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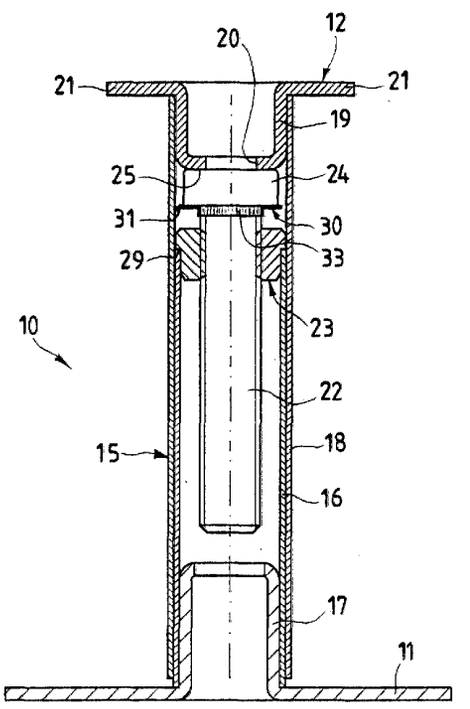
(54) Improved support column for superelevated modular flooring

(57) The invention consists of a support column for superelevated modular flooring, of the type in which a base (11) and a top support (12) are interconnected operatively by a support (15), at an adjustable height, which is formed by numerous modular elements. According to the invention, such modular elements include, in combination: an internal tubular element (16) fixed to such base (11) and an external tubular base (18) cooperating with said top support (12). Between the two mentioned internal (16) and external (18) tubular elements, a height adjustable mechanism is provided for which can be accessed from the top through the use of a manoeuvring device which passes through said top support (12).

Fig.9



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Description

[0001] The present invention relates to some improvement features made to the support columns used to lay down superelevated modular flooring.

[0002] As men skilled in the art well know, the adoption of superelevated modular flooring, in any kind of construction, is rapidly expanding.

[0003] In fact, in a construction built adopting superelevated modular flooring, the installation of the entire plant engineering network, besides being simple, rapid and rational, also has the advantage of allowing for future intervention, be it maintenance or according to contingent requirements, by simply raising one or more panels, with the objective of gaining access to the system underneath, for example to create a new job-station, or other.

[0004] Once all of the connections required have been made, it is only necessary to reposition the panel, or the panels, removed to restore the flooring as it was originally, without having carried out any complicated or costly destructive intervention.

[0005] The superelevated modular flooring is made up of a structure which can be composed of single height adjustable columns, or (more frequently) columns that are interconnected by cross-beams, upon which the panels are supported and possibly fixed.

[0006] Superelevated modular flooring of the type known is described, for example, in US Patents 4.279.109, 4.676.036, 4.685.258, 4.719.727, 4.850.162, 5.088.251, 5.412.914.

[0007] In a superelevated modular flooring, of the type briefly described above, the support column of the panels is extremely important and it should be made in such a way as to satisfy all of the following main requirements.

[0008] The support column should first of all be height adjustable, in a simple, fast and convenient manner for the staff in charge of laying the flooring, in order to allow for perfect reciprocal levelling of the panels.

[0009] The height adjustability of the support column should also be possible once the floor has been laid, removing the smallest number of panels possible, preferably just one.

[0010] Beyond the maximum adjustability field (excursion between the minimum and maximum heights), the structure of the column should allow for the creation of columns of different heights, according to requirements, without having the precise need of having available more special components, especially produced for the objective, with the obvious inconveniences that may arise.

[0011] In addition, the support column should have a structure which may be produced at a low cost, with the possibility of assembly starting from all of the loose components (separate) and starting from the different undergroups which may be assembled reciprocally.

[0012] Then, the column structure should be capable of supporting heavy loads even though of a small size (diameter).

[0013] Furthermore, the height of the support column should be finely adjusted (micrometric regulation) and slackening means should be provided for to prevent possible variations in the predefined adjustment, due to the vibrations that the floor is submitted to, originating from the various levels of strength.

[0014] Finally, the regulation mechanism of the column should be completely hidden, in order to create a column with the most pleasant appearance possible, especially for flooring made with transparent materials, such as glass for example.

[0015] Support columns like the ones that are well known are not capable of adequately satisfying all of the above mentioned requirements.

[0016] The general object of the present invention is that of creating a height adjustable support column, for superelevated modular flooring, capable of satisfying all of the above mentioned requirements.

[0017] This object is achieved by a column with the features indicated in the main claim attached hereto and in the dependent claims.

[0018] The structural and functional features of the invention and the advantages thereof with regards to the known technique can be clearly understood from an examination of the following description, referring to the drawings attached, which illustrate an example of embodiment of the invention itself. In the drawings:

- Figure 1 is a perspective view, completely exploded, illustrating all of the components of the column support according to the invention;
- Figure 2 is a perspective partially broken and section view, illustrating the column of Figure 1 in an assembled state and completely lowered;
- Figure 3 is a perspective view illustrating the column assembled in its completely lowered state;
- Figure 4 is a view, as Figure 3, illustrating the column in a raised state according to the regulation allowed for;
- Figures 5, 6 and 7 are perspective views illustrating three assembling possibilities of the column according to the invention, starting from various subgroups;
- Figure 8 is a perspective view illustrating the possibility of height adjustability from the top of the column according to the invention, by removing only one of the panels (generally four), which rest onto the column itself;
- Figure 9 is a vertical section of the column according to the invention;
- Figure 10 is a detailed view in plant illustrating the female screw of the column regulation mechanism;
- Figure 11 is a partial section view from the top of the female screw of Figure 10;
- Figure 12 is a view in plant of the anti-unscrewing washer of the height adjustable mechanism of the column; and

- Figure 13 is a section of the washer of Figure 12;
- Figure 14 is a vertical section of another column according to the invention;
- Figure 15 is an enlarged section view of a detail of Figure 14; and
- Figure 16 is a view in plant from the top of the support of Figure 14.

[0019] With reference to the drawings, the support column for superelevated modular flooring according to the invention is indicated in its whole with 10.

[0020] Column 10 is structurally made up of a support base 11 and a top support 12 aimed at receiving, directly the panels 13 of the floor, or a system of cross beams 14 upon which these panels 13 rest (Figure 8).

[0021] The base 11 and the top support 12 are interconnected by means of telescopic support 15 (Figures 13, 14) containing the height adjustable mechanism (hidden) of the column 10.

[0022] More precisely, such telescopic support 15 includes a first internal tubular element 16 trigged, for example for interference, on a male pierced attachment 17 which extends centrally from the base 11. In this way, the base 11 and the internal tubular element 16 are firmly fixed between themselves.

[0023] Upon the first internal tubular element 16 a second external tubular element 18 is mounted and translates, which is also fixed to the support 12. In this way, the support 12 is structurally formed by a glass 19 upon which the external tubular element 18 is fitted with interference. The bottom of this glass 19 has a hole 20, while numerous spokes 21 appear from its top edge (in the example illustrated, there are four), aimed at receiving the panels 13 and the cross beams 14 (Figure 8).

[0024] The height of the telescopic support 15, and therefore of the column 10, can be adjusted by a micrometric adjustment mechanism which is generally accessible from the top, and is completely contained within the telescopic support 15 itself.

[0025] Such micrometric adjustment mechanism is a screw mechanism 22 and a female screw 23, wherein the female screw 23 is blocked with interference at the top of the internal tubular element 16, while the screw 22 is fitted, at the highest extremity, with a manoeuvre head 24, which is easily adjoined against the pierced base 25 of the glass 19. Furthermore, the head 24 of the screw 22 has a seat 26, for example hexagonal, which can be accessed through the hole 20 of the glass 19, for a manoeuvre tool 27 (Figure 8).

[0026] As clearly illustrated in Figures 10, 11 the female screw 23 presents, for example, lines 28 or similar (conicity) for stable coupling with interference, at the top of the internal tubular element 16. In this way, the female screw 23 is inserted using pressure into the tubular element 16 until it reaches one of its circumferential undercuts 29 against the edge of the tubular element 16 itself.

[0027] The height adjustable mechanism of the column 10 according to the invention includes a washer which is resiliently pliable 30 (Figures 1, 12, 13, fitted onto the screw stem 22 and abutting against the lower face of the head 24.

[0028] In this way, the screw stem 22 has an unthreaded restraint area 33 (Figure 9) with gripping ridges (or equivalent).

[0029] As is clearly illustrated in Figures 1, 12, 13, such washer 30 has a series of interspaced external circumferential teeth 31, slightly bent (just a few degrees) downwards, and a series of internal teeth 32, intercalated to teeth 31, bent downwards, by approximately 90°, in order to identify a stop neck which puts pressure on the stem of the screw 22, opportunely predisposed with the above mentioned area 33 of fixing.

[0030] However, the external teeth 31 act using a friction movement over the internal surface area of the external tubular element 18, as illustrated in the Figures, in particular in Figure 9.

[0031] Figures 14-16 illustrate another possible realization of the support column of the present invention, where similar elements are indicated with the same reference numbers.

[0032] In this example the washer 30 is not present and a support 112 is provided for, of an almost flat shape, welded to the external tubular element 18. The hole 20 provides for four stalks 40 placed at 90° from one another, aimed at abutting against a border 41 made above the head 24 of the screw 22 and engaging itself with it. The head 24, furthermore, has a central protuberance 42 which fixes itself between the hole 20 and the housing 26 is left empty for the maneouvre tool 27. The stalks 40, of any number whatsoever, engage themselves with the head 24 of the screw 22 and prevent unscrewing even in this case.

[0033] The operation of the support column according to the invention is clear as described above with reference to the drawings, and briefly is the following.

[0034] The support columns 10 of the tubular flooring are placed on the concrete slab of the building, and possibly fixed to the base 11, and possibly also interconnected between themselves, using the cross beams 14, as illustrated in Figure 9.

[0035] The height adjustment of the column 10 is conveniently carried out from above, without any problems whatsoever for the operator, using the tool 27 (or any other tool suitable for the task, introduced - through the pierced bottom of the glass 19 - in the housing 26 of the head 24 of the screw 22), in the screwing or unscrewing direction, as indicated by arrows 33 of Figure 8, depending if the height of the column 10 is to be increased or reduced. We must point out that such an operation may be carried out automatically through the use of motorized systems that are controlled by level sensors.

[0036] Thanks to the action of the anti-unscrewing washer 30, acting in a positive manner between the screw 22 and the external tubular element 18, the prefixed height of the column 10 is guaranteed throughout

time, even in the presence of relevant stresses transmitted by the overhanging flooring.

[0037] Characteristically, in case of need, the column support 10 can be reached simply by removing just one of the panels 13 which puts pressure on it, as illustrated in Figure 8, through the introduction from above of tool 27 which can be inserted into the hexagonal head 26 of the head 24 of the screw 22 passing easily through the hole 20 at the bottom of the glass 19.

[0038] Another important advantage of the support column according to the invention is that columns of different heights are achieved by simply modifying the length (an operation that can easily be done on site) of the tubular elements 16 and/or 18, with equal regulation fields, without the need to keep special components in stock, or to carry out on site inappropriate cutting operations of existing components.

[0039] As can be clearly seen from the drawings, the height adjustment mechanism of the column is completely hidden, therefore the column has a pleasant appearance and can be used when laying transparent flooring.

[0040] A column that is produced according to the regulations of this invention, despite the relatively small diameter of the telescopic support 15, is capable of bearing extremely heavy weights, as the only function of the screw 22 is that of contrasting the compression loads, while the flexural loads are contrasted by the telescopic support 15.

[0041] More precisely, the vertical load is supported by the screw system, bolt and internal tubular element, while the side or radial load is supported by two internal and external telescopic tubular elements and guided between themselves.

[0042] According to the invention the column support is made of seven members, which can be packed and assembled in different ways, all at very low costs.

[0043] The seven members can be packed loose, as illustrated in Figure 1, and assembled one at a time.

[0044] On the other hand a package can be prepared, as illustrated in Figure 5, where the screw 22, the female screw 23 and the washer 30 are assembled in a subgroup, which are in turn assembled to the other loose members. Or, according to the invention the column may be packaged with the base 11 and with the internal sleeve 16 loose, together with two subgroups made up of: a first subgroup of screw 22, female screw 23 and washer 30 and a second subgroup made up of the head and the external tubular element 18, as illustrated in Figure 6.

[0045] Finally, according to the invention the column may be packed with the base 11 and the internal tubular element 16 loose, and with all the other components mounted into a single subgroup, as illustrated in Figure 7.

[0046] The objective mentioned in the preamble of the description is therefore achieved.

[0047] The scope of protection of the invention is defined in the following claims.

Claims

1. Column support for superelevated modular flooring, wherein a base (11) and a top support (12, 112) are interconnected operatively by means of a support (15), at an adjustable height, which is made up of numerous modular elements, **characterised in that** such modular elements include, in combination: an internal tubular element (16) fixed to said base (11) and an external tubular element (18) which works with said top support (12, 112), and between these two internal (16) and external (18) tubular elements a height adjustable mechanism is provided for, which can be accessed from the top using a manoeuvre tool passing through said top support (12, 112).

2. A column, according to claim 1, **characterised in that** said height adjustable mechanism is a screw (22) and female screw (23) mechanism.

3. A column, according to claim 2, **characterised in that** said screw (22) and female screw (23) mechanism includes a screw (22) with a head (24) that abuts against said top support (12, 112) and has a casing for manoeuvre tool (27), and a female screw (23) fixed to the top extremity of said internal tubular element (16).

4. A column, according to claim 3, **characterised in that** said top support (12) is structurally made up of a glass (19) upon which said external tubular element (18) is fixed, the bottom (25) of the glass (19) has a hole (20) for the access of said manoeuvre tool (27), while numerous spokes (21) arise from the top support aimed at receiving the panels (13) and the cross beams (14).

5. A column, according to claim 1, **characterised in that** between said support (15), and said regulation mechanism, an anti-unscrewing blocking means is provided for.

6. A column, according to claim 5, **characterised in that** said anti-unscrewing blocking means is made up of an elastically pliable washer (30) acting between said screw (22) and said external tubular element (18).

7. A column, according to claim 6, **characterised in that** said washer (30) has a series of circumferential external interspaced teeth (31), slightly bent downwards or upwards, working together with the internal surface of the external tubular element (18) and a series of internal teeth (32), intercalated to the

teeth (31), bent downwards, in order to identify a stop neck which puts pressure on the stem of the screw (22), opportunely provided with a fixing area (33).

8. A column, according to claim 3, **characterised in that** said female screw (23) has means (28) for stable coupling, with interference, to the top of the internal tubular element (16), upon which said female screw (23) is inserted using pressure until it reaches the stroke of one of its circumferential undercuts (29) against the end border of the tubular element (16) itself.

9. A column, according to claim 3, **characterised in that** said support (112) includes an anti-unscrewing blocking means made up of stalks (40) made from said support (112) which abuts against a screw (22) head (24) of a screw (22)-and-female-screw (23) mechanism, said support (112) being flat and connected to said external tubular element (18).

10. A column, according to claim 9, **characterised in that** said stalks (40) are formed from around a hole (20), formed from said support (112) and abut onto a border (41) which is formed from said head (24) of the screw (22), said head (24) furthermore leads to a central protuberance (42) which fits into said hole (20).

11. A column, according to claims 9 or 10, **characterised in that** said stalks (40) are four and are positioned at 90° from each other.

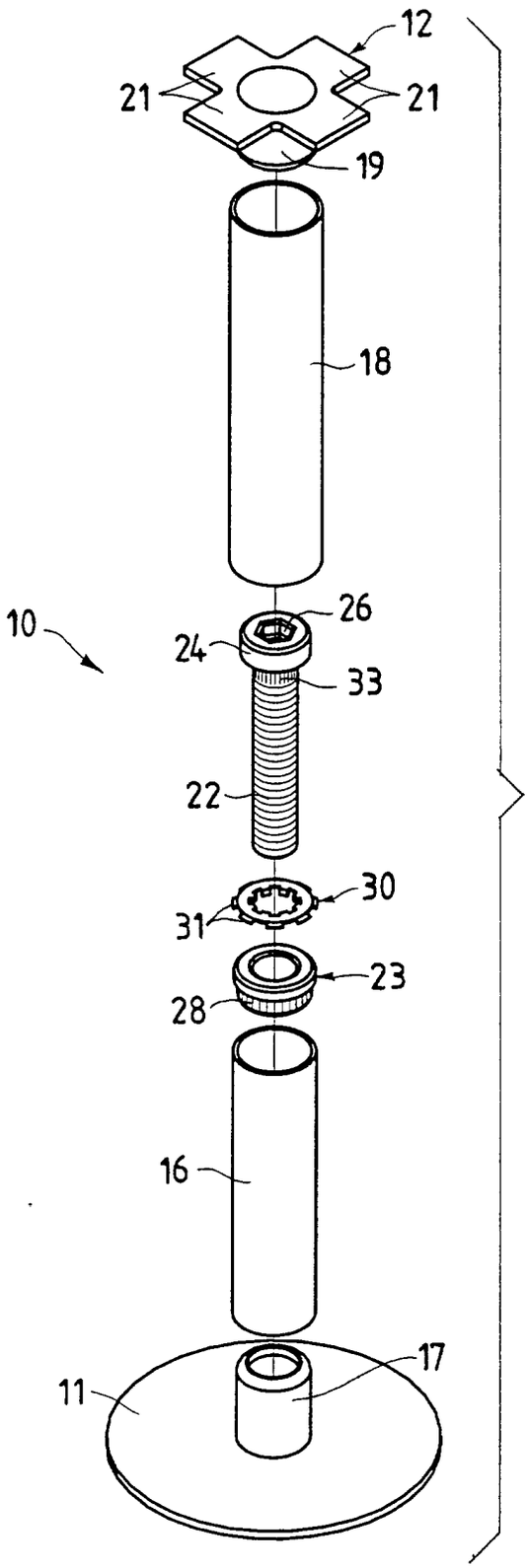


Fig.1

Fig.2

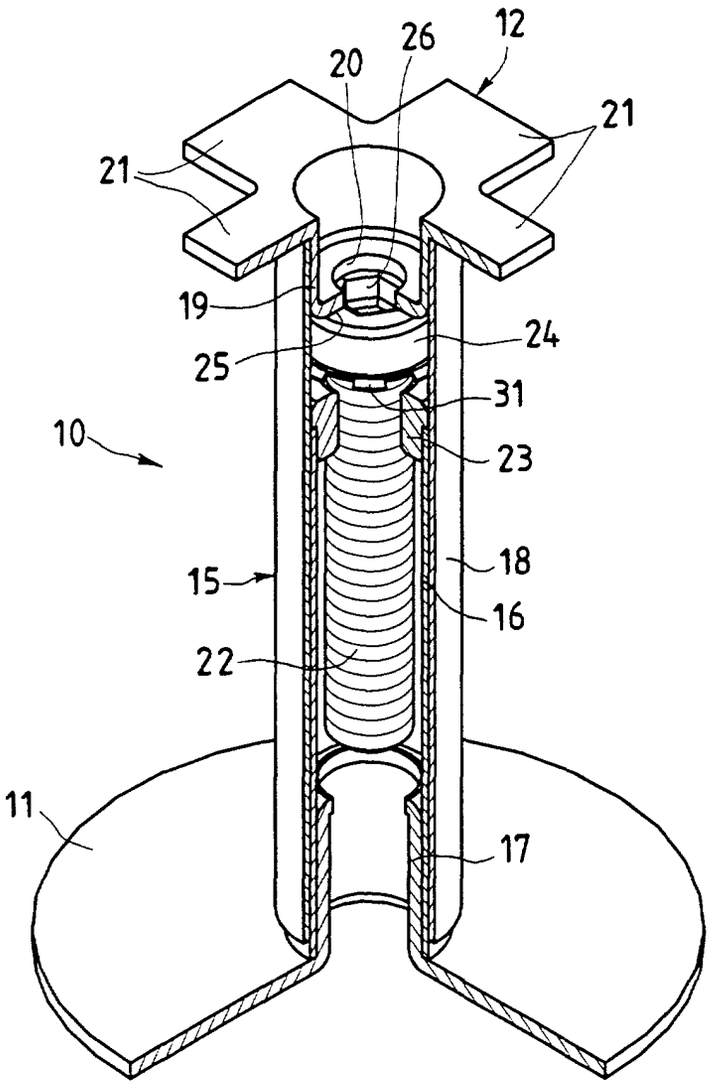
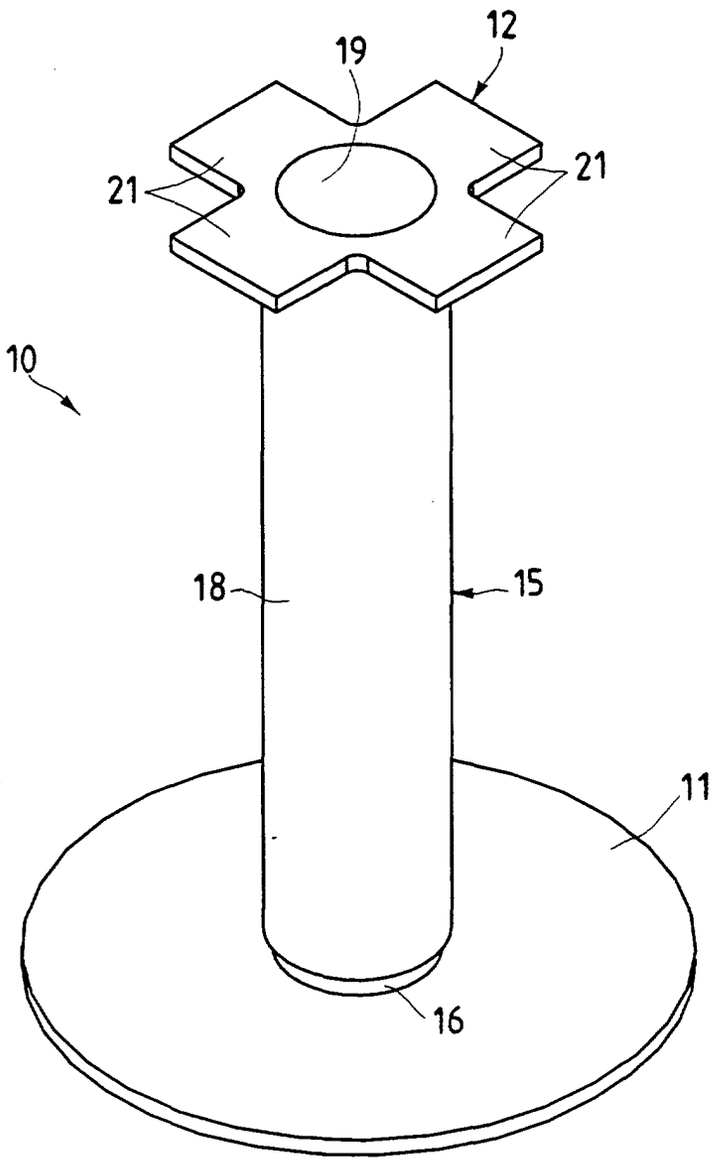


Fig.3



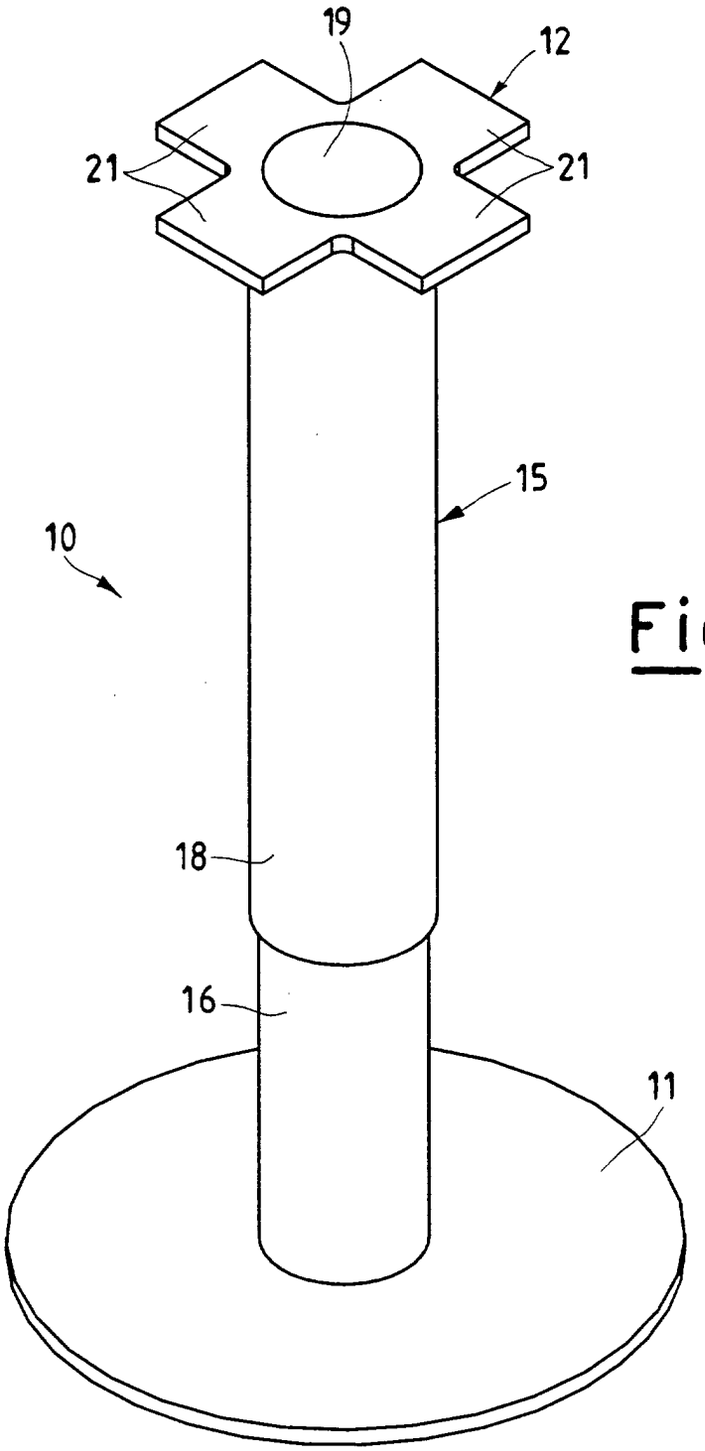


Fig.4

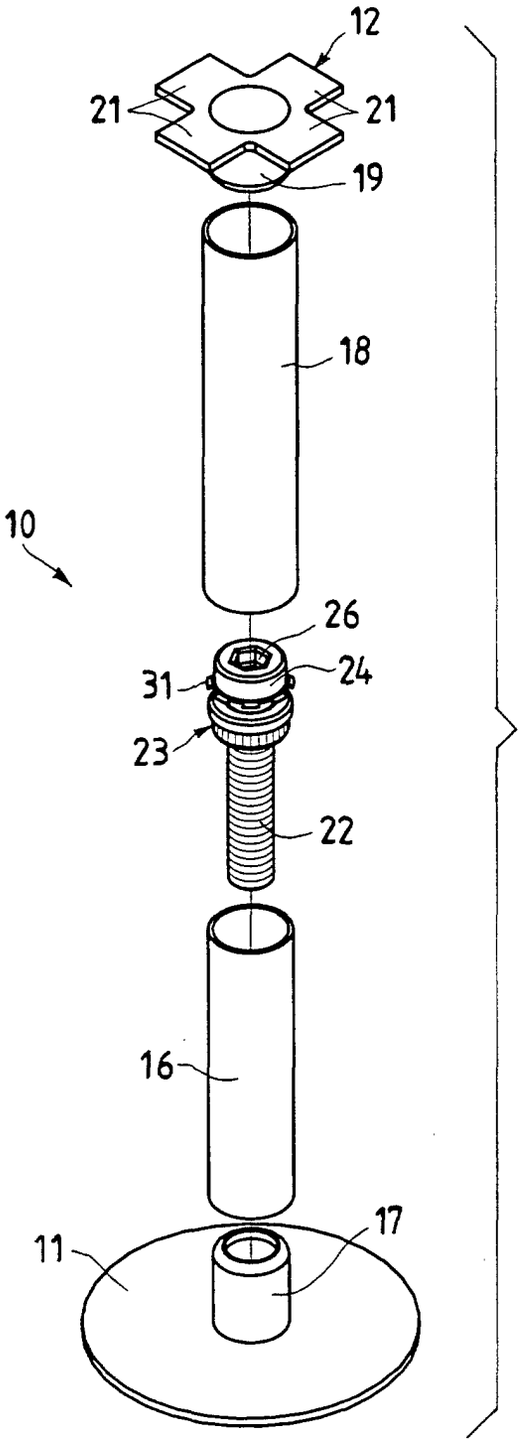


Fig.5

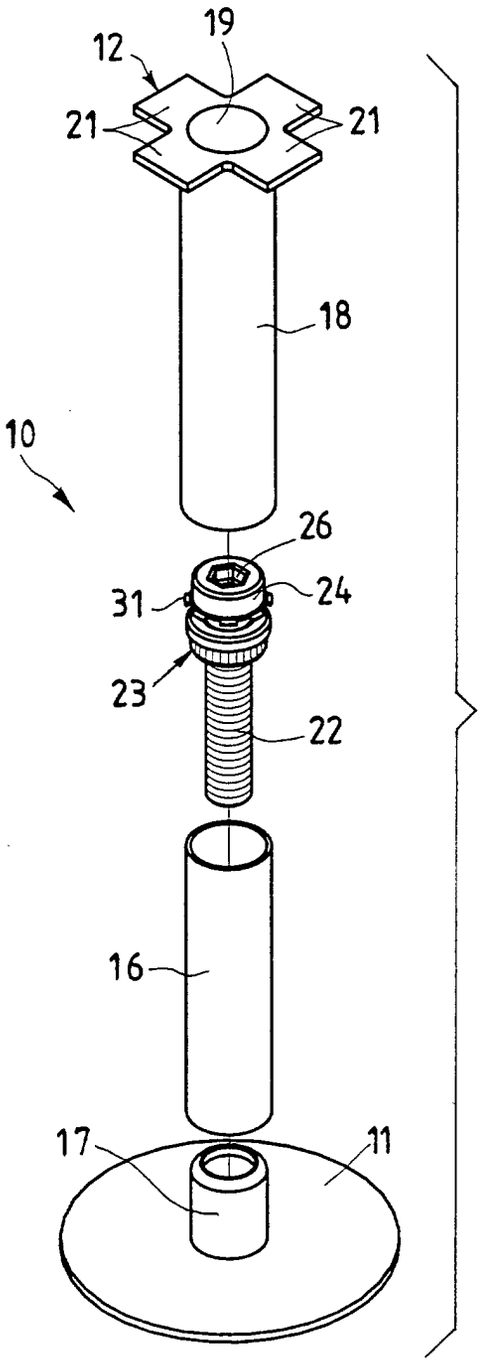


Fig.6

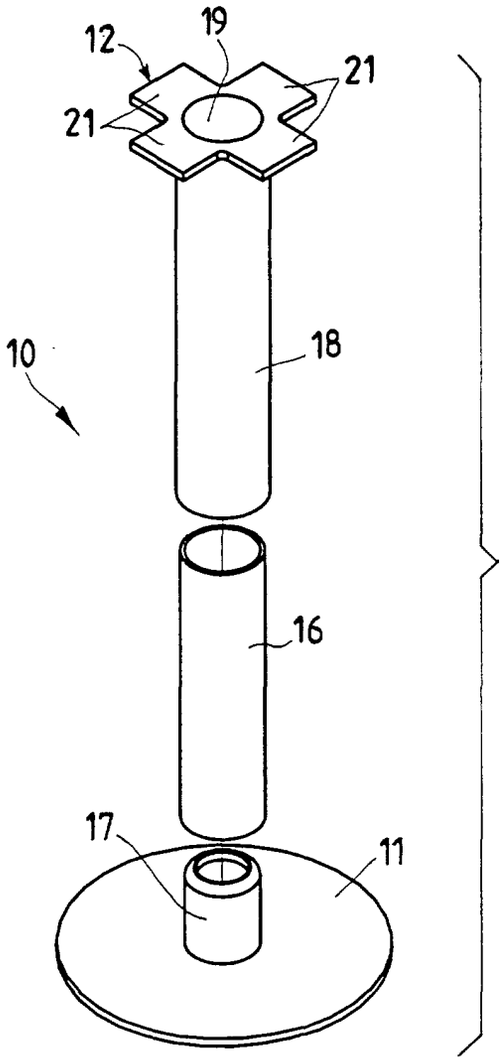


Fig.7

Fig.8

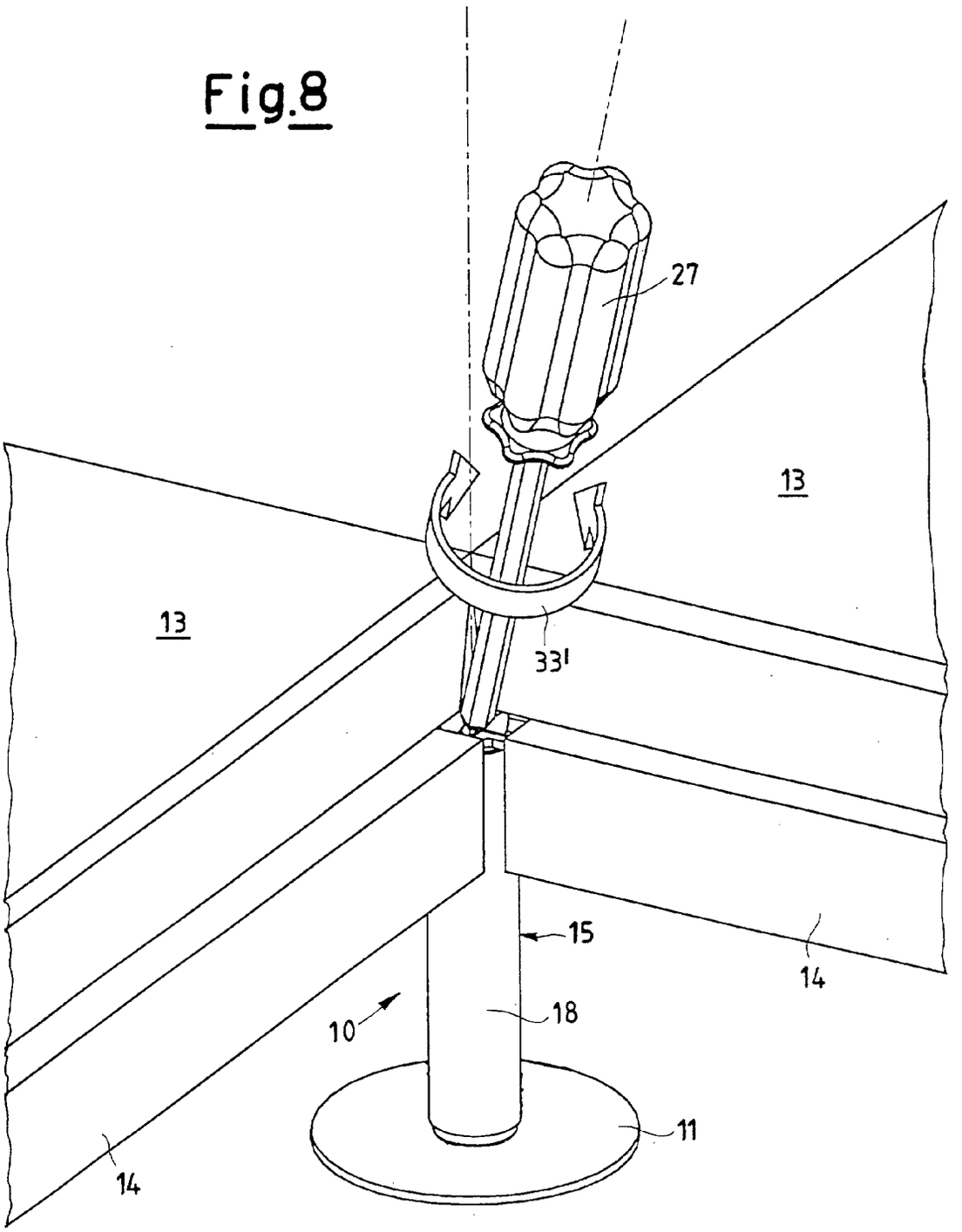
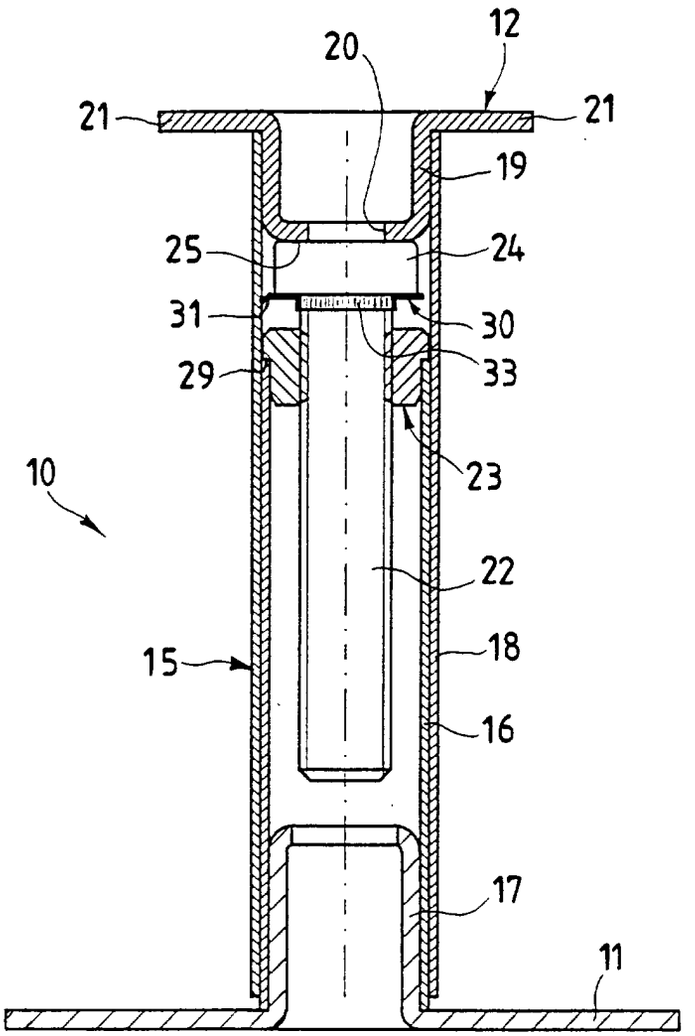


Fig.9



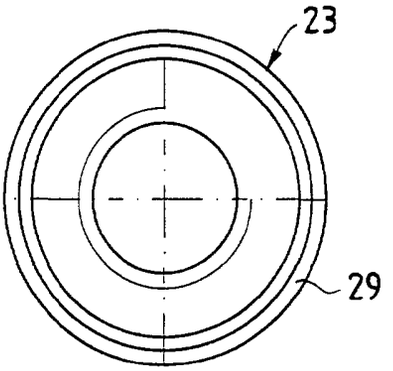


Fig.10

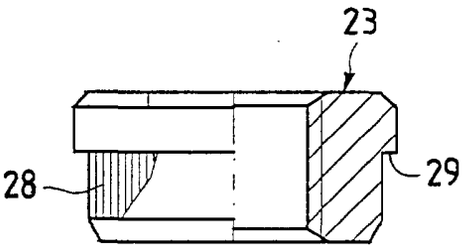
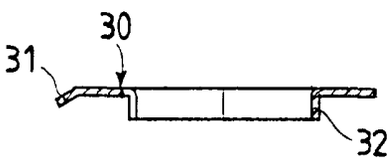


Fig.11

Fig.13



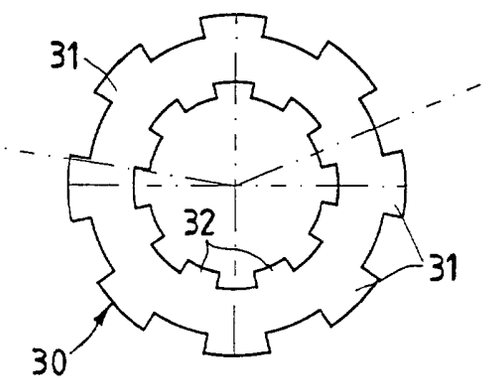


Fig.12

Fig.14

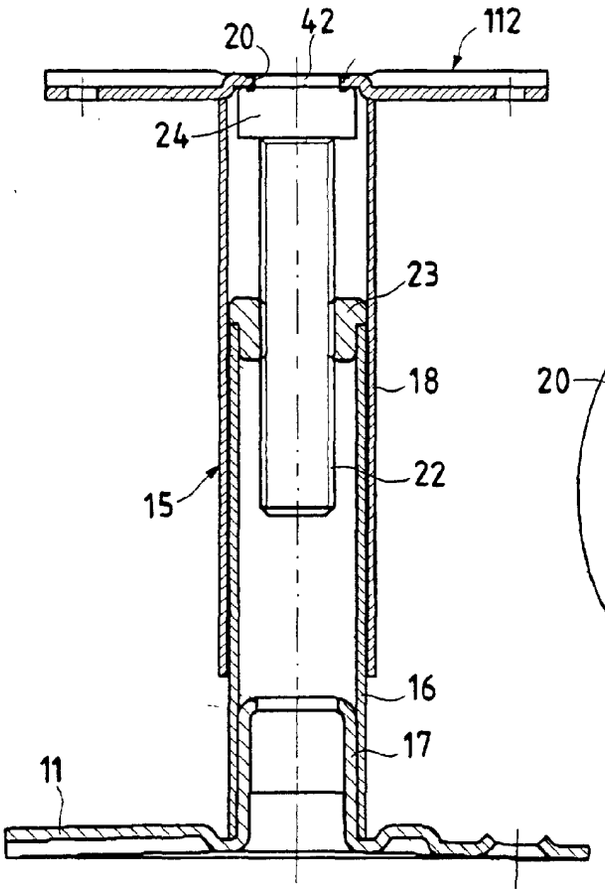
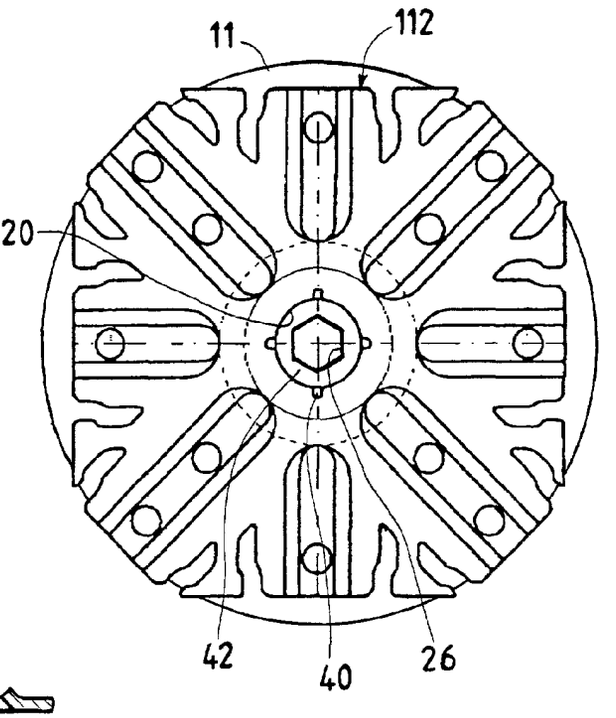


Fig.16



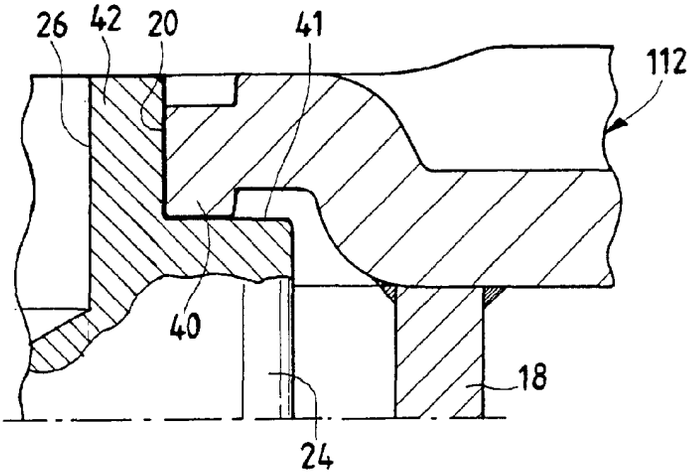


Fig.15

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 20 2747

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 November 2000	Vijverman, W

CATEGORY OF CITED DOCUMENTS

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