(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 854 255 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
22.07.1998 Bulletin 1998/30

(51) Int Cl.[6]: **E04G 25/06**

(21) Application number: **98500004.1**

(22) Date of filing: **12.01.1998**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **15.01.1997 ES 9700061**
23.01.1997 ES 9700128

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(54) A strut for supporting formwork

(57) The device is applicable to struts constituted by two telescopically-coupled tubular elements (1,2), and is characterized in that it has a sleeve (15) which can slide on the shaft of the strut, the sleeve (15) bearing on the adjustment nut (3) of the strut and having two diametrally-opposed notches (5,6) each of which has an inclined step in one of its sides, the bottom of the notch (5,6) preferably being rounded in order to receive the axial travel-limit pin (10) of the strut, the device being completed by a cylindrical element (11) which slides on the outside of the shaft of the strut, carrying respective diametrally-opposed projections (12,13) which are arranged in the direction of the generatrices of the sleeve and, for an upper or working position of the strut, can be engaged in the notches (5,6) of the sleeve, preventing the pin (10) from accidentally falling into the notches.

Moreover, the strut comprises two telescopic tubular elements (1,2) such that a resilient clip (20) is mounted inside the inner tubular element (2), the clip having two arms (21,21') with enlarged end portions which project through respective diametrally-opposed openings (24,24') in the said inner tubular element (2) and can abut an upper collar (25) fixed to the adjustment nut (3), preventing accidental disassembly of the strut.

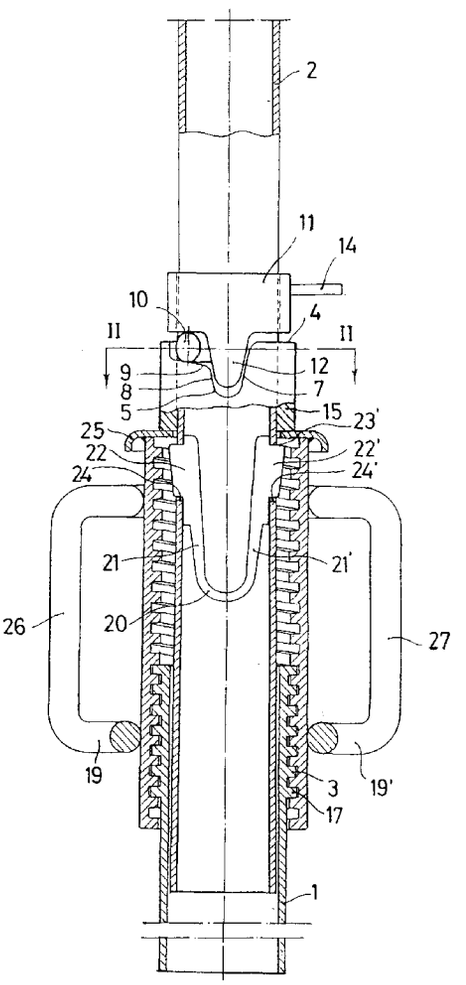

FIG. 1

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Description

The present invention relates to a strut for supporting formwork having considerable characteristics of novelty and inventive activity over those currently known.

As is known, the purpose of using struts for supporting formwork is to provide supports which are easy to use and inexpensive to produce for supporting formwork for concrete in construction works during the time when the concrete is setting, the struts being intended subsequently to be dismantled and possibly transported to other works.

At the moment, known struts have a structure based on two elements of which one forms the base or the portion which establishes contact with the ground and the other is the so-called shaft which is the element which, by sliding inside the base, establishes contact with the formwork with its upper end. The two elements are fixed together by devices of various types.

Some currently-known struts have quick-release devices based on the establishment of notches which have a straight step on the upper edge of an element associated with the upper end of the strut, thus defining a substantially horizontal region on which the transverse pin which extends through the shaft can rest, this position corresponding to the working position of the strut, the notches also defining, in a position immediately adjacent each step, a recess in which the pin will be housed after it has descended vertically or dropped to the position in which the strut is not loaded. In devices of this type for releasing the load on struts there is the considerable disadvantage that, owing to an incorrect operation, a knock, etc., the pin may be moved towards the edge of the step, falling into the groove and releasing the load at an undesired moment, that is, when the strut is in the working position, which may cause considerable problems. Moreover, given that the surface on which the pin bears must have a very slight inclination in order not to favour accidental falling, it is necessary to strike the pin hard in order for it to fall into the recess which is intended to receive it.

Another problem which arises with currently-known struts is that the shaft is easily separated from the base once the strut has been taken down. This gives rise to losses and damages to the elements mentioned owing to knocks in the regions which have to be fitted into one another, which involves wastage of equipment owing to the need to renovate some of the said elements and/or additional costs for repairs, etc.

The present invention is intended to solve the problems mentioned above in a manner such that the pin of the device for releasing the load cannot fall into the release notch accidentally, and in a manner such that the force for moving the pin to the release position is minimal.

Another of the objects of the present invention is to disclose a strut which has means for preventing detachment of the shaft from the base, so that separation of the two elements is impossible and the problems mentioned are prevented.

In order to achieve its objects, the present invention provides for a sleeve which can slide on the shaft of the strut, the sleeve bearing on the adjustment nut of the strut and having two diametrally-opposed notches each of which has an inclined step in one of its sides, the bottom of the notch preferably being rounded in order to receive the axial travel-limit pin of the strut. The transverse pin will bear on the inclined side of the step in the upper or working position of the strut, the device being completed by a cylindrical element which slides on the tubular element constituting the shaft of the strut, and which performs a safety function, its lower edge being provided with two projections of a shape fitting the said notches, so that they can be housed in the said notches in working position of the pin which, for this reason, cannot accidentally fall into the notches.

The arrangement described achieves a first relative position or axial working position of the two elements of the strut in which the transverse pin bears on the intermediate inclined steps of the two notches, and a second axial position of the two elements of the strut in which the upper element has been displaced rapidly by falling from the position in abutment with the intermediate step to the bottom of the notches. The change from the first position to the second is achieved easily upon the removal of the cylindrical safety element from the position in abutment on the bottom of the notches, thus allowing the pin to be moved easily to the bottom thereof by gravity, or possibly with the aid of a gentle radial tap on the said cylindrical safety element.

Moreover, the strut of the present invention has, inside the sliding shaft, a resilient clip the ends of which project through openings in the said shaft and can abut a fixed collar on the movable height-adjustment nut which is coupled with an external thread of the base. The clip, which is mounted inside the shaft, is preferably U-shaped, its arms having respective laterally enlarged end portions which project through diametrally-opposed slots of the element forming the shaft. The collar thus, allows the shaft to pass during its sliding movement but prevents the ends of the clip from passing in its upper abutment position, thus preventing the shaft from coming fully out of the base. The said enlarged portions or heads of the U-shaped clip have slightly inclined outer sides so that, during the movement to introduce the shaft into the base, when the clip establishes contact with the edge of the tubular element forming the base, the clip is urged into the shaft, interfering with the inside of the tube forming the base until the clip reaches the upper edge of the base again during its upward movement, when the enlargements of the clip project outwardly through the slots in the shaft again, reaching the position for performing their function of abutment against the upper collar of the nut when the uppermost position is reached.

In order to facilitate the turning of the nut or annular coupling element, the strut of the present invention comprises a double handle constituted by a single rectangular frame, preferably formed from round rod, which can be adapted to the shapes of respective circular sectors in two diametrally-opposed sectors of the periphery of the nut by shaping prior to its incorporation on the outer surface of the nut of the strut, enabling a double handle to be produced for the nut by quick and easy welding in the coinciding regions, considerably facilitating the operation of the nut.

For a better understanding, some drawings of a preferred embodiment of the present invention are appended by way of non-limiting example.

Figure 1 is a side elevational view of a device according to the present invention, in the upper or working position of the strut.

Figure 2 is a cross-section taken in the section plane indicated in Figure 1.

Figure 3 is an external elevational view similar to Figure 1, corresponding to the lower position between the tubular elements of the strut.

Figures 4 and 5 are respective cross-sections of the device taken in the section planes shown.

Figures 6 and 7 are a side elevational view of the device in the lower position, and a section taken in the section plane indicated, respectively.

The device of the present invention for releasing the load on struts is applicable to struts formed by two telescopically-engaged tubular elements, indicated 1 and 2, interconnected by an adjustment nut 3, and is characterized in that a sleeve 15 which can slide on the shaft 2 of the strut bears on the adjustment nut 3 thereof and has two diametrally-opposed notches 5 and 6, (Figures 1 and 2) of which one side, for example, the side 7 of the notch 5, is straight, or possibly inclined, whereas the other side 8 has an intermediate step 9 which is inclined. The bottom of the notch is preferably rounded in order to receive the axial travel-limit pin 10 of the strut. The transverse pin 10 which interconnects the said sleeve 15 and the shaft 2 bears on the step 9 in the working position of the strut and can be moved to the bottom of the notch 5, as can be seen in Figure 3, to reach the position for the rapid removal of the strut or for the rapid release of its load. As will be understood, the difference in height between the positions shown in Figures 1 and 2 represents a rapid movement of the upper element 2 of the strut relative to the lower element or base 1, enabling the strut to be disconnected rapidly from the formwork. Given the inclination of the seat 9, the displacement of the pin 10 will take place practically automatically, by gravity, or by means of a gentle radial tap on a projecting tab 16 of the sleeve 15, moving from the position in which the strut is loaded to the position in which is not loaded.

In order to keep the pin 10 in the upper position shown in Figure 1, the device of the present invention has a cylindrical element 11 sliding on the outside of the tubular element 2 and carrying two diametrally-opposed appendages 12 and 13 which extend along generatrices, Figures 1 and 3, and the ends of which have shapes fitting the notches 5 and 6. In the position shown in Figure 1, the appendages 12 and 13 are situated in the bottom of the said notches 5 and 6, one of their side edges performing the function of an abutment which acts on the pin 10. In the position in which the pin 10 is released so that it falls to the bases of the notches, the appendages 12 and 13 are disposed on the rim 4, as can be seen in Figure 3. A small external holder or handle 14 enables the cylindrical element 11 to be handled easily during its manual upward or downward movement.

As will be understood, given the inclination of the seat 9, the pin 10 will descend to the bottom of the notches 5 and 6 practically automatically by gravity and, in the event of there being a slight blockage of the movement of the said pin, a gentle radial tap on the tab 16 will force it to move, if necessary.

According to the present invention, the tubular element 1 has, around its upper edge, a screw thread 17 in which the nut 3, provided with a double outer handle constituted by the elements 19 and 19', is engaged.

Inside the tubular element 2, there is a resilient U-shaped clip 20, having symmetrical arms 21 and 21' which terminate in respective enlarged, laterally outwardly-projecting portions 22 and 22' with substantially straight upper edges 23 and 23'. By virtue of its resilience, the said clip 20 has the effect of moving the arms 21 and 21' apart so that the enlarged portions 22 and 22' project through diametrally-opposed openings 24 and 24' in the tubular element 2. With this arrangement, when the tubular elements 1 and 2 which form the strut adopt the position shown in Figure 2, the enlarged portions 22 and 22' act against the inner wall of the base tubular element. When the tubular element 2 reaches its upper abutment position, that is, in its uppermost position, when the enlarged portions 22 and 22' have passed over the upper edge of the tubular element 1, the said enlarged portions project from inside the tube 2 to a greater extent and can abut the inner edges of the upper collar 25 of the nut 3, preventing accidental separation of the two elements of the strut.

The double handles 19 and 19' are formed from a rectangular element, preferably made of round rod, with larger sides 26 and 27 having respective substantially semi-circumferential sector-shaped regions 28 or 29 which fit regions of the same shape, that is, diametrally-opposed and axially spaced-apart substantially semi-circular sectors of the upper nut 3, enabling the handles to be joined firmly and quickly to the nut 3 by a welded joint, for example, by spot welding or by another system, at the sides 26 and 27.

Claims

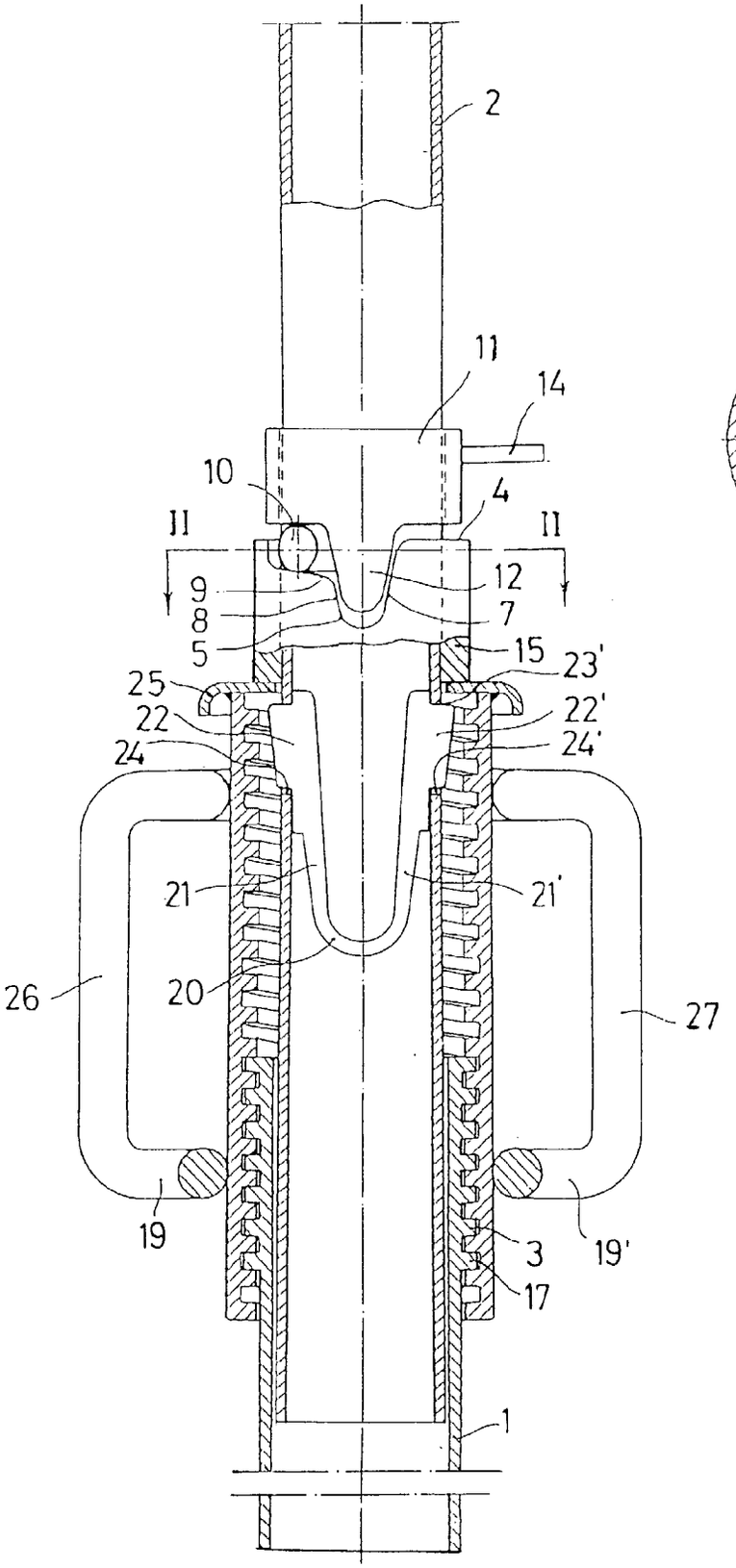
1. A strut for supporting formwork, of the type constituted by two telescopically-coupled tubular elements, characterized in that it has a sleeve which can slide on the shaft of the strut, the sleeve bearing on the adjustment nut of the strut and having two diametrally-opposed notches each of which has an inclined step in one of its sides, the bottom of each notch preferably being rounded in order to receive the axial travel-limit pin of the strut, the device being completed by a cylindrical element which slides on the outside of the shaft of the strut, carrying respective diametrally-opposed projections which are arranged in the direction of the generatrices of the sleeve and, for an upper working position of the strut, can be engaged in the notches of the sleeve forming a lateral abutment with the transverse pin in the said upper position which corresponds to the position in which the said pin bears on the intermediate inclined steps of the two notches, preventing the pin from accidentally falling into the notches.

2. A strut for supporting formwork, according to Claim 1, characterized in that the projections of the sliding cylindrical element of the device are of a shape substantially fitting the notches of the sleeve.

3. A strut for supporting formwork, according to Claim 1, characterized in that a resilient U-shaped clip is mounted inside the inner tubular element, the arms of the U-shaped clip having respective enlarged end portions which project laterally outwardly and which can project through respective diametrally-opposed openings of the inner tubular element in order to abut an upper collar fixed to the nut, preventing accidental disassembly of the strut.

4. A strut for supporting formwork, according to Claim 1, characterized in that the outer sides of the enlarged end portions of the arms of the resilient U-shaped clip are slightly inclined to facilitate its entry into the tubular element forming the base during the downward movement of the inner tubular element or shaft.

5. A strut for supporting formwork, according to Claim 1, characterized in that the adjustment nut for the relative movement of the two tubular elements of the strut has a double outer handle constituted by a rectangular element which has, on its larger sides, respective circular sector-shaped portions which coincide with respective diametrally-opposed circular sectors of the adjustment nut of the strut, and are fixed in these positions.


2
11
14
10
4
II
II
9
8
5
12
7
15
23'
25
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26
27
19
19'
3
17
1

FIG. 1

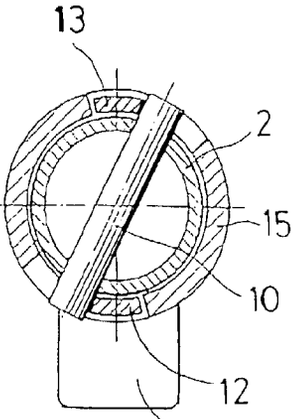
13
2
15
10
12
16

FIG. 2

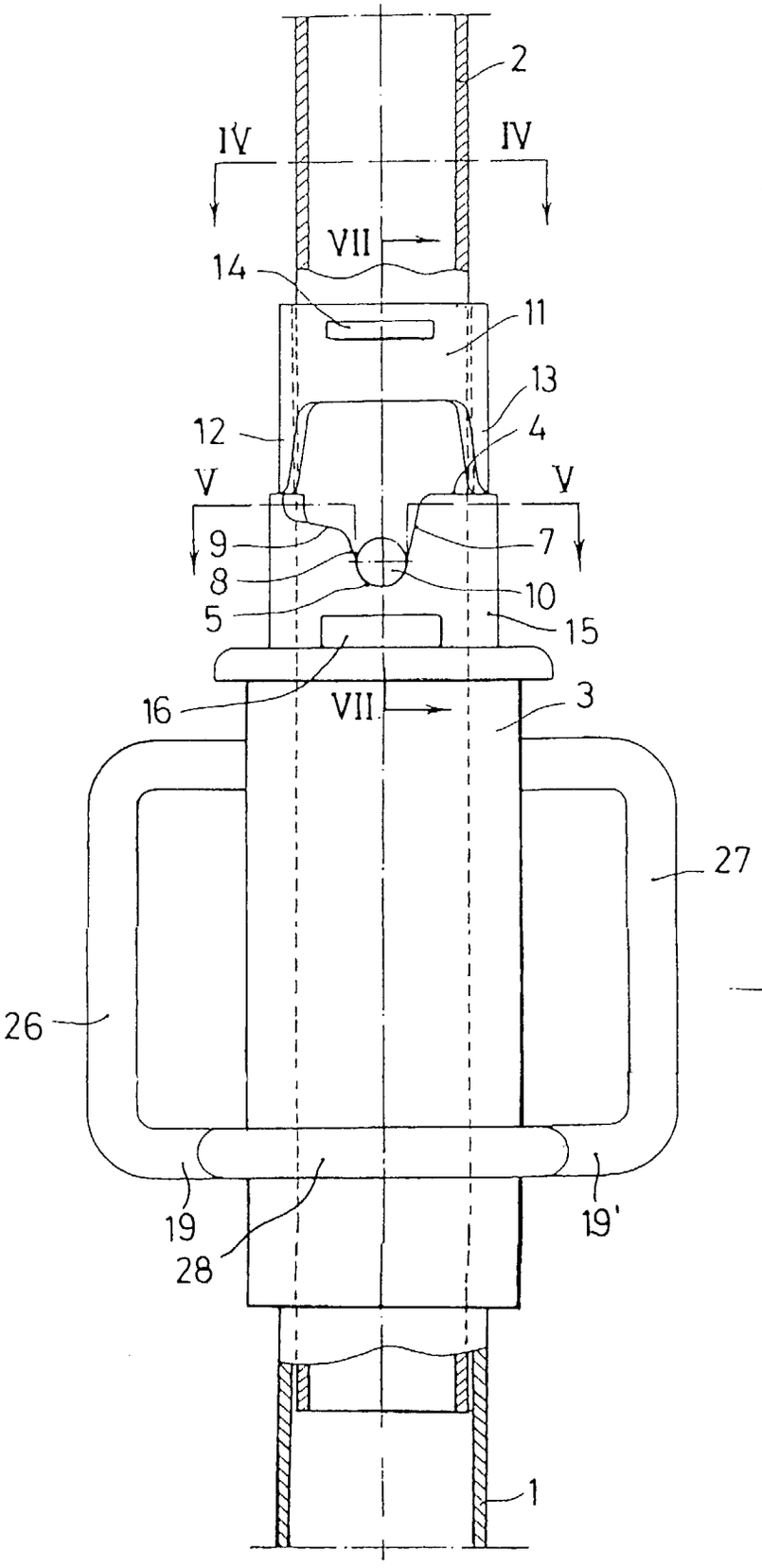

FIG. 3

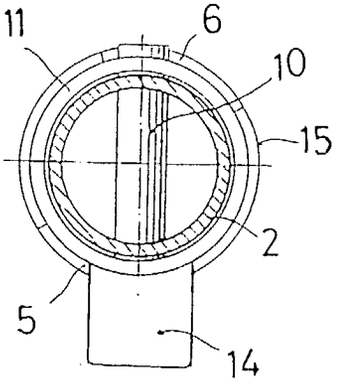

FIG. 4

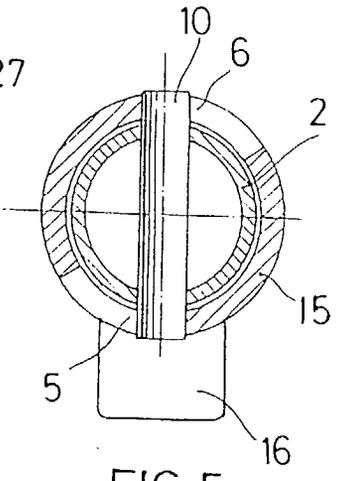

FIG. 5

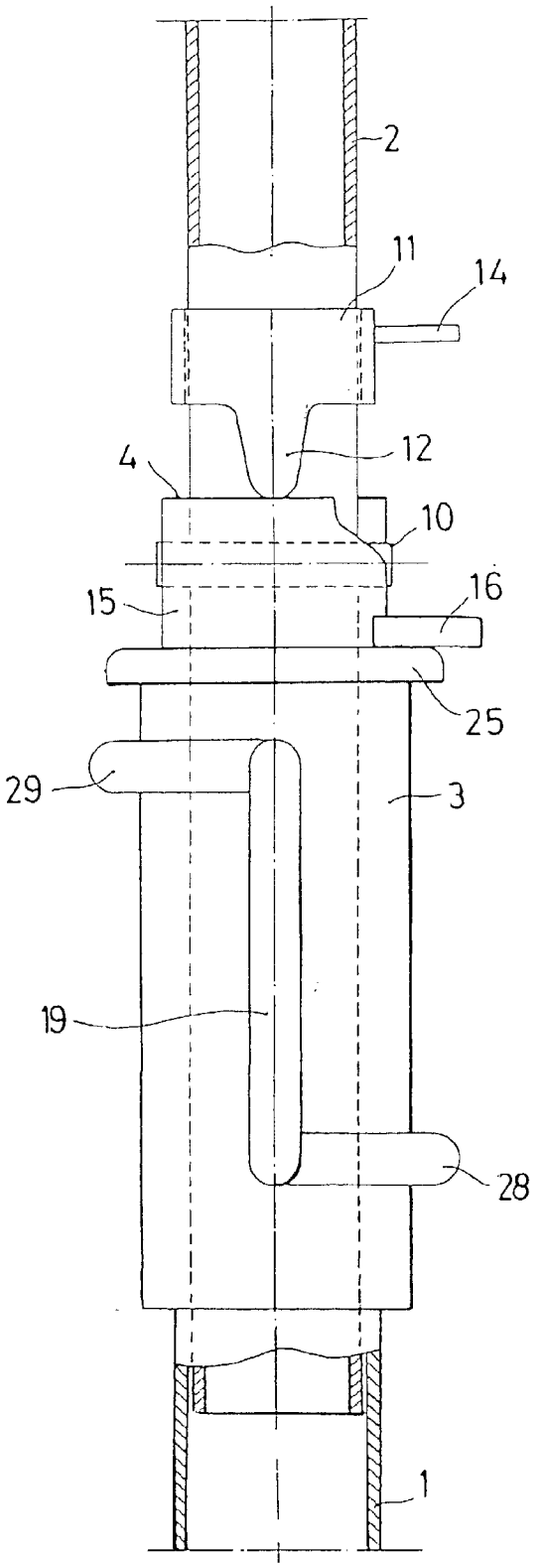

FIG.6

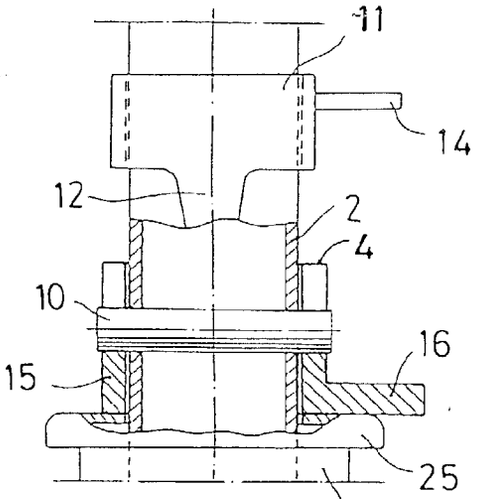

FIG.7

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EUROPEAN SEARCH REPORT

Application Number
EP 98 50 0004

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.6)
A	DE 37 39 754 A (MÜLLER & BAUM) * the whole document *	1	E04G25/06
A	DE 43 42 683 A (RENNEPONT) * column 2, line 25 - column 4, line 18; figures *	1	
A	FR 2 188 648 A (LOEB)		
A	DE 94 14 199 U (SELL)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E04G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 April 1998	Vijverman, W

CATEGORY OF CITED DOCUMENTS

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