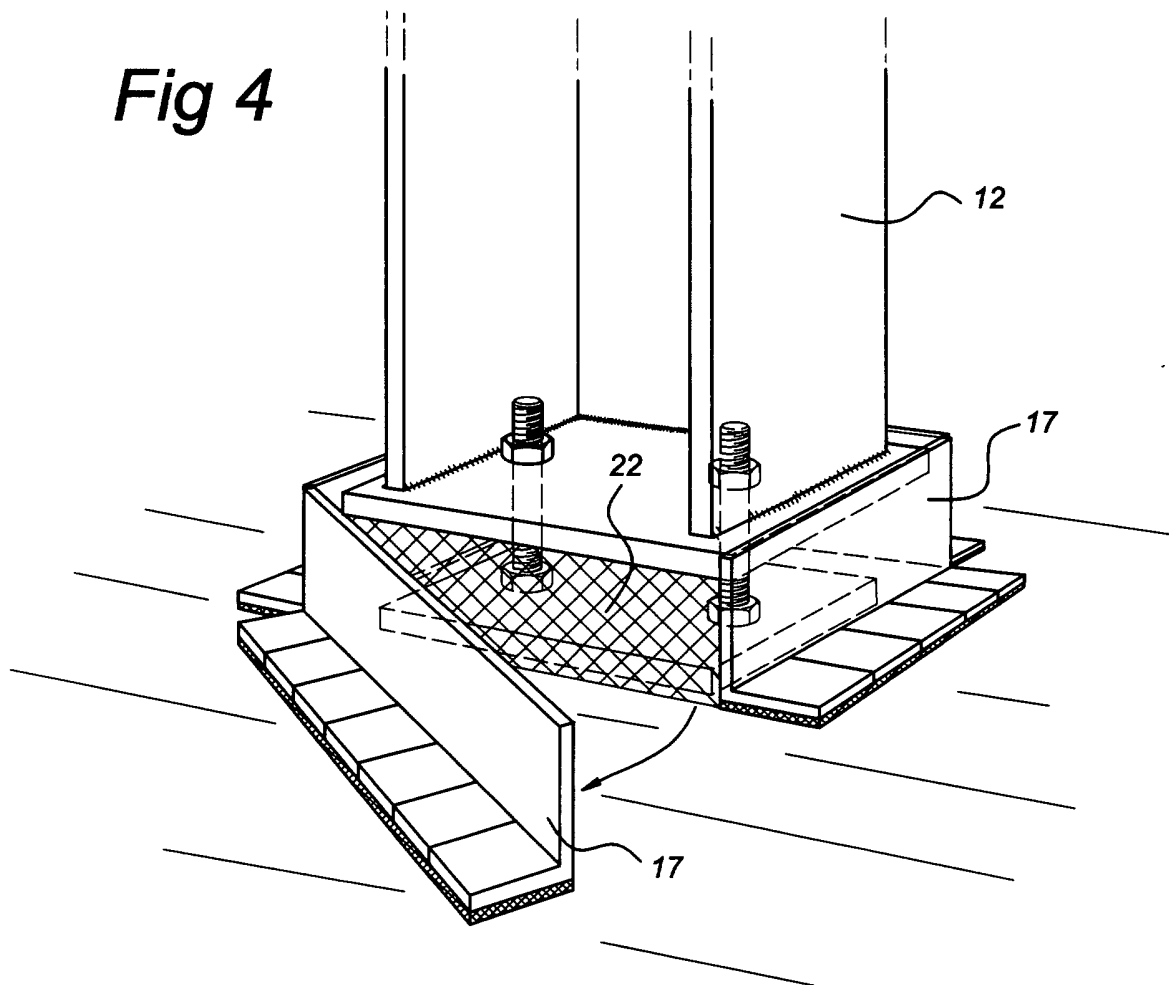


Fig 5

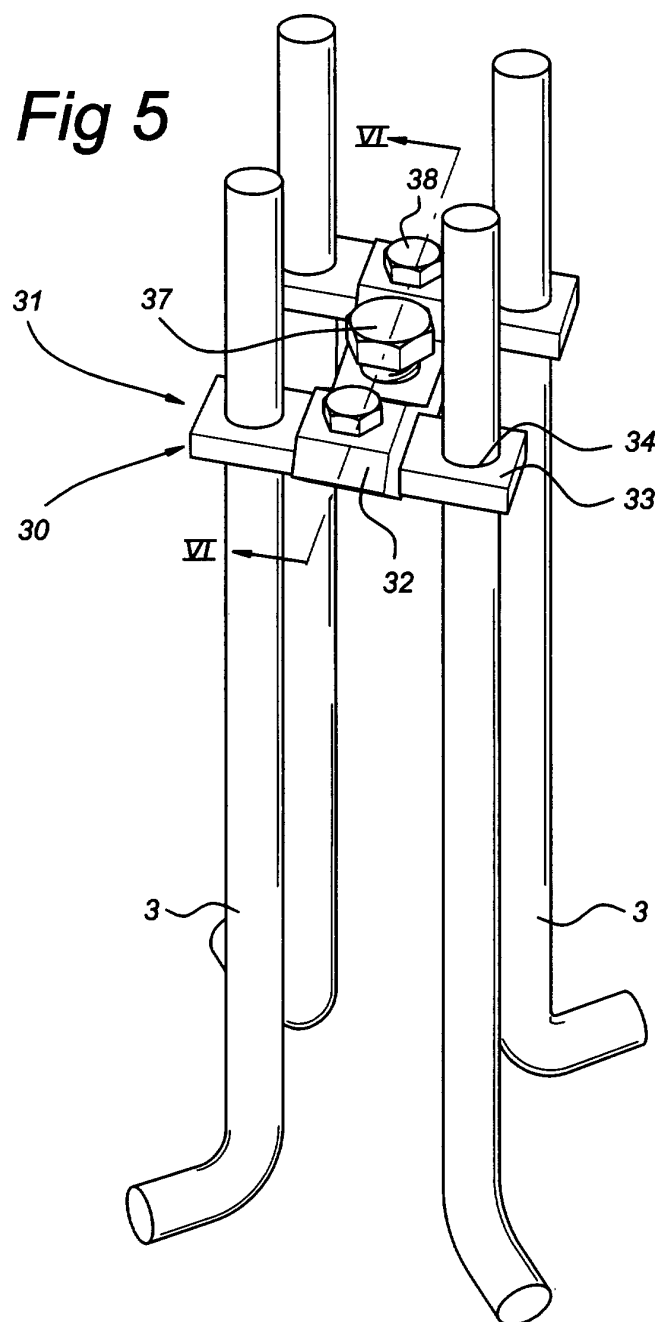
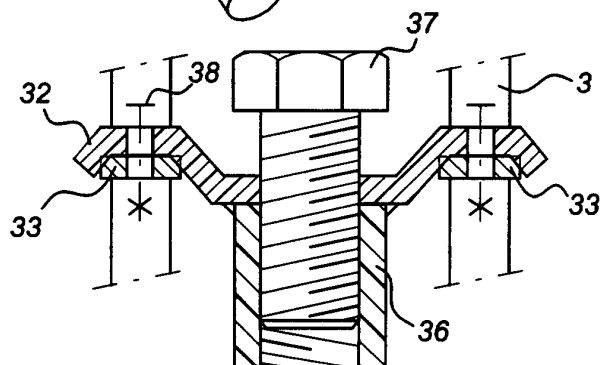


Fig 6





European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 01 20 0028

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 505 033 A (MATSUO ET AL.) 9 April 1996 (1996-04-09) * column 7, line 26 - column 8, line 67; figures 11A, 11B, 12 *	1, 8, 11	E04H12/22
A	US 3 323 765 A (FERNANDEZ) 6 June 1967 (1967-06-06) * column 4, line 11 - line 27; figure 4 *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E04H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 23 March 2001	Examiner Clasing, M
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 01 20 0028

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23-03-2001

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US 5505033 A	09-04-1996	NONE	
US 3323765 A	06-06-1967	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82