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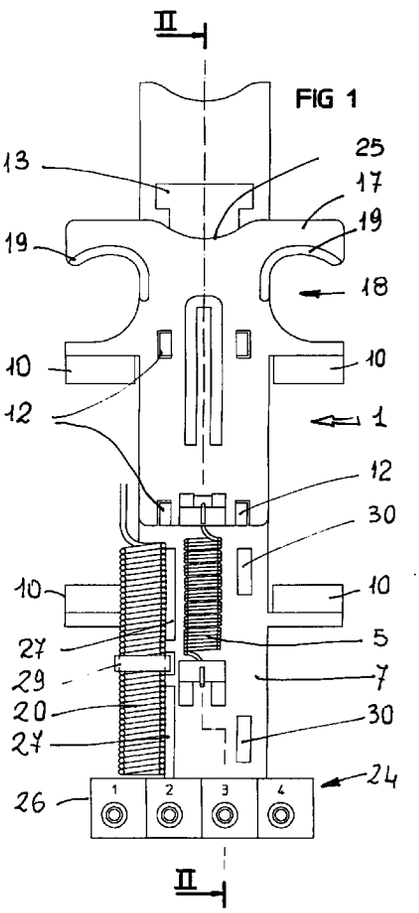
(54) Support device with quick fixing and release system for immersion sensors in cooling plants

(57) A support device with quick fixing and release system for immersion sensors (20) in cooling plants which include tanks (2) containing a cooling fluid (3) and at least one heat exchange coil (4) immersed in the fluid (3) comprises securing means (7,8,10) connected to a resilient element (5) arranged in between and to remote operating means (17,18) which can be operated outside the fluid (3) so as to be stably but removably associated with the spirals (6) of a coil (4) upon operation of the operating means (17,18) and against the opposing reaction of the resilient element (5).

FIG 1



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Description

The present invention relates to a support device with quick fixing and release system for immersion sensors in cooling plants, in particular for the refrigeration of drinks.

In the technical sector relating to the dispensing and distribution of drinks it is known to use refrigerating systems which comprise a tank containing a cooling fluid, for example cold water or brine, and coils immersed in the tank which convey some components of the drink, for example still or soda water, cooling them along their path towards the preparation or dispensing apparatus.

The detection of certain parameters important for heat exchange, such as for example the temperature of the coolant and the thickness of any layer of ice deposited on the coil, is performed using probes which operate immersed in the tank and are fixed to the coils with various techniques.

A fixing technique employed, for example, for fixing the temperature probes involves the use of removable elongated supports which are made as one piece and have shaped ends which are suitably spaced from one another so as to be able to be hung vertically and associated with two superimposed spirals of a same coil, to which the support is then rigidly connected by means of suitable pipe-holding clips or equivalent means.

A substantially similar fixing technique is also used in order to fix probes for detecting the thickness of the ice, which are made using electronics technology.

In the case where, on the other hand, these detection probes operate on the basis of a mechanical principle, fixing to the coils is performed by means of permanent connections of the welded type.

These fixing techniques, whatever the function performed by the sensor, or its physical operating principle, have in common the drawback that they require the use of support devices which are designed specifically for the particular application in question.

Moreover, since the coils are frequently mounted coaxially with each other, one inside the other, in the case of removable supports with an elongated shape, fixing to the spirals for positioning of the probe is performed with a certain degree of difficulty on account of the limited space available for manoeuvring between one coil and another.

In order to fix the support to the coil it is necessary, in fact, first of all to incline the support at a certain angle with respect to the vertical, so as to allow the association of its bottom end with a corresponding bottom spiral of the coil, and then fix the top end of the support to an overlying spiral closest to the free surface of the liquid.

Another disadvantage is represented moreover by the fact that, in the case of action required following initial installation of the support and the probes supported by the latter, the handling operations necessary for any adjustment or maintenance must inevitably be performed with immersion of the hands in the cooling fluid, resulting in obvious discomfort for the operator.

The object of the present invention is therefore that of eliminating the abovementioned drawbacks, by providing a support device with quick fixing and release system for immersion sensors, which is provided with securing means which are connected together by a resilient element and can be stably associated with the spirals of a coil so as to remain in contact therewith upon operation of operating means which can be made to function outside the liquid and against the reaction of said resilient element.

According to a preferred embodiment, the support device comprises a first and a second support element, which are slidably engaged with one another so as to be movable with respect to one another in order to be able to vary the distance of the securing means, adjusting it depending on the various distances of the coils and adapting itself also to the different forms and dimensions of the latter.

The support device comprises moreover elements for retaining the probes with a modular configuration, by means of which all the various types of sensors currently in use may be mounted on the same support device, without the need for designing in each case a specific system for connecting the sensor depending on the type of parameter to be recorded and depending on the specific operating principle.

Moreover, the retaining elements enable the various types of probes to be mounted on a same support device at different distances from the exchange walls of the coils.

This allows one, for example, to position the probes for detecting the thickness of the ice, at a distance with a varying setting depending on the requirements of the various applications.

The technical characteristics of the invention, in accordance with the aforementioned objects, may be clearly determined from the contents of the claims indicated below and the advantages thereof will emerge clearly from the detailed description which follows, with reference to the accompanying drawings, which show an embodiment thereof purely by way of a non-limiting example, in which:

Figure 1 is an overall elevation view of the support device;

Figure 2 is a cross-sectional view of the support device according to Figure 1, sectioned along the plane indicated by II-II in Figure 1;

Figure 3 is a plan view of the device according to the preceding figures, from above;

Figures 4 and 5 are respectively a front vertical elevation view and a side view of a first support element included in the device;

Figures 6, 7 and 8 are, respectively, a front vertical elevation view, a plan view from above and a sectional view along a plane indicated by VIII-VIII in

Figure 6 of a second support element included in the device;

Figure 9 is an overall view of the support device, according to the preceding Figures, mounted on the spirals of a coil in an operational configuration thereof inside a tank of a cooling plant;

Figures 10 and 11 are cross-sectional side views of the support device which illustrate particular connecting means present between the support elements of the device, so as to be able to fix them to one another in a stable, but removable manner;

Figures 12 and 13 are cross-sectional side views of the device illustrated in an operational configuration thereof, applied to a coil, and in a configuration where the support elements are located at the maximum distance from one another;

Figure 14 is a view of a detail according to Figure 12 shown on a larger scale;

Figure 15 is a horizontal section view of the support device according to Figure 9, along the line XV-XV;

Figure 16 is a view of a detail of the support device illustrated with parts removed, on which by way of example a probe for detecting the thickness of the ice is mounted.

In accordance with the figures of the drawings, 1 denotes overall a support device for immersion sensors 20 in cooling plants which include (Figure 9) tanks 2 containing a cooling fluid 3 and heat-exchange coils 4 immersed in the fluid.

The support device (Figures 1 and 2) comprises essentially a first and a second support element 7,8 (Figures 4, 5, 6, 7 and 8), which are provided with hook-shaped contact elements 10, are mounted in relative sliding engagement with respect to one another and are connected by a reslient element 5 arranged in between them and fastened thereto.

The first support element 7 has an elongated shape and has a guide 11 consisting of a rectangular eyelet 13 provided with straight edges 14 interrupted by two transverse slots 15. The second support element 8 supports two pairs of sliding blocks 12 which have a shape matching the edges 14 of the eyelet 11 and can be coupled in abutment with the straight edges 14 so as to allow the relative sliding of the second support element 8 with respect to the first support element 7 along a sliding direction 9 which, during use of the device 1, is transverse to the spirals 6 of the coil 14, as will become clear from the remainder of the description below.

The sliding blocks 12 can be fixed to and released from the eyelet 13 by means of the slots 15, in the same way that the support elements 7,8, associated respectively with the guides 11 and the sliding blocks 12, may be mutually engageable and disengageable with/from one another transversely with respect to the sliding direction 9, as clearly shown in Figure 10.

The mutually engaging and disengaging condition of the support elements 7,8 is controlled by retaining means which consist essentially in a lamellar lug 16 which has an elongated shape and is made of resiliently yielding material and is conveyed by the second support element 8 in the sliding direction 9 of the sliding block 12.

The lug 16 (Figure 13), in its working configuration, intercepts, when the two support elements 7,8 are in the condition closest to one another, a wall 23 located opposite the eyelet 13, preventing the sliding blocks 12 of the second support element 8 from reaching the slots 15 for release from the eyelet 13. In the inactive position (Figure 11), the lug 16 is deflected laterally so as to be displaced from the path of the sliding block 12. Since, in this configuration, the wall 23 is surpassed without the possibility of intercepting the lug 16, the sliding blocks 12 have a free travel path towards the slot 15 and allow the two support elements 7,8 to be separated from or assembled in the mutually engaged condition, as required.

As regards the contact elements 10, from Figures 9, 12 and 14 in particular, it can be seen that these have a profiled shape complementing the contour of the spirals 6 of the coil 4 and preferably having a polycentric curved shape designed to embrace at least two spirals 6 with cross sections of different shape and dimensions.

The second support element 8 also comprises a bracket 17 incorporated and provided with an anatomical handle 18 for manual gripping, provided with rings 19 for inserting one's fingers and an impression 25 for receiving the thumb.

The bracket 17, together with the associated handle 18, represents a preferred embodiment of more general operating means of the device 1, which can be operated outside the fluid 3.

The first support element 7, the second support element 8 and the contact elements 10, on the other hand, represent a preferred embodiment of general securing means. Consequently, from a detailed examination of Figure 9 it can be clearly understood that, by means of the action imparted manually to the operating means it is possible to attach and release rapidly the first and the second support elements 7,8 to/from two spirals 6 of a same coil 4 arranged vertically above one another, allowing the stable, but removable fixing of the support device 1 onto the spirals 6 against the opposing reaction of the resilient element 5.

Fomr Figures 1, 3 and 9 it can be seen moreover that the device 1 comprises modular means for gripping and supporting the sensors 20 at a variable distance from the spirals 6 of the coil 4, said means being located at one end 24 and consisting in particular of a clamp 21 for gripping two temperature probes 20 which are parallel with one another and have an elongated bar shape, by way of example, but not exclusively consisting of probes 20 of the electronic type for detecting the thickness of the ice.

The modular means also comprise means for adjusting the distance for fixing the probes 20 from the

spirals 6, which can be regulated by amounts variable in steps 26.

The latter in particular are distinguished from one another by coded symbols or numbers so as to allow easy identification of the step 26 in which the sensor 20 is to be inserted, by the operator who is performing assembly of the sensors 20.

The steps 26 advantageously allow a generic sensor 20, for example of the so-called bulb-type shown in Figure 16, to be positioned at various distances from the coils 4 which govern heat exchange. In the case where it is wished to further increase the possibilities of adjusting the positioning distance of the sensors 20, the adjusting means also comprise spacing elements 22 with a single step 26', which may be associated with one another in a modular superimposed manner so as to obtain the desired distance.

From an examination of Figure 1 it can be seen moreover that, in a particular constructional embodiment, the modular means for gripping and supporting the sensors 20 are incorporated in the body itself of the first support element 7.

In fact, if we observe Figures 1 and 4, it can be noted that the first support element 7 has a fin 27, mounted in a projecting manner and centrally interrupted, against which a spiral-shaped probe 20 is supported, being stably fixed to the first support element 7 by means of a clip 29 which passes through a rectangular hole 28 formed on the support element 7.

Said support element 7 also has a pair of rectangular holes 30 arranged vertically above one another, through which a filament sensor 20 may be mounted.

The invention thus conceived may be subject to numerous modifications and variations, all of which falling within the scope of the inventive idea. Moreover, all the details may be replaced by technically equivalent elements.

Claims

1. Support device with quick fixing and release system for immersion sensors (20) in cooling plants which include tanks (2) containing a cooling fluid (3) and at least one heat exchange coil (4) immersed in the fluid (3), characterized in that it comprises securing means (7,8,10) connected to a resilient element (5) arranged in between and to remote operating means (17,18) which can be operated outside the fluid (3) so as to be stably but removably associated to the spirals (6) of a coil (4) upon operation of operating means (17,18) and against the opposing reaction of the resilient element (5).

2. Support device according to Claim 1, characterized in that said securing means comprise a first and a second support element (7,8) which are mounted in relative sliding engagement in a sliding direction (9) transverse to the spirals (6) and are provided with elements (10) making contact with the spirals (6).

3. Device according to Claim 2, characterized in that said first and second support element (7,8) comprise interchangeably with one another a sliding block (12) and a guide (11) which are coupled together in a complementary manner and can be attached and released to/from one another upon disengagement of retaining means (16).

4. Device according to Claim 2, characterized in that said guide (11) includes an eyelet (13) with straight edges against which said sliding block (12) is positioned in abutment, said eyelet (13) having at least one slot (15) transverse to the edges (14) by means of which the sliding block (12) and the guide (11) can be engaged and disengaged with/from one another transversely with respect to the sliding direction (9).

5. Device according to Claim 3, characterized in that said retaining means comprise a lug (16) mounted on one of the support elements (7,8) on the path of the sliding block (12), said lug (16) being displaceable from a working position in which it intercepts the movement of the sliding block (12), preventing it from reaching the slots (15) for disengagement from the edges (14), to an inactive position, lateral with respect to the path of the sliding block (12), in which the latter has a free travel path towards the slot (15).

6. Device according to Claim 5, characterized in that said lug (16) has a lamellar shape.

7. Device according to Claim 6, characterized in that said lug (16) is resiliently yielding.

8. Device according to Claim 2, characterized in that said contact elements (10) have a shape complementing the contour of the spirals (6) of the coil (4).

9. Device according to Claim 2 or 8, characterized in that said contact elements (10) have a shape profiled so as to complement the contour of at least two spirals (6) having cross-sections different from one another.

10. Device according to Claim 2, characterized in that said operating means comprise a bracket (17) mounted on one of the support elements (7,8) and provided with a handle (18) for manual gripping.

11. Device according to Claim 10, characterized in that said handle (18) comprises rings (19) for inserting one's fingers.

12. Device according to Claim 1, characterized in that it

comprises modular means (21,22,26,26',27,28,29) for gripping and supporting the sensors (20) at a variable distance from the spirals (6) of the coil (4).

13. Device according to Claim 12, characterized in that said modular means comprises at least one clamp (21) for gripping probes (20) with an elongated shape.

14. Device according to Claim 12, characterized in that said modular means comprise means (22) for adjusting the distance at which the probes (20) are fixed from the spirals (6), said means being regulatable by amounts variable in steps (26).

15. Device according to Claim 14, characterized in that said adjusting means comprise spacing elements (22) with a single step (26'), which can be superimposed in a modular manner on one another.

16. Device according to Claim 12, characterized in that said modular means comprise a fin (27) and a hole (28) which are formed on one of said support elements (7,8) and intended for fixing a sensor (20) by means of a clip (29).

17. Device according to Claim 12, chaarcterized in that said modular means comprise a pair of holes (30) formed on said first support element (7) through which a filament sensor (20) is mounted.

18. Element for gripping and supporting sensors (20) at a variable distance from the spirals (6) of a heat exchange coil (4) in a cooling plant, characterized in that it is constructed in accordance with any one of the preceding Claims 12 to 17.

19. Quick-fixing and release support bracket for immersion sensors (20) in cooling plants which include tanks (2) containing a cooling fluid (3) and heat exchange coils (4) immersed in the fluid (3), characterized in that it is constructed in accordance with any one of the preceding Claims 1 to 11.

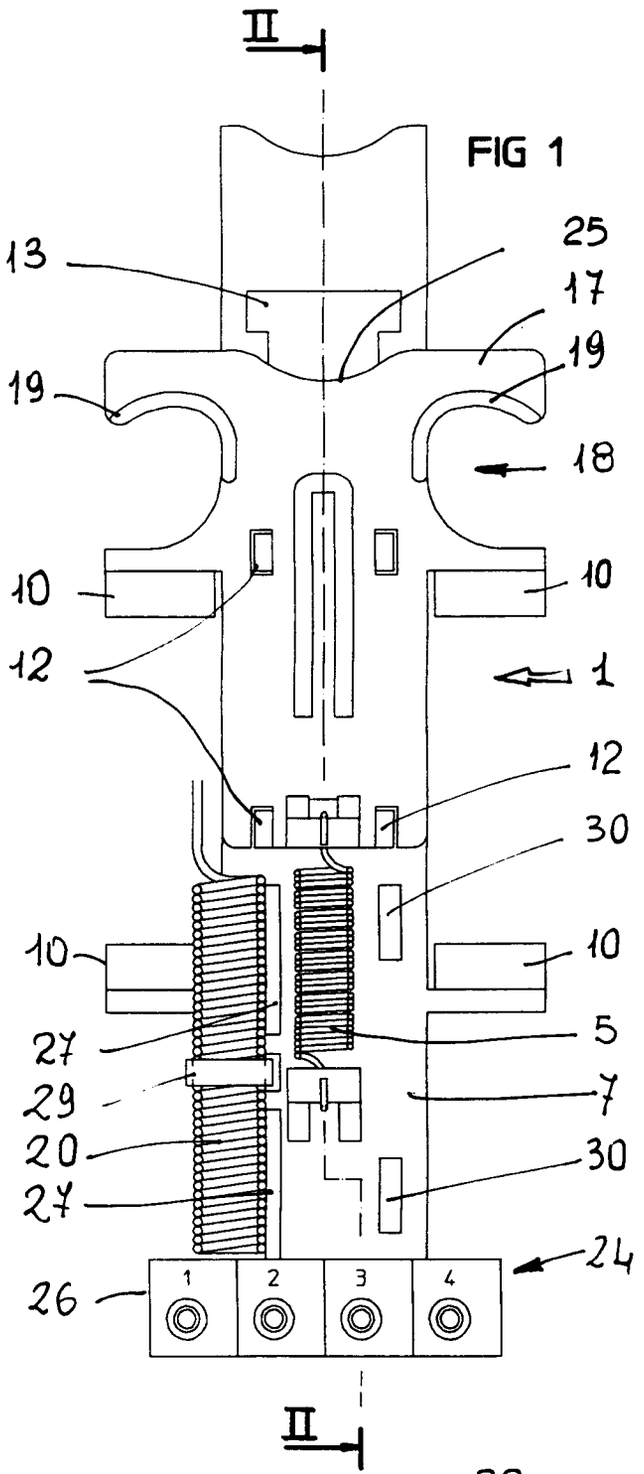

FIG 1

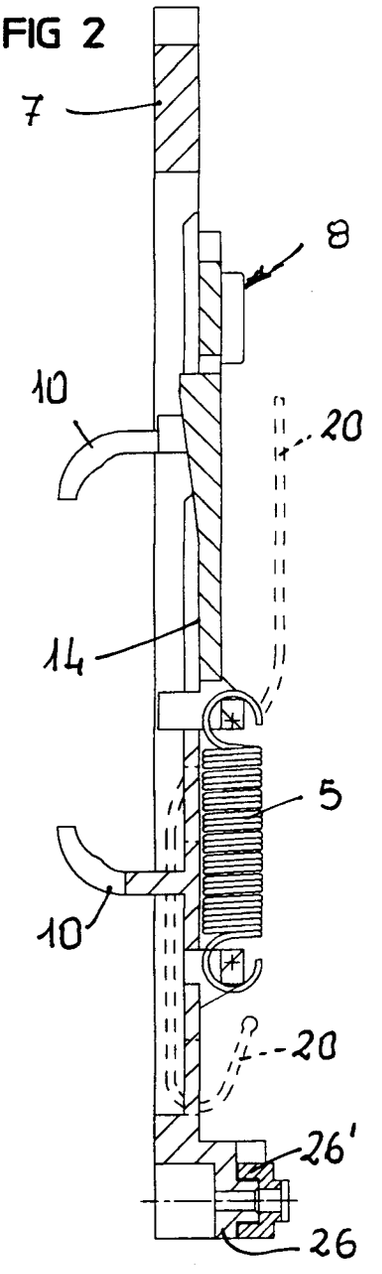

FIG 2

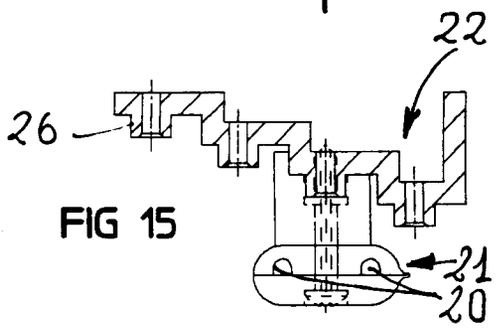

FIG 15

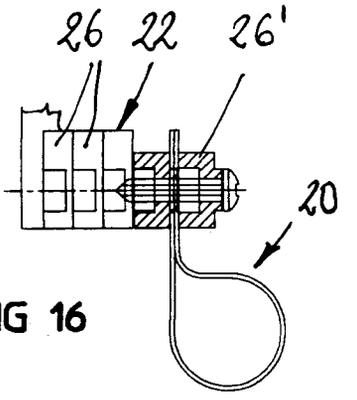

FIG 16

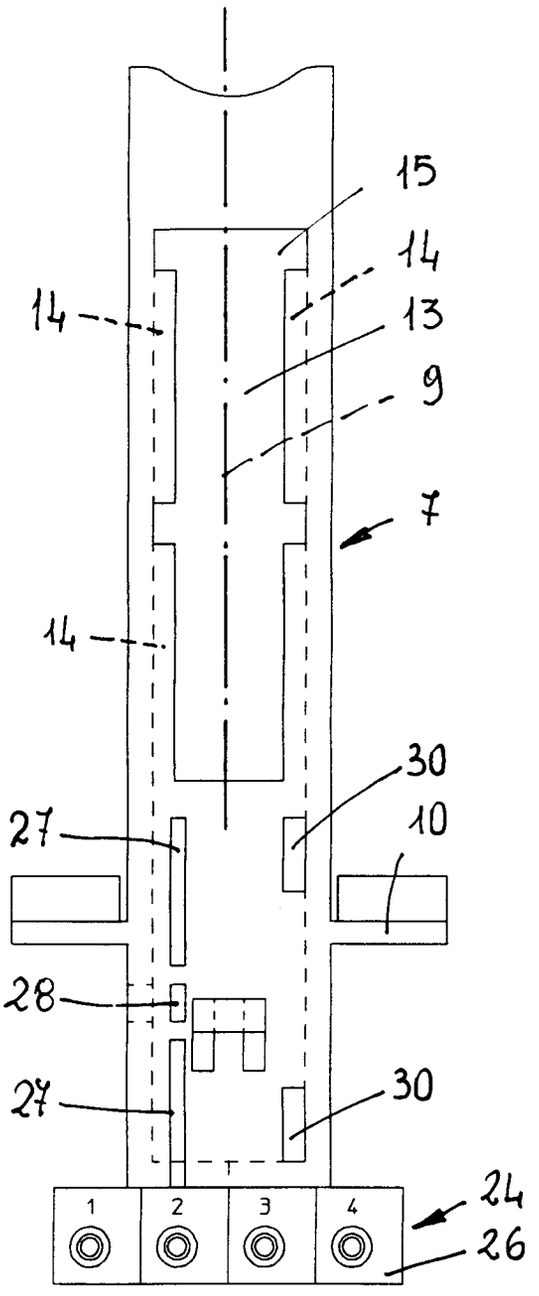

FIG 4

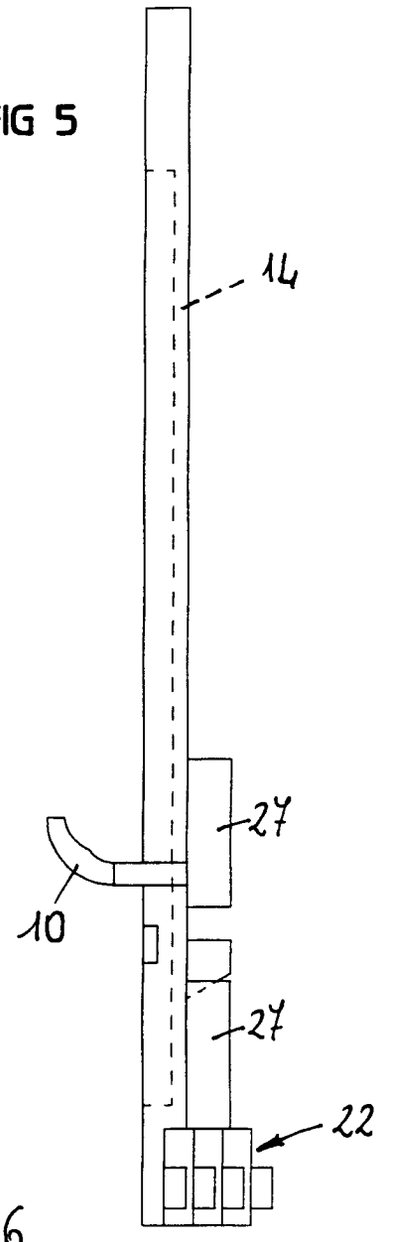

FIG 5

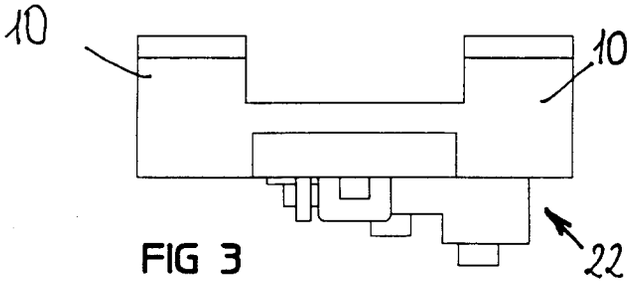

FIG 3

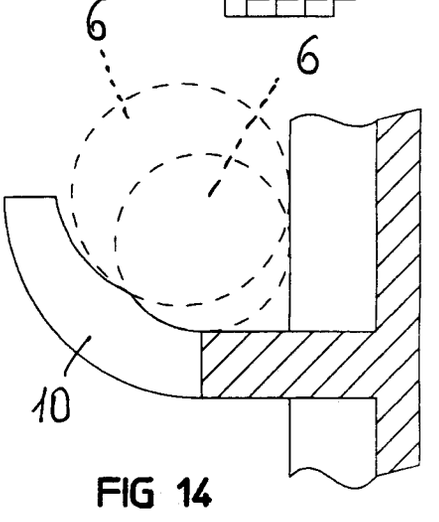

FIG 14

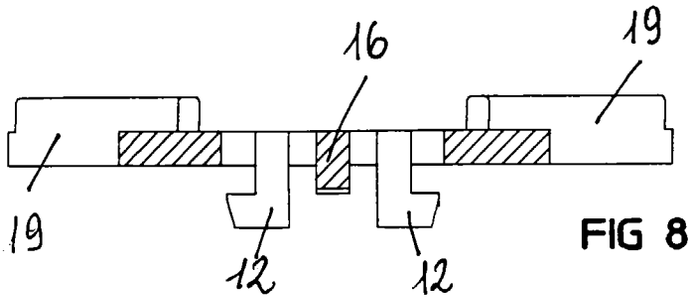

FIG 8

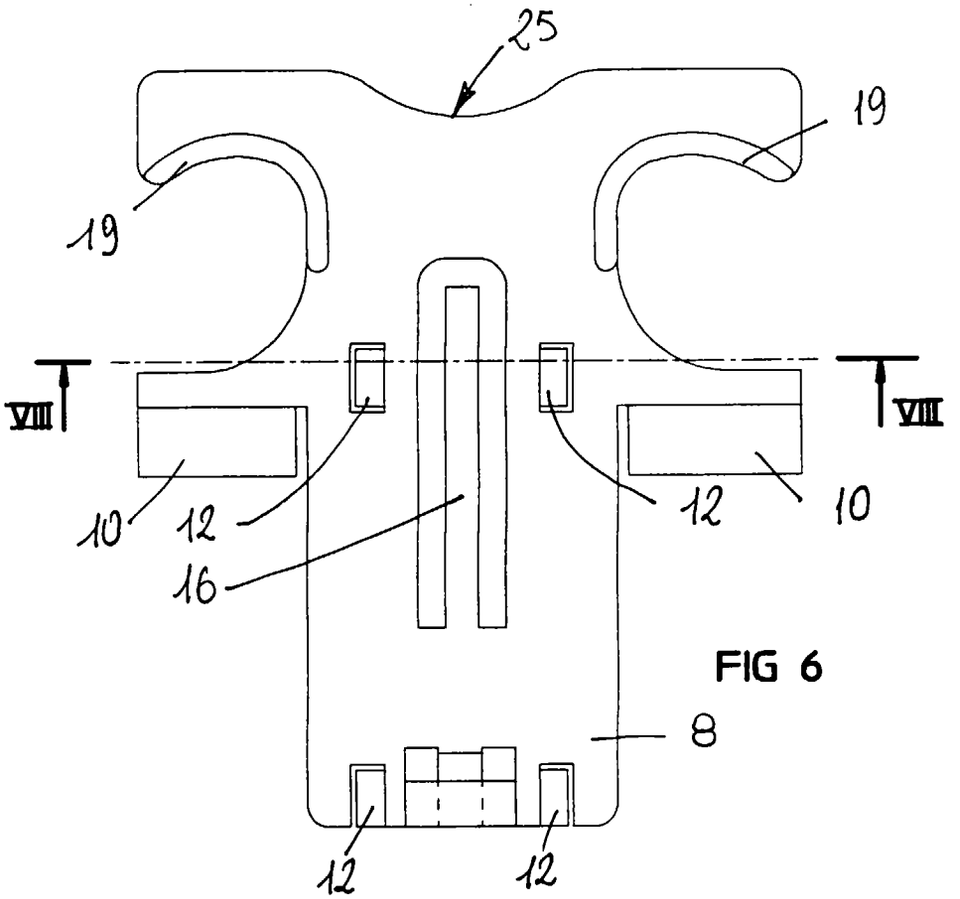

FIG 6

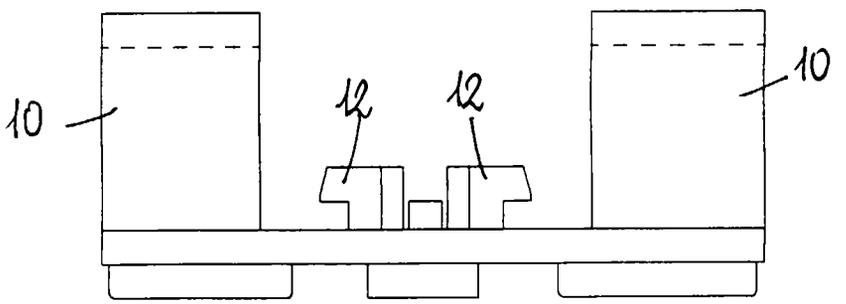

FIG 7

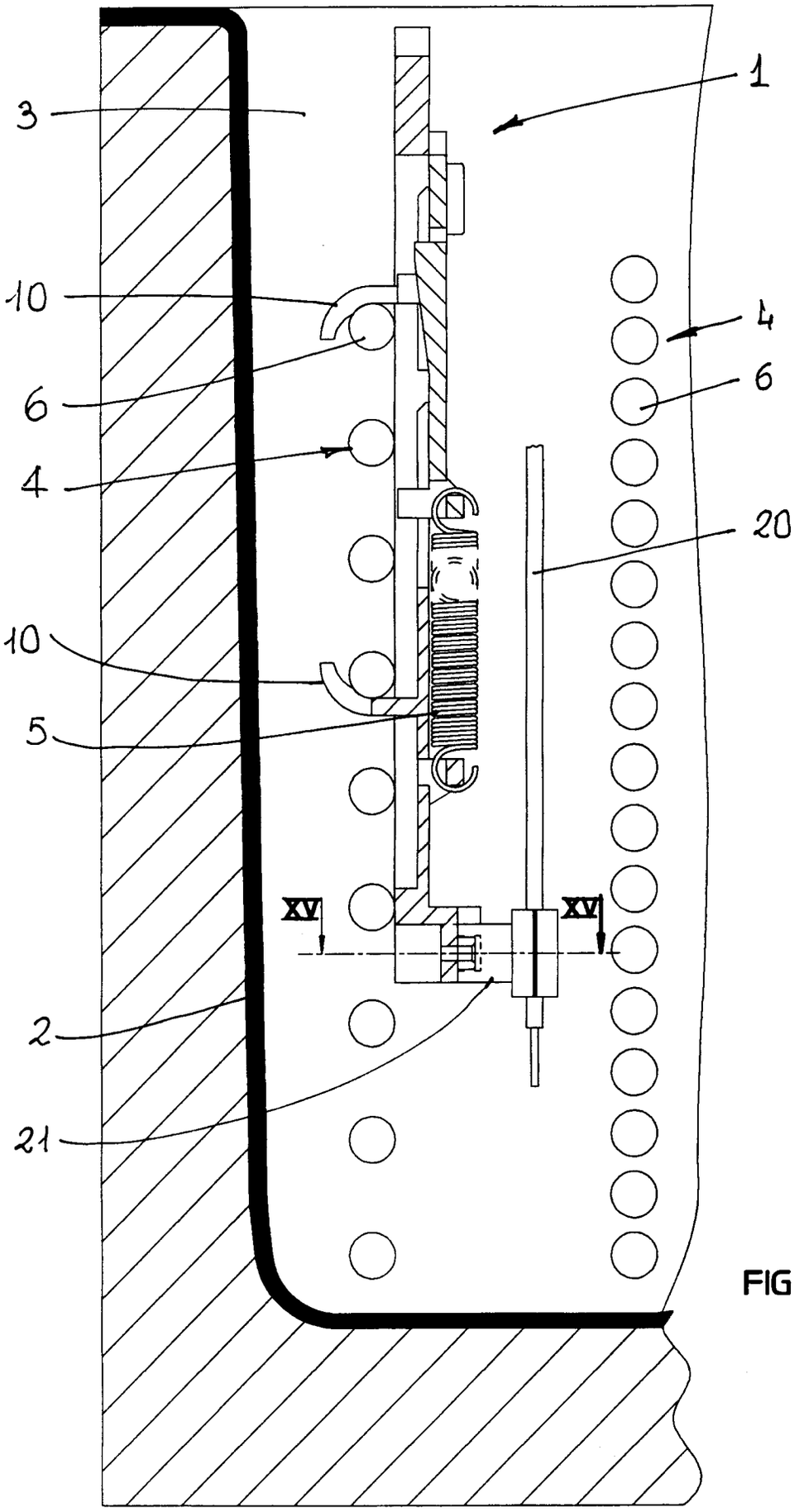

FIG 9

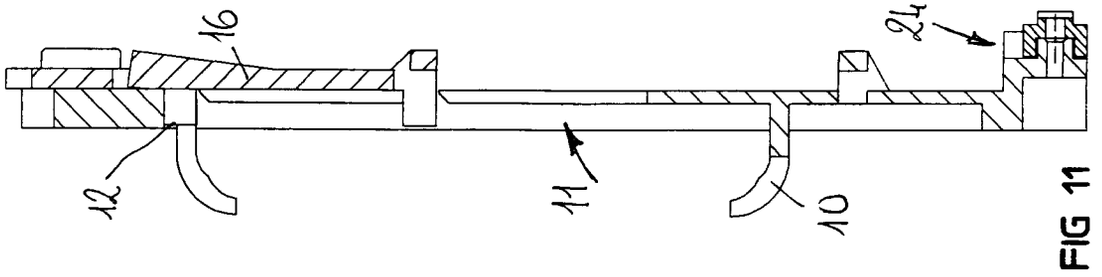

FIG 11

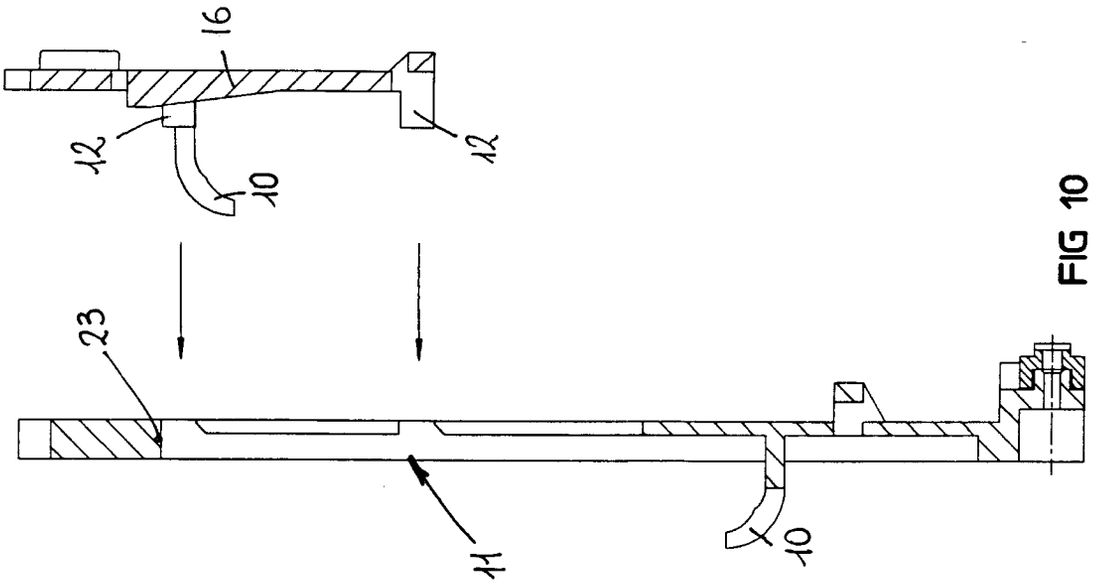

FIG 10

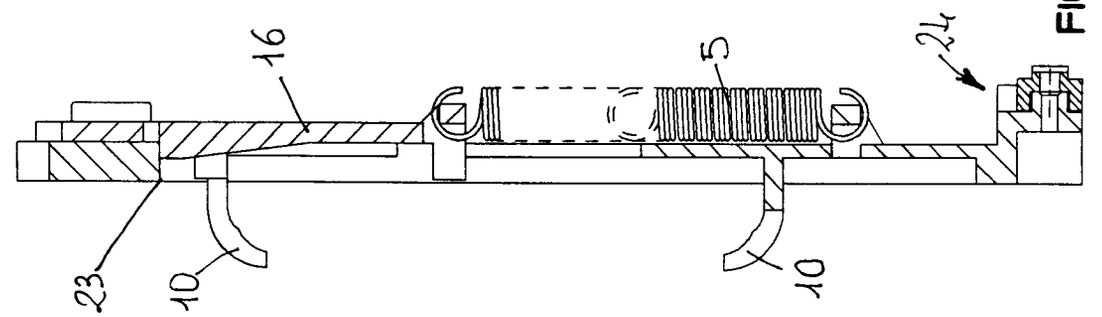

FIG 13

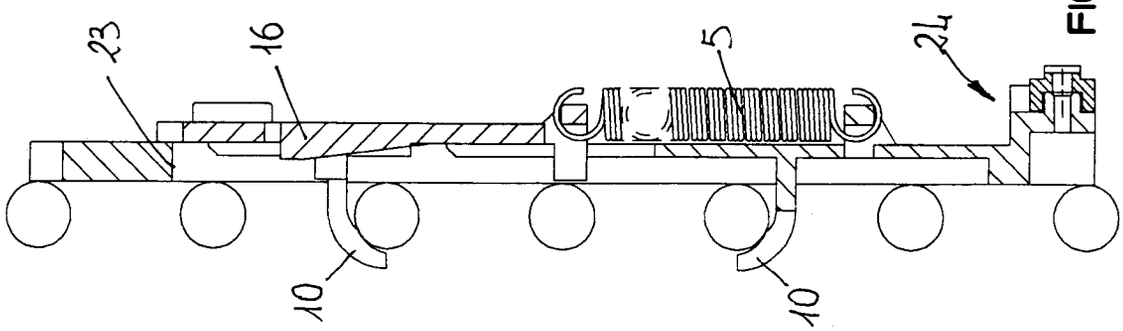

FIG 12

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0528

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)
Y	EP 0 644 387 A (IMI CORNELIUS INC) 22 March 1995 * page 5, line 40 - page 6, line 5; figures 6-10 *	1	B67D1/00 F25D21/02
Y	US 4 126 290 A (DROUILLARD GORDON E) 21 November 1978 * the whole document *	1	
A	GB 2 250 641 A (LANCER CORP) 10 June 1992 * figures *	12	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

F25D
G01K
B27D
H01Q

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 March 1997	Ramboer, P

CATEGORY OF CITED DOCUMENTS

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